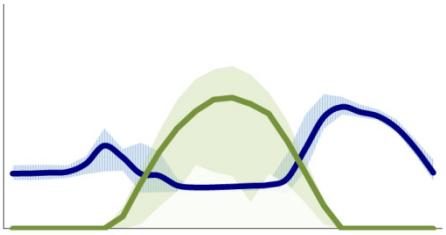
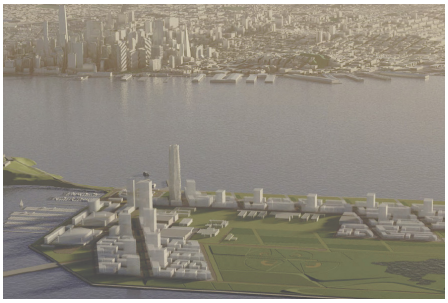
TICD

Treasure Island

Development Energy Study

FINAL





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December 2009

This report takes into account the particular instructions and requirements of our client.
It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party

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Issue Document Verification with Document ✓

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1 Summary

This report contains the results of an analysis undertaken to estimate building and site energy use for the Treasure Island Development. The analysis also defines profiles for this energy use, identifying how much energy is being used for each hour of the day. Additionally, findings of analysis carried out on both renewable energy scenarios and the use of district energy are included.

A large amount of data has been produced during this study. The bulk of this is contained with the appendixes of this report with the front end narrative containing only key data.

This summary contains the key findings.

1.1 Site energy

Site energy includes electricity demand and consumption and natural gas consumption that is forecast for the project post development, including both building energy and infrastructure energy. Understanding site energy and how demand changes throughout the year is important for sizing on site energy solution as well as acting as a starting point for energy conservation approaches.

- Based on the Business as Usual (BAU) energy iteration minimally code compliant with Title 24-2008, anticipated energy use data is as follows:
    - Peak site electrical demand is 18.3 MW
    - Base electrical load is 3.2 MW
    - Annual electrical consumption is 78,000 MWh
    - Total annual energy consumption is 350,000 MMBtu/yr
- Based on the proposed 4th energy iteration *(% cost premium minus LR & MR residential cooling*), anticipated energy use data is as follows;
    - Peak site electrical demand is 11.4 MW
    - Base electrical load is 2.9 MW
    - Annual electrical consumption is 58,500 MWh
    - Total annual energy consumption is 297,500 MMBtu/yr
- Building energy dominates these statistics and particularly low-rise and high-rise residential energy.

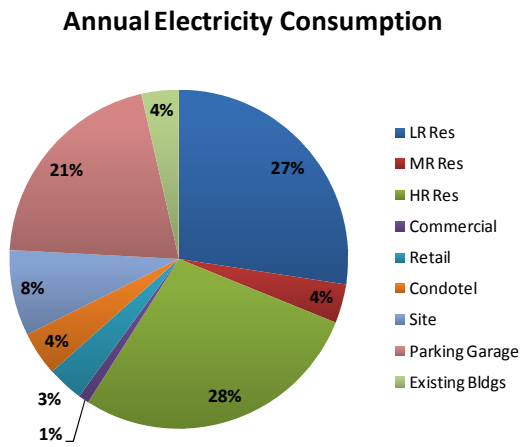


Figure 1 - Annual electricity consumption of site by end use (Iteration 4)

- Infrastructure energy requirements contribute 6% to the peak electricity demand and 8% to the annual energy consumption of the site.
- Peak demand occurs around 7:00pm in the evening. There is a minor demand peak around 7:00am. These are driven by the residential components.

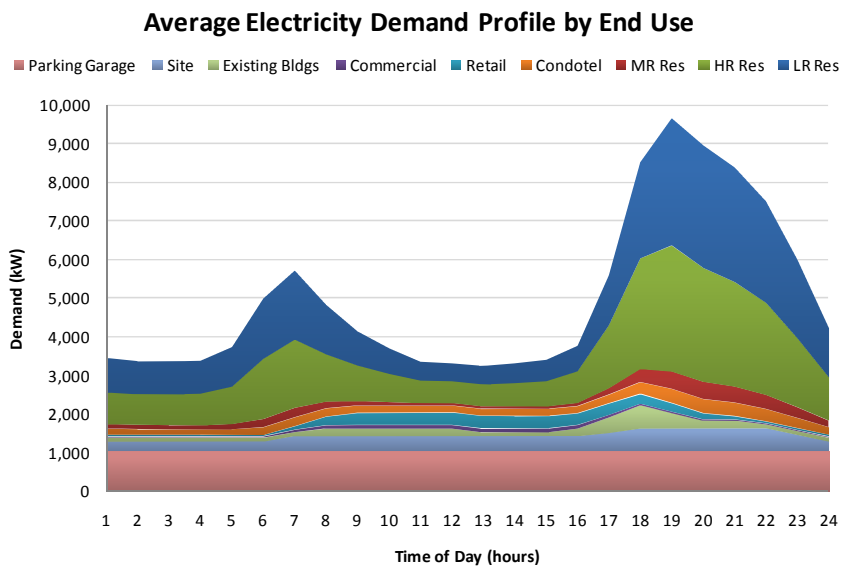


Figure 2 - Average daily electrical demand profile by end use (Iteration 4)

1.2 Building energy

Four iterations of building energy analysis have been undertaken and these help set clear targets for building energy conservation in terms of exceeding local and state energy regulations. The four iterations are as follows:

- **Iteration #1** - Minimum Title 24-2008 Prescriptive Compliance

- **Iteration #2** - City of SF Green Building Ordinance (LEED Gold Energy Performance - Approximately 15% below T24-2008)
- **Iteration #3** - SF Green Building Ordinance + % Construction Cost Premium
- **Iteration #4** - % Cost Premium Minus LR & MR Residential Cooling

The 3rd iteration applies a series of energy conservation measures within a 2% construction cost budget. These conservation measures could be implemented through site specific energy codes. Energy intensities are shown below for this scenario which is representative of a code compliant approach.

Building Type	Electricity Consumption Intensity	Gas Consumption Intensity	Total Combined Energy Consumption Intensity	Total Combined Annual Energy Consumption
	(kWh/s.f.)	(kBtu/s.f.)	(kBtu/s.f.)	(MMBtu/yr)
Low-Rise Residential	4.1	8.0	21.9	108,075
Mid-Rise Residential	4.0	8.0	21.6	14,965
High-Rise Residential	4.3	8.0	22.7	85,957
Commercial	6.0	15.7	36.3	3,631
Retail	7.5	0.0	25.5	6,879
Condotel	6.8	19.8	43.1	15,545
Adaptive Resue	6.0	15.7	36.3	11,799

Table 1 - Iteration 3, % Construction Cost Premium

More realistic values are obtained in iteration four, which removes cooling from the low and mid rise residential buildings and modifies the heating type to gas-fired baseboard heating systems for these buildings. If cooling is included within these building types, the previous table should be referenced per Title 24-2008 compliance requirements. In reality however, cooling should not be required due to the temperate climate. The following table represents this scenario. This iteration is the recommended iteration for the development.

Building Type	Electricity Consumption Intensity	Gas Consumption Intensity	Total Combined Energy Consumption Intensity	Total Combined Annual Energy Consumption
	(kWh/s.f.)	(kBtu/s.f.)	(kBtu/s.f.)	(MMBtu/yr)
Low-Rise Residential	3.2	10.3	21.4	105,850
Mid-Rise Residential	3.1	11.1	21.8	15,125
High-Rise Residential	4.3	8.0	22.7	85,957
Commercial	6.0	15.7	36.3	3,631
Retail	7.5	0.0	25.5	6,879
Condotel	6.8	19.8	43.1	15,545
Adaptive Resue	6.0	15.7	36.3	11,799

Table 2 - Iteration 4, Minus Cooling & baseboard heating in Low & Mid-rise Residential - Recommended TI building performance target

When compared to a building minimally compliant with Title 24-2008 (due to be enforced in January of 2010), the following energy savings have been shown with each iteration:

	Percentage Improvement		
Analysis Iteration	Electricity demand (%)	Electricity consumption (%)	Energy consumption (%)
#1 -- Min T-24	0	0	0
#2 -- LEED Gold Equivalent	16	12	9
#3 -- 2% cost premium	29	19	15
#4 -- No LR or MR Res cooling**	38	25	15

** Recommended TI Energy Target

Table 3 - Building energy iteration comparison

1.3 Renewable energy

Multiple photovoltaic (PV) scenarios were considered for the development. The results summary is as follows:

- To meet the term sheet requirement of 5% site peak electricity demand offset by PV, approximately 1.7 acres of PV is required. PV peak output will likely occur around 1pm in July. The site's peak demand will likely occur in September around 6pm. They will not coincide.
- The optimized scenario includes PV build out for areas with the appropriate scale to warrant third party development or where legislation exists to ensure efficient build-out and operation. This scenario includes rooftops of garages, adaptive re-use building roofs, low income housing roofs and 20 acres of ground-mounted PV. This equates to 101% of the site's peak electricity demand though again, output will not coincide with the site's peak demand.
- Build-out of 50% of all available real estate on rooftops, combined with 20 acres of ground-mounted PV will offset 57% of the site annual electricity consumption whilst meeting 170% of the peak electricity demand.
- Achieving net zero energy (electricity + natural gas) would require total roof build-out plus 106 acres of ground-mounted PV.

Preliminary feasibility studies into a waste to energy system using biodigester technology showed attractive paybacks as low as 12 years, which with incentives may reduce further. This technology should be studied further and be considered by both the San Francisco Utilities Commission and the potential third party service providers interested in providing waste-to-power services.

1.4 District Energy

A series of calculations were undertaken to act as a yardstick for discussions with third party energy companies. These calculations looked at different mixes of energy production (heating, cooling and/or electricity) and applied them against the phased nature of the project to understand the business case viability.

- The analysis also concluded that moving towards a district approach would conservatively save up to 1.5% of floor area in each building due to cooling and heating equipment that is made redundant by the district system.

- As a general statement, all combinations of the district system (heating only, heating and cooling, heating, cooling and electricity) appear viable, resulting in energy production at a lower cost to the end user, when compared to a building by building approach. However:
    - Infrastructure costs and energy demand densities (development densities) tend to drive the district energy economics. The phase analysis identifies negative financial implications by including the timing of the phased installation of underground infrastructure. This negative impact tends to be less for the early phases, due to relatively smaller infrastructure and higher energy demand densities, but as the lower density residential is brought online, the economics look less attractive; phase 4 is impacted the most by this. Seeking incentives may improve this, but none have been assumed for our analysis. The use of satellite plants appears to be more attractive as it defers not just underground infrastructure cost but also the cost of head end equipment; this is especially true for the cooling option.
    - The heating (option 1) and combined heating and power (options 3 and 4) options tend to shift site energy reliance from electricity to natural gas. This has cost advantages in most cases, but also has implications for carbon emissions. The overall carbon picture relies greatly on the emission rates for electrical energy use, as natural gas rates are relatively constant. Plant efficiencies (for boilers and turbines) have a positive but minor impact on carbon emission rates and costs.
    - The CHP analysis (Options 3 and 4) identified potential cost savings, primarily from improved purchasing power at wholesale rates and proper plant sizing. The CHP system has a major impact on increasing natural gas usage which has implications for site CO2 emissions. Assuming the current local electric grid emission rates, the overall emissions impact was marginally augmented. The major benefits of this system include potential cost savings to energy customers. The study also identified the 1.5 MW scale to be the most appropriate for heating and power only. If Option 4 is pursued (inclusion of absorption cooling from waste heat), a capacity of 3 MW may be more appropriate. The impact of local incentives will improve the economics further.
    - Although more costly in the long run, the use of satellite district plants, developed alongside each phase, appears slightly more attractive by delaying some of the infrastructure costs.

2 Introduction

This report documents the work carried out for the Treasure Island and Yerba Buena project in San Francisco. This work consisted of computational energy analysis for seven building types that generally make up the proposed development. This work has tried to follow the steps that a vertical development team would need to go through to verify that their building is in compliance with both the California Energy Code Title 24-2008 and the local green building ordinances adopted by the City of San Francisco and ultimately, any energy conservation targets adopted by the TI project.

The aim of this analysis is to show how far a vertical development team can push the boundaries of building performance beyond that of the referenced code standards by demonstrating alternative designs incorporating energy conservation measures (ECM's). This is carried out whilst recognizing the reality that economics play a key part of any development, and thus the ECM's selected for this analysis to gain improved energy performance are both market ready and fit in with the anticipated construction budget for the buildings.

The building energy data calculated has been combined with estimates of site level infrastructure. These combined figures give overall site energy demand and consumption figures. The following components have been included;

- Buildings to be constructed as part of this redevelopment;
  - Residential
  - Commercial
  - Retail
  - Condotel
  - Parking
  - Police Station
- Existing buildings to be retained;
  - Adaptive re-use
  - Historical residential buildings**
  - Federal buildings**
- Site infrastructure;
  - Sanitary sewer lift station
  - Storm water conveyance
  - Waste water treatment plant
  - Site lighting

*** These components are not part of the Treasure Island Redevelopment project and are included only to give a more comprehensive energy picture of the islands.*

Although the analysis is useful as a checksum for infrastructure sizing, this is not its purpose and it should not be used for this as following a code compliance methodology will inherently give higher energy usage figures.

The next step that is detailed in this report relates to energy profiles that have been produced for the buildings. These profiles show electricity and natural gas usage patterns for a typical day for each month of the year, as well as showing peaks and minimum values. These profiles will be essential in latter stages when considering and optimizing both renewable energy and conventional energy generation equipment.

Finally, renewable energy scenarios have been overlaid onto these profiles. A maximum and minimum build-out case has been considered as well as a number of scenarios falling in between.

3 Treasure Island & Yerba Buena Island Build-out

The development will be a mixed-use community, consisting primarily of residential units but also containing hotels, office space, retail spaces, parking garages, and other buildings. The breakdown of square footages for both the TI site and the YB site are shown in the table below and based on the 8000 du scheme developed for the project – which is the densest scheme.

	Treasure Island Site Building Square Footage	Yerba Buena Island Site Building Square Footage	Total Square Footage	Percent of Total Site Square Footage
	[sq. ft.]	[sq. ft.]	[sq. ft.]	[%]
Single Fam	771,800	400,000		
4-Story Flats	550,000	0		
5-Story Flats	3,224,100	0		
LR Res total	4,545,900	400,000	4,945,900	41%
Midrise	693,000	0		
MR Res total	693,000	0	693,000	6%
High Rise	1,028,700	0		
Icon Tower	567,000	0		
Neighborhood Tower	2,184,600	0		
HR Res total	3,780,300	0	3,780,300	31%
New Office	100,000	0	100,000	1%
New Retail	270,000	0	270,000	2%
Hotel	178,750	24,375		
Condotel	157,950	0		
Hotel total	336,700	24,375	361,075	3%
Bldg 1 AR	80,000	0		
Bldg 2 AR	95,000	0		
Bldg 3 AR	150,000	0		
Adaptive Resue Total	325,000	0	325,000	3%
Parking Garage	1,679,750	36,720	1,716,470	14%
RESERVED				
RESERVED				
Treasure Island Site	11,730,650	461,095	12,191,745	100%

Table 4 - Square footage values for TI & YB

4 Site Energy Demand and Consumption

The energy demand and consumption study carried out for the Treasure Island and Yerba Buena redevelopment project consisted of two primary phases; the first involved estimating the energy characteristics of the on-site buildings, whereas energy characteristics of ancillary consumers (site lighting, waste water treatment plant, etc) were estimated in phase two. The results of each phase were then summed, resulting in an accurate depiction of energy demand and consumption characteristics of the TI & YB site as a whole.

4.1 Building Energy Approach

4.1.1 Generic Building Types

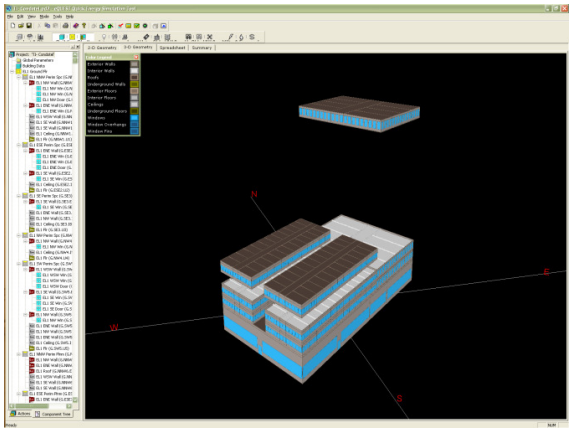
Computational energy analyses were performed to estimate building energy consumption. This was carried out with an energy modeling software program called eQUEST by creating computer models of seven different generic building types. These generic building types consist of the following and represent the mix of end uses that make up the development:

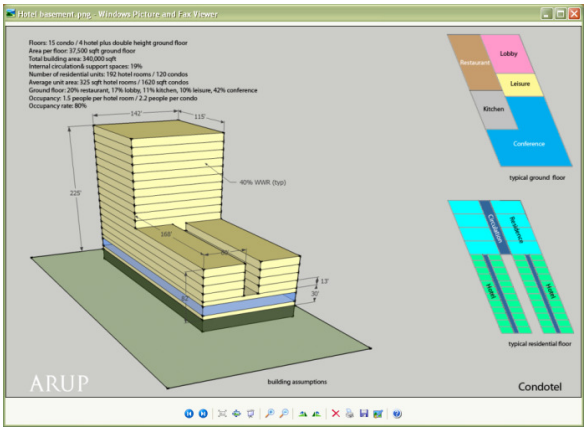
- Low-rise residential
- Mid-rise residential
- High-rise residential
- Commercial
- Retail
- Hotel / Condotel
- Adaptive reuse

The generic buildings were configured based on a combination of:

- The 8000 du program options plan dated April 28th, 2009
- Discussion and comments from TICD
- Past project experience

Below is a comparison of the generic building sheet (right) and the visualization from the energy model (left). This example represents the Condotel model. Various floors appear to be floating in the energy model shot because multipliers have been applied to these (they are repeat floors) and so are not visualized. These generic building sheets can be seen in Appendix A.





4.1.2 Model Validation

Baseline model results were compared and validated against Bay Area specific and building specific end use survey data that is made available by the Department of Energy. This data is from a report issued in 2004 and records energy use in existing buildings. Due to more progressive building codes since the release of this report, it was expected that the energy models would be showing results with at least an average 20% improvement (i.e. reduction) in energy consumption against the end use data.

An example comparison is shown below (representing the Condotel generic building) following initial calibration of the models. The % lower than CBEC value indicates how much lower the energy model energy consumption is over the end use survey average value.

Total Building Area	340,000	s.f.
Building Electricity Use Intensity	12.08	kWh/s.f./yr
CBEC Electricity Use Intensity	14.00	kWh/s.f./yr
% Lower than CBEC	14%	
Building Gas Use Intensity	23.12	MBTU/s.f./yr
CBEC Gas Use Intensity	36.00	MBTU/s.f./yr
% Lower than CBEC	36%	
Combined Energy Use Intensity	64.36	MBTU/s.f./yr
CBEC Combined Energy Use Intensity	83.78	MBTU/s.f./yr
% Lower than CBEC	23%	

Table 5 - Benchmarking against CBEC averages, Condotel data shown above

4.1.3 Building Energy Performance Iterations

Treasure Island Redevelopment must meet minimum energy performance enforced by various standards and codes. Moreover, energy performance beyond these minimums has been investigated by implementing ECMs to the baseline buildings (a.k.a. minimally compliant buildings). There are different iterations of energy performance in addition to the baseline, discussed below.

4.1.3.1 Iteration #1 – Title 24 - 2008

At the time of build out, the buildings will need to be in compliance with this building code or a certain increment above this code. There is a new version of this code, T-24 2008 which was due to be enforced at the beginning of August 2009. This enforcement date has been pushed back to January 2010 however; it still defines our minimum compliance case. Thus, for inputs into the models, prescriptive requirements to the California Energy Code Title 24-2008 were used. Tables documenting eQUEST inputs for each generic building type can be seen in Appendix B.

4.1.3.2 Iteration #2 – City of SF Green Building Ordinance

The City of SF Green Building Ordinance is effective as of September 2008 and effectively requires more aggressive sustainability goals to be pursued by new construction projects as well as major refurbishments. This is achieved by mandating a minimum requirement under either LEED or the Greenpoints rating systems.

A summary of the requirements are shown below along with roll out year.

	Now	2009	2010	2012
Commercial > 25,000 sqft	LEED Certified	LEED Silver		LEED Gold
Residential (4 or fewer units)	Greenpoints checklist	25 points	50 points	75 points
Residential (5+ units <75' high	Greenpoints checklist	25 points	50 points	75 points
Residential (>75')	LEED Certified		LEED Silver	

Table 6 - Requirements of the SF Green Building Ordinance

The City requires that all building projects submit a relevant checklist to identify which points they are seeking and this then becomes part of the planning process. It is not clear as yet how the code will be enforced as the City is not requiring that projects formally register their projects for independent certification. Enforcement may come through City Inspectors prior to Certificate of Occupancy approval but this is an assumption at the moment.

For the purposes of this study, an assumption has been made that all buildings planned for TI will be in compliance with LEED NC Gold certification or equivalent.

To understand the implications of this in terms of energy use, a LEED NC checklist for the project using the new 2009 version of LEED has been produced (this can be seen in Appendix C). It has been assumed which non-energy points would be likely for a typical building in the development and then the remaining points required to achieve LEED gold have been made up using the energy points.

The summary is that a typical building will need 60 points for Gold + three points margin assuming a typical project will lose a couple of points through the design and construction process. This makes our target 63 points.

This leaves a requirement of 9 energy points (out of 19 available) which is equivalent to an improvement of around 30% over the LEED referenced energy code: ASHRAE 90.1, 2007. A building in compliance with this code is estimated to perform around 15% worse than a building in compliance with T-24 2008 therefore; the second energy modeling iteration needs to target a 15% (30%-15%) energy reduction over our first iteration.

Since an equivalency with LEED Gold and mandatory compliance with Title 24-2008 are required for the development, this iteration is considered as the cost baseline. For the purposes of this report, this City of SF Green Building Ordinance energy performance iteration may be referred to as LEED Gold Energy Performance. The next iteration, explained below, then adds additional ECM's to the LEED Gold baseline to realize energy savings with an allocated cost premium.

4.1.3.3 Iteration #3 – +2% Construction Cost Premium

Per TICD, a cost premium of 3% is being factored into the construction cost for each building type for sustainable features. It is assumed that 2% of this will be utilized for energy related enhancements or features. This third energy model iteration will identify which features this premium will buy and estimate the resulting energy consumption.

Per TICD, our assumed construction costs are as follows:

	Baseline construction cost	Cost including energy features at 2% premium
	($/gross sqft)	($/gross sqft)
Low rise residential	224	228
Mid rise residential	255	260
High rise residential	264	269
Office	225	230
Condotel	264	269
Adaptive re-use	225/125/70*	230/128/72*
Retail	350	357

Table 7 - Assumed construction costs and premiums

4.1.3.4 Iteration #4 – % Cost Premium Minus LR & MR Residential Cooling

The final energy performance iteration involves removing active cooling from the low-rise (LR) and mid-rise (MR) residential buildings, which together make up approximately 65% of the Treasure Island and Yerba Buena redevelopment total square footage. Any cooling load in this iteration is assumed to be met with natural ventilation and thus consumes little to no energy for cooling. The heating system for low and mid rise buildings was also modified for iteration 4. The previous iterations assumed cooling and heating would be provided by heat pumps. Iteration 4 modifies this to a gas-fired baseboard heating system.

This iteration is meant to serve as a performance target for the redevelopment.

Cooling is typically not provided for residential buildings in areas adjacent to the bay. The climate is mild due to the ocean effects and sea breezes.

Below is a visual representation of the modeled iterations for the project.

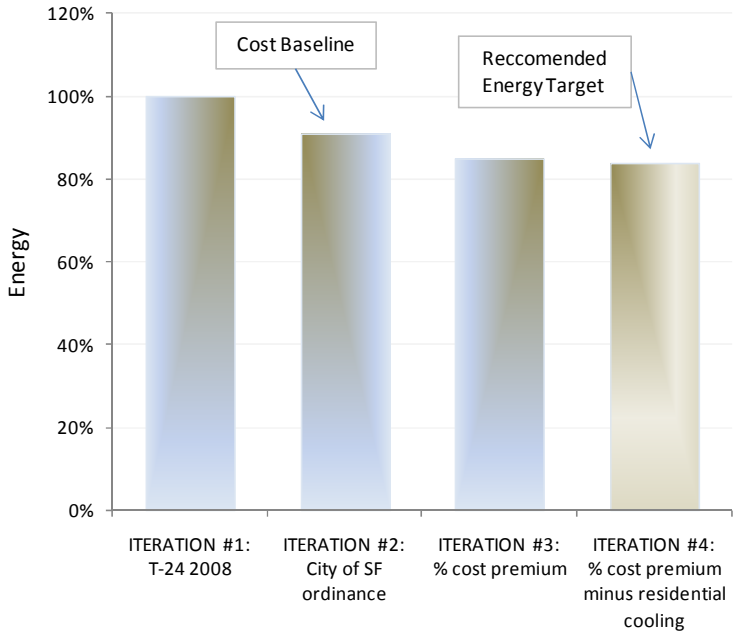


Figure 3 - Energy consumption of the energy performance iterations

4.1.4 Building Energy Conservation Measures

To take the building models from minimum Title 24-2008 energy compliance to each of the more aggressive iterations, Energy Conservation Measures (ECM's) were proposed and modeled to determine potential impact on building energy consumption. Only the more economically viable and market ready ECM's were investigated and these comprise the library of ECM's. Specific combinations of ECM's were selected for each building type and are listed in the modeling result sheets in the Appendices.

Brief descriptions of each ECM are listed below.

4.1.4.1 ECM's

Thermal Mass

Utilizing high density finishes within the interior of the buildings helps to attenuate temperature peaks and lows and saves heating and cooling energy. This typically means that the interior of the building will use exposed concrete with no painting or other finishes.

Insulation

Code prescribes a minimum level of insulation or overall thermal efficiency for walls and roofs. This ECM increases insulation over and above this. Extra insulation will reduce heating and cooling energy requirements.

High performance glazing

High performance glazing can help to reduce heating and cooling loads and improve acoustics within a building and typically consists of one or more of the following features; additional panes of glass, low emissivity coating on one of the glass panes or a reflective or tinted coating.

External shading

Properly designed and installed exterior shading can help reduce summer sun penetrating through a window and adding to the building's heat gains whilst still allowing the lower-angled winter sun's solar heat gain for useful passive solar heating. Finally, shading can allow a building to take advantage of natural daylight whilst reducing the negative effects associated with the sun's energy.

Daylighting

Artificial lighting is a major component of a buildings energy usage. Taking advantage of natural daylighting when possible and having reactive controls integrated into the artificial lighting system can realize significant energy savings as well as enhancing the building for occupants.

Skylights

Skylights have the ability to bring natural daylighting into deeper plan spaces. These can be used in conjunction with daylighting sensors to dramatically reduce lighting electricity consumption. Unless these are optimized, they do however run the risk of increasing the amount of direct sun to a building and hence increasing cooling energy.

Occupancy Sensors

Electricity is frequently wasted by powering luminaires that provide lighting unoccupied spaces. This is wasted energy, and occupancy sensors provide reactive controls to avoid unnecessary lighting. The sensor itself utilizes either one or a combination of infrared or ultrasonic technologies and will turn off the lighting systems it is controlling after detecting

vacancy for a given amount of time. Occupancy sensors are particularly effective in closed spaces, such as restrooms, conference rooms, closed offices, etc.

High efficiency lighting

The energy code specifies minimum lighting power densities. This ECM goes one stage further by considering the use of high efficiency lighting throughout. High efficiency lighting may consist of compact fluorescents or LED's and is typically more expensive than conventional lighting.

Natural ventilation

San Francisco experiences a climate with no real extremes and the site location is ideal for the use of natural ventilation to cool and ventilation buildings either for part of the year or for the entire year. To maximize this, buildings need to be planned and designed appropriately, allowing the penetration of wind driven air through the building interior zones or enhancing the natural ventilation effect through the use of high bay spaces or stack effect. Natural ventilation can save significant fan and pumping energy as well as the energy needed to produce cooling. It can also increase an occupant's interaction with the building, giving the sensation of being more comfortable as well as minimizing internal pollutants that may be recirculated via a conventional mechanical air system.

Split system SEER (Cooling)

Code specifies minimum efficiency levels for air conditioning equipment such as split system A/C units that are typically used in residential buildings. This ECM assumes that a premium will be paid to purchase units with high cooling efficiency.

Split system HSPF (Heating)

Similar to the previous ECM but now concentrating on increasing heating efficiency.

Natural ventilation with baseboard heating

This ECM combines natural ventilation with baseboard heating. Often air side heating systems are used within homes where a fan blows around air that is heated either electrically or via natural gas combustion. For this ECM, the heating system used is a more efficient hydronic system where the heat is distributed via water to radiator type emitters that typically sit below windows at exterior walls. This ECM can save heating and fan energy but requires implementation of hydronic infrastructure, including a boiler.

DX cooling with baseboards

Heat pump systems are often used within residential, retail and some smaller office buildings. They combine heating and cooling into one refrigerant-based unit. In winter, low grade heat is extracted from the ambient air and used to heat the building. This is very inefficient and degrades the performance of the unit over a heating and cooling system. This ECM aims to correct this inefficiency by using the air system for cooling only, maintaining the baseboard system for heating.

Radiant heating and cooling

Radiant heating and cooling consists of a series of plastic tubes cast directly into the floor surface through which hot or chilled water is circulated. The system has superior thermal comfort when compared to all air systems. It also uses less energy due to water being used to distribute the energy and also because the system only heats objects in a room radiantly – air temperature can be lower with comfort still maintained.

Underfloor air distribution

Conventional air conditioning and air heating systems supply air into a space at high level and blow it down to where the occupied zone is. This means that the air enters the space at high velocity and can cause drafts and discomfort. Displacement ventilation utilizes low level air entry and the air then heats up and rises – following the air's natural buoyancy patterns. This system maximizes thermal comfort and is also very efficient due to fan savings and cooling savings due to increased economizer operation.

Demand control ventilation

When a building's occupants breathe, they emit carbon dioxide. If carbon dioxide builds up, occupants get sleepy and a building becomes uncomfortable to live or work in. Building codes require that clean outside air is brought into a building to replace this CO2. The amount of outside (a.k.a. ventilation) air brought into the building tends to be fixed and based on a worse case. This leads to wasted energy as the air is heated, cooled and treated. Demand control ventilation reduces the unnecessary energy consumption by sensing the CO2 build up in the building and adjusting the amount of outside air to compensate for occupancy and the respiration rate of these occupants. This ensures that the building is not over or under ventilated and hence reduces energy consumption.

Waterside economizer

Waterside economizers are essentially an extra hydronic circuit consisting of bypass valves and a heat exchanger that allows a building's heat rejection system to bypass the chiller, avoiding significant chiller compressor electricity consumption. Its use is highly dependent on ambient conditions, but when conditions allow, heat from the building hydronic loop is transferred directly to the condenser water loop and to the cooling tower for rejection to the atmosphere. Heat exchanger is typically of plate and frame type.

Indirect evaporative cooling

Conventional cooling systems use refrigerants and compressors which in turn use energy. To offset some of this energy, a conventional cooling system can be partly or fully replaced with an evaporative cooling system. As water evaporates in an airstream, heat is removed from the airstream. This cooler air can then be supplied to a space in a conventional way. The system uses negligible amounts of energy but does not cool as precisely or as much as a conventional system. It also uses some amounts of water.

Heat recovery

There are many times when energy is not utilized fully, and any opportunity to recover this energy rather than wasting it should be investigated. A heat recovery wheel for the HVAC system recovers useful energy from an air stream that would otherwise be exhausted to the exterior atmosphere and transfers it to the supply airstream. This process preheats the supply air and thus less HW is needed to bring the air up to the desired supply temperature, thus saving energy back at the boiler plant.

High efficiency chiller

Chillers consume a remarkable amount of energy in a building, so selecting a chiller that is more efficient at transferring heat can lead to dramatic energy savings. This ECM keeps the same chiller plant capacity but changes the energy performance value of the chillers.

High efficiency boiler

This ECM simply evaluates energy savings from installation of a boiler with higher energy conversion efficiency. High efficiency boilers vary in technology, size, construction and cost, with condensing boilers having the highest first cost and highest energy efficiency.

Variable Speed Drives on Motors

Motors without Variable Speed/Frequency Drives (VSD or VFD) are unable to operate at different revolution rates (e.g. rpm). This is not an issue when motor operation is constant, such as in a constant speed fan. However, in more complex systems such as Variable Air Volume air systems, the fan speed needs to be able to fluctuate. VFD's vary the input frequency into the motor, thereby reducing the rpm's of the shaft and consuming significantly less energy than constant speed motors.

Energy Star compliance equipment

This ECM assumes that high efficiency washing machines, driers, refrigerators and dishwashers will be utilized within the building. These tend to cost a small premium over and above standard equipment but pay back through energy savings. Energy Star is the recognized performance standard for appliances with the US. Appliances are not specifically covered by the building energy code Title-24 and are considered non-regulated loads.

Solar Hot Water System

A solar hot water system, also commonly referred to as a solar thermal system, consists of collectors mounted on roofs or the ground that collect solar radiant energy in the form of heat. The collectors then transfer this heat energy to a circulating heat transfer fluid that will then transfer the heat to the DHW loop, the HW loop, or both. Systems can vary in size, capability, sophistication, output temperature, etc, depending on the application.

4.1.5 ECM Selection

Once ECM's were modeled and energy savings estimated, the next step was to determine the capital cost implications. This enabled life-cycle analyses to determine each ECM's feasibility and ensured that economic considerations were held in high regard and returns are maximized.

Costing for ECM's was taken from a variety of sources, but mostly included the following:

- RSMeans Square Foot Costs 2009
- RSMeans Building Construction Data 2009
- RSMeans Mechanical Cost Data 2009
- Various Manufacturer's Representatives
- Previous project costing estimates
- Limited assumptions

For all ECM's, a cost per square foot metric was eventually estimated, and this was compared against ECM energy savings, thus allowing the final determination of ECM's that would fit within the allocated 2% construction cost premium for sustainability measures.

ECM costing assumptions and calculations can be seen in Appendix D.

ECM energy savings can be seen in Appendix E.

4.1.6 Iteration Results

The energy modeling software eQUEST outputs electricity and gas consumption data for every hour over the course of a year. For each generic building energy model, the 8,760 hours can then be imported into a spreadsheet and analyzed. The results of this analysis can be seen in Appendix F.

4.1.6.1 Multipliers

These results estimate the energy performance of each of the generic buildings, but in order to estimate energy demands and consumption characteristics of the entire site build out after development has been completed, multipliers were used based on square footage values for the project. These multipliers can be seen in the chart below.

	Representative Models	Representative Models	Treasure Island Site Building Square Footage	Yerba Buena Island Site Building Square Footage	Total Square Footage	Site Building Square Footage Multiplier	Percent of Total Site Square Footage
		[sq. ft.]	[sq. ft.]	[sq. ft.]	[sq. ft.]	x	[%]
Single Fam	LR Res		771,800	400,000			
4-Story Flats	LR Res		550,000	0			
5-Story Flats	LR Res		3,224,100	0			
LR Res total	LR Res	75,640	4,545,900	400,000	4,945,900	65.4	41%
Midrise	MR Res		693,000	0			
MR Res total	MR Res	130,264	693,000	0	693,000	5.3	6%
High Rise	HR Res		1,028,700	0			
Icon Tower	HR Res		567,000	0			
Neighborhood Tower	HR Res		2,184,600	0			
HR Res total	HR Res	240,000	3,780,300	0	3,780,300	15.8	31%
New Office	Commercial	100,000	100,000	0	100,000	1.0	1%
New Retail	Retail	30,000	270,000	0	270,000	9.0	2%
Hotel	Condotel		178,750	24,375			
Condotel	Condotel		157,950	0			
Hotel total	Condotel	340,574	336,700	24,375	361,075	1.1	3%
Bldg 1 AR	AR		80,000	0			
Bldg 2 AR	AR		95,000	0			
Bldg 3 AR	AR		150,000	0			
Adaptive Resue Total	AR	100,000	325,000	0	325,000	3.3	3%
Parking Garage	n/a	n/a	1,679,750	36,720	1,716,470	1.0	14%
RESERVED							
RESERVED							
Treasure Island Site	n/a	n/a	11,730,650	461,095	12,191,745		100%

Table 8 - Square footage values for the site, representative models for each building type, and the respective multipliers

4.2 Infrastructure Energy Approach

In addition to the energy required to operate (heat, cool, light, etc) buildings on-site – calculated in the previous phase – infrastructure components need to be accounted for; this will enable the total site energy characteristics to be determined.

The energy requirements for the site utilities have been collected for the following components and factored into the overall site energy estimates:

- Potable water pump stations
- Sanitary sewer pump stations
- Storm water pump stations
- Automated waste handling system
- Site lighting

4.2.1 Potable water

Potable water will be provided to the development via the Yerba Buena Auxiliary Pump Station. This is located on the San Francisco side of the Bay Bridge. Based on information received from BKF, this pump station includes:

- 2 x 88 HP pumps sized at 900 GPM each and 140 total dynamic head.

A booster pump is also provided for upper portions of Yerba Buena Island as follows:

- 1 x 35 HP booster pump sized at 400 GPM and 175 total dynamic head. This pump will run at an average capacity of 154 GPM for 24 hours.

Assuming a pump efficiency of 75%, the power demand draw from each pump is as follows;

- Auxiliary pumps – 63 kW
- Booster pump – 7 kW

Assuming that the auxiliary pumps run for 10 hours per day and the booster pumps run 24 hours per day, the following yearly electricity consumption is as follows;

- Auxiliary pumps – 229,950 kWh/year
- Booster pump – 61,320 kWh/year
- Total – 291,270 kWh/year

Note: due to pumps being located off site, power requirements for potable water have not been included in the overall site energy calculations.

4.2.2 Sanitary sewer

Sanitary sewer lift station energy requirements are listed below and based on information received from BKF.

Total annual pump energy consumption is estimated at: 184,820 kWh/year

Pump reference		*A-YBI*	*B-YBI*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Flowrate	(GPM)	69.5	139	60	259	60	60	438	60	60	60	239
Total dynamic head	(Ft)	88	11	39	80	34	13.5	28	34	13.5	11	28
Pump power	(HP)	14.09	0.72	4.92	8.08	2.23	2.59	11.67	2.23	2.59	0.72	11.67
Brake horse power (assume 50% eff pump)	(HP)	28.2	1.4	9.8	16.2	4.5	5.2	23.3	4.5	5.2	1.4	23.3
Convert to kW	(kW)	21.02	1.08	7.35	12.06	3.33	3.87	17.41	3.33	3.87	1.08	17.41
Annual run time of pump	(Hrs/yr)	949	4672	1059	5658	2008	694	2336	2008	694	2008	1278
Annual pump energy consumption	(kWh)	19948	5046	7780	68229	6685	2684	40670	6685	2684	2168	22241

Table 9 - Sanitary sewer power calculation

4.2.3 Storm water

Storm water conveyance power consumption is again based on data received from BKF and is as follows:

Project catchment area (acres)	*2.26*
Rainfall (inches/yr)	18
Treated water (80% of total) (gallons)	88,364,771
Flowrate (GPM)	168
Total dynamic head (ft)	10
Pump power (HP)	0.42
Brake horse power (assume 80% eff pump) (HP)	0.53
Convert to kW (kW)	0.40
Annual run time of pump (Hrs/yr)	8,760
Annual pump energy consumption (kWh)	3,468

Table 10 - Storm water conveyance summary

4.2.4 Automated Waste Handling System

The automated waste handling system is an optional element of the project infrastructure. Based on discussions with TransVac Systems, it is understood that the system power requirements will conservatively be within the 150 to 200 kW range. The system will run for

16 hours during daytime hours at full load and then turn down to a minimum level during off hours.

It has been assumed that the system will run at 185 kW between the hours of 7am and 11pm. For the remaining hours, it will run at 150 kW. This equates to 1,518,400 kWh per year.

For this energy study, this feature is considered an option for implementation and has not been included as a component of site energy.

4.2.5 Waste Water Treatment Plant (WWTP)

Energy information for the WWTP was obtained from Brown and Caldwell. The peak power for the facility is estimated at 290 kW and it is understood that the WWTP will run year round at 12 hours full load and 12 hours part load in any particular day. At part load, it is assumed that the power will be 145 kW.

This equates to 1,905,300 kWh per year.

4.2.6 Site Lighting

External lighting associated with buildings is included within the building energy models and thus is reflected in the energy consumption of the buildings. Site lighting, as defined here, is additional to this and consists of the following:

- Street lighting (for high and low traffic streets)
- Pedestrian lighting
- Sports field lighting
    - Tennis court lighting
    - Baseball field lighting
    - Soccer field lighting

A summary for site lighting power is as follows based on data received from AES on 9th November 2009:

Description	***Peak Demand (kW)***	***Annual Consumption (kWh)***	***Operation***
Street lighting	21	61,216	Varies by month – dusk to dawn
Pedestrian lighting	21	61,216	Varies by month – dusk to dawn
Sports lighting	340	642,600	Evenings only – dusk to 11:00pm
Total (Demand is non-coincident)	382	765,000	

Table 11 – Site lighting power summary

4.2.7 Summary of Infrastructure Energy

The infrastructure energy components add only 8% to the peak site electrical demand. The electricity consumption for the development is increased by approximately 12% due to these infrastructure components.

Electricity profiles for these infrastructure components can be seen in the following chart for a typical 24 hour period. In the chart, each infrastructure component is added to the previous component to understand what the peak simultaneous demand is.

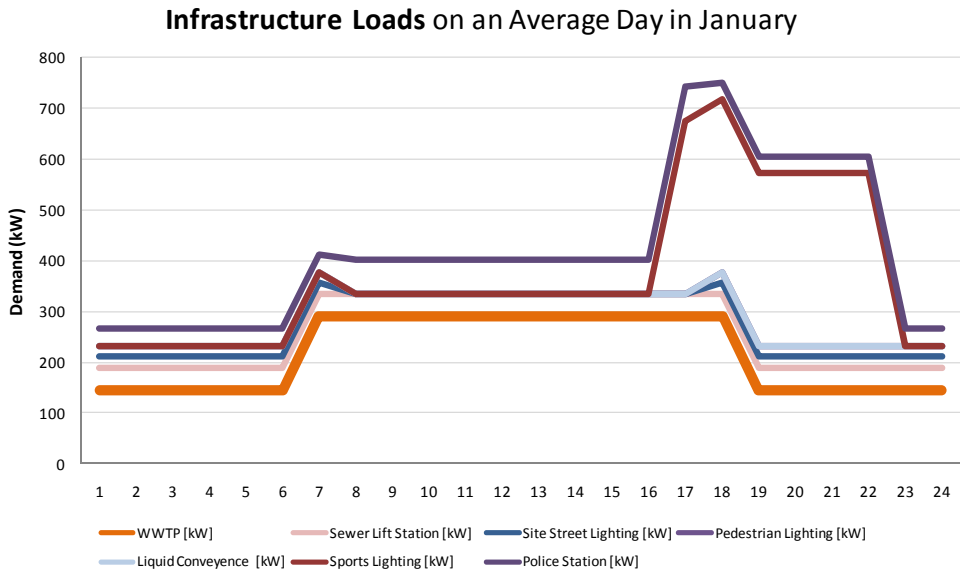


Figure 4 - Electricity demand profiles of site infrastructure components

As can be seen, the demand is peaking out at over 0.7 MW at 6:00pm. The peak hour for the buildings occurs one hour later at around 7:00pm, when infrastructure demand is slightly lower at 0.6 MW.

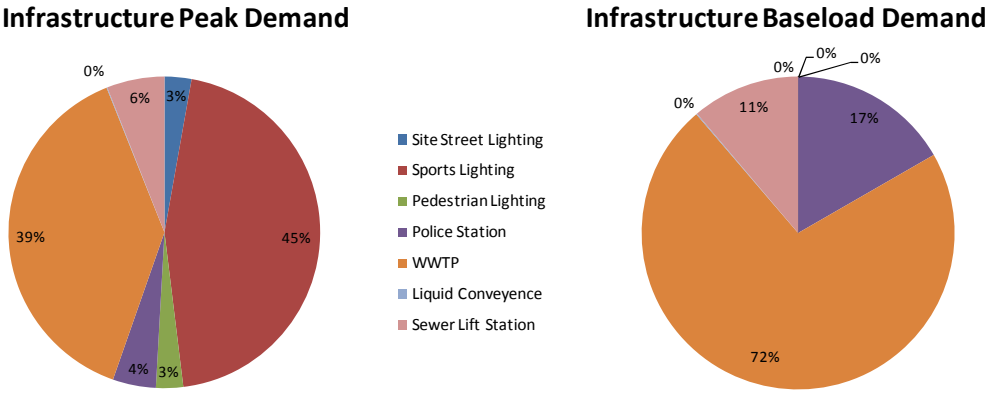


Figure 5 - Infrastructure Peak and Baseload Demands by end use

4.3 Site Energy Demand and Consumption Results

The estimates for the infrastructure energy requirements were combined with the results from the building energy analysis, yielding overall energy demand and consumption information for the entire TI & YB site.

The following charts show the breakdown of demands of the entire TI & YB development (values specific to Building Energy Performance Iteration #4):

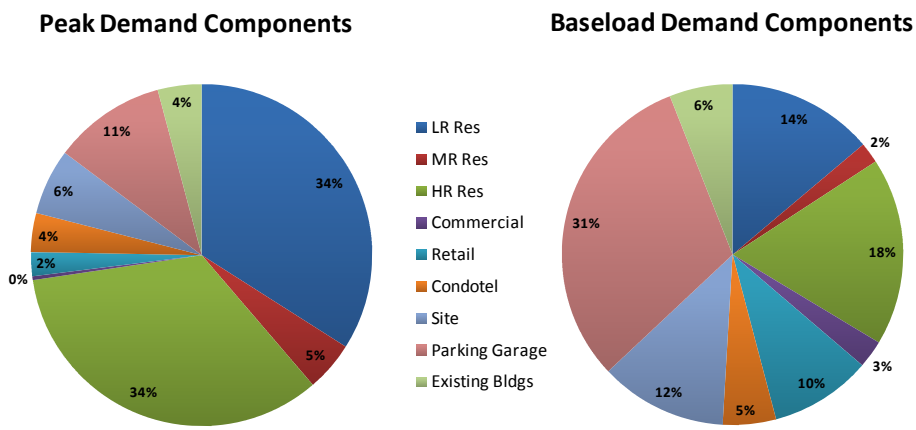


Figure 6 - Percent of both peak and baseload demands by end use

Note that site energy (street lighting, WWTP, sports lighting, etc) accounts for only 6% of the peak demand, but 12% of the baseload demand. Also noteworthy is the parking garages' contribution to baseload energy demand is calculated to be 31%. This is a result of the constant operation of both the lighting and exhaust systems. Careful design to maximize the use of natural ventilation or daylighting will bring this figure down dramatically.

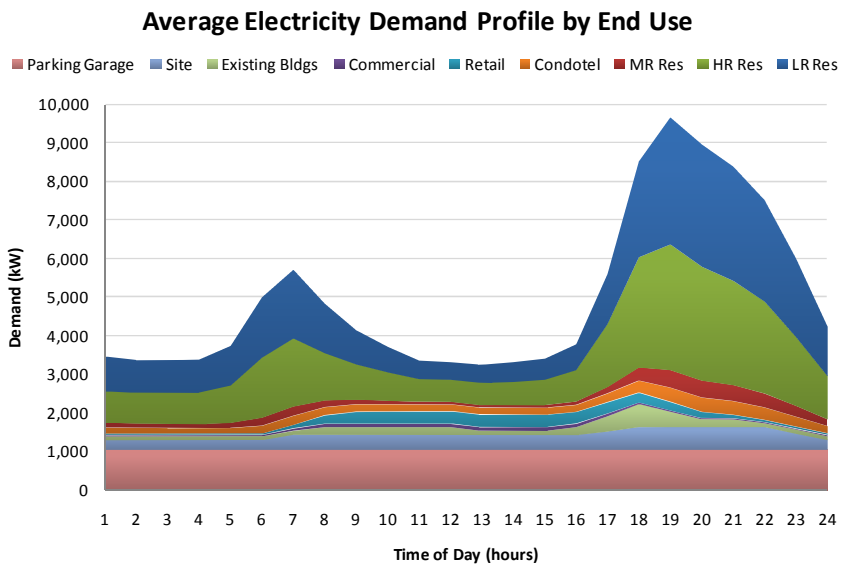


Figure 7 - Average daily electrical demand profile by end use

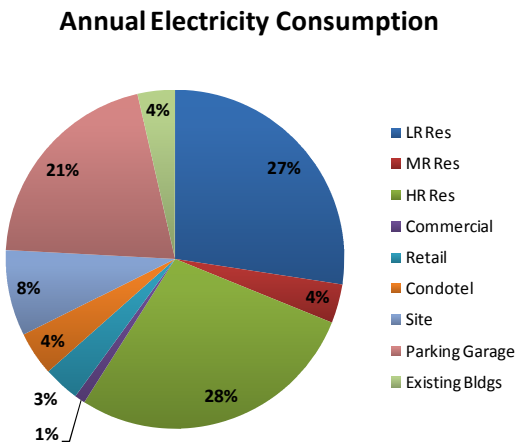


Figure 8 - Annual electricity consumption of site by end use

The following pages include results from the Site Energy and Demand Profile Analysis, and consist of the following:

1. Summary of energy information for each iteration
2. Site energy profiles - a sheet for each iteration and data for an average day of every month of the year.

As a reminder, the energy iterations considered for this analysis are:

- **Iteration #1** - Minimum Title 24-2008 Prescriptive Compliance
- **Iteration #2** - City of SF Green Building Ordinance (LEED Gold Energy Performance - Approximately 15% below T24-2008)
- **Iteration #3** - SF Green Building Ordinance + % Construction Cost Premium
- **Iteration #4** - % Cost Premium Minus LR & MR Residential Cooling with gas-fired heating system for low- and mid-rise residential

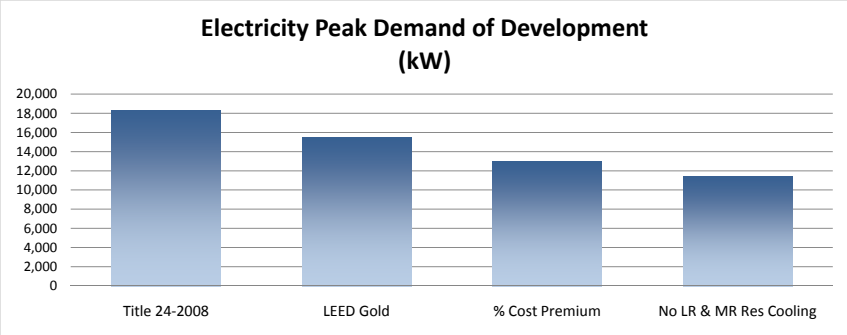
4.3.1 Diversity Factor

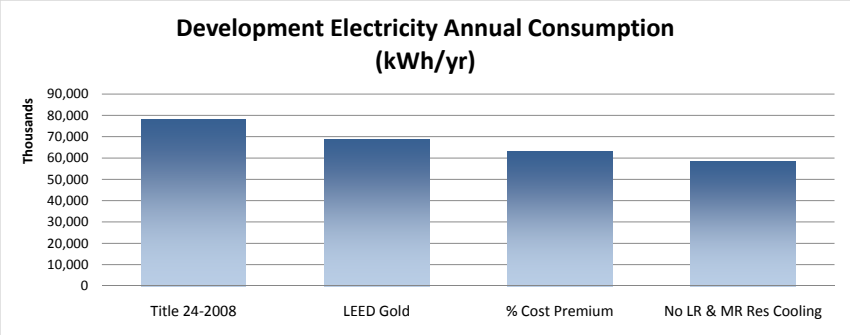
A limitation of the energy modeling and application of a multiplier is that results assume that every building on-site is performing exactly the same as the generic model results, i.e. all the building occupants are leaving and arriving at the same time, using the lights at the same time, and so on. This is not an accurate depiction of what a true development experiences, and thus the values are corrected by applying diversity factors to both the demand and consumption values, thereby accounting for fluctuations in occupancy schedules and variations in human behavior. Diversity factors can be seen in the iteration summary sheets towards the back of this document.

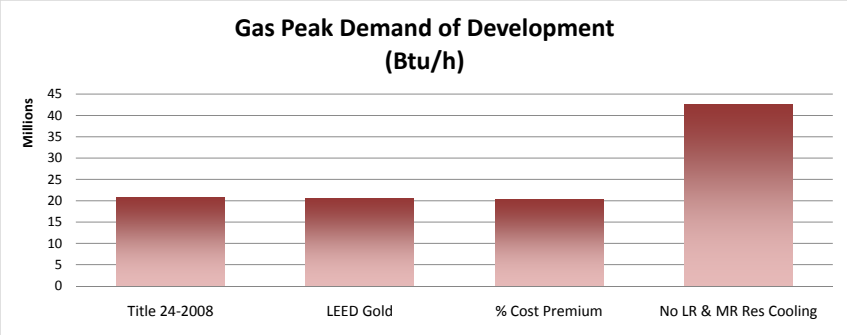
It has been assumed that the peak electrical demand will be reduced by 40% due to diversity (60% diversity factor applied). Diversity factors are described within the “Standard Handbook for Electrical Engineers” by Fink and Beaty. Diversity factors vary depending on which part of the system they are being applied. The document lists that for “General Power from users to substation”, a diversity factor of 0.45 is applicable. Due to the heavy residential nature of the TI development, a more conservative value of 0.6 has been utilized.

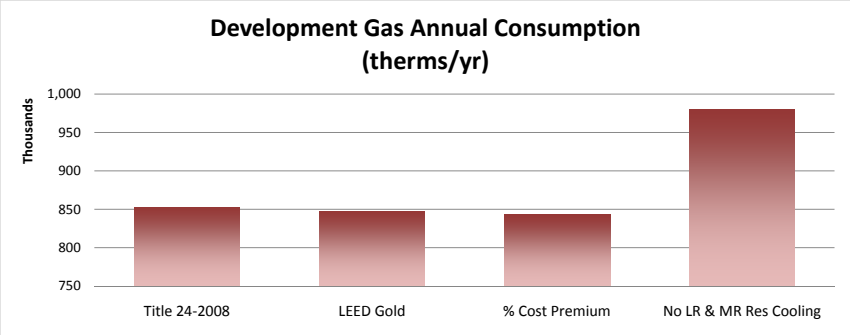
Treasure Island Site Energy Iteration Comparison

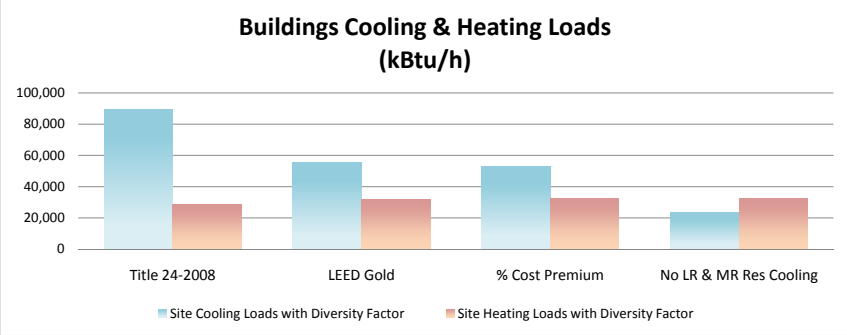
	Total Development Energy								Energy Intensity of Development								Buildings Total Cooling / Heating			
	Demand				Consumption				Demand				Consumption				Loads		Intensities	
	Electricity Peak Demand	% Improvement over T24	Gas Peak Demand	% Improvement over T24	Annual Electricity Consumption	% Improvement over T24	Annual Gas Consumption	% Improvement over T24	Electricity Peak Demand Intensity	% Improvement over T24	Gas Peak Demand Intensity	% Improvement over T24	Electricity Consumption Intensity	% Improvement over T24	Gas Consumption Intensity	% Improvement over T24	Site Cooling Loads with Diversity Factor	% Improvement over T24	Site Heating Loads with Diversity Factor	% Improvement over T24	Site Cooling Loads with Diversity Factor	% Improvement over T24	Site Heating Loads with Diversity Factor	% Improvement over T24
	(kW)		(Btu/h)		(kWh/yr)		(therms/yr)		(W/s.f.)		(Btu/h/s.f.)		(kWh/s.f.)		(kBtu/s.f.)		(kBtu/h)		(kBtu/h)		(Btu/h/s.f.)		(Btu/h/s.f.)	
Title 24-2008	18,320		20,832,610		77,982,568		852,850		1.50		1.71		6.40		7.00		28.820		89,614		28,739		7.35		2.36	
LEED Gold	15,458	16%	20,608,049	1%	68,864,155	12%	847,590	1%	1.27	16%	1.69	1%	5.65	12%	6.95	1%	26.225	9%	55,755	38%	32,054	-12%	4.57	38%	2.63	-12%
% Cost Premium	12,993	29%	20,245,621	3%	63,087,468	19%	843,134	1%	1.07	29%	1.66	3%	5.17	19%	6.92	1%	24.571	15%	52,738	41%	32,359	-13%	4.33	41%	2.65	-13%
No LR & MR Res Cooling	11,435	38%	42,553,072	-104%	58,483,468	25%	979,568	-15%	0.94	38%	3.49	-104%	4.80	25%	8.03	-15%	24.402	15%	23,717	74%	32,359	-13%	1.95	74%	2.65	-13%

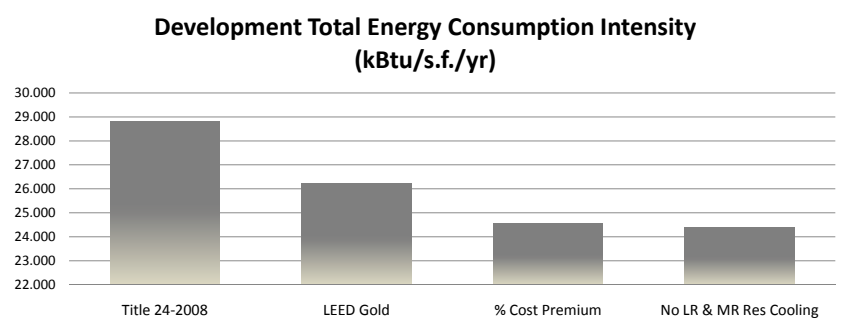












Treasure Island Site Energy Simulation Results

ARUP

ENERGY PERFORMANCE ITERATION:

#1 - Minimum Title 24-2008 Perscriptive

Summary Info

TI Site s.f.	11,730,650	s.f.
YB Site s.f.	461,095	s.f.
Combined s.f.	12,191,745	s.f.

Electricity

Peak Demand	18.3	MW
Peak Demand	1.5	W/s.f.
Base Load Demand	3.2	MW
Annual Consumption	77,982,568	kWh/year
Annual Consumption	6.4	kWh/s.f.

Gas

Peak Demand	20,833	kBtu/h
Peak Demand	1.7	Btu/h/s.f.
Base Load Demand	1,303	kBtu/h
Annual Consumption	852,850	therms/year
Annual Consumption	7.0	kBtu/s.f.

Combined Energy

Peak Demand	80,643	kBtu/h
Peak Demand	6.6	Btu/h/s.f.
Annual Consumption	351,361,553	kBtu/year
Annual Consumption	28.8	kBtu/s.f.

Heating Loads

Peak Heating	28,739	kBtu/h
Peak Heating	2.4	Btu/h/s.f.

Cooling Loads

Peak Cooling	89,614	kBtu/h
Peak Cooling	7.4	Btu/h/s.f.

Assumed Site-Wide **Demand** Diversity Factor **60%**
Assumed Site-Wide **Consumption** Diversity Factor **80%**

Modeled Energy Conservation Measures (ECM's)

Title 24-2008

ECM's	Residential	Commercial	Retail	Condetel
Thermal Mass				
Insulation				
High Performance Glazing/SHGC				
External Shading				
Daylighting				
Skylights	yes			
Occupancy Sensors				
High Efficiency Lighting		yes		
Natural Ventilation			yes	
High Efficiency DX Units				
Natural Vent with Baseboard Htg		yes	yes	yes
Radiant Heating & Cooling	yes		yes	yes
Underfloor Air Distribution	yes		yes	yes
Demand Control Ventilation	yes			
Water Side Economizer	yes		yes	yes
Indirect Evaporative Cooling	yes		yes	yes
Heat Recovery	yes		yes	
High Efficiency Chiller	yes		yes	
High Efficiency Boiler	yes		yes	
Variable Speed Drives on Motors	yes		yes	
Energy Star Equipment				
Solar Hot Water System				

* NOTE - there are no ECM's selected as this is the baseline iteration

Legend

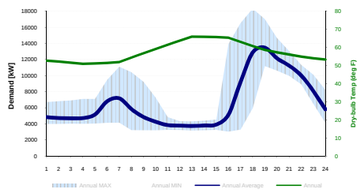
ELECTRICITY GRAPHS
Blue lines - average hourly electricity demand profile
Light blue - range of annual max and min hourly electricity demands
y-axis is in kW of electrical demand

GAS GRAPHS
Red lines - average hourly gas demand profile
Light grey - range of annual max and min hourly gas demands
y-axis is in Btu/h of gas demand

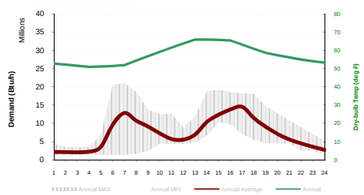
Each graph also has average daily dry bulb temperature profile shown in green.

Annual Profiles

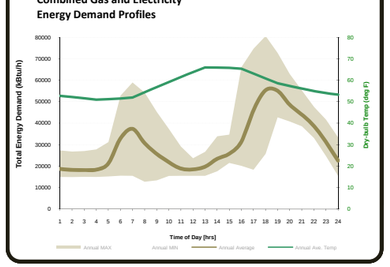
Electricity Demand Profiles

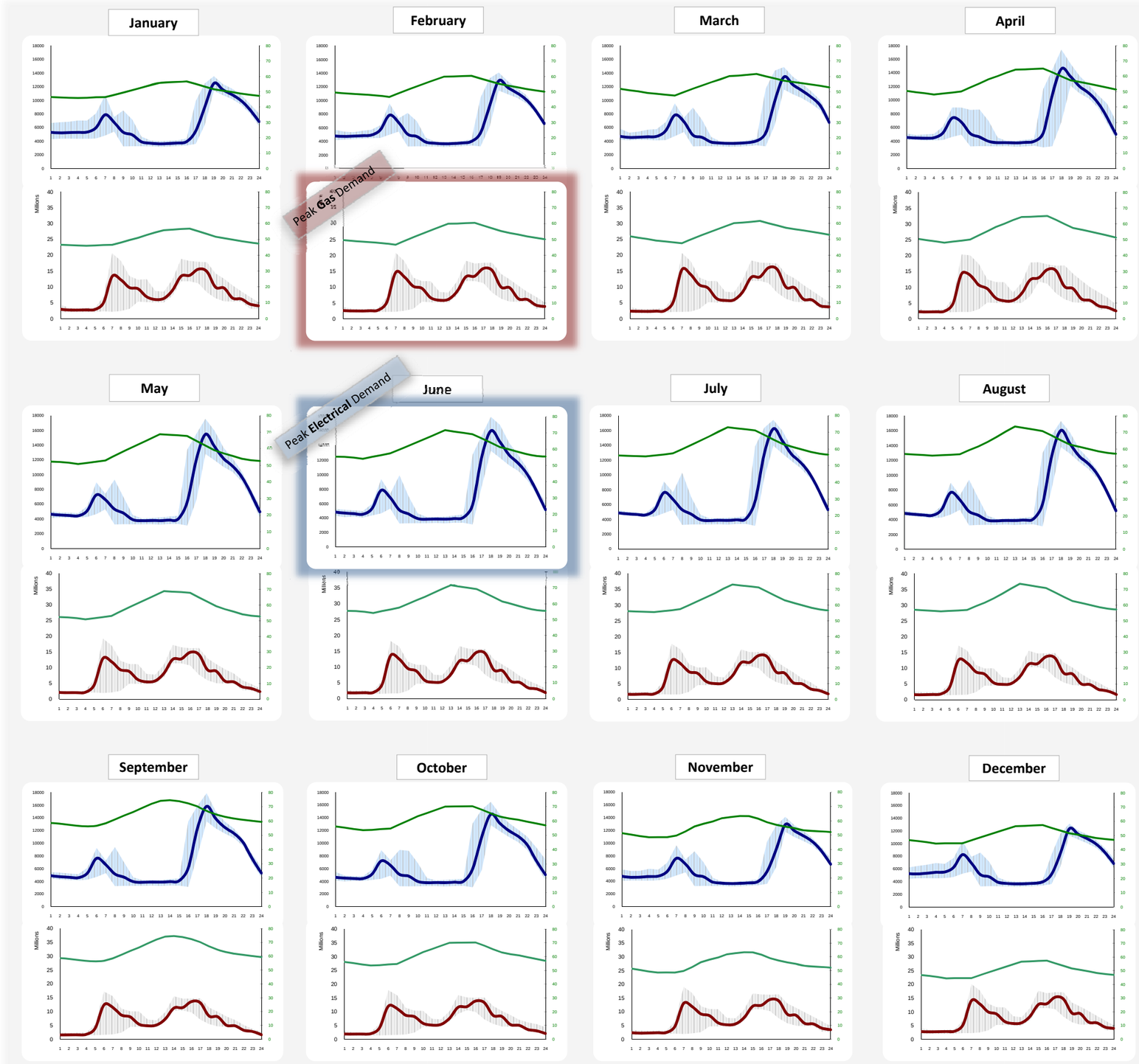


Gas Demand Profiles



Combined Gas and Electricity Energy Demand Profiles





Treasure Island Site Energy Simulation Results

ARUP

ENERGY PERFORMANCE ITERATION:

#2 - City of SF Green Building Ordinance

Summary Info

TI Site s.f.	11,730,650	s.f.
YB Site s.f.	461,095	s.f.
Combined s.f.	12,191,745	s.f.

Electricity

Peak Demand	15.5	MW
Peak Demand	1.3	W/s.f.
Base Load Demand	3.0	MW
Annual Consumption	68,864,155	kWh/year
Annual Consumption	5.6	kWh/s.f.

Gas

Peak Demand	20,608	kBtu/h
Peak Demand	1.7	Btu/h/s.f.
Base Load Demand	1,304	kBtu/h
Annual Consumption	847,590	therms/year
Annual Consumption	7.0	kBtu/s.f.

Combined Energy

Peak Demand	70,813	kBtu/h
Peak Demand	5.8	Btu/h/s.f.
Annual Consumption	319,723,542	kBtu/year
Annual Consumption	26.2	kBtu/s.f.

Heating Loads

Peak Heating	32,054	kBtu/h
Peak Heating	2.6	Btu/h/s.f.

Cooling Loads

Peak Cooling	55,755	kBtu/h
Peak Cooling	4.6	Btu/h/s.f.

Assumed Site-Wide **Demand** Diversity Factor **60%**
Assumed Site-Wide **Consumption** Diversity Factor **80%**

Modeled Energy Conservation Measures (ECM's)

City of SF Green Bldg Ordinance

ECM's	Residential	Commercial	Retail	Condotel
Thermal Mass	■	■	■	■
Insulation	■	■	■	■
High Performance Glazing/SHGC	■	■	■	■
External Shading	■	■	■	■
Daylighting			■	
Skylights	pot.			
Occupancy Sensors				
High Efficiency Lighting		pot.		
Natural Ventilation			pot.	
High Efficiency DX Units			■	
Natural Vent with Baseboard Htg		pot.		pot.
Radiant Heating & Cooling	pot.			pot.
Underfloor Air Distribution	pot.			pot.
Demand Control Ventilation	pot.			
Water Side Economizer	pot.			pot.
Indirect Evaporative Cooling	pot.			pot.
Heat Recovery	pot.			
High Efficiency Chiller	pot.			
High Efficiency Boiler	pot.			
Variable Speed Drives on Motors	pot.		pot.	
Energy Star Equipment	■	■	■	■
Solar Hot Water System				

Legend

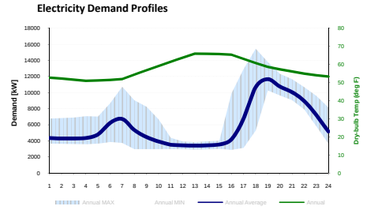
ELECTRICITY GRAPHS
Blue lines - average hourly electricity demand profile
Light blue - range of annual max and min hourly electricity demands
y-axis is in kW of electrical demand

GAS GRAPHS
Red lines - average hourly gas demand profile
Light grey - range of annual max and min hourly gas demands
y-axis is in Btu/h of gas demand

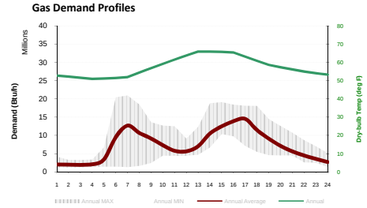
Each graph also has average daily dry bulb temperature profile shown in green.

Annual Profiles

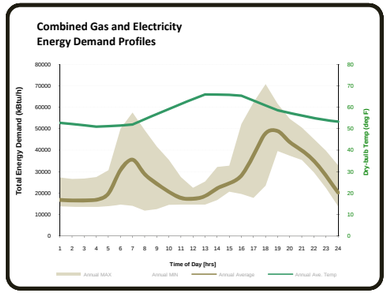
Electricity Demand Profiles

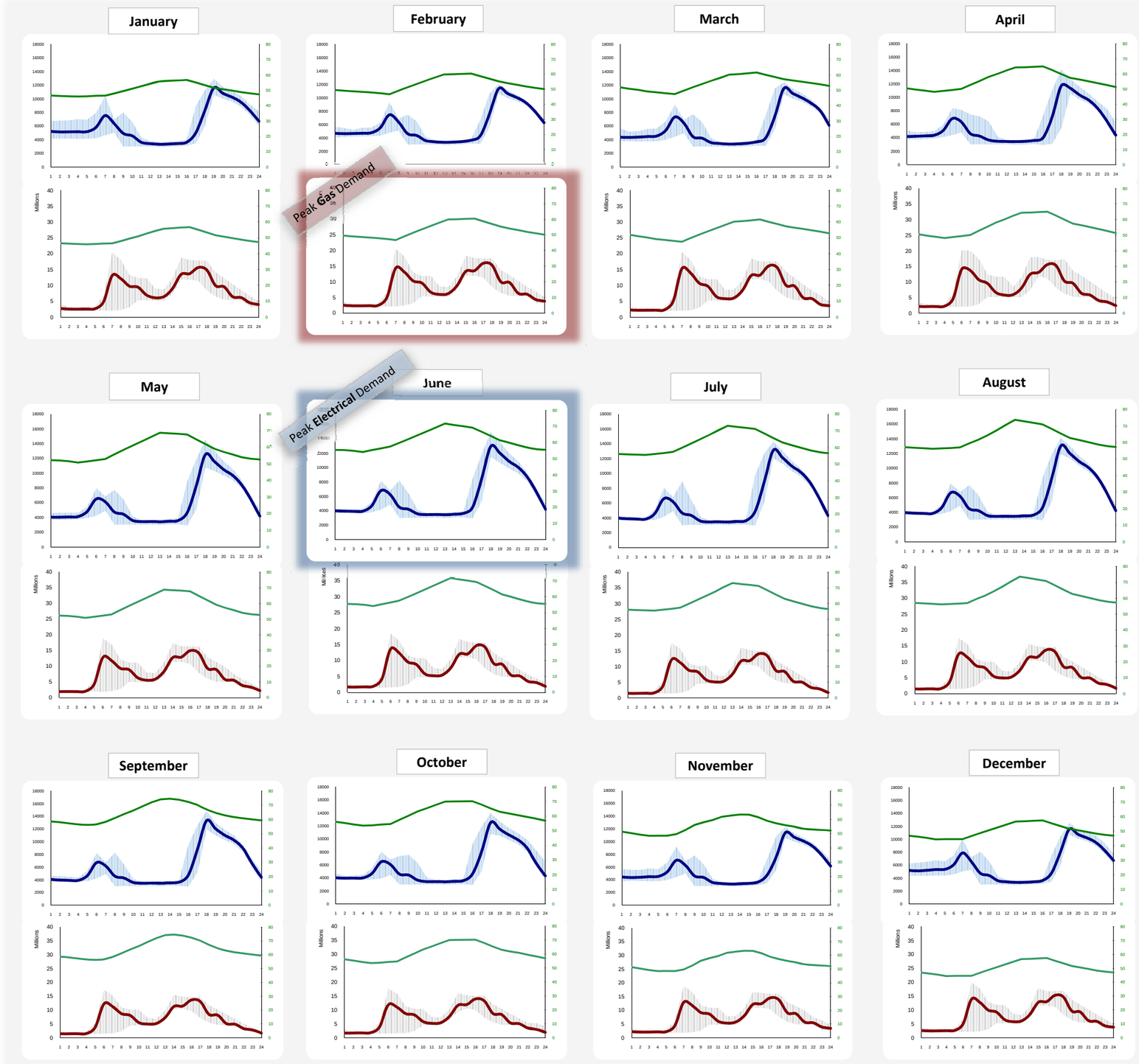


Gas Demand Profiles



Combined Gas and Electricity Energy Demand Profiles





Treasure Island Site Energy Simulation Results

ARUP

ENERGY PERFORMANCE ITERATION:

#3 - % Construction Cost Premium for Energy Measures

Summary Info

TI Site s.f.	11,730,650	s.f.
YB Site s.f.	461,095	s.f.
Combined s.f.	12,191,745	s.f.
Electricity		
Peak Demand	**13.0**	MW
Peak Demand	**1.1**	W/s.f.
Base Load Demand	**2.9**	MW
Annual Consumption	**63,087,468**	kWh/year
Annual Consumption	**5.2**	kWh/s.f.
Gas		
Peak Demand	**20,246**	kBtu/h
Peak Demand	**1.7**	Btu/h/s.f.
Base Load Demand	**1,304**	kBtu/h
Annual Consumption	**843,134**	therms/year
Annual Consumption	**6.9**	kBtu/s.f.
Combined Energy		
Peak Demand	**62,055**	kBtu/h
Peak Demand	**5.1**	Btu/h/s.f.
Annual Consumption	**299,567,841**	kBtu/year
Annual Consumption	**24.6**	kBtu/s.f.
Heating Loads		
Peak Heating	**32,359**	kBtu/h
Peak Heating	**2.7**	Btu/h/s.f.
Cooling Loads		
Peak Cooling	**52,738**	kBtu/h
Peak Cooling	**4.3**	Btu/h/s.f.

Assumed Site-Wide **Demand** Diversity Factor **60%**
Assumed Site-Wide **Consumption** Diversity Factor **80%**

Modeled Energy Conservation Measures (ECM's)

2% Cost Premium

ECM's	Residential	Commercial	Retail	Condetel
Thermal Mass				
Insulation				
High Performance Glazing/SHGC				
External Shading				
Daylighting				
Skylights	n/a			
Occupancy Sensors				
High Efficiency Lighting		n/a		
Natural Ventilation			n/a	
High Efficiency DX Units				
Natural Vent with Baseboard Htg		n/a	n/a	n/a
Radiant Heating & Cooling	n/a		n/a	n/a
Underfloor Air Distribution	n/a		n/a	n/a
Demand Control Ventilation	n/a			
Water Side Economizer	n/a		n/a	n/a
Indirect Evaporative Cooling	n/a		n/a	n/a
Heat Recovery	n/a		n/a	
High Efficiency Chiller	n/a		n/a	
High Efficiency Boiler	n/a		n/a	
Variable Speed Drives on Motors	n/a		n/a	
Energy Star Equipment				
Solar Hot Water System				

Legend

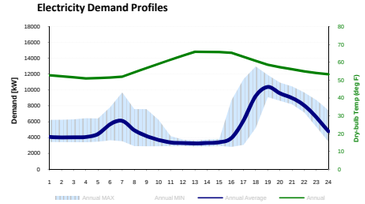
ELECTRICITY GRAPHS
Blue lines - average hourly electricity demand profile
Light blue - range of annual max and min hourly electricity demands
y-axis is in kW of electrical demand

GAS GRAPHS
Red lines - average hourly gas demand profile
Light grey - range of annual max and min hourly gas demands
y-axis is in Btu/h of gas demand

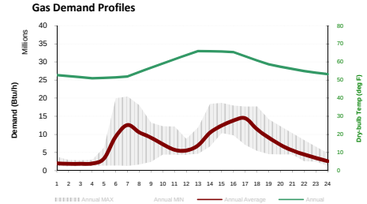
Each graph also has average daily dry bulb temperature profile shown in green.

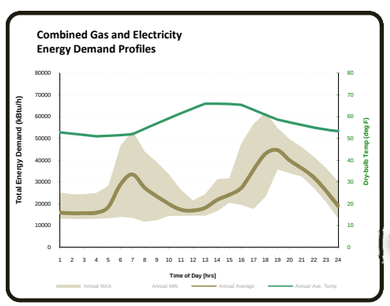
Annual Profiles

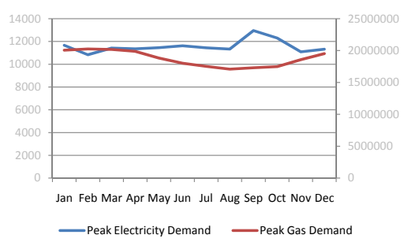
Electricity Demand Profiles

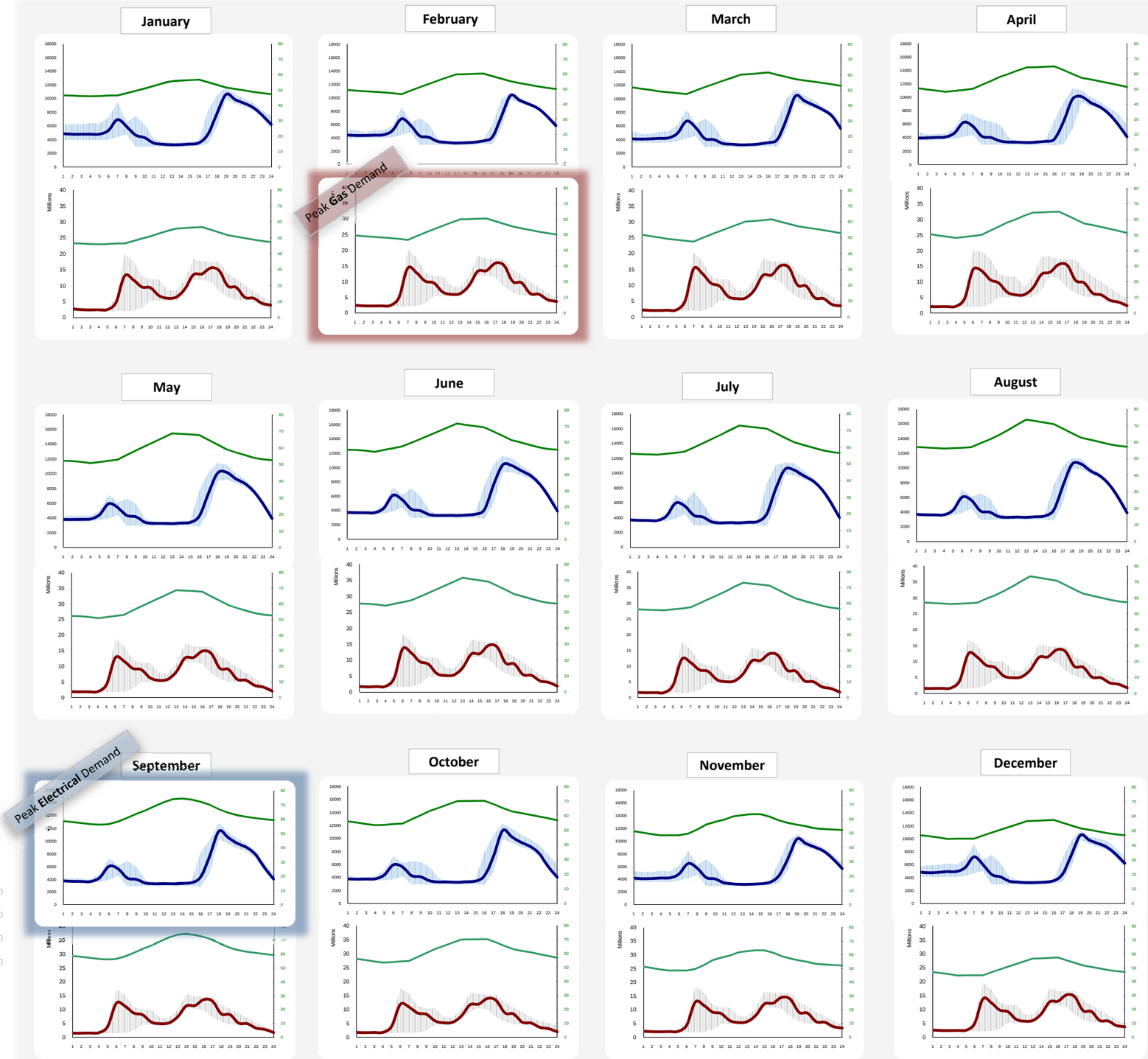


Gas Demand Profiles









Treasure Island Site Energy Simulation Results

ARUP

ENERGY PERFORMANCE ITERATION:

#4 - % Cost Premium minus LR & MR Residential Cooling

Summary Info

TI Site s.f.	11,730,650	s.f.
YB Site s.f.	461,095	s.f.
Combined s.f.	12,191,745	s.f.
Electricity		
Peak Demand	**11.4**	MW
Peak Demand	**0.9**	W/s.f.
Base Load Demand	**2.9**	MW
Annual Consumption	**58,483,468**	kWh/year
Annual Consumption	**4.8**	kWh/s.f.
Gas		
Peak Demand	**42,553**	kBtu/h
Peak Demand	**3.5**	Btu/h/s.f.
Base Load Demand	**1,281**	kBtu/h
Annual Consumption	**979,568**	therms/year
Annual Consumption	**8.0**	kBtu/s.f.
Combined Energy		
Peak Demand	**73,434**	kBtu/h
Peak Demand	**6.0**	Btu/h/s.f.
Annual Consumption	**297,502,397**	kBtu/year
Annual Consumption	**24.4**	kBtu/s.f.
Heating Loads		
Peak Heating	**32,359**	kBtu/h
Peak Heating	**2.7**	Btu/h/s.f.
Cooling Loads		
Peak Cooling	**23,717**	kBtu/h
Peak Cooling	**1.9**	Btu/h/s.f.

Assumed Site-Wide **Demand** Diversity Factor **60%**
Assumed Site-Wide **Consumption** Diversity Factor **80%**

Modeled Energy Conservation Measures (ECM's)

2% Cost Premium

ECM's	Residential	Commercial	Retail	Condotel
Thermal Mass	■	■	■	■
Insulation	■	■	■	■
High Performance Glazing/SHGC	■	■	■	■
External Shading	■	■	■	■
Daylighting	■	■	■	■
Skylights	■	■	■	■
Occupancy Sensors	■	■	■	■
High Efficiency Lighting	■	■	■	■
Natural Ventilation	■	■	■	■
High Efficiency DX Units	■	■	■	■
Natural Vent with Baseboard Htg	■	■	■	■
Radiant Heating & Cooling	■	■	■	■
Underfloor Air Distribution	■	■	■	■
Demand Control Ventilation	■	■	■	■
Water Side Economizer	■	■	■	■
Indirect Evaporative Cooling	■	■	■	■
Heat Recovery	■	■	■	■
High Efficiency Chiller	■	■	■	■
High Efficiency Boiler	■	■	■	■
Variable Speed Drives on Motors	■	■	■	■
Energy Star Equipment	■	■	■	■
Solar Hot Water System				

*NOTE - No Cooling Modelled in Low-Rise and Mid-Rise Residential Buildings

Legend

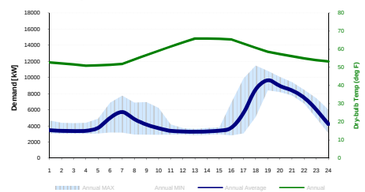
ELECTRICITY GRAPHS
Blue lines - average hourly electricity demand profile
Light blue - range of annual max and min hourly electricity demands
y-axis is in kW of electrical demand

GAS GRAPHS
Red lines - average hourly gas demand profile
Light grey - range of annual max and min hourly gas demands
y-axis is in Btu/h of gas demand

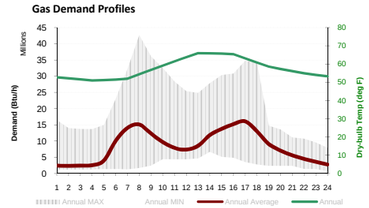
Each graph also has average daily dry bulb temperature profile shown in green.

Annual Profiles

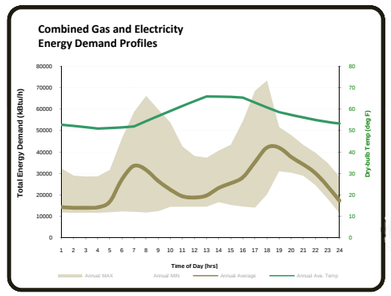
Electricity Demand Profiles

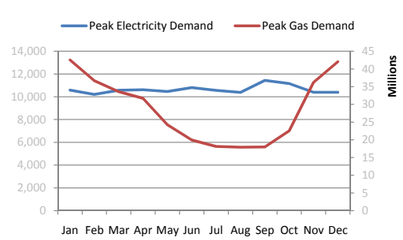


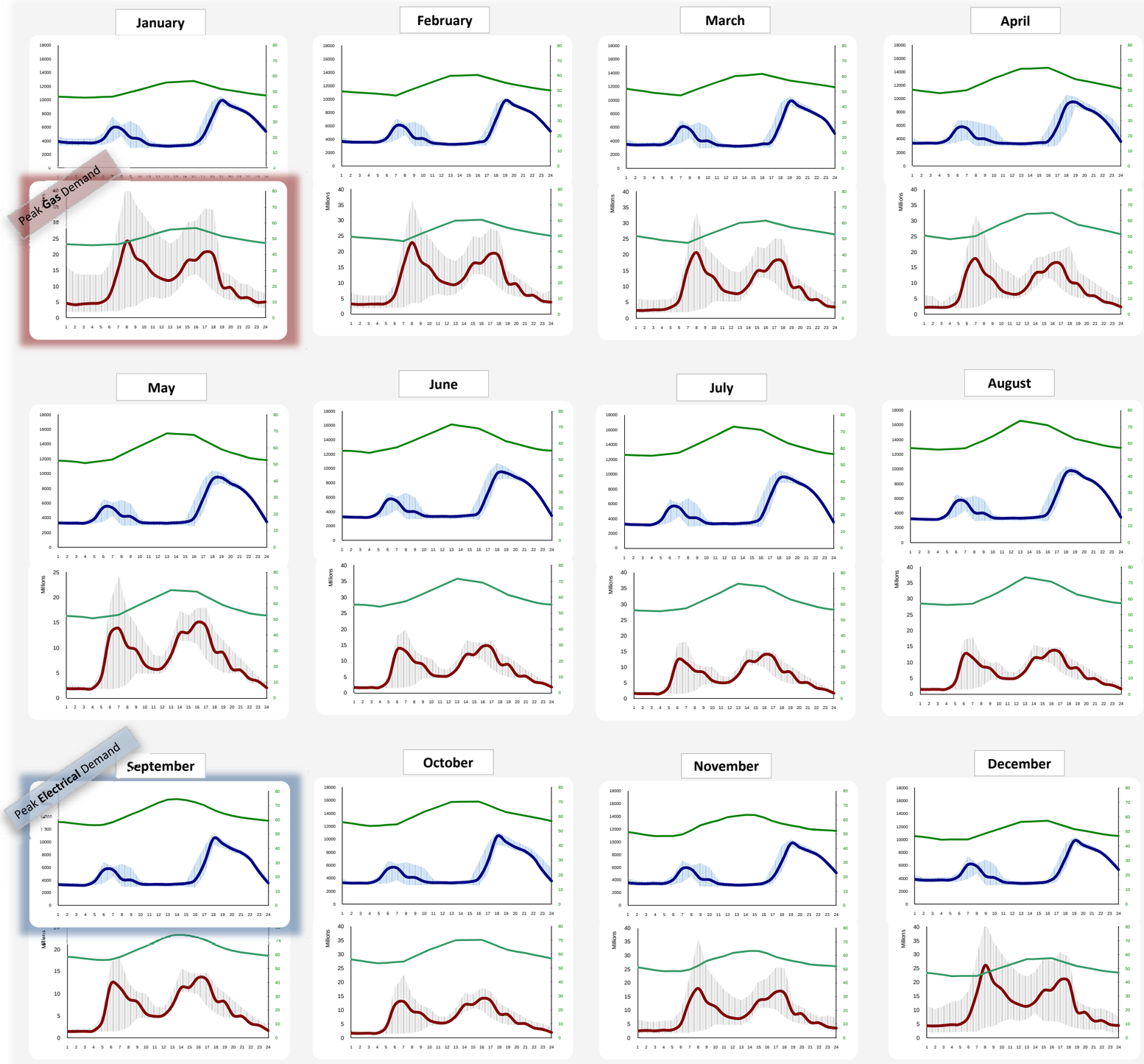
Gas Demand Profiles



Combined Gas and Electricity Energy Demand Profiles







5 Renewable Energy

Once the building and site energy characteristics were combined, a number of renewable energy scenarios were studied. The majority of these are based around the utilization of photovoltaics; however waste-to-energy technology utilizing anaerobic digestion was also studied in isolation to understand viability at this scale.

5.1 Photovoltaics

In order to carry out the analysis for the photovoltaic (PV) energy generation systems that can supply clean energy to the project, many assumptions were made. Many of these assumptions, along with other factors that were considered, are listed below.

Two different PV technologies will be utilized throughout the site: crystalline silicon (c-Si) PV and thin-film PV.

The crystalline panel capacities are assumed to be rated at 230 W_p based on the Sunpower 230 Solar Panel.

To optimize the annual generation from the panels, the general rule of thumb is to mount them at a tilt with respect to the horizon of the location's latitude, and azimuth facing due south (if the location is in the Northern Hemisphere). In practice, however, there are additional variables that can affect the ideal tilt and azimuth, such as fog or shading occurring at certain times of the day, space constraints, and also utility time-of-use (TOU) rate multipliers. Although the utilization factor, in kWh/kW, of each PV panel is annually maximized at a latitude tilt (37° in the case of San Francisco), project economics are generally optimized at a lower tilt to optimize summer PV generation, fully taking advantage of higher summer peak rates.

Another consideration is that with increasing panel tilt comes increased spacing between panels, due to the longer shadows cast from the more upright panels (self-shading). This principle is illustrated in the following diagram. The installed PV capacity for a given area decreases as the tilt angle increases.

Because roof and ground space has a high premium in the development, roof-mounted PV systems have tilts of 10 degrees, allowing generation from the given real estate to be maximized. This assumption is further supported by the likelihood of TOU schedules, as discussed above which will increase the cost of electricity during peak sun periods.

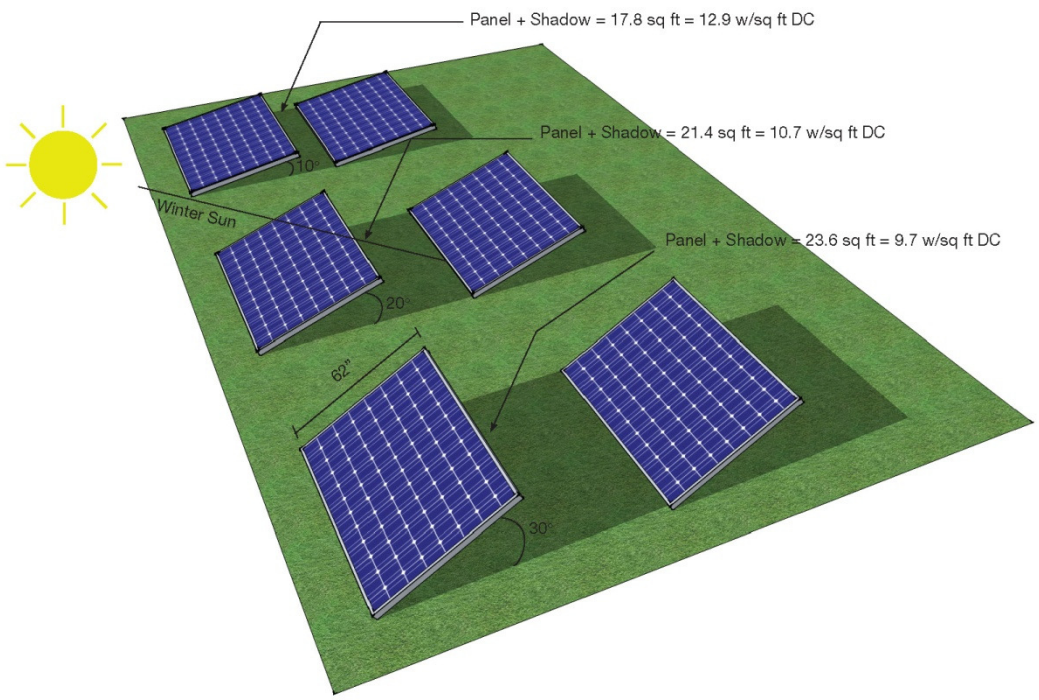


Figure 9 - PV spacing requirements as a function of tilt

For the ground-mounted PV, a fixed tilt of 20 degrees is assumed, as the panels can be installed slightly less densely to improve the utilization factor of the PV system though not spaced out too much to use the land inefficiently.

Single-axis tracking PV was also studied for the ground-mounted PV. These systems use motors enabling the panels to track the sun's movement throughout the day, giving higher energy production through the year at the cost of additional maintenance required for the moving parts. For the ground-mounted PV, single axis tracking systems will improve utilization by 20-40% but also require panels to be further spaced apart. Due to this land use inefficiency, tracking systems have not been included within the PV scenario calculations.

The roofs of buildings 2 and 3 have been modeled using thin-film amorphous silicon (a-Si) PV. This was chosen for a number of reasons. Firstly, thin-film technology uses considerably less silicon material than c-Si modules and thus weighs significantly less; this will ensure that the existing structure can support the proposed PV system. Secondly, thin-films are flexible and can be cosmetically molded to the curvature of the south-facing halves of the roofs. The average tilt for the thin-film PV system was assumed to be 10 degrees.

One final consideration when running the analysis of the PV systems is shading from adjacent structures. A heavily shaded roof will suffer significant utilization factor reduction and so PV locations will need to be chosen carefully.

For the purposes of the PV analysis undertaken and presented in this report, it has been assumed that 50% of each roof area will be available for PV build out. This correction factor accounts for variables such as roof-mounted mechanical equipment and shading from parapets and adjacent structures, all of which reduce the area available for photovoltaic modules.

5.2 Photovoltaic Scenarios

The following scenarios were analyzed for the project:

5% On-Site Peak Build-Out

Meets the minimum requirement of the term sheet for PV – 5% of the project's peak electricity demand to be met by the kWh_e output of the PV system. The peak PV production will not occur at the same time as the project peak demand. Assumes that the system will be installed in the form of ground-mounted PV.

Optimized Build-Out

Applies the most likely build out based on discussions with potential third party partners. Assumes build-out of roof-mounted PV for Adaptive Reuse buildings #1 & #2, parking garages, and the low-income housing. Rooftop useable area for PV is assumed to be 50% of total roof area. Adding to the roof PV, ground-mounted PV totaling 20 acres (871,200 s.f.) is dispersed throughout site.

Maximum Build-Out

Assumes the same 20 acres of ground-mounted PV, in addition to maximum build-out of PV on rooftops of every new construction building on-site, excluding AR building #1 and the Condotel.

Gas Offset

Maximizes rooftop installations per the previous scenario and then assumes ground-mounted PV to get to a point where the forecast natural gas energy usage of the site will be offset by the PV on an annual basis. This scenario would be equal to net zero carbon should SFPUC be the utility provider for the site and assuming that the electricity provided would be from hydro power and free of carbon.

Electricity Offset

Maximizes rooftop PV build-out in addition to assuming utilization of enough ground-mounted PV to get to a point where the forecast electricity consumption of the site will be offset by the total on-site PV (including the ground-mounted PV) on an annual basis.

Energy Offset

Energy includes both on-site natural gas combustion plus electricity consumed from the grid. This scenario again maximizes roof build-out as discussed previously and then assumes existence of ground-mounted PV of sufficient capacity such that the aggregate PV system generates an equivalent amount of energy as the forecast energy consumption of the site over an annual basis.

A plan-view depiction approximates the solar build-out area required for each of the scenarios on the following pages.

LEGEND

- Energy Offset
- Electricity Offset
- Maximum
- Gas Offset
- Optimized
- 5% Peak Demand

Build-out Summary

5% Peak Demand

Business Optimized

Maximum Build-out

Gas Offset

Electricity Offset

Energy Offset

5.3 Results

Results of the PV analysis can be seen in the following tables and commentary is provided below.

- The **5% Peak** scenario can be met through the build-out of 1.7 acres of PV, assumed to be entirely ground-mounted PV, although PV mounted on rooftops would yield same generation. This capacity of PV will offset about 2% of the site's electricity consumption or about 1% of the site's energy consumption. Peak PV AC output is equivalent to 5% of the site's peak electricity demand in value, although non-coincidental in the time of day of occurrence.
- The suggested **Business Optimized** Build-Out consists of a total of 20 acres of ground-mounted PV and installations on the rooftops of low income housing, parking structures and existing buildings 2 and 3. These areas either appear to be of adequate scale for utility-scale power purchase agreements or, in the case of low income housing, have the necessary legislation in place to allow virtual net metering which will allow a more efficient installation. This scenario is equivalent to 100% of the site's peak electricity demand.
    - Below is a graph of PV output (yellow) vs. site electricity demand (blue) for an average day in July. The y-axis units are in kW and the x-axis is hours in the day. The lighter colors represent the range of outputs and demands experienced in the month, and the dark lines represent averages.
    - In this case, the PV system is peaking at an AC output of 11,590 kW_p at 1pm when the site's electricity demand is just over 3,000 kW. Thus, at this moment, the PV system would be exporting approximately 8,400 kW_p onto the grid.

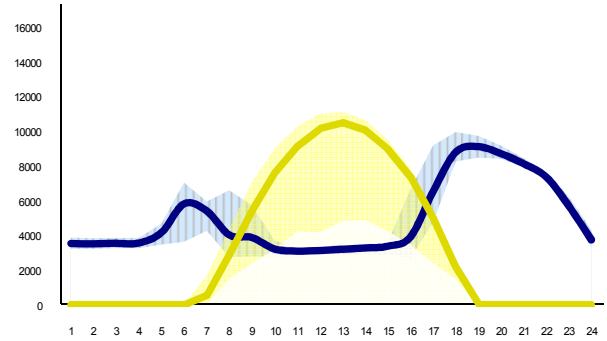


Figure 10 - Peak PV generation, in July, for Optimized PV scenario

- The **Maximum** Build-Out case will equal 170% of the site's peak electricity demand, 57% of the site's electricity consumption, and 38% of the site's energy consumption.
- The **Gas Offset** case will equal 146% of the site peak electricity demand and offset 50% of annual electricity consumption or 33% of annual energy consumption. This scenario maximum roof built out and an additional 12.5 acres of ground-mounted PV dispersed throughout the site.
- The **Electricity Offset** case will, on an annual basis, offset 100% of the site's electricity consumption and will have a peak output equal to 3 times the peak site

electrical demand. This is also equal to 67% of the site's total energy consumption. This scenario would require 60 acres of ground-mounted PV plus total roof built out (approximately 90 acres of total PV).

- To completely offset all energy (both electricity and gas) consumption on-site on an annual basis, 106 acres of ground-mounted PV would be required in addition to the maximized roof build-out assumed above. The peak output of this **Energy Offset** build-out would be 434% of the peak electric demand of the site, and the total PV generation would equate to 148% of total site electricity consumption.

Due to the predominantly residential nature of the site, peak site electricity demand occurs at 7.00pm, when residents return home from work, use appliances, cook and use artificial lighting. Photovoltaics, on the other hand, has an output directly proportional to the path of the sun and thus generates peak output towards the middle of the day when the sun is shining its brightest. Thus, peak PV output will not coincide with the site's peak electricity demand. As a result, during times of PV peak output, it is anticipated that the development may need to be able to export electricity to the grid. For example, for the Business Optimized PV build-out, as much as 8.4 MW_e of electricity could be exported to the grid during the middle of the day. This may be beneficial to the local grid, however, as typically peak demands at a city-level occur towards the middle of the day due to the larger mix of retail, commercial and industrial buildings.

The following tables show important area assumptions and results for each PV build-out scenario, followed by profile sheets overlaying PV daily profiles onto the site energy demand profile for Iteration #4.

Table 13 - PV Area for each build-out scenario

End Use Type	PV type	Tilt (deg, horizontal = 0)	Azimuth (deg, S=180)	Utilization Factor (kWh/kWp)	Installed PV Density (Wp/s.f.)	PV Build-Out Scenarios: 5% Peak Area (s.f.)	5% Peak Area (acres)	5% Peak Installed PV Capacity (kWp)	Optimized Area (s.f.)	Optimized Area (acres)	Optimized Installed PV Capacity (kWp)	Maximum Area (s.f.)	Maximum Area (acres)	Maximum Installed PV Capacity (kWp)	Energy Offset Analysis: Gas Offset Area (s.f.)	Gas Offset Area (acres)	Gas Offset Installed PV Capacity (kWp)	Electricity Offset Area (s.f.)	Electricity Offset Area (acres)	Electricity Offset Installed PV Capacity (kWp)	Energy Offset Area (s.f.)	Energy Offset Area (acres)	Energy Offset Installed PV Capacity (kWp)
LR Res	c-Si	10	180	1,360	12	0	0	0	0	0	0	631,855	15	7,582	631,855	15	7,582	631,855	15	7,582	631,855	15	7,582
MR Res	c-Si	10	180	1,360	12	0	0	0	0	0	0	28,282	1	339	28,282	1	339	28,282	1	339	28,282	1	339
HR Res	c-Si	10	180	1,360	12	0	0	0	0	0	0	53,611	1	643	53,611	1	643	53,611	1	643	53,611	1	643
Low Income Housing	c-Si	10	180	1,360	12	0	0	0	305,892	7	3,671	305,892	7	3,671	305,892	7	3,671	305,892	7	3,671	305,892	7	3,671
Commercial	c-Si	10	180	1,360	12	0	0	0	0	0	0	37,993	1	456	37,993	1	456	37,993	1	456	37,993	1	456
Retail	c-Si	10	180	1,360	12	0	0	0	0	0	0	63,930	1	767	63,930	1	767	63,930	1	767	63,930	1	767
Parking Structures, Bldg 1	c-Si	10	180	1,360	12	0	0	0	110,400	3	1,325	110,400	3	1,325	110,400	3	1,325	110,400	3	1,325	110,400	3	1,325
Adaptive Reuse Bldgs 2 & 3	a-Si	10	165	1,350	6	0	0	0	116,888	3	701	116,888	3	701	116,888	3	701	116,888	3	701	116,888	3	701
Ground-mounted PV	c-Si	20	180	1,425	10	74,253	1.7	743	871,200	20	8,712	871,200	20	8,712	544,500	12.5	5,445	2,613,600	60	26,136	4,617,360	106	46,174
					Totals	74,253	1.7	**743**	1,404,379	32	**14,409**	2,220,049	51	**24,197**	1,893,349	43	**20,930**	3,962,449	91	**41,621**	5,966,209	137	**61,658**

** Energy Offset - PV electricity generation equivalent to combined site electric and gas consumption over the course of a year.

Table 12 - PV build-out scenario results summary

	Units	PV Build-Out Scenarios: 5% Peak	Optimized	Maximum	Energy Offset Analysis: Gas Offset	Electricity Offset	Energy Offset **	Units
PV Total Capacity	kW_p	**743**	**14,409**	**24,197**	**20,930**	**41,621**	**61,658**	** kW_p
PV Peak Output	kW_e	**583**	**11,591**	**19,402**	**16,743**	**33,466**	**49,677**	kW_e
% of Site Peak Electricity Demand	%	**5%**	**101%**	**170%**	**146%**	**293%**	**434%**	** %
PV Electricity Generation	kWh/yr	**1,026,252**	**20,151,517**	**33,462,925**	**28,809,302**	**58,282,246**	**86,824,464**	kWh/year
% of Site Electricity Consumption	%	**2%**	**34%**	**57%**	**49%**	**100%**	**148%**	%
PV Annual Capacity Factor	%	**15.8%**	**16.0%**	**15.8%**	**15.7%**	**16.0%**	**16.1%**	** %
PV Electricity Generation	kBtu/yr	**3,501,572**	**68,756,976**	**114,175,500**	**98,297,340**	**198,859,022**	**296,245,072**	kBtu/year
% of Site Energy Consumption	%	**1%**	**23%**	**38%**	**33%**	**67%**	**100%**	%
Net Metering Net Balance	kWh/yr	**-57,457,216**	**-38,331,951**	**-25,020,543**	**-29,674,165**	**0**	**28,340,996**	kWh/year
Peak Electricity Exporting *	kW_e	**-2,600**	**8,400**	**16,200**	**13,700**	**30,500**	**46,700**	kW_e

* Peak Electricity Exporting - The value of the difference between the coincidental peak PV output and the electricity demand. This power is exported onto the grid.

** Energy Offset - PV electricity generation equivalent to combined site electric and gas consumption over the course of a year.

Treasure Island Site Renewable Energy Profiles

ARUP

ENERGY PERFORMANCE ITERATION:

% Cost Premium minus LR & MR Residential Cooling

SITE RENEWABLES ITERATION:

5% Peak PV Build-out

Energy Demand Summary

TI Site s.f.	11,730,650	s.f.
YB Site s.f.	461,095	s.f.
Combined s.f.	12,191,745	s.f.

Electricity

Peak Demand	**11.4**	MW
Peak Demand	**0.9**	W/s.f.
Base Load Demand	**2.6**	MW
Annual Consumption	**58,483,468**	kWh/year
Annual Consumption	**4.8**	kWh/s.f.

Combined Energy

Peak Demand	**73,434**	kBtu/h
Peak Demand	**6.0**	Btu/h/s.f.
Annual Consumption	**297,502,397**	kBtu/year
Annual Consumption	**24.4**	kBtu/s.f.

Photovoltaic (PV) Summary

PV by End-Use

End-Use Type	Useable Area s.f.	Useable Area acres	PV Capacity kW_p
LR Res	631,855	15	-
MR Res	28,282	1	-
HR Res	53,611	1	-
Low-Income	305,892	7	-
Commercial	37,993	1	-
Retail	63,930	1	-
Parking Structures + Bldg 1	110,400	3	-
Adaptive Reuse, Bldgs 2, 3	116,888	3	-
Solar Farm	74,253	1.7	743
TOTAL	74,253	1.7	743

Entire Site PV System

PV Total Capacity	**743**	** kW_p
PV Peak Output	**583**	kW_e
PV Peak Average Output	**524**	kW_e
PV Peak Output	**5%**	** % of peak site elec demand
PV Electricity Generation	**1,026,252**	kWh/year
PV Electricity Generation	**2%**	% of site elec consumption
PV Annual Capacity Factor	**15.8%**	** %
PV Electricity Generation	**3,501,572**	kBtu/year
PV Electricity Generation	**1%**	% of site energy consumption
Net Metering Net Balance	**-57,457,216**	kWh/year
Peak Electricity Exporting	**-2,600**	kW_e

****NOTES:**

PV Peak Output

This is the ratio, represented as a percentage, of the peak site PV system output over the peak site electric demand. It is independent of time, and thus the peaks do not have to be coincidental.

Capacity Factor

A common metric used to evaluate how well an energy generation system is performing with respect to climate and other technolgies. It is calculated by taking the actual system generation over the theoretical maximum generation. The theoretical maximum generation assumes the system is performing at 100% capacity for every hour of the year.

Wp vs We

Wp, or kWp, is the peak rating of the solar module, reflecting the amount of direct current (DC) power that can be generated, and does not take into account derating due to wiring loss, temperature, inverter efficiency losses, etc. We, or kWe, is the electric rating, or AC rating, and this more accurately denotes the useful power generation of the system. Derate factors are applied to Wp values to take into account all of the losses, and the values range from 77 to 85 percent.

Legend

ELECTRICITY GRAPHS

Blue lines - average hourly electricity demand profile
Light blue - range of annual max and min hourly electricity demands
y-axis is in kW (both demand and electrical AC generation)

TOTAL ENERGY GRAPHS

Brown lines- average hourly total combined energy demand profile (both gas and electric)
Light brown- range of annual max and min hourly combined energy demands
y-axis is in Btu/h (both demand and electrical AC generation)

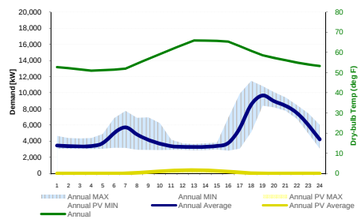
PV SYSTEM GENERATION PROFILES

Yellow lines- average hourly electricity generated from the PV systems
Light yellow- range of PV hourly outputs (not shown for total energy graphs to simplify graphs)

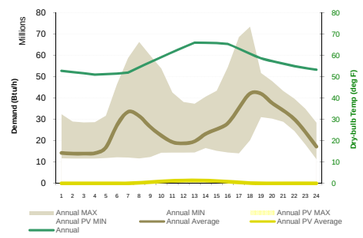
The Annual Profile graphs below also have average daily dry bulb temperature profile shown in green.

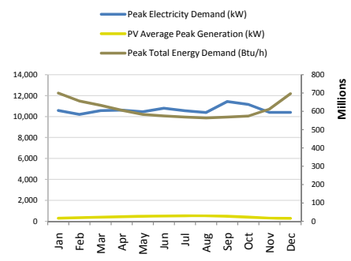
Annual Profiles

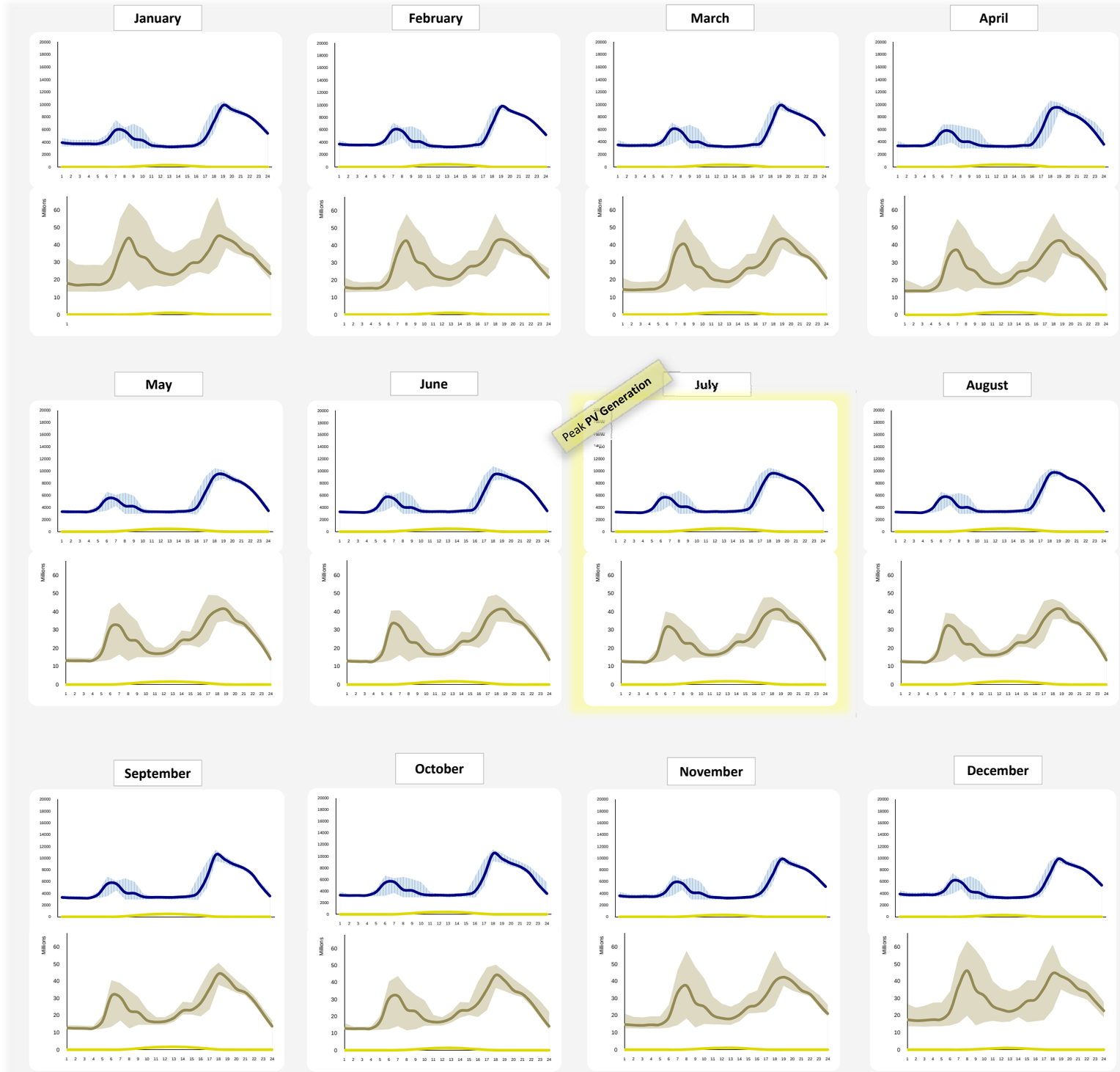
Electricity Profiles



Total Energy Profiles







Treasure Island Site Renewable Energy Profiles

ARUP

ENERGY PERFORMANCE ITERATION:

% Cost Premium minus LR & MR Residential Cooling

SITE RENEWABLES ITERATION:

Optimized PV Build-out

Energy Demand Summary

TI Site s.f.	11,730,650	s.f.
YB Site s.f.	461,095	s.f.
Combined s.f.	12,191,745	s.f.

Electricity

Peak Demand	**11.4**	MW
Peak Demand	**0.9**	W/s.f.
Base Load Demand	**2.6**	MW
Annual Consumption	**58,483,468**	kWh/year
Annual Consumption	**4.8**	kWh/s.f.

Combined Energy

Peak Demand	**73,434**	kBtu/h
Peak Demand	**6.0**	Btu/h/s.f.
Annual Consumption	**297,502,397**	kBtu/year
Annual Consumption	**24.4**	kBtu/s.f.

Photovoltaic (PV) Summary

PV by End-Use

End-Use Type	Useable Area s.f.	Useable Area acres	PV Capacity kW_p
LR Res	631,855	15	-
MR Res	28,282	1	-
HR Res	53,611	1	-
Low-Income	305,892	7	3,671
Commercial	37,993	1	-
Retail	63,930	1	-
Parking Structures + Bldg 1	110,400	3	1,325
Adaptive Reuse, Bldgs 2, 3	116,888	3	701
Solar Farm	871,200	20	8,712
TOTAL	2,220,049	51	14,409

Entire Site PV System

PV Total Capacity	**14,409**	** kW_p
PV Peak Output	**11,591**	kW_e
PV Peak Average Output	**10,441**	kW_e
PV Peak Output	**101%**	** % of peak site elec demand
PV Electricity Generation	**20,151,517**	kWh/year
PV Electricity Generation	**34%**	% of site elec consumption
PV Annual Capacity Factor	**16.0%**	** %
PV Electricity Generation	**68,756,976**	kBtu/year
PV Electricity Generation	**23%**	% of site energy consumption
Net Metering Net Balance	**-38,331,951**	kWh/year
Peak Electricity Exporting	**8,400**	kW_e

****NOTES:**

PV Peak Output

This is the ratio, represented as a percentage, of the peak site PV system output over the peak site electric demand. It is independent of time, and thus the peaks do not have to be coincidental.

Capacity Factor

A common metric used to evaluate how well an energy generation system is performing with respect to climate and other technolgies. It is calculated by taking the actual system generation over the theoretical maximum generation. The theoretical maximum generation assumes the system is performing at 100% capacity for every hour of the year.

Wp vs We

Wp, or kWp, is the peak rating of the solar module, reflecting the amount of direct current (DC) power that can be generated, and does not take into account derating due to wiring loss, temperature, inverter efficiency losses, etc. We, or kWe, is the electric rating, or AC rating, and this more accurately denotes the useful power generation of the system. Derate factors are applied to Wp values to take into account all of the losses, and the values range from 77 to 85 percent.

Legend

ELECTRICITY GRAPHS

Blue lines - average hourly electricity demand profile
Light blue - range of annual max and min hourly electricity demands
y-axis is in kW (both demand and electrical AC generation)

TOTAL ENERGY GRAPHS

Brown lines- average hourly total combined energy demand profile (both gas and electric)
Light brown- range of annual max and min hourly combined energy demands
y-axis is in Btu/h (both demand and electrical AC generation)

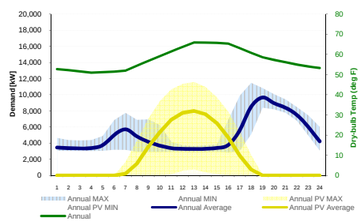
PV SYSTEM GENERATION PROFILES

Yellow lines- average hourly electricity generated from the PV systems
Light yellow- range of PV hourly outputs (not shown for total energy graphs to simplify graphs)

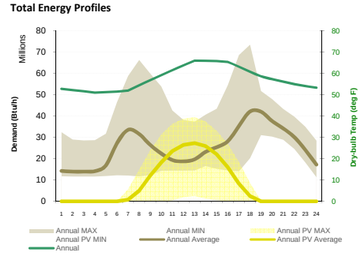
The Annual Profile graphs below also have average daily dry bulb temperature profile shown in green.

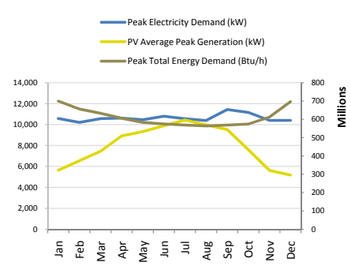
Annual Profiles

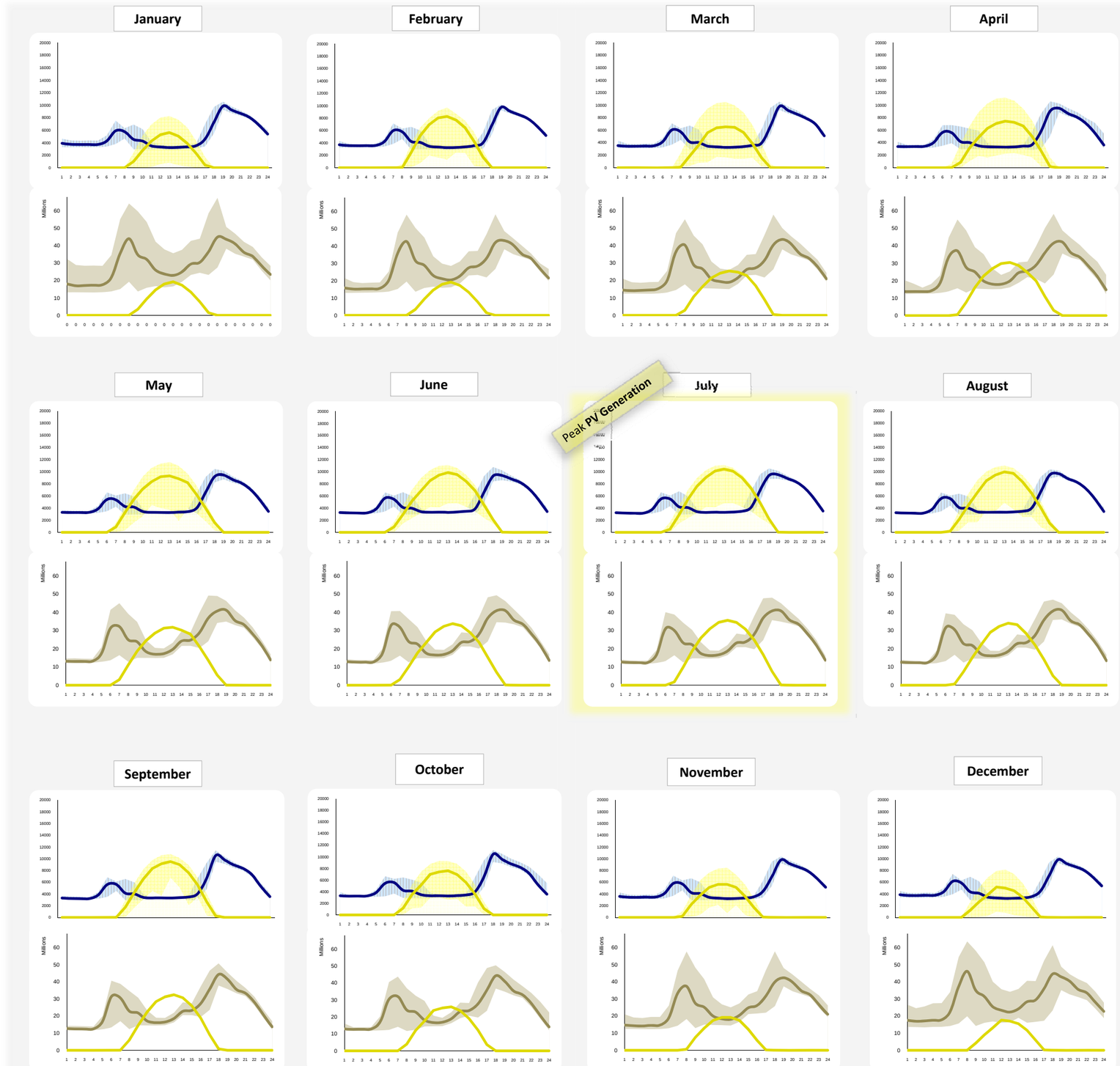
Electricity Profiles



Total Energy Profiles







Treasure Island Site Renewable Energy Profiles

ARUP

ENERGY PERFORMANCE ITERATION:

% Cost Premium minus LR & MR Residential Cooling

SITE RENEWABLES ITERATION:

Maximum PV Build-out

Energy Demand Summary

TI Site s.f.	11,730,650	s.f.
YB Site s.f.	461,095	s.f.
Combined s.f.	12,191,745	s.f.

Electricity

Peak Demand	**11.4**	MW
Peak Demand	**0.9**	W/s.f.
Base Load Demand	**2.6**	MW
Annual Consumption	**58,483,468**	kWh/year
Annual Consumption	**4.8**	kWh/s.f.

Combined Energy

Peak Demand	**73,434**	kBtu/h
Peak Demand	**6.0**	Btu/h/s.f.
Annual Consumption	**297,502,397**	kBtu/year
Annual Consumption	**24.4**	kBtu/s.f.

Photovoltaic (PV) Summary

PV by End-Use

End-Use Type	Useable Area s.f.	Useable Area acres	PV Capacity kW_p
LR Res	631,855	15	7,582
MR Res	28,282	1	339
HR Res	53,611	1	643
Low-Income	305,892	7	3,671
Commercial	37,993	1	456
Retail	63,930	1	767
Parking Structures + Bldg 1	110,400	3	1,325
Adaptive Reuse, Bldgs 2, 3	116,888	3	701
Solar Farm	871,200	20	8,712
TOTAL	2,220,049	51	24,197

Entire Site PV System

PV Total Capacity	**24,197**	** kW_p
PV Peak Output	**19,402**	kW_e
PV Peak Average Output	**17,495**	kW_e
PV Peak Output	**170%**	** % of peak site elec demand
PV Electricity Generation	**33,462,925**	kWh/year
PV Electricity Generation	**57%**	% of site elec consumption
PV Annual Capacity Factor	**15.8%**	** %
PV Electricity Generation	**114,175,500**	kBtu/year
PV Electricity Generation	**38%**	% of site energy consumption
Net Metering Net Balance	**-25,020,543**	kWh/year
Peak Electricity Exporting	**16,200**	kW_e

****NOTES:**

PV Peak Output

This is the ratio, represented as a percentage, of the peak site PV system output over the peak site electric demand. It is independent of time, and thus the peaks do not have to be coincidental.

Capacity Factor

A common metric used to evaluate how well an energy generation system is performing with respect to climate and other technolgies. It is calculated by taking the actual system generation over the theoretical maximum generation. The theoretical maximum generation assumes the system is performing at 100% capacity for every hour of the year.

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Legend

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Blue lines - average hourly electricity demand profile
Light blue - range of annual max and min hourly electricity demands
y-axis is in kW (both demand and electrical AC generation)

TOTAL ENERGY GRAPHS

Brown lines- average hourly total combined energy demand profile (both gas and electric)
Light brown- range of annual max and min hourly combined energy demands
y-axis is in Btu/h (both demand and electrical AC generation)

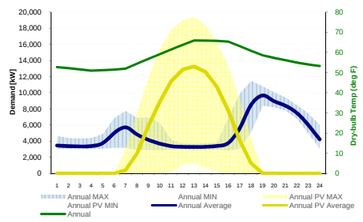
PV SYSTEM GENERATION PROFILES

Yellow lines- average hourly electricity generated from the PV systems
Light yellow- range of PV hourly outputs (not shown for total energy graphs to simplify graphs)

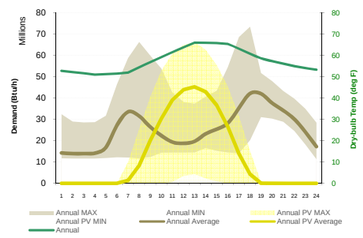
The Annual Profile graphs below also have average daily dry bulb temperature profile shown in green.

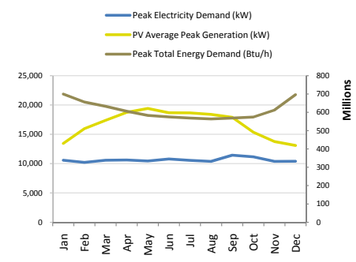
Annual Profiles

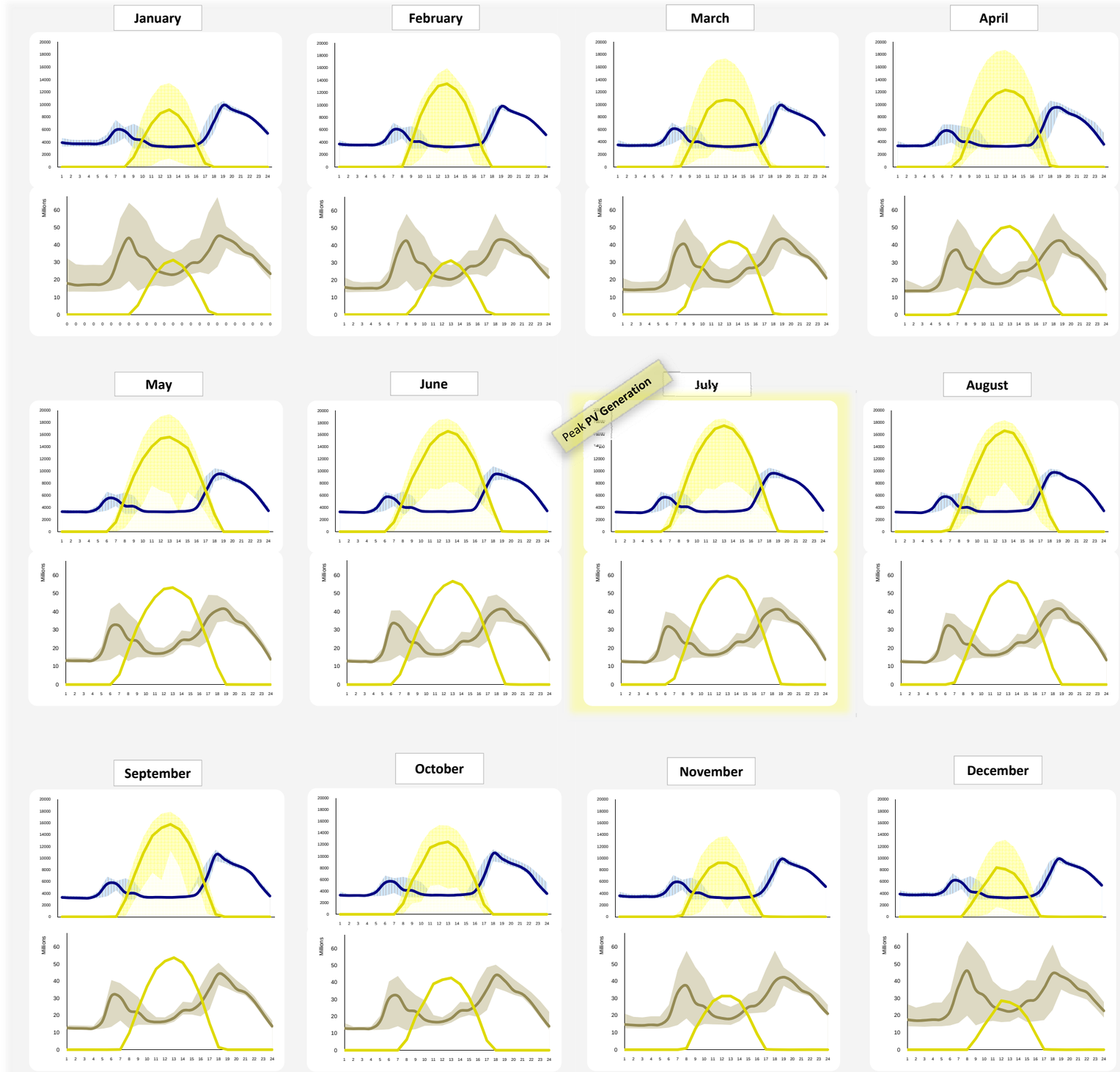
Electricity Profiles



Total Energy Profiles







6 Waste to Energy

The use of a waste to energy system has also been discussed for the TI project with the potential that this could be procured through an Energy Service Company. This system would receive feedstocks in the form of fats, oils, grease and potentially foodwaste from residences and restaurants on the site. These would be captured in a digester and broken down anaerobically, producing biogas. This in turn can either be burned to turn a turbine, producing electricity, or can be used to directly heat water via a boiler, which could be used to feed into the potential district heating system or used locally should there be a need for hot water.

One of the driving factors in applying this system is the availability of feedstock and the ease of getting this feedstock to the waste processing facility. If the feedstock needs to be collected and transported via conventional fossil fuel means, it is likely that the system will not be environmentally viable.

The potential use of the automated waste handling system for the project however could make this a potentially viable system providing the central waste handling facility was combined with or adjacent to the bio-digestion facility.

The diagram below indicates the steps taken by this type of system to convert waste to energy.

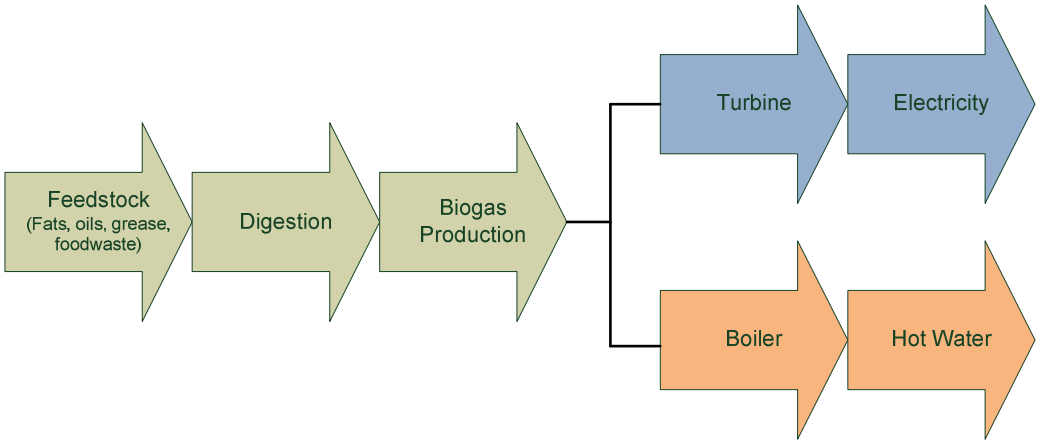


Figure 11 - Waste to energy system flowchart

A high-level feasibility study was undertaken to understand the power production potential of this type of system for Treasure Island as well as the economics.

The full report can be found within Appendix G of this report. A summary is repeated below.

6.1.1 Assumptions

- Based on development occupancy of 18,240 people.
- Wastewater treatment plant flow rate is 1.31 millions of gallons per day (MGD).
- It is assumed that there are four restaurants on the site.
- Analysis assumes food waste captured from restaurants and/or residences. Fats, oils and grease are not included in the conservative scenarios.

- Savings are incurred due to avoided electricity costs, avoided food disposal costs and avoided natural gas costs.

6.1.2 Analysis options

The following scenarios were considered:

- Option A – Uses Capstone 65 kW microturbines. Assumes no residential food waste will be available for digester feedstock.
- Option B – Uses Capstone 65 kW microturbines. Assumes both residential and restaurant food waste will be digested.
- Option C – Uses Stirling Biopower FleXgen G43 Stirling Engines. Assumes no residential food waste will be digested. Assumes both residential and restaurant food waste will be available for digester feedstock.
- Option D – Uses Stirling Biopower FleXgen G43 Stirling Engines.

6.1.3 Results

The economic results of the analysis are shown below:

Option	*Capital Cost*	*Electrical Savings*	*Natural Gas Savings*	*Avoided Food Disposal Costs*	*Annual Operation and Maintenance Costs*	*Simple Payback*
	($)	($/yr)	($/yr)	($/yr)	($/yr)	(yr)
A	2,100,000	47,000	22,000	27,000	(65,000)	68
B	2,400,000	109,000	44,000	117,000	(71,000)	12
C	2,100,000	36,000	24,000	27,000	(64,000)	91
D	2,400,000	77,000	47,000	117,000	(68,000)	14

Table 14 - Economic results

Energy results for each option are shown below:

Option	*Net Peak Power Production*	*Heat Recovered*	*Annual Electrical Generation*	*% of Site Peak Demand Met (based on 11.4 MW)*	*% of Site Electricity Consumption Offset (based on 58,717 MWh)*
	(kW)	(Therms)	(kWh	(%)	(%)
A	50	2.51	391,667	0.5	0.7
B	115	5.02	908,333	1	1.6
C	38	38	300,000	0.3	0.5
D	81	81	641,667	0.7	1.1

Table 15 - Energy results

6.1.4 Conclusion

The analysis options that included residential food waste (Options B & D) yield paybacks that are relatively attractive (12 & 14 years, respectively). Moreover, these paybacks would likely reduce further once incentives and rebates available for waste to energy systems are factored in. To move this system forward, the following would likely been required:

- An automated waste handling system would be installed on the site;
- The automated waste system would be able to isolate food waste;
- The biodigestion facility, the automated waste collection facility and the WWTP facility would all be within close proximity;
- A more detailed feasibility study is recommended to explore in further depth.

7 District Energy System

The following section describes the series of studies performed to identify potential district energy (DE) options for the project. The study identifies technical, and financial options for several different district energy scenarios. The following options were identified and studied in detail based on the use of various technologies and the use of these technologies at various project scales and phasing. Several different options have been considered as potential site wide generation strategies. The following 4 options are included – in addition to a Business as Usual (BAU) case – as the most probable scenarios:

- Option 1 – Centralized Heating for Entire Development
- Option 2 – Centralized Heating with Electric Cooling For East and South Development
- Option 3 – Combined Heating and Power
- Option 4 – Combined Heating, Cooling, and Power

7.1.1 Major Assumptions

- Yerba Buena has not been considered in this analysis.
- Building Energy Performance Iteration 3 has been assumed in all calculations.
- The study of these different scenarios by phase provides a more detailed look into the potential breakdown for smaller distributed plants, or satellite plants.

7.1.2 Results

- The analysis also concluded that moving towards a district approach would conservatively save up to 1.5% of floor area in each building due to cooling and heating equipment that is made redundant by the district system.
- Infrastructure costs and energy demand densities (development densities) tend to drive the district energy economics. The phase analysis identifies negative financial implications as the timing of underground infrastructure is installed throughout the phases. This negative impact tends to be less for the early phases, due to relatively smaller infrastructure and higher energy demand densities, but as the lower density residential is brought online, the economics look less attractive - phase 4 is where the negative hit is seen most. Seeking incentives may improve this, but none have been assumed for our analysis. The use of satellites plants appears to be more attractive as it defers not just underground infrastructure cost but also the cost of head end equipment – this especially true for the cooling option.
- The heating (option 1) and combined heating and power (options 3 and 4) options tend to shift site energy reliance from electricity to natural gas. This has cost advantages in most cases, but also has implications for carbon emissions. The overall carbon picture relies greatly on the emission rates for electrical energy use as natural gas rates are relatively constant. Plant efficiencies (for boilers and turbines) have a positive but minor impact on carbon emission rates and costs
- The CHP analysis (Options 3 and 4) identified potential cost savings, primarily from improved purchasing power at wholesale rates and proper plant sizing. The CHP system had a major impact on increasing natural gas usage which has implications for site CO2 emissions. Assuming the current local electric grid emission rates, the overall emissions impact was marginally higher. The major benefits of this system include potential cost savings to energy customers. The study also identified the 1.5 MW scale to be the most appropriate for heating and power only. If Option 4 is pursued (inclusion

of absorption cooling from waste heat), a capacity of 3 MW may be more appropriate. The impact of local incentives will improve the economics further.

- Although more costly in the long run, the use of satellite district plants developed alongside each phase, would appear slightly more attractive by delaying some of the infrastructure costs.

7.2 Site Wide Energy Supply Options Summary

The following is a brief summary of the key assumptions used throughout this study. The following global assumptions have been used in the analysis of site wide heating, cooling, and power generation options. These are preliminary estimates as building areas and site wide energy values are still under development.

7.2.1 Project Phasing

As can be seen in this study, project build-out and phasing has a significant impact on DE options. Phasing plays a key role in sizing/capacity, infrastructure work, and, most of all, project economics. In most cases, the energy infrastructure needs to be in-place as buildings come "on-line." It will not be financially prudent to install the entire required capacity, when only a small portion of the load will come "online" initially, with the rest of the load following 8 or more years down the line. Therefore, the study analyzes a phased approach, where the infrastructure for each build-out phase comes online in the first year of that build-out phase. The study does not identify specific locations for central plants; however, it is very likely and very possible that a new central plant could be developed at each phase serving the local buildings for that build-out.

In general, the phasing follows closely with the development zoning where:

Phase	*Start*	*End*	*Duration (years)*	*Build-Out Locations*	*Build-Out Area (million sq ft)*
1	2012	2014	2	Ferry & Infrastructure	0
2	2014	2016	2	City Side East, partial Retail Core and Island Core	4.565
3	2016	2018	2	East Side, partial Retail Core and Island Core	4.402
4	2018	2020	2	City Side (west) and several towers	3.450
Total	2012	2020	2	All	11.158

Table 16 - Assumed Development Phasing Details

7.2.2 Building Areas and End-Use Energy Demands

The building type and area breakdowns used in this analysis have been taken from the Building Energy Performance work. The following table shows the assumed development phasing and energy end-use demands:

	Building Areas (Million Square Feet)					Electricity		Heating		Cooling	
Building Type	***Phase 1***	***Phase 2***	***Phase 3***	***Phase 4***	***Total***	***Demand (MW)***	***Consumption (MWh)***	***Demand (MBtuh)***	***Consumption (MBtu)***	***Demand (MBtuh)***	***Consumption (MBtu)***
Low rise residential	0	0.960	1.568	2.103	4.632	4.2	17,205	-	-	0	0
Mid Rise Residential	0	1.124	1.270	0.831	3.222	3.0	11,755	-	-	0	0
High Rise Residential	0	1.884	0.293	0.095	2.272	2.6	9,796	-	-	-	-
Commercial	0	0.180	0.667	0	0.707	1.1	4,908	-	-	-	-
Adaptive Reuse	0	0.080	0.245	0	0.325	0.5	1,958	-	-	-	-
Total	0	4.565	4.402	3.450	11.158	11.5	44,000	49.1	122,200	13.9	12,500

Table 17 - Building Areas and End Use Demands

*A diversity factor of 60% has been applied to the electric, heating, and cooling demand values.

7.2.3 Energy End Uses Served by the District Energy System

The end-uses considered for the district energy analysis include heating (space heating and domestic water heating), space cooling, and other electrical end-uses. A matrix of building type specific end uses analyzed in this study have been included below.

Building Type	**Space Heating**	**Domestic Hot Water Heating**	**Space Cooling**	**Other Electrical**
Low rise residential	all	all	none	partial
Mid Rise Residential	all	all	none	partial
High Rise residential	all	all	all	partial
Commercial	all	all	all	partial
Adaptive Reuse	all	all	all	partial

Table 18 - Building Areas and End Use Demands

The energy end-use splits have been identified for each building type and organized by the site energy supply types considered for the BaU Case.

7.2.4 Financial Assumptions

The general financial assumptions that are consistent throughout the study have been included below. Some financial assumptions will vary between each study. These variances are noted in the detailed summary for each.

For each option, a financial analysis is performed to indicate financial viability of different options and technologies. This includes estimations on capital costs (plant and infrastructure), annual operating costs (plant and infrastructure), and exploration of incentives and alternative financing options. Financial analysis is performed by phase and technology and summarized in a project cash flow. In order to understand the impact of these options to customers, estimated cost premiums to customers are identified. These

cost premiums are developed by comparing the likely DE customer charges to the avoided cost of the local utility provider (Pacific Gas and Electric). Since the development is dominated by residential building, fixed electrical and gas rates have been assumed for avoided electricity and natural gas costs. Fixed industrial rates have been assumed for gas or electricity purchased by the district energy plant for generating energy on-site. Additionally, energy escalation rates have been assumed using averages from the Department of Energy.

Utility Service	Fixed Rate Assumption	Source/Notes	Escalation Rate**
Electricity-Residential	120.00 $/MWh	Estimate based on current PG&E residential and multifamily user rates.	1.72%
Natural Gas-Residential	11.00 $/MBtu	Estimate based on current PG&E residential and multifamily user rates.	1.91%
Electricity-Industrial	60.00 $/MWh*	Estimate based on current PG&E large commercial user rates.	1.61%
Natural Gas-Industrial	5.00 $/MBtu*	Estimate based on current PG&E large commercial user rates.	2.18%

Table 19 - Building Areas and End Use Demands

*These values are only estimates, negotiation of rates will be required.
**Escalation rates are 30 year averages and based on values from "Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis – 2009". These values do not include general Inflation which is estimated at 1.2%.

7.3 Space Analysis

A plant space requirement calculation was performed to estimate plant space requirements for each technology. The purpose of this analysis is to compare district energy space requirements to BaU and provide preliminary space requirements that could be used to inform space allocations and future design work. Space allocations for district energy generation plants are summarized for each district option.

7.3.1 Results

- The district energy system will take up less useable floor and roof area within the building footprint. This has financial benefits for the vertical developer through increased usable floor area. It also reduces the amount of roof equipment required increasing the available roof space for green roofs, photovoltaic or solar thermal renewable energy collectors as well as improving site aesthetics.
- Significant site-wide distribution infrastructure will be required in order to connect each building within the development to the district energy plant(s). This infrastructure will have a significantly higher cost than BAU (which essentially is nothing), but will also provide benefits over the BAU. The cost savings for the infrastructure will likely be realized through reduced maintenance requirements for equipment that would be required for the BAU case.

7.3.2 Comparison of BaU and District Energy Space Requirements

A comparison of the BaU and district energy space requirements at each building helps identify the impacts to building space allocations. In general, the district option will reduce required plant space in a building by moving the generation equipment to a central location.

7.3.3 BaU Plant Types and Space Use

The BaU plant space use is likely to vary significantly across building types and building sizes. Table below summarizes the assumptions made for typical BaU heating and cooling plant types used in comparison to the district energy options.

7.3.4 District Energy Connections to Buildings (Customer Connections)

All connections to buildings are assumed to consist of a meter (measuring supply and return), meter enclosure, shut-off valves and plate & frame heat exchangers. The meters will provide for accurate measurement of energy usage, provide for trouble shooting and monitoring of both district and building systems, and provide measurements for billing purposes. Meters will be contained within a meter enclosure which may be located inside or outside the building; this enclosure will likely require periodic access by the district energy operator. The shut-off valves will provide for isolation of the system. Heat exchangers will allow for separation of district and building water systems. In some cases, heat exchangers may be provided through the district energy operator or by the building owner. For the purposes of this study, heat exchangers are assumed to be owned and operated by the district energy operator.

Scenario	Business As Usual	District Energy Connection	Estimated Building Area Savings (%)
Small Building or Residence			
Heating Plant	Electric Heat or Heat Pump (Unitary)	Heat exchanger and pumping system to unitary system	0.0%
Cooling Plant	Outdoor AC Condensing Unit or Heat Pump (unitary)	Heat exchanger and pumping system to unitary system	
Medium Building or Connection			
Heating Plant	Building Hot Water – Gas-Fired Boiler	Heat exchanger and pumping system to unitary system	1.0%
Cooling Plant	Building Air-Cooled Chiller Plant	Heat exchanger and pumping system to unitary system	
Large Building or Connection			
Cooling Plant	Building Hot Water Plant – Gas-Fired Boiler	Heat exchanger and pumping system to unitary system	1.5%
Large Building or Connection - Cooling Plant	Building Water-Cooled Chiller Plant	Heat exchanger and pumping system to unitary system	

Table 20 - Space Analysis Summary

See calculations for additional assumptions and space estimations.

7.4 Business as Usual (BaU) Energy End Use

The purpose of this section is to identify the energy end-use profiles and corresponding energy sources (or primary fuel types) that can be used to identify benefits or disadvantages as compared to the district energy system options.

7.4.1 Site Annual Energy End-Use Profile

In order to understand the potential for heating and cooling at a district level, these end use energy figures were extracted from the building energy performance models. The following graphs illustrate the end-use energy split for the Proposed Energy Efficiency Case that does not consider cooling for Low Rise and Mid Rise Residential buildings.

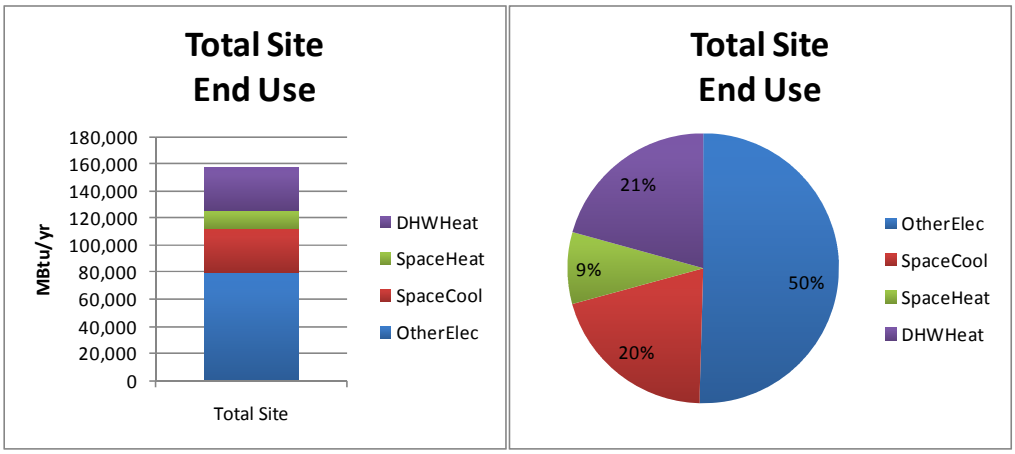


Figure 12 - Total site end use summary

These graphs indicate that more that nearly 50% of the sites energy demand is either a heating or cooling end use. Heating (comprised of space and domestic hot water heating) is nearly a third of the total site energy use.

7.4.2 Energy Source End-Use Splits

The following pie chart identifies electricity as the predominant energy source for the site. The gas-fired heating and CHP technologies in the Distirct Options have a significant impact on the energy source split by switching from electric to gas. This has implications for both carbon emissions and fuel costs which are identified in the following sections.

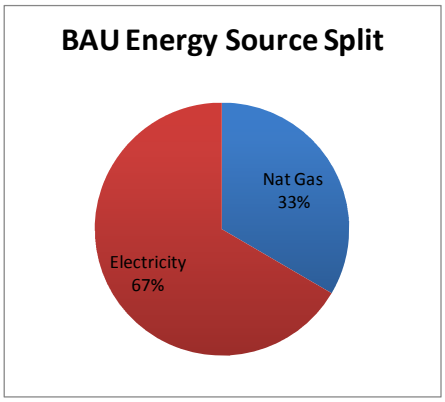


Figure 13 - Business as usual energy source breakdown

The following charts illustrate the specific building end-use demands served by each energy source. Electricity is the predominant source providing a significant portion of space cooling, space heating, domestic hot water heating, and other electric loads. Natural gas service primarily domestic hot water and a small portion of space heating for commercial type buildings.

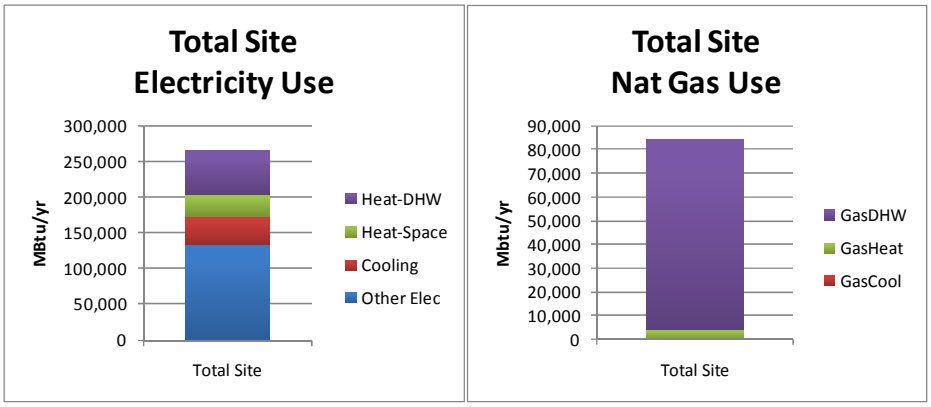


Figure 14 - Energy consumption by source energy

7.5 District Energy Options

The following summaries the four different district energy options analyzed. Additional details can be found in Appendix K.

The following has been provided for each option to provide for comparison of these options:

- Option Summary - brief description of the option considered
- Distribution Infrastructure Summary - identifies the required infrastructure and gives preliminary sizes and lengths for distribution pipework. It also gives an indication of the area (or number of customers) that could be served by the system.
- Technology and Cost Summary - summary of the technologies considered including capacities, efficiencies, energy generation quantities and profiles, and other technical operating characteristics. Costs include a high level estimate of capital costs, first year operating costs, first year revenues, cost impact to customers, etc.

7.5.1 Results

- Infrastructure costs and energy demand densities (development densities) tend to drive the district energy economics. The phase analysis identifies negative financial implications as the timing of underground infrastructure is installed throughout the phases. This negative impact tends to be less for the early phases, due to relatively smaller infrastructure and higher energy demand densities, but as the lower density residential is brought online, the economics look less attractive - phase 4 is where the negative hit is seen most. Seeking incentives may improve this, but none have been assumed for our analysis. The use of satellites plants appears to be more attractive as it defers not just underground infrastructure cost but also the cost of head end equipment – this especially true for the cooling option.
- The heating (option 1) and combined heating and power (options 3 and 4) options tend to shift site energy reliance from electricity to natural gas. This has cost advantages in most cases, but also has implications for carbon emissions. The overall carbon picture relies greatly on the emission rates for electrical energy use as natural gas rates are relatively constant. Plant efficiencies (for boilers and turbines) have a positive but minor impact on carbon emission rates and costs

- The CHP analysis (Options 3 and 4) identified potential cost savings, primarily from improved purchasing power at wholesale rates and proper plant sizing. The CHP system had a major impact on increasing natural gas usage which has implications for site CO2 emissions. Assuming the current local electric grid emission rates, the overall emissions impact was marginally higher. The major benefits of this system include potential cost savings to energy customers. The study also identified the 1.5 MW scale to be the most appropriate for heating and power only. If Option 4 is pursued (inclusion of absorption cooling from waste heat), a capacity of 3 MW may be more appropriate. The impact of local incentives will improve the economics further.
- Although more costly in the long run, the use of satellite district plants developed alongside each phase, would appear slightly more attractive by delaying some of the infrastructure costs.

7.5.2 Option 1 - Centralized Heating Only for Entire Development

This option considers the installation of natural gas-boilers for generating heating hot water that will be distributed throughout the entire site. Infrastructure and boiler plants are assumed to be installed at the beginning of each phase. Infrastructure size and boiler capacity are sized separately for each phase.

The distribution infrastructure is assumed to provide heating to the entire development. Refer to the District Energy Infrastructure Site Diagram for a graphical representation of the proposed infrastructure layout. (Note: Chilled water infrastructure is not considered for this option.) Distribution of hot water is provided through underground piping systems. Electrical centrifugal pumps are used to distribute the hot water through the distribution piping system.

Heating Hot Water		Phase 1	Phase 2	Phase 3	Phase 4	Total
Building Connections	qty	0	20	30	30	80
Connected Area	million sq ft	0.00	3.93	4.40	3.40	11.7
Distribution Pipe Length	linear feet	0	10,500	4,500	6,000	21,000
Infrastructure Cost	Million $	0	2.038	1.088	1.350	4.475

Table 21 - Option 1 Distribution Infrastructure Summary

The central heating plant benefits from large demand diversity which provides for smaller overall capacities than the BaU case. This translates to lower capital costs and lower maintenance costs across the site. The other benefit from diversity is improved equipment part load efficiencies which can result in increased fuel use efficiency.

This study identifies the site-wide district heating system to be economically viable for the entire development. Table 1 identifies an overall energy cost savings of about 5%. This cost savings does not include avoided cost savings from building level heating plant equipment which further increases these cost savings.

Of particular interest is the fact that Phase 4 (in isolation) yields an customer cost premium. Phase 4 which includes primarily the CitySide (west) development area has a lower overall heating demand density and relatively higher infrastructure costs due to the lower development density. This reduces the overall financial viability for this phase or development area. However, since this cost premium is marginal and the avoided cost of building heat generation equipment is not included, it is likely that the other benefits provided by this central system will outweigh the added cost premium. Other benefits include space savings, reduced maintenance costs and improved building aesthetics to name a few.

Gas-Fired Boiler (Heating Hot Water)		Phase 1	Phase 2	Phase 3	Phase 4	Total	BaU
Capacity	MBtuh	0.0	12.8	9.6	8.9	31.3	52.8
Generation	MBtu	0	37,004	30,899	23,012	90,916	94,004
Capital Cost	Million $	0.000	0.781	0.555	0.521	1.858	3.135
Unit Cost	$/MBtuh	0.00	61.1	57.9	58.7	59.4	59.4
Infrastructure Cost	Million $	0.000	0.145	0.097	0.109	0.351	0.526
Operating Cost	Million $	0.0	32.3	24.7	29.9	29.1	25.27
Customer Cost Premium (+) Premium, (-) Savings	%	0%	-5%	-25%	13%*	-5.7%**	base
Plant Area	sq ft	0	3,153	2,363	2,189	7,705	117,290

Table 22 - Option 1 – Technology and Cost Summary

* Cost premium for phase 4 due to lower overall heating demand density and relatively higher infrastructure costs.

**Overall cost savings across entire development.

A significant portion of the site heating energy in the BaU was generated with electricity. In Option 1, all of the heating is now generated by natural gas creating a much higher use and dependence on natural gas. This fuel switching has carbon emission implications (may be reduction or increase depending on the carbon emission rate of the electricity source) but also benefits from relatively lower natural gas prices. The change in primary energy use is described in the following Figures.

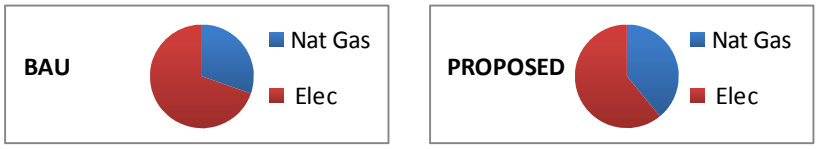


Figure 15 - Option 1 – BaU vs Proposed Primary Energy Source Splits

The fuel switching is also evident in the following graphs. Note that efficiency gains are marginal. Assuming typical emission rates for the region, CO2 reductions are also marginal. The major benefit from this Option from an energy use standpoint is reduced energy cost. Primarily through increased purchasing power of natural gas and electricity.

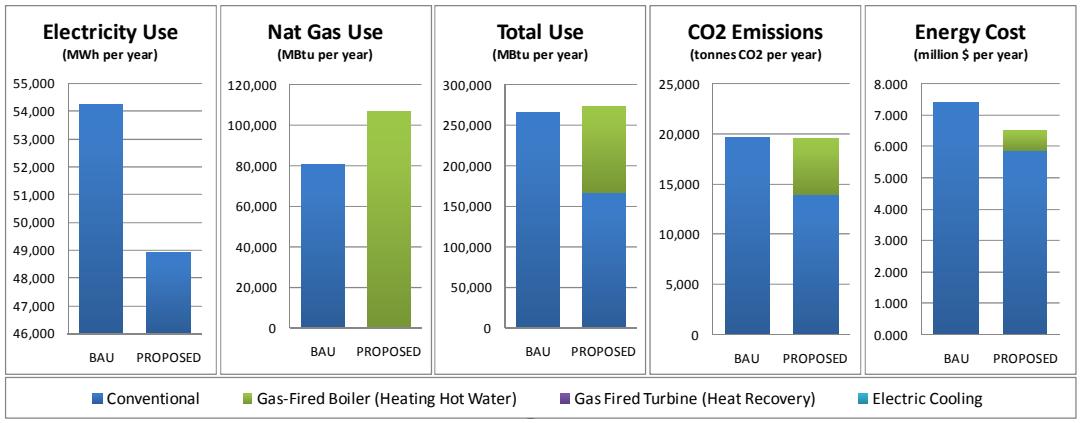


Figure 16 - Option 1 – BaU vs Proposed Summary of Energy Use, Emissions and Fuel Costs

7.5.3 Option 2 – Centralized Heating with Electric Cooling

This option considers the same heating scheme in option 1 with the addition of cooling for a portion of the development. An electric chiller plant is assumed to generate chilled water for

all buildings requiring mechanical cooling. Building types requiring mechanical cooling include HR residential, commercial, and adaptive reuse. These buildings are generally located within the Retail Core and Island Core development areas, or Phases 2 and 3 referenced in tables below. Building connections are assumed to be major building or block connections for the purpose of this study. Refer to the District Energy Infrastructure Site Diagram for a graphical representation of the proposed infrastructure layout. Distribution of hot water is provided through underground piping systems. Electrical centrifugal pumps are assumed to distribute the hot and chilled water through the distribution piping system.

Heating Hot Water		Phase 1	Phase 2	Phase 3	Phase 4	Total
Building Connections	qty	0	20	30	30	80
Connected Area	million sq ft	0.00	3.93	4.40	3.40	11.7
Distribution Pipe Length	linear feet	0	10,500	4,500	6,000	21,000
Infrastructure Cost	Million $	0	2.038	1.088	1.350	4.475
Chilled Water		Phase 1	Phase 2	Phase 3	Phase 4	Total
Building Connections	qty	0	10	5	5	20
Connected Area	million sq ft	0.00	1.45	1.10	0.08	2.627
Distribution Pipe Length	linear feet	0	6,000	0	0	6,000
Infrastructure Cost	Million $	0	1.150	0.080	0.020	1.250

Table 23 - Option 2 Distribution Infrastructure Summary

The primary energy source for cooling is electricity in both the BaU and Proposed Option. The overall increase in natural gas use is driven by the district heating system as described in Option 1.

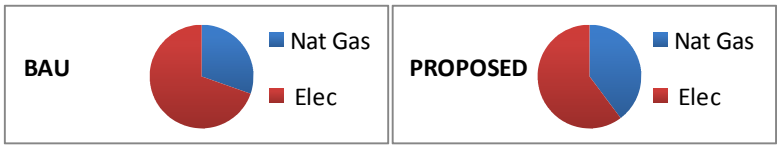


Figure 17 - Option 2 – BaU vs Proposed Primary Energy Source Splits

The cooling efficiency gains are marginal for the district cooling system this is primarily driven by a balance of increased cooling generation efficiencies and increased distribution energy use and distribution heat gains. Again, the major cost advantage of this system is through greater purchasing power and avoided costs of cooling generation equipment. There is no significant CO2 emissions impact for the district cooling option.

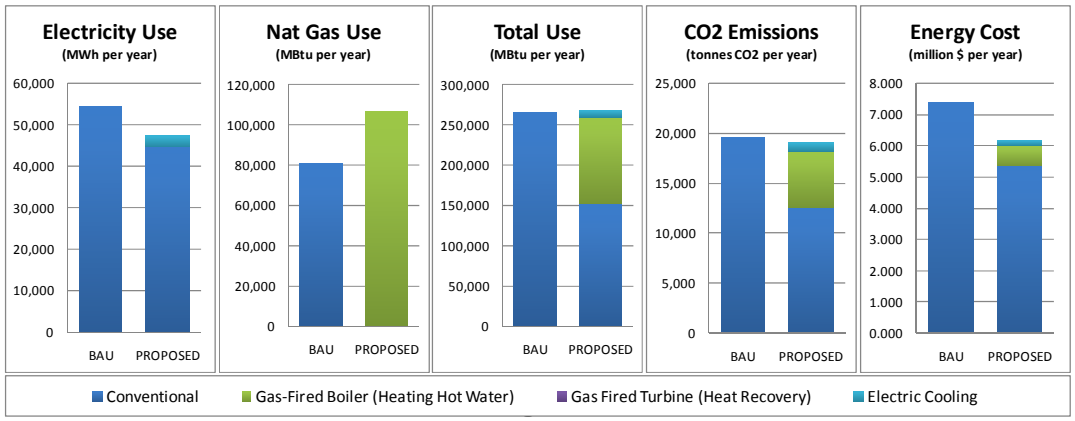


Figure 18 - Option 2 – BaU vs Proposed Summary of Energy Use, Emissions and Fuel Costs

This study identifies the site-wide district cooling system to have a higher cost premium than BaU. Table 1 identifies an overall energy cost premium of about 70%. The reason for the cost premium is primarily because the avoided cost savings from building level cooling plant equipment have not been considered. If one just considered fuel costs, the savings from the district cooling system are nearly 50% over BaU. The other reason for this higher cost premium is the relatively low cooling demand densities and significant infrastructure requirements.

The impact of infrastructure can be seen between Phases 2 and 3. In phase 2, the infrastructure for both phases has been included in the analysis. This creates a significant cost premium for phase 2 while decreasing this premium for phase 3. In addition, Phase four has a relatively small increase in cooling demand with significant infrastructure costs. One way of significantly reducing the infrastructure cost and associated cost premium would be to install chilled and hot water piping simultaneously, avoiding repeat excavation and backfill for separate systems.

Electric Cooling Plant (Chilled Water)		Phase 1	Phase 2	Phase 3	Phase 4	Total	BAU
Capacity	MBtuh	0.0	23.3	7.1	1.5	31.9	38.3
	tons	0.0	1,945	592	122	2,659	3,190
Generation	MBtu	0	25,646	11,715	1,555	38,916	22,025
Capital Cost	Million $	0.000	1.359	0.376	0.077	1.812	2.175
Unit Cost	$/MBtuh	0	699	635	635	682	682
Operating Cost	Million $	0.000	0.118	0.030	0.022	0.170	0.255
Est. Customer Energy Rate	$/Mbtu	#DIV/0!	38.90	20.88	58.25	60.51	12.832
Customer Cost Premium (+) Premium, (-) Savings	%	0.0%	82.8%	58.0%	91.2%	68.9%	base
Plant Area	sq ft	0	11,438	3,480	715	15,633	26,274

Table 24 - Option 2 (Run 1) – Technology and Cost Summary

7.5.4 Option 3 – Combined Heating and Power

A gas-fired turbine plant was considered for providing baseload heating, cooling, and power. The turbine plant utilizes a heat recovery unit that provides steam for generating low temperature hot water (<250 deg F). The viability of this technology is dependant on the ability to effectively utilize both the power and waste heat developed through the combustion process. When considering generation for the site in isolation, i.e. no net generation to the grid, three 1 MW gas-fired turbines has been identified as technically viable solution to test. In order to test the phase appropriateness and overall capacity, a single turbine is assumed

to be installed in each phase separately. In addition to the turbines, gas-fired heating, in option 1 is also considered in order to maximize the utilization of the heating distribution infrastructure required for distributing heat to the buildings. The distribution infrastructure is assumed to provide heating to the entire development. Building connections are assumed to be major building or block connections for the purpose of this study. Refer to the District Energy Infrastructure Site Diagram for a graphical representation of the proposed infrastructure layout. Distribution of hot and chilled water is provided through underground piping systems. Electrical centrifugal pumps are used to distribute the hot and chilled water through the distribution piping system.

Heating Hot Water		Phase 1	Phase 2	Phase 3	Phase 4	Total
Building Connections	qty	0	20	30	30	80
Connected Area	million sq ft	0.00	3.93	4.40	3.40	11.7
Distribution Pipe Length	linear feet	0	10,500	4,500	6,000	21,000
Infrastructure Cost	Million $	0	2.038	1.088	1.350	4.475

Table 25 - Option 3 – Distribution Infrastructure Summary

As mentioned previously, maximizing use of the electricity and heat generated by these systems improves the overall financial viability of these systems. There are also regulatory requirements for minimum efficiencies including those established by PURPA and FERC. The FERC efficiency for these three turbines is approximately 44.5% each. The minimum FERC efficiency is 42.5%. The total efficiency of the heating and power produced from natural gas is about 55% for all three turbines. This is a low utilization/efficiency which means much of the useful heat is not being fully utilized.

This option has an even greater impact on primary energy source use than option 1. Primarily because a significant portion of the grid supplied electricity is offset by natural gas generated electricity. This has implications for emission factors (typically reducing overall CO2 emissions through efficient use of fossil fuel energy than the local utility). This significant change in source energy use is identified in the graph below.

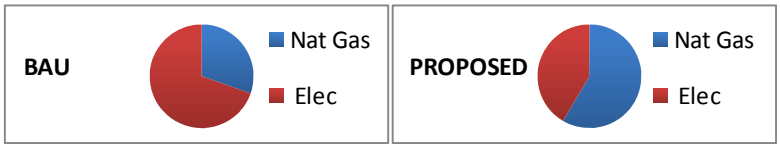


Figure 19 - Option 3 (Run 1) – BaU vs Proposed Primary Energy Source Splits

In addition to fuel source adjustments, the overall site energy usage increases. This increase in energy is not because CHP is less efficient, but rather due to the fact that site energy is referenced rather than source energy. The CO2 emissions captures the source efficiency impacts which are marginal, with CO2 emissions slightly increasing. The major benefit is reduced energy/fuel costs.

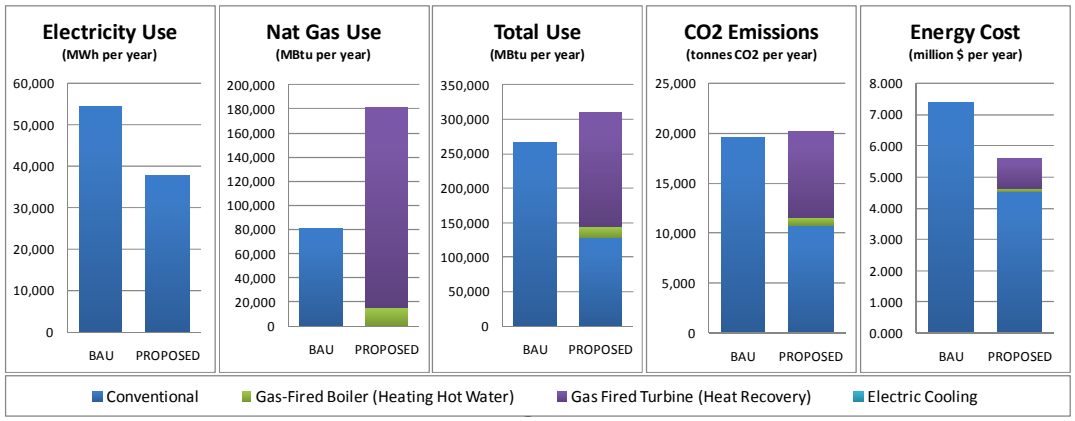


Figure 20 - Option 3 (Run 1) – BaU vs Proposed Summary of Energy Use, Emissions and Fuel Costs

Financially, this option will add a cost premium for customers. The avoided cost of heat generation equipment and maintenance will slightly improve the economics, but the benefits are not significant. The phase analysis identifies an increasing cost premium. This indicates that all though a 3MW total capacity is technically feasible it may not be the optimal capacity. In addition other regulatory, economic, or local specific issues may further dictate the capacity of this system. Tables below indicate these findings.

Gas-Fired Turbine (Heating, Cooling, and Power)		Phase 1	Phase 2	Phase 3	Phase 4	Total
Capacity	MW-elec	0.000	1.000	1.000	1.000	3.000
	Mbtuh-heat	0.000	6.824	6.677	5.985	19.487
Generation	kWh-e	0	5,639	4,831	4,487	14,956
	Mbtu-heat	0	38,478	34,337	31,897	104,712
Capital Cost	$	0.000	3.131	3.131	3.131	9.394
	$/kW	0	3,131	3,131	3,131	3,131
Operating Cost	$	0.000	0.147	0.126	0.117	0.389
	$/Mbtu	0.000	22.201	19.454	18.770	19.982
Cost Premium (+) Premium, (-) Savings	%	0.0%	-1.9%	8.6%	21.0%	8.8%
Plant Area	sf	0	10,350	10,446	10,446	31,242

Table 26 - Option 3 (Run 1) – Technology and Cost Summary

In order to further understand the impact of CHP sizing a second run was performed. This time three 0.5 MW units were assumed, one installed per phase. The overall system efficiencies for these runs were about 78%. This is a somewhat aggressive efficiency at this capacity level, but identified potential cost savings over the BaU. The net emissions impacts in this run were improved and comparable to BAU. Energy cost savings also improved. The following tables and figures summarize these savings.

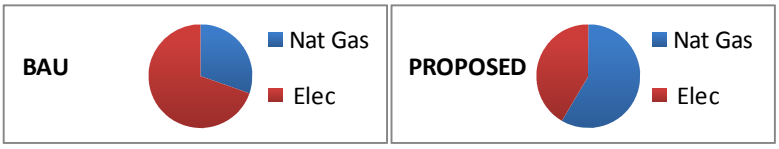


Figure 21 – Option 3 (Run 2) BaU vs Proposed Primary Energy Source Splits

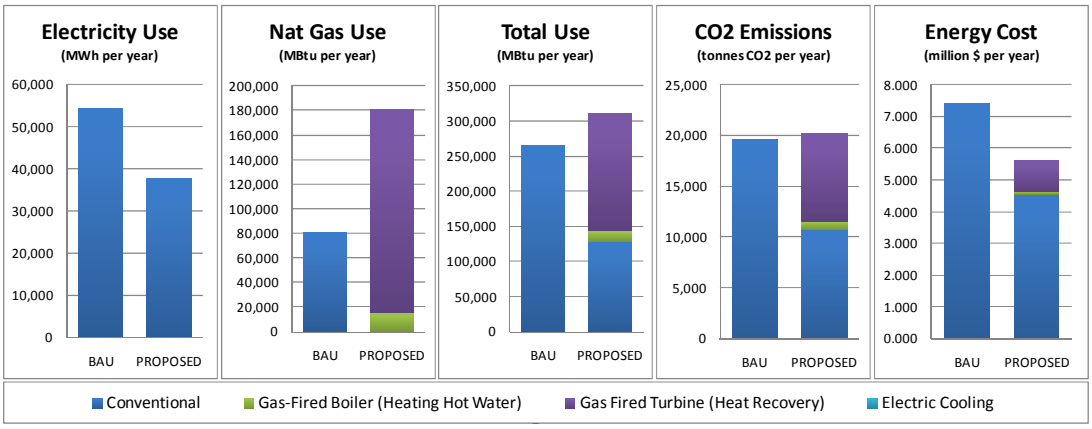


Figure 22 - Option 3 (Run 2) – BaU vs Proposed Summary of Energy Use, Emissions and Fuel Costs

Gas-Fired Turbine (Heating, Cooling, and Power)		Phase 1	Phase 2	Phase 3	Phase 4	Total
Capacity	MW-elec	**0.000**	**0.500**	**0.500**	**0.500**	**1.500**
	Mbtuh-heat	0.000	3.412	3.554	3.554	10.520
Generation	kWh-e	0	4,128	3,896	3,170	11,195
	Mbtu-heat	0	28,173	27,697	22,532	78,402
Capital Cost	$	0.000	1.566	1.566	1.566	4.697
	$/kW	0	3,131	3,131	3,131	3,131
Operating Cost	$	0.000	0.107	0.101	0.082	0.291
	$/Mbtu	0.000	21.918	18.993	17.640	21.314
Cost Premium (+) Premium, (-) Savings	%	0.0%	-11.8%	-10.4%	-2.6%	-8.6%
Plant Area	sf	0	5,175	5,223	5,223	15,621

Table 27 - Option 3 (Run 2) – Technology and Cost Summary

7.5.5 Option 4 – Combined Heating, Cooling, and Power

A gas-fired turbine plant is considered for providing base load heating, partial cooling, and partial power. The turbine plant utilizes a heat recovery unit that provides high grade heat for generating hot water through a heat exchanger and chilled water through an absorption chiller plant. A gas-fired boiler plant is considered for generating the remainder of the heating required for the development. Gas-fired turbine plant operates to meet minimum heat demand required for base heating and cooling.

The plant is assumed to serve the same development areas and heating and cooling loads as identified in Option 2. The following table summarizes the major infrastructure for this option.

Heating Hot Water		Phase 1	Phase 2	Phase 3	Phase 4	Total
Building Connections	qty	0	20	30	30	80
Connected Area	million sq ft	0.00	3.93	4.40	3.40	11.7
Distribution Pipe Length	linear feet	0	10,500	4,500	6,000	21,000
Infrastructure Cost	Million $	0	2.038	1.088	1.350	4.475
Chilled Water		Phase 1	Phase 2	Phase 3	Phase 4	Total
Building Connections	qty	0	10	5	5	20
Connected Area	million sq ft	0.00	1.45	1.10	0.08	2.627

Distribution Pipe Length	linear feet	0	6,000	0	0	6,000
Infrastructure Cost	Million $	0	1.150	0.080	0.020	1.250

Table 28 - Option 4 – BaU vs Proposed Summary of Energy Use, Emissions and Fuel Costs

The FERC efficiency for the three turbines is approximately 44.5% each. The minimum FERC efficiency is 42.5%. The total efficiency of the heating, cooling, and power produced from natural gas is over 75%. This is a higher utilization/efficiency than the heating and power only case.

As can be seen from the results, the cost premium for CHP is marginal and as the overall electric capacity approaches the minimum demands, the cost premium increases. This indicates that all though a 3MW total capacity is technically feasible it may not be the optimal capacity. In addition other regulatory, economic, or local specific issues may further dictate the capacity of this system.

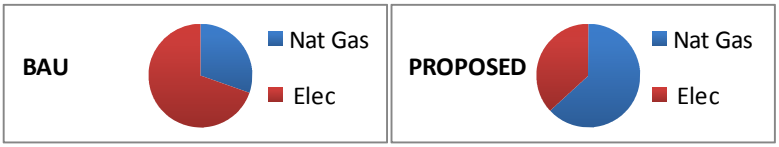


Figure 23 - Option 4 – BaU vs Proposed Primary Energy Source Splits

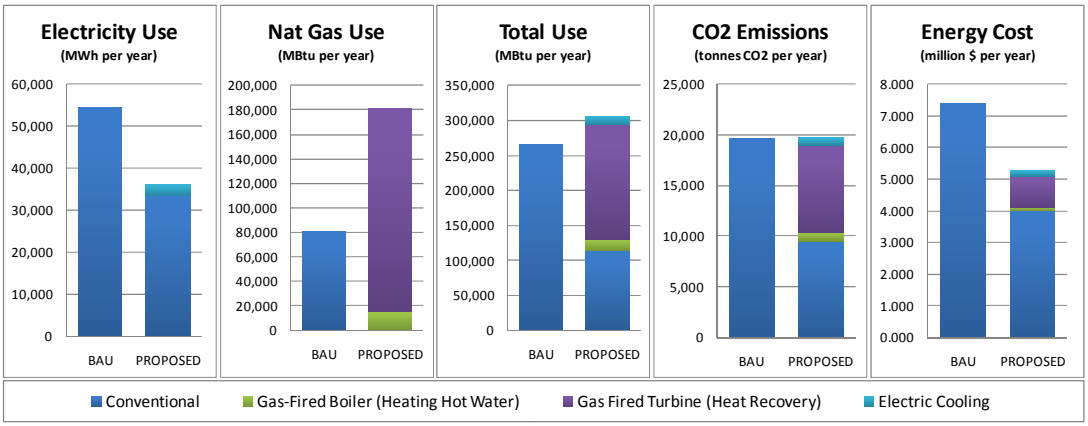


Figure 24 – Option 4 – BaU vs Proposed Summary of Energy Use, Emissions and Fuel Costs

Gas-Fired Turbine (Heating, Cooling, and Power)		Phase 1	Phase 2	Phase 3	Phase 4	Total
Capacity	MW-elec	**0.000**	**1.000**	**1.000**	**1.000**	**3.000**
	Mbtuh-heat	0.000	6.824	7.108	6.094	20.027
	Mbtuh-cool	0.000	2.922	2.769	0.971	6.662
Generation	kWh-e	0	8,165	6,871	4,546	19,582
	Mbtu-heat	0	55,717	48,840	32,317	136,874
	Mbtu-cool	0	11,373	10,765	1,555	23,692
Capital Cost	$	0.000	3.131	3.131	3.131	9.394
	$/kW	0	3,131	3,131	3,131	3,131
Operating Cost (non-fuel)	$	0.000	0.212	0.179	0.118	0.509
	$/Mbtu	0.000	24.224	21.433	18.881	16.830
Cost Premium (+) Premium, (-) Savings	%	0.0%	1.9%	7.8%	20.3%	8.8%
Plant Area	sf	0	10,350	10,446	10,446	31,242

Table 29 - Option 4 – Technology and Cost Summary

Appendices

These Appendices for this report consist of a number of pages of different documents essential to the project results. The Appendices are organized as follows:

Appendix A – **Generic Building Sheets**

- Sheets illustrate shape, form and provide certain assumptions for each generic building modeled for the site

Appendix B – **eQUEST Assumptions Database**

- Provides all of the assumptions that went into constructing the energy models, per Title 24-2008 prescriptive requirements.

Appendix C – **LEED NC v3.0 Checklist**

- In order to estimate energy savings required for LEED Gold certification, project team completed LEED NC v3.0 checklist for LEED Gold certification.

Appendix D – **ECM Costing Sheet**

- Costing assumptions and calculations for each ECM analyzed for each generic building energy model. Provided input into which ECM's were eligible for % Cost Premium iteration.

Appendix E – **Building Energy Calculations**

- Collation of ECM energy savings and costing data to apply ECM's to baseline building to reach each iteration of energy performance.

Appendix F – **Site Energy Profile Summary and Generic Building Energy Profiles**

- Site wide energy profile summaries for each analysis iteration.
- Energy demand profiles and data for each generic building type for each iteration.
- Summary tables include infrastructure loads, as well as historical and existing buildings on-site that are not part of the TI & YB redevelopment

Appendix G – **Waste to Energy Feasibility Analysis**

- Letter report from Kennedy/Jenks detailing results of a high level analysis of the viability of a waste to energy system located at the WWTP.

Appendix H – **Plant Space Analysis**

- Space calculation results for comparison of plant space required for BaU and district energy heating and cooling scenarios.

Appendix I – **End Use Demand Calculations**

- Summary of Energy End Use breakdown calculations by building type.

Appendix J – **District Energy Calculations**

- Summary of District energy calculations including energy generation profiles and financial summaries.

Appendix K – **District Energy Infrastructure Diagram**

- Graphical representation of proposed heating and cooling distribution infrastructure used in the district energy analysis.

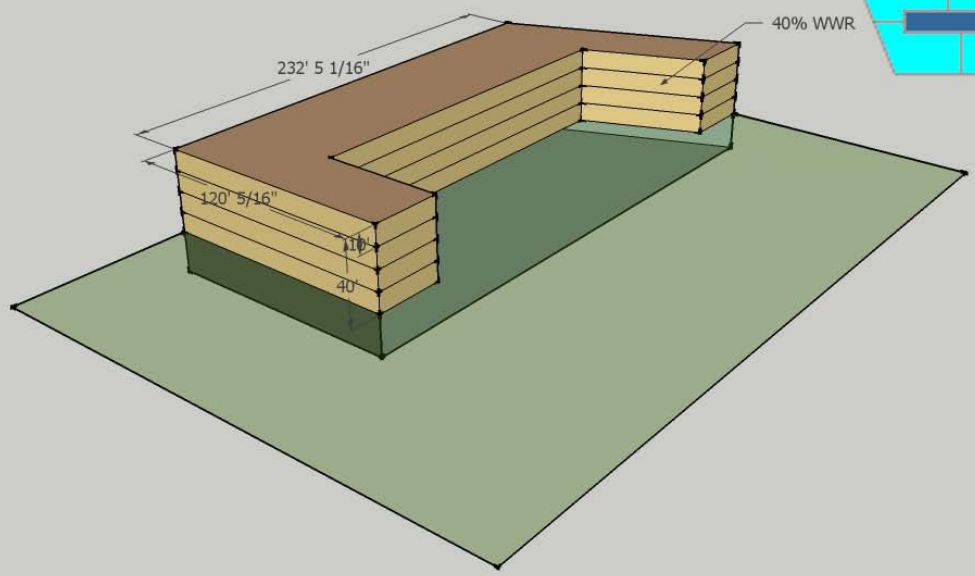
Appendix A

Generic Building Sheets

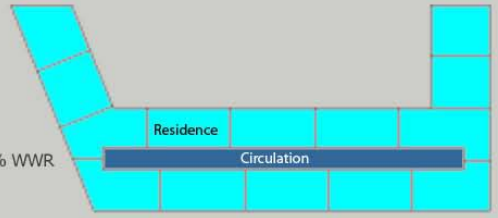
A1 Generic Building Sheets

- Sheets Illustrate shape, form and provide certain assumptions for each generic building modeled for the site.

Floors: 4
Area per floor: 18,910 sqft
Total building area: 75,640 sqft
Internal circulation: 15%
Number of residential units: 56 (14 per floor)
Average unit area: 1100 sqft



building assumptions

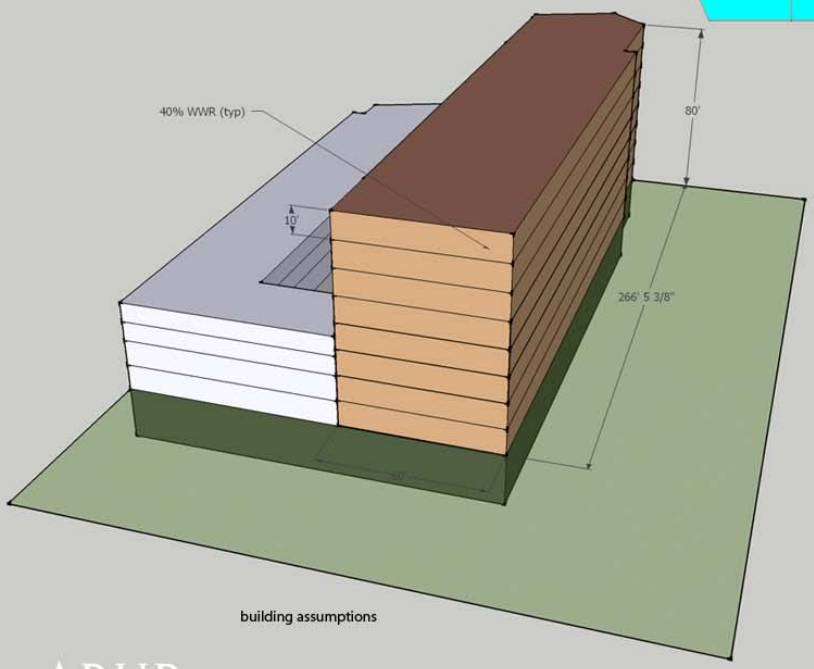


typical plan

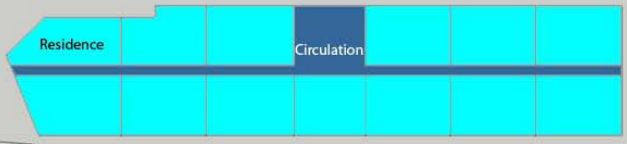
ARUP

Low Rise Residential

Floors: 8
Area per floor: 16,283 sqft
Total building area: 130,264 sqft
Internal circulation: 17%
Number of residential units: 104 (13 per floor)
Average unit area: 1100 sqft



building assumptions

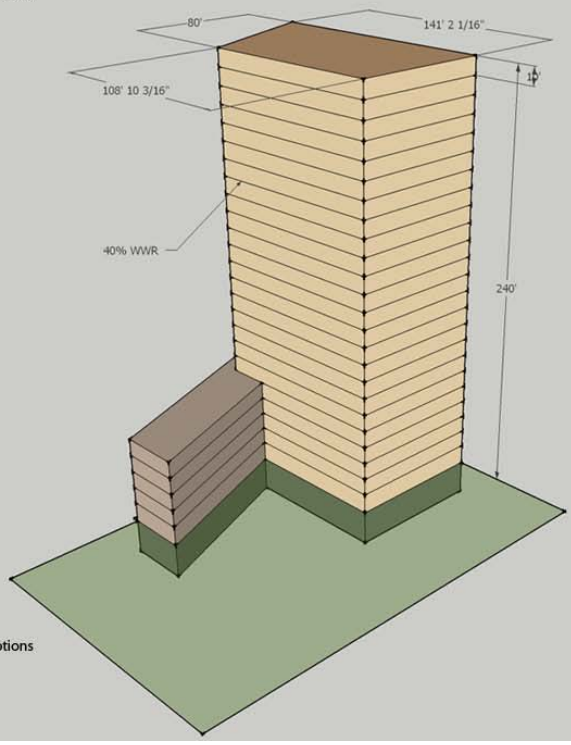


typical plan

ARUP

Mid Rise Residential

Floors: 24
Area per floor: 10,000 sqft
Total building area: 240,000 sqft
Internal circulation: 17%
Number of residential units: 144 (6 per floor)
Average unit area: 1350 sqft



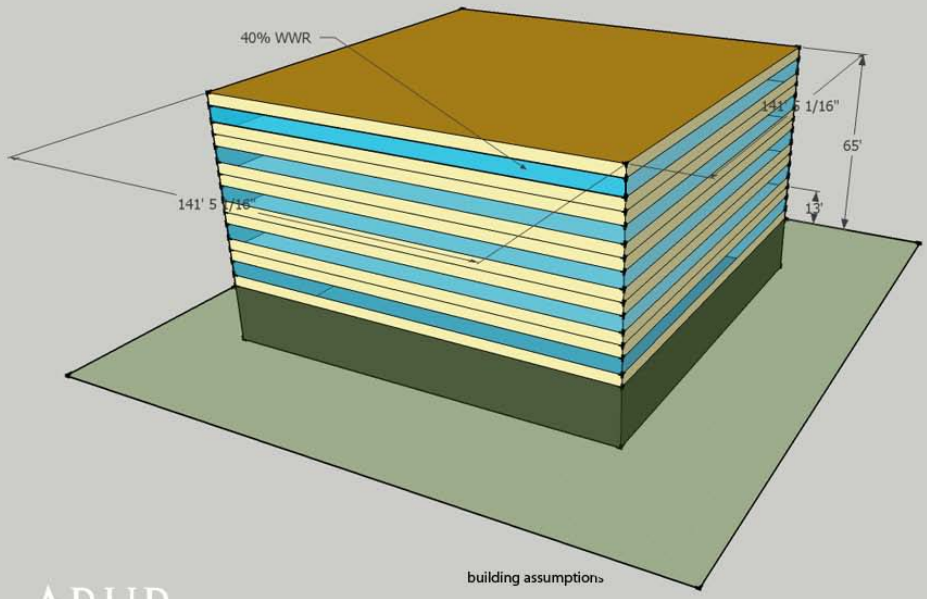
building assumptions

typical plan

ARUP

High Rise Residential

Floors: 5
Area per floor: 20,000 sqft
Total building area: 100,000 sqft
Internal circulation: 10%



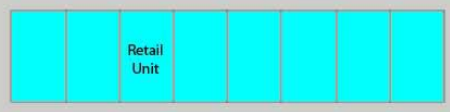
building assumptions

typical plan

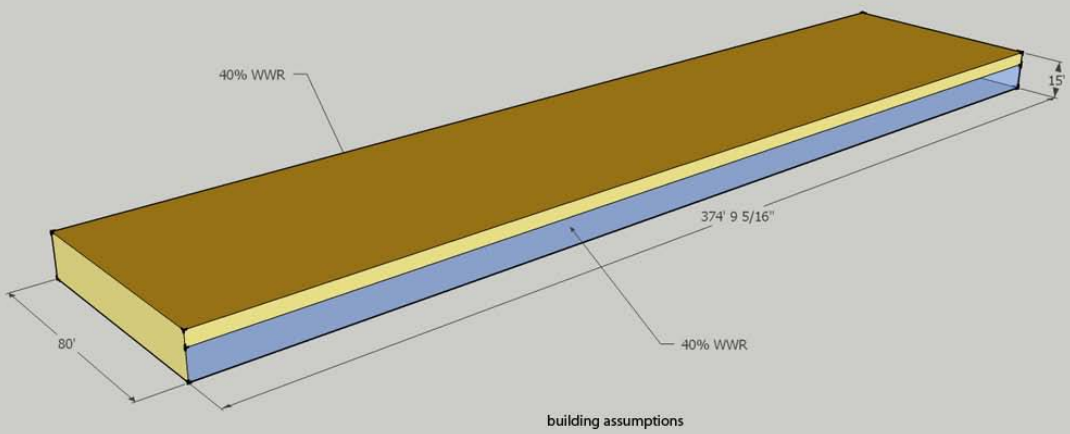
ARUP

Office

Floors: 1
Total building area: 30,000 sqft
Internal circulation: 0%
Number of retail units: 8
Average unit area: 3700 sqft



typical plan

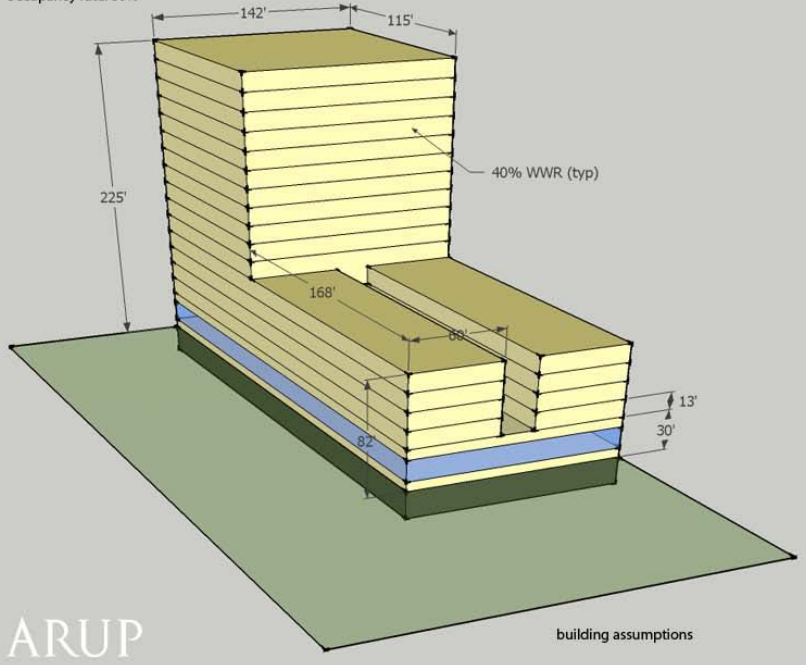


building assumptions

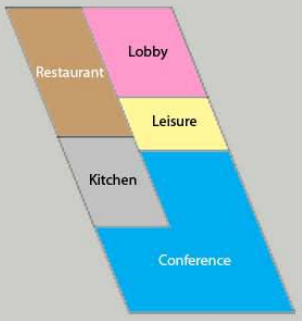
ARUP

Retail

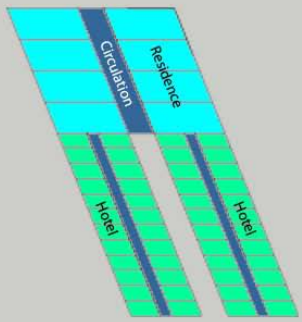
Floors: 15 condo / 4 hotel plus double height ground floor
Area per floor: 37,500 sqft ground floor
Total building area: 340,000 sqft
Internal circulation& support spaces: 19%
Number of residential units: 192 hotel rooms / 120 condos
Average unit area: 325 sqft hotel rooms / 1620 sqft condos
Ground floor: 20% restaurant, 17% lobby, 11% kitchen, 10% leisure, 42% conference
Occupancy: 1.5 people per hotel room / 2.2 people per condo
Occupancy rate: 80%



building assumptions



typical ground floor



typical residential floor

ARUP

Condotel

Appendix B

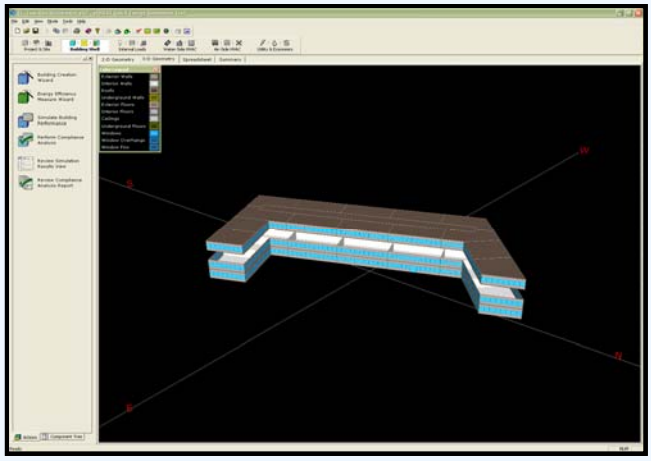
eQUEST Assumptions Database

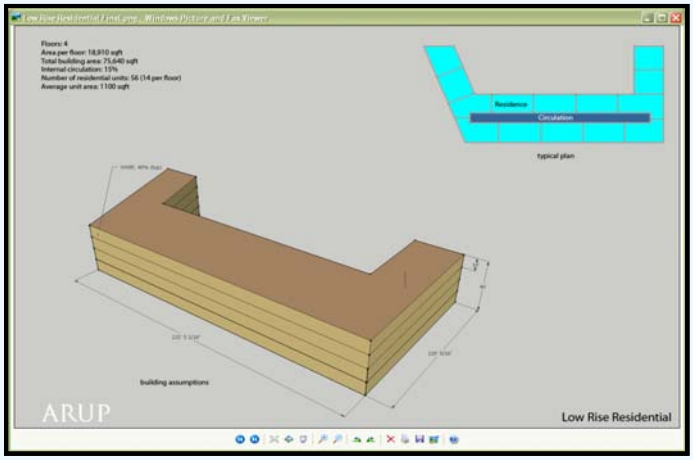
B1 eQUEST Assumptions Database

- Provides all of the assumptions that went into constructing the energy models, per Title 24-2008 prescriptive requirements.

Low-Rise Residential per Title 24-2008

ARUP





	flagged	eQUEST Category	default (Y/N)	eQUEST Input	DD	eQUEST Comments	Title 24 requirement
PROJECT & SITE DATA							
General Information							
		Project Name		TI - Low Rise Residential			eQUEST run - ~ **8.80 kWh/sf/yr** (gas + elec)
		Building Type		Multifamily, High-Rise (interior entries)			
		Energy Code Compliance Analysis		California Title 24			
		Vintage		2006 or after			
Building Location, Utilities & Rates		Coverage		California (Title 24)			
		Region		Oakland Area (CZ03)			
		City		San Francisco AP			
		Electic Utility / Rate		PG&E (CA), A10s (kWh & kW charges, <499 kW secondary voltage)			
		Gas Utility / Rate		PG&E (CA), GNR-1 (bldgs w <20800 therms/mo)			
Other Data		Analysis Year		2010			
		Usage Details		Hourly Enduse Profile			
Compliance Analysis Settings							
		Scope of Permit		Envelope/Mech/Lighting			
		Building Type		High-Rise Residential			4 floors and over is high-rise per Title 24-2008
Season Definitions							
		Descriptions of Seasons		Typical Use Throughout Year			
		Number of Seasons		1			
BLDG ENVELOPE & LOADS							
General Shell Info							
		Building Area [s.f.]		75,640			
		# of Floors Above Grade		4			
		# of Floors Below Grade		0			
Building Footprint							
		Footprint Shape/Zoning		custom			
		Zoning Pattern		custom			
		Building Orientation		East North East		per TI site plans	
		Floor - Floor Height		10 ft			
		Floor - Ceiling Height		9 ft			
Buliding Envelope Constructions							
Roof		Construction		Metal Frame, > 24 in o.c.			n/a
		Ext Finish		Roof, Built-up			No requirement
		Ext Color		Medium (abs=0.6)			No requirement

Low-Rise Residential per Title 24-2008

ARUP

	Ext Insulation	none	Metal building roofs in CZ 3 U-factor - 0.065 (R-15.4)
	Add'l Insulation	R-11 batt, no rad barrier Total R-15.34	Metal building roofs in CZ 3 U-factor - 0.065 (R-15.4)
Walls	Construction	Metal Frame, 2.6, 16 in. o.c.	n/a
	Ext Finish / Color	Glass, spandrel	No requirement
	Ext Color	Medium (abs=0.6)	No requirement
	Ext Insulation	1 1/2 in polyisocyanurate (R-7)	Metal framed walls in CZ 3 U-factor - 0.105 (R-9.5)
	Add'l Insulation	no batt	Metal framed walls in CZ 3 U-factor - 0.105 (R-9.5)
	Interior Insulation	no board insulation Total R-9.37	Metal framed walls in CZ 3 U-factor - 0.105 (R-9.5)
Ground Floor	Exposure	Earth Contact	
	Interior Finish	Carpet with fiber pad	
	Construction	4 in Concrete	
	Ext/Cav Insul	vert int bd, R-20, 4 ft deep....manually changed U-factor to 0.058 in DD Total R-17	Mass floor has U-factor - 0.058 (R-17)
Infiltration	Perim	0.038 CFM/sf	? - infil specified per window and door in Title 24, eQUEST input is for entire wall area
	Core	0.001 CFM/sf	? - infil specified per window and door in Title 24, eQUEST input is for entire wall area
Building Interior Constructions			
Ceilings	Interior Finish	Drywall Finish	
	Batt Insultation	none	
Vertical Walls	Wall Type	Frame	
	Batt Insulation	none	
Floors	Interior Finish	Carpet with fiber pad	
	Rigid Insulation	none	
	Construction	4 in concrete	
	Concrete Cap	none	
Exterior Doors			
Exterior Doors	Glass - E, W, N, S, SE	1, 1, 0, 0, 0	
	Height, Width	7 ft, 6 ft	
	Construction	specify properties	
	Glass Category & Type	NFRC Ufactor = 0.70, SHGC=0.55, VT=.81	Swinging Doors in CZ 3 U-factor - 0.70 (R-1.4), SHGC taken from TABLE 143-B Non-North windows SHGC
	Frame Type	Alum w/ Brk	
	Frame Wd (in)	3.0 in	
Exterior Windows			
Exterior Windows	Window Area Spec Method	% of Gross Wall Area (floor to floor)	
	Glass Category	specify properties	
	Glass Type **#1 (North)**	NFRC Ufactor=.47, SHGC=.55, VT=.81	TABLE 143-B Exterior Windows [WWR of 40%] in CZ 3 U-factor - 0.47 (R-2.12) & SHGC 0..55 (North) and 0.26 (Non-North)
	Frame Type	Alum x/ Brk, Oper, Mtl Spacer	
	Frame Wd (in)	1.50 in	
	Typ Window Width (ft)	4.25	
	Window Ht (ft)	4.25	
	Sill Ht (ft)	3	
	% Window (incl frame) E, W, N, S, SE	0, 0, 40, 0, 0	WWR of 40% - max allowed by Title 24
	Glass Type **#2 (Non-North)**	NFRC Ufactor=.47, SHGC=.26, VT=.81	TABLE 143-B Exterior Windows [WWR of 40%] in CZ 3 U-factor - 0.47 (R-2.12) & SHGC 0..55 (North) and 0.26 (Non-North)
	Frame Type	Alum x/ Brk, Oper, Mtl Spacer	
	Frame Wd (in)	1.50 in	
	Typ Window Width (ft)	4.25	
	Window Ht (ft)	4.25	
	Sill Ht (ft)	3	
	% Window (incl frame) E, W, N, S, SE	40, 40, 0, 40, 40	
	Custom Window/Door Placement	none - default	
Exterior Window Shades and Blinds			
Exterior Window Shades and Blinds	Overhangs	none - default	No requirement
	Fins	none - default	No requirement
Window Blinds/Drapes	Type	none - default	No requirement
Roof Skylights		NONE	No requirement
Ground Floor Daylight Zoning		NONE	No requirement
Typical (Middle) Floor Daylight Zoning		NONE	No requirement
Top Floor Daylight Zoning		NONE	No requirement
Building Operation Schedule			No requirement

Low-Rise Residential per Title 24-2008

ARUP

Use	Daytime Unoccupied, Typical Use	Entire Year	
	Return at	Leave at	
M	5pm	7am	
T	5pm	7am	
W	5pm	7am	
R	5pm	7am	
F	5pm	7am	
S	4pm	9am	
S	4pm	9am	
Hol	4pm	9am	

Activity Areas Allocation

Area Type	Percent Area %, Design Max Occup (sf/person), **Design Venitlation (CFM/per)**	
Residential (Multifam Dwelling Unit)	71, 400, 15	S 121.2(B) - 15 cfm * Occupants Occupants = 1/2 CBC egress = total sf divided by 200 divided by two.
Corridor	16, 400, 15	S 121.2(B) - 15 cfm * Occupants Occupants = 1/2 CBC egress = total sf divided by 200 divided by two.
Storage (conditioned)	7, 400, 15	S 121.2(B) - 15 cfm * Occupants Occupants = 1/2 CBC egress = total sf divided by 200 divided by two.
Laundry	6, 400, 15	S 121.2(B) - 15 cfm * Occupants Occupants = 1/2 CBC egress = total sf divided by 200 divided by two.
Occupancy Profile	EL1 Occup Profile (S1)	

Zone Group Definitions

Non-HVAC Enduses to Model

Exterior Enduses	Exterior Lighting	Connected Intensity & Monthly Single Day Profiles	
	DHW	Model DHW Equip w Seasonal Profiles	
Laundry Facilities	Location of Equip	In-Unit	
	# Dwelling Units per Floor	14	
	Laundry Loads/Unit/Wk	12.6	
	Washer Type	Vertical Axis	
	Dryer Fuel	Electricity	

Interior Lighting Loads and Profiles

Area Type	LPD (W/sf)	
Residential (Multifam Dwelling Unit)	1.0	TABLE 146-F, Multi-Family (1.0) -- DD says 0.934 LPD...??
Corridor	0.6	TABLE 146-F, Corridors (0.6)
Storage (conditioned)	0.6	TABLE 146-F, All other (0.6)
Laundry	0.9	TABLE 146-F, Laundry (0.9)
Multiplier	1	
Ambient Profile	EL1 InsLtg Profile (S1)	

Cooking Loads and Profiles

Self-Contained Refrig Loads and Profiles

Area Type	Refrig Equip Load (W/sf)
Residential (Multifam Dwelling Unit)	0.10
Corridor	0
Storage (conditioned)	0
Laundry	0
Sensible Ht (Frac) for all	1
Profile	EL1 S-C Refrig Profile (S1)

Misc Loads and Profiles

Area Type	Electric Load (W/sf)	
Residential (Multifam Dwelling Unit)	0.3	maybe need to look into appliances...baseline has minimum efficiency and proposed has highest efficiency available.
Corridor	0	
Storage (conditioned)	0	
Laundry	0.15	
Sensible Ht (Frac) for all	1	
Profile	EL1 Misc Profile (S1)	

Exterior Lighting Loads

Exterior LPD [W/sf]	0.165	TABLE 147-A, Hardcape LZ3 = 0.092 W/ft2 AWA, and 770 W IWA, LWA ignored; TABLE 147-B, building facades 0.35 W/ft2

Domestic Water Heating (DHW) Profiles

Low-Rise Residential per Title 24-2008

ARUP

	Profile	EL1 DHW Profile (S1)	

HVAC SYSTEM

HVAC System Definition

	Cooling Source	DX Coils	
	Heating Source	DX Coils (Heat Pump)	
	Heating Pump Source	Air	
	System Type	**Split System Single Zone Heat Pump (residential)**	
	System per Area	System per Zone	
	Return Air Path	Direct	
	System Assignment to Thermal Zones	Apply to All Zones	

HVAC Zones: Temperature and Air Flows

Seasonal T-stat setpts	Occupied (deg F) Cool / Heat	78 / 68	S 112(c) - t-stats shall be setback tstats, w controls able to control 4 time periods
	Unoccupied (deg F) Cool / Heat	78 / 68	
Design Temps	Cooling Design Temp (deg F) Indoor / Supply	75 / 55	per ASHRAE Handbook, Fundamentals
	Heating Design Temp (deg F) Indoor / Supply	72 / 90	per ASHRAE Handbook, Fundamentals
Air Flows	Minimum Design Flow	0.50 CFM/sf	

Packaged HVAC Equipment

Cooling	Overall Size	Auto-size	
	Typical Unit Size	65-90 kBtuh or 5.4-7.5 tons	less than 65 kBtu/h no requirement
	Efficiency	EER of 10.1	Per table 144-B, EER of 10.1 required (before 1/1/2010)
Heating	Size	Auto-size	
	Efficiency	COP of 3.2	Per table 144-B, COP of 3.2 required (before 1/1/2010)

HVAC System Fans

Supply Fans	Power	27.97 BHP (auto-sized)	S 144(h) - Condenser fan motors of 7.5hp or larger shall have capability to perate at 2/3 full speed or less
	Motor Efficiency	High	default in eQUEST per Title 24-2005
	Fan Flow & OSA	Auto-size	
	Fan Type	Forward Curved Centrifugal w/ Discharge Dampers	

HVAC System #1 Fan Schedules

	On at	Off at
M	5pm	7am
T	5pm	7am
W	5pm	7am
R	5pm	7am
F	5pm	7am
S	4pm	9am
S	4pm	9am
Hol	4pm	9am
	Fan 'On' Mode	Continuous

HVAC Zone Heating, Vent and Economizers

Zone Heat Source & Capabilities / Delta T	Baseboards	none	
Economizer(s)	Type	none	S144(e)1 - systems w cooling capacity > 75 kBtu/h must have economizer

DHW SYSTEM

Non-Residential Domestic Water Heating

Heater Specifications	Heater Fuel	Electricity	
	Efficiency Spec	Standby Loss	
	Heater Type	Storage	
	Hot Water Use	20.00 gal/person/day	asked plumbing - "sounds reasonable"
	Input Rating	13.2 kW	
Storage Tank	Tank Capacity	101 gal	
	Insulation R-value	16 h-ft2-degF/Btu	S 145(b) --> 151(f)8(c) --> S 113 - R-16 req'd
	Standy Loss	0.89 %/hr	S 145(b) --> 151(f)8(c) --> S 111 - CEC Appliance Stds
Water Temperatures	Supply Water	135.0 deg F	asked plumbing - 135 is mixed temp...sounds hot though
	Inlet	Equals Ground Temperature	
Pumping	Recirculation %	0.00%	

Low-Rise Residential per Title 24-2008

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Residential Domestic Water Heating			
Heater Specifications	Heater Fuel	Natural Gas	
	Efficiency Spec	Efficiency and Standby Loss	
	Heater Type	Storage	
	Thermal Efficiency	0.8	AFUE of 80% required
	Hot Water Use	20.00 gal/person/day	asked plumbing - "sounds reasonable"
	Input Rating	1,640.0 kBtuh	
Storage Tank	Tank Capacity	1,790 gal	
	Insulation R-value	16 h-ft2-degF/Btu	S 145(b) --> 151(f)8(c) --> S 113 - R-16 req'd
	Standy Loss	3.25 %/hr	S 145(b) --> 151(f)8(c) --> S 111 - CEC Appliance Stds
Water Temperatures	Supply Water	110.0 deg F	asked plumbing - 110 is mixed temp
	Inlet	Equals Ground Temperature	
Pumping	Recirculation %	0.00%	

Mid-Rise Residential per Title 24-2008

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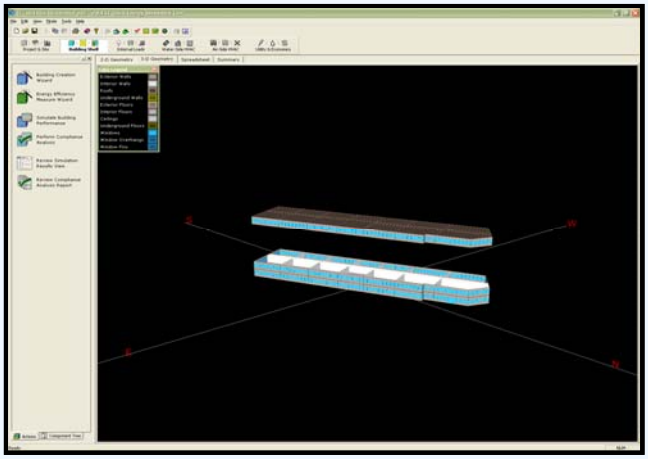

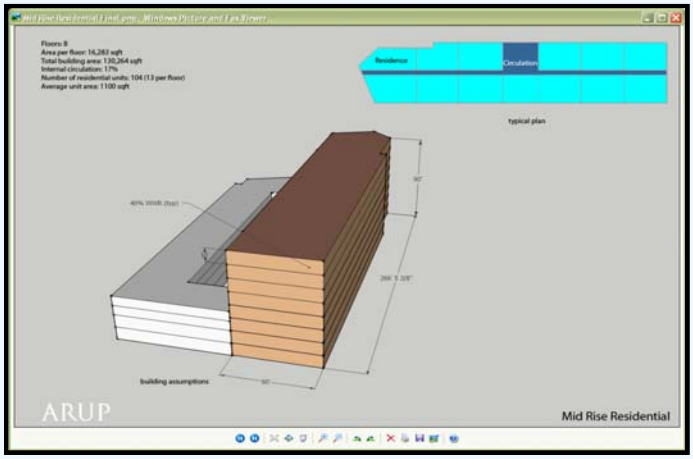

	flagged	eQUEST Category	default (Y/N)	eQUEST Input	DD	eQUEST Comments	Title 24 requirement
PROJECT & SITE DATA							
General Information							
		Project Name		TI - Mid Rise Residential			eQUEST run - ~ **8.93 kWh/sf/yr** (gas + elec)
		Building Type		Multifamily, High-Rise (interior entries)			
		Energy Code Compliance Analysis		California Title 24			
		Vintage		2006 or after			
		Building Location, Utilities & Rates Coverage		California (Title 24)			
		Region		Oakland Area (CZ03)			
		City		San Francisco AP			
		Electic Utility / Rate		PG&E (CA), A10s (kWh & kW charges, <499 kW secondary voltage)			
		Gas Utility / Rate		PG&E (CA), GNR-1 (bldgs w <20800 therms/mo)			
		Other Data Analysis Year		2010			
		Usage Details		Hourly Enduse Profile			
Compliance Analysis Settings							
		Scope of Permit		Envelope/Mech/Lighting			
		Building Type		High-Rise Residential			4 floors and over is high-rise per Title 24-2008
Season Definitions							
		Descriptions of Seasons		Typical Use Throughout Year			
		Number of Seasons		1			
BLDG ENVELOPE & LOADS							
General Shell Info							
		Building Area [s.f.]		130,264			
		# of Floors Above Grade		8			
		# of Floors Below Grade		0			
Building Footprint							
		Footprint Shape/Zoning		custom			
		Zoning Pattern		custom			
		Building Orientation		East North East		per TI site plans	
		Floor - Floor Height		10 ft			
		Floor - Ceiling Height		9 ft			
Buliding Envelope Constructions							
		Roof Construction		Metal Frame, > 24 in o.c.			n/a
		Ext Finish		Roof, Built-up			No requirement
		Ext Color		Dark (abs=0.9)			No requirement

Mid-Rise Residential per Title 24-2008

ARUP

	Ext Insulation	none		Metal building roofs in CZ 3 U-factor - 0.065 (R-15.4)
	Add'l Insulation	R-11 batt, no rad barrier	Total R-15.34	Metal building roofs in CZ 3 U-factor - 0.065 (R-15.4)
Walls	Construction	Metal Frame, 2.6, 16 in. o.c.		n/a
	Ext Finish / Color	Glass, spandrel		No requirement
	Ext Color	Dark (abs=0.9)		No requirement
	Ext Insulation	1 1/2 in polyisocyanurate (R-7)		Metal framed walls in CZ 3 U-factor - 0.105 (R-9.5)
	Add'l Insulation	no batt		Metal framed walls in CZ 3 U-factor - 0.105 (R-9.5)
	Interior Insulation	no board insulation	Total R-9.37	Metal framed walls in CZ 3 U-factor - 0.105 (R-9.5)
Ground Floor	Exposure	Earth Contact		
	Interior Finish	Carpet with fiber pad		
	Construction	4 in Concrete		
	Ext/Cav Insul	vert int bd, R-20, 4 ft deep....manually changed U-factor to 0.058 in DD	Total R-17	Mass floor has U-factor -0.058 (R-17)
Infiltration	Perim	0.038 CFM/sf		? - infil specified per window and door in Title 24, eQUEST input is for entire wall area
	Core	0.001 CFM/sf		? - infil specified per window and door in Title 24, eQUEST input is for entire wall area
Building Interior Constructions				
Ceilings	Interior Finish	Drywall Finish		
	Batt Insultation	none		
Vertical Walls	Wall Type	Frame		
	Batt Insulation	none		
Floors	Interior Finish	Carpet with fiber pad		
	Rigid Insulation	none		
	Construction	4 in concrete		
	Concrete Cap	none		
Exterior Doors				
Exterior Doors	Glass - E, W, N, S	1, 0, 0, 0		
	Height, Width	7 ft, 6 ft		
	Construction	specify properties		
	Glass Category & Type	NFRC Ufactor = 0.70, SHGC=0.55, VT=.81		Swinging Doors in CZ 3 U-factor - 0.70 (R-1.4), SHGC taken from TABLE 143-B Non-North windows SHGC
	Frame Type	Alum w/ Brk		
	Frame Wd (in)	3.0 in		
Exterior Windows				
Exterior Windows	Window Area Spec Method	% of Gross Wall Area (floor to floor)		
	Glass Category	specify properties		
	Glass Type **#1 (North)**	NFRC Ufactor=.47, SHGC=.55, VT=.81		TABLE 143-B Exterior Windows [WWR of 40%] in CZ 3 U-factor - 0.47 (R-2.12) & SHGC 0..55 (North) and 0.26 (Non-North)
	Frame Type	Alum x/ Brk, Oper, Mtl Spacer		
	Frame Wd (in)	1.50 in		
	Typ Window Width (ft)	4.25		
	Window Ht (ft)	4.25		
	Sill Ht (ft)	3		
	% Window (incl frame) W, E, S, N, NE	0, 0, 0, 40, 40		WWR of 40% - max allowed by Title 24
	Glass Type **#2 (Non-North)**	NFRC Ufactor=.47, SHGC=.55, VT=.81		TABLE 143-B Exterior Windows [WWR of 40%] in CZ 3 U-factor - 0.47 (R-2.12) & SHGC 0..55 (North) and 0.26 (Non-North)
	Frame Type	Alum x/ Brk, Oper, Mtl Spacer		
	Frame Wd (in)	1.50 in		
	Typ Window Width (ft)	4.25		
	Window Ht (ft)	4.25		
	Sill Ht (ft)	3		
	% Window (incl frame) W, E, S, N, NE	40, 40, 40, 0, 0		
	Custom Window/Door Placement	none - default		
Exterior Window Shades and Blinds				
Exterior Window Shades and Blinds	Overhangs	none - default		No requirement
	Fins	none - default		No requirement
Window Blinds/Drapes	Type	none		No requirement
Roof Skylights		NONE		No requirement
Ground Floor Daylight Zoning		NONE		No requirement
Typical (Middle) Floor Daylight Zoning		NONE		No requirement
Top Floor Daylight Zoning		NONE		No requirement
Building Operation Schedule				No requirement

Mid-Rise Residential per Title 24-2008

ARUP

Use	Daytime Unoccupied, Typical Use	Entire Year	
	Return at	Leave at	
M	5pm	7am	
T	5pm	7am	
W	5pm	7am	
R	5pm	7am	
F	5pm	7am	
S	4pm	9am	
S	4pm	9am	
Hol	4pm	9am	

Activity Areas Allocation

Area Type	Percent Area %, Design Max Occup (sf/person), **Design Venitlation (CFM/per)**	
Residential (Multifam Dwelling Unit)	71, 400, 15	S 121.2(B) - 15 cfm * Occupants Occupants = 1/2 CBC egress = total sf divided by 200 divided by two.
Corridor	16, 400, 15	S 121.2(B) - 15 cfm * Occupants Occupants = 1/2 CBC egress = total sf divided by 200 divided by two.
Storage (conditioned)	7, 400, 15	S 121.2(B) - 15 cfm * Occupants Occupants = 1/2 CBC egress = total sf divided by 200 divided by two.
Laundry	6, 400, 15	S 121.2(B) - 15 cfm * Occupants Occupants = 1/2 CBC egress = total sf divided by 200 divided by two.
Occupancy Profile	DL1 Occup Profile (S1)	

Zone Group Definitions

Non-HVAC Enduses to Model

Exterior Enduses	Exterior Lighting	Connected Intensity & Monthly Single Day Profiles	
	DHW	Model DHW Equip w Seasonal Profiles	
Laundry Facilities	Location of Equip	In-Unit	
	# Dwelling Units per Floor	13	
	Laundry Loads/Unit/Wk	11.7	
	Washer Type	Vertical Axis	
	Dryer Fuel	Electricity	

Interior Lighting Loads and Profiles

Area Type	LPD (W/sf)	
Residential (Multifam Dwelling Unit)	1.0	TABLE 146-F, Multi-Family (1.0)
Corridor	0.6	TABLE 146-F, Corridors (0.6)
Storage (conditioned)	0.6	TABLE 146-F, All other (0.6)
Laundry	0.9	TABLE 146-F, Laundry (0.9)
Multiplier	1	
Ambient Profile	EL1 InsLtg Profile (S1)	

Cooking Loads and Profiles

Area Type	
Residential (Multifam Dwelling Unit)	
Corridor	
Storage (conditioned)	
Laundry	
Sensible Ht (Frac) for all	
Profile	

Self-Contained Refrig Loads and Profiles

Area Type	Refrig Equip Load (W/sf)
Residential (Multifam Dwelling Unit)	0.114
Corridor	0
Storage (conditioned)	0
Laundry	0
Sensible Ht (Frac) for all	1
Profile	EL1 S-C Refrig Profile (S1)

Misc Loads and Profiles

Area Type	Electric Load (W/sf)	
Residential (Multifam Dwelling Unit)	0.3	maybe need to look into appliances...baseline has minimum efficiency and proposed has highest efficiency available.
Corridor	0	
Storage (conditioned)	0	
Laundry	0.15	
Sensible Ht (Frac) for all	1	

Mid-Rise Residential per Title 24-2008

ARUP

	Profile	EL1 Misc Profile (S1)	
Exterior Lighting Loads			
	Exterior LPD [W/sf]	0.1278	TABLE 147-A, Hardcape LZ3 = 0.092 W/ft2 AWA, and 770 W IWA, LWA ignored; TABLE 147-B, building facades 0.35 W/ft2
Domestic Water Heating (DHW) Profiles			
	Profile	EL1 DHW Profile (S1)	

HVAC SYSTEM

HVAC System Definition			
	Cooling Source	DX Coils	
	Heating Source	DX Coils (Heat Pump)	
	Heating Pump Source	Air	
	System Type	**Split System Single Zone Heat Pump (residential)**	
	System per Area	System per Zone	
	Return Air Path	Direct	
	System Assignment to Thermal Zones	Apply to All Zones	
HVAC Zones: Temperature and Air Flows			
Seasonal T-stat setpts	Occupied (deg F) Cool / Heat	78 / 68	S 112(c) - t-stats shall be setback tstats, w controls able to control 4 time periods
	Unoccupied (deg F) Cool / Heat	78 / 68	
Design Temps	Cooling Design Temp (deg F) Indoor / Supply	75 / 55	per ASHRAE Handbook, Fundamentals
	Heating Design Temp (deg F) Indoor / Supply	72 / 90	per ASHRAE Handbook, Fundamentals
Air Flows	Minimum Design Flow	0.50 CFM/sf	
Packaged HVAC Equipment			
Cooling	Overall Size	Auto-size	
	Typical Unit Size	65-90 kBtuh or 5.4-7.5 tons	less than 65 kBtu/h no requirement
	Efficiency	EER of 10.1	Per table 144-B, EER of 10.1 required (before 1/1/2010)
Heating	Size	Auto-size	
	Efficiency	COP of 3.2	Per table 144-B, COP of 3.2 required (before 1/1/2010)
HVAC System Fans			
Supply Fans	Power	51.56 BHP (auto-sized)	S 144(h) - Condenser fan motors of 7.5hp or larger shall have capability to operate at 2/3 full speed or less
	Motor Efficiency	High	default in eQUEST per Title 24-2005
	Fan Flow & OSA	Auto-size	
	Fan Type	Forward Curved Centrifugal w/ Discharge Dampers	
HVAC System #1 Fan Schedules			
	On at	Off at	
M	5pm	7am	
T	5pm	7am	
W	5pm	7am	
R	5pm	7am	
F	5pm	7am	
S	4pm	9am	
S	4pm	9am	
Hol	4pm	9am	
	Fan 'On' Mode	Continuous	
HVAC Zone Heating, Vent and Economizers			
Zone Heat Source & Capabilities / Delta T	Baseboards	none	
Economizer(s)	Type	none	S144(e)1 - systems w cooling capacity > 75 kBtu/h must have economizer

DHW SYSTEM

Non-Residential Domestic Water Heating			
Heater Specifications	Heater Fuel	Electricity	
	Efficiency Spec	Standby Loss	
	Heater Type	Storage	
	Hot Water Use	20.00 gal/person/day	asked plumbing - "sounds reasonable"
	Input Rating	22.7 kW	
Storage Tank	Tank Capacity	174 gal	

Mid-Rise Residential per Title 24-2008

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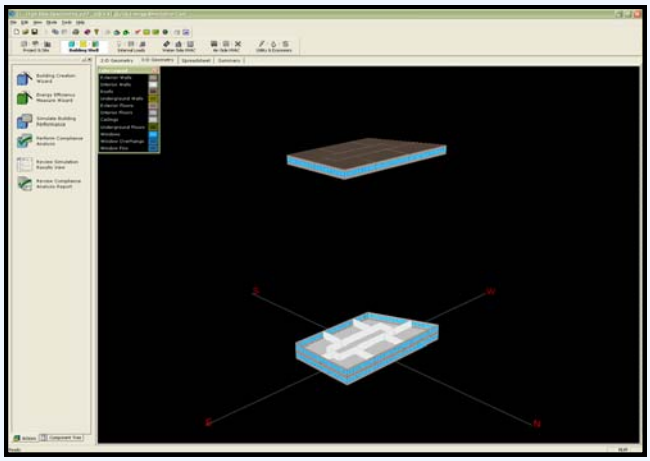
	Insulation R-value	16 h-ft2-degF/Btu	S 145(b) --> 151(f)8(c) --> S 113 - R-16 req'd
	Standy Loss	0.89 %/hr	S 145(b) --> 151(f)8(c) --> S 111 - CEC Appliance Stds
Water Temperatures	Supply Water	135.0 deg F	asked plumbing - 135 is mixed temp...sounds hot though
	Inlet	Equals Ground Temperature	
Pumping	Recirculation %	0.00%	

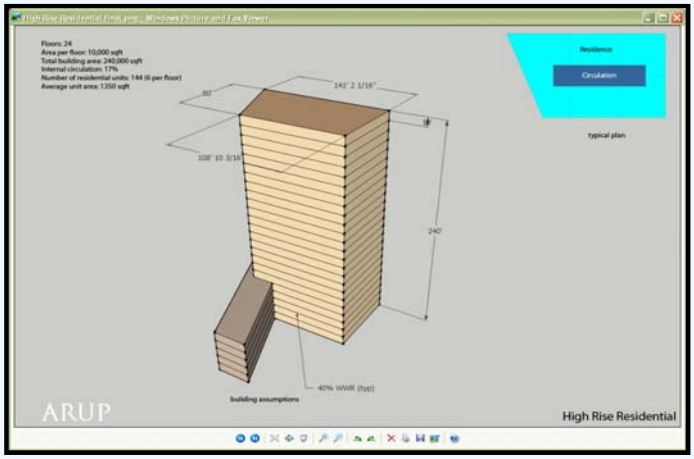
Residential Domestic Water Heating

Heater Specifications	Heater Fuel	Natural Gas	
	Efficiency Spec	Efficiency and Standby Loss	
	Heater Type	Storage	
	Thermal Efficiency	0.8	AFUE of 80% required
	Hot Water Use	20.00 gal/person/day	asked plumbing - "sounds reasonable"
	Input Rating	2,824.6 kBtuh	
Storage Tank	Tank Capacity	3,083 gal	
	Insulation R-value	16 h-ft2-degF/Btu	S 145(b) --> 151(f)8(c) --> S 113 - R-16 req'd
	Standy Loss	3.25 %/hr	S 145(b) --> 151(f)8(c) --> S 111 - CEC Appliance Stds
Water Temperatures	Supply Water	110.0 deg F	asked plumbing - 110 is mixed temp
	Inlet	Equals Ground Temperature	
Pumping	Recirculation %	0.00%	

High-Rise Residential per Title 24-2008

ARUP





flagged	eQUEST Category	default (Y/N)	eQUEST Input	DD	eQUEST Comments	Title 24 requirement
PROJECT & SITE DATA						
General Information						
	Project Name		TI - High Rise Residential			eQUEST run - ~ **8.91 kWh/sf/yr** (gas + elec)
	Building Type		Multifamily, High-Rise (interior entries)			
	Energy Code Compliance Analysis		California Title 24			
	Vintage		2006 or after			
Building Location, Utilities & Rates	Coverage		California (Title 24)			
	Region		Oakland Area (CZ03)			
	City		San Francisco AP			
	Electic Utility / Rate		PG&E (CA), A10s (kWh & kW charges, <499 kW secondary voltage)			
	Gas Utility / Rate		PG&E (CA), GNR-1 (bldgs w <20800 therms/mo)			
Other Data	Analysis Year		2010			
	Usage Details		Hourly Enduse Profile			
Compliance Analysis Settings						
	Scope of Permit		Envelope/Mech/Lighting			
	Building Type		High-Rise Residential			4 floors and over is high-rise per Title 24-2008
Season Definitions						
	Descriptions of Seasons		Typical Use Throughout Year			
	Number of Seasons		1			
BLDG ENVELOPE & LOADS						
General Shell Info						
	Building Area [s.f.]		240,000			
	# of Floors Above Grade		24			
	# of Floors Below Grade		0			
Building Footprint						
	Footprint Shape/Zoning		custom			
	Zoning Pattern		custom			
	Building Orientation		East North East		per TI site plans	
	Floor - Floor Height		10 ft			
	Floor - Ceiling Height		9 ft			
Buliding Envelope Constructions						
Roof	Construction		Metal Frame, > 24 in o.c.			n/a
	Ext Finish		Roof, Built-up			No requirement
	Ext Color		Medium (abs=0.6)			No requirement

High-Rise Residential per Title 24-2008

ARUP

	Ext Insulation	none		Metal building roofs in CZ 3 U-factor - 0.065 (R-15.4)
	Add'l Insulation	R-11 batt, no rad barrier	Total R-15.34	Metal building roofs in CZ 3 U-factor - 0.065 (R-15.4)
Walls	Construction	Metal Frame, 2.6, 16 in. o.c.		n/a
	Ext Finish / Color	Glass, spandrel		No requirement
	Ext Color	Medium (abs=0.6)		No requirement
	Ext Insulation	1 1/2 in polyisocyanurate (R-7)		Metal framed walls in CZ 3 U-factor - 0.105 (R-9.5)
	Add'l Insulation	no batt		Metal framed walls in CZ 3 U-factor - 0.105 (R-9.5)
	Interior Insulation	no board insulation	Total R-9.37	Metal framed walls in CZ 3 U-factor - 0.105 (R-9.5)
Ground Floor	Exposure	Earth Contact		
	Interior Finish	Carpet with fiber pad		
	Construction	4 in Concrete		
	Ext/Cav Insul	vert int bd, R-20, 4 ft deep....manually changed U-factor to 0.058 in DD	Total R-17	Mass floor has U-factor -0.058 (R-17)
Infiltration	Perim	0.038 CFM/sf		? - infil specified per window and door in Title 24, eQUEST input is for entire wall area
	Core	0.001 CFM/sf		? - infil specified per window and door in Title 24, eQUEST input is for entire wall area
Building Interior Constructions				
Ceilings	Interior Finish	Drywall Finish		
	Batt Insultation	none		
Vertical Walls	Wall Type	Frame		
	Batt Insulation	none		
Floors	Interior Finish	Carpet with fiber pad		
	Rigid Insulation	none		
	Construction	4 in concrete		
	Concrete Cap	none		
Exterior Doors				
Exterior Doors	Glass - N, S, W, E	1, 1, 0, 0		
	Height, Width	7 ft, 6 ft		
	Construction	specify properties		
	Glass Category & Type	NFRC Ufactor = 0.70, SHGC=0.26, VT=.81		Swinging Doors in CZ 3 U-factor - 0.70 (R-1.4), SHGC taken from TABLE 143-B Non-North windows SHGC
	Frame Type	Alum w/ Brk		
	Frame Wd (in)	3.0 in		
Exterior Windows				
Exterior Windows	Window Area Spec Method	% of Gross Wall Area (floor to floor)		
	Glass Category	specify properties		
	Glass Type **#1 (North)**	NFRC Ufactor=.47, SHGC=.55, VT=.81		TABLE 143-B Exterior Windows [WWR of 40%] in CZ 3 U-factor - 0.47 (R-2.12) & SHGC 0..55 (North) and 0.26 (Non-North)
	Frame Type	Alum x/ Brk, Oper, Mtl Spacer		
	Frame Wd (in)	1.50 in		
	Typ Window Width (ft)	4.25		
	Window Ht (ft)	4.25		
	Sill Ht (ft)	3		
	% Window (incl frame) E, W, N, S	0, 0, 40, 0		WWR of 40% - max allowed by Title 24
	Glass Type **#2 (Non-North)**	NFRC Ufactor=.47, SHGC=.26, VT=.81		TABLE 143-B Exterior Windows [WWR of 40%] in CZ 3 U-factor - 0.47 (R-2.12) & SHGC 0..55 (North) and 0.26 (Non-North)
	Frame Type	Alum x/ Brk, Oper, Mtl Spacer		
	Frame Wd (in)	1.50 in		
	Typ Window Width (ft)	4.25		
	Window Ht (ft)	4.25		
	Sill Ht (ft)	3		
	% Window (incl frame) E, W, N, S	40, 40, 0, 40		WWR of 40% - max allowed by Title 24
	Custom Window/Door Placement	none - default		
Exterior Window Shades and Blinds				
Exterior Window Shades and Blinds	Overhangs	none - default		No requirement
	Fins	none - default		No requirement
Window Blinds/Drapes	Type	none		No requirement
Roof Skylights		NONE		No requirement
Ground Floor Daylight Zoning		NONE		No requirement
Typical (Middle) Floor Daylight Zoning		NONE		No requirement
Top Floor Daylight Zoning		NONE		No requirement
Building Operation Schedule				No requirement

High-Rise Residential per Title 24-2008

ARUP

Use	Daytime Unoccupied, Typical Use	Entire Year	
	Return at	Leave at	
M	5pm	7am	
T	5pm	7am	
W	5pm	7am	
R	5pm	7am	
F	5pm	7am	
S	4pm	9am	
S	4pm	9am	
Hol	4pm	9am	

Activity Areas Allocation

Area Type	Percent Area %, Design Max Occup (sf/person), **Design Venitlation (CFM/per)**	
Residential (Multifam Dwelling Unit)	71, 400, 15	S 121.2(B) - 15 cfm * Occupants Occupants = 1/2 CBC egress = total sf divided by 200 divided by two.
Corridor	16, 400, 15	S 121.2(B) - 15 cfm * Occupants Occupants = 1/2 CBC egress = total sf divided by 200 divided by two.
Storage (conditioned)	7, 400, 15	S 121.2(B) - 15 cfm * Occupants Occupants = 1/2 CBC egress = total sf divided by 200 divided by two.
Laundry	6, 400, 15	S 121.2(B) - 15 cfm * Occupants Occupants = 1/2 CBC egress = total sf divided by 200 divided by two.
Occupancy Profile	DL1 Occup Profile (S1)	

Zone Group Definitions

Non-HVAC Enduses to Model

Exterior Enduses	Exterior Lighting	Connected Intensity & Monthly Single Day Profiles	
	DHW	Model DHW Equip w Seasonal Profiles	
Laundry Facilities	Location of Equip	In-Unit	
	# Dwelling Units per Floor	6	
	Laundry Loads/Unit/Wk	15.5	
	Washer Type	Vertical Axis	
	Dryer Fuel	Electricity	

Interior Lighting Loads and Profiles

Area Type	LPD (W/sf)	
Residential (Multifam Dwelling Unit)	1.0	TABLE 146-F, Multi-Family (1.0)
Corridor	0.6	TABLE 146-F, Corridors (0.6)
Storage (conditioned)	0.6	TABLE 146-F, All other (0.6)
Laundry	0.9	TABLE 146-F, Laundry (0.9)
Multiplier	1	
Ambient Profile	EL1 InsLtg Profile (S1)	

Cooking Loads and Profiles

Area Type	
Residential (Multifam Dwelling Unit)	
Corridor	
Storage (conditioned)	
Laundry	
Sensible Ht (Frac) for all	
Profile	

Self-Contained Refrig Loads and Profiles

Area Type	Refrig Equip Load (W/sf)
Residential (Multifam Dwelling Unit)	0.08
Corridor	0
Storage (conditioned)	0
Laundry	0
Sensible Ht (Frac) for all	1
Profile	EL1 S-C Refrig Profile (S1)

Misc Loads and Profiles

Area Type	Electric Load (W/sf)	
Residential (Multifam Dwelling Unit)	0.3	maybe need to look into appliances...baseline has minimum efficiency and proposed has highest efficiency available.
Corridor	0	
Storage (conditioned)	0	
Laundry	0.15	
Sensible Ht (Frac) for all	1	

High-Rise Residential per Title 24-2008

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	Profile	EL1 Misc Profile (S1)	
Exterior Lighting Loads			
	Exterior LPD [W/sf]	0.09975	TABLE 147-A, Hardcape LZ3 = 0.092 W/ft2 AWA, and 770 W IWA, LWA ignored; TABLE 147-B, building facades 0.35 W/ft2
Domestic Water Heating (DHW) Profiles			
	Profile	EL1 DHW Profile (S1)	

HVAC SYSTEM

HVAC System Definition			
	Cooling Source	DX Coils	
	Heating Source	DX Coils (Heat Pump)	
	Heating Pump Source	Air	
	System Type	**Split System Single Zone Heat Pump (residential)**	
	System per Area	System per Zone	
	Return Air Path	Direct	
	System Assignment to Thermal Zones	Apply to All Zones	
HVAC Zones: Temperature and Air Flows			
Seasonal T-stat setpts	Occupied (deg F) Cool / Heat	78 / 68	S 112(c) - t-stats shall be setback tstats, w controls able to control 4 time periods
	Unoccupied (deg F) Cool / Heat	78 / 68	
Design Temps	Cooling Design Temp (deg F) Indoor / Supply	75 / 55	per ASHRAE Handbook, Fundamentals
	Heating Design Temp (deg F) Indoor / Supply	72 / 90	per ASHRAE Handbook, Fundamentals
Air Flows	Minimum Design Flow	0.50 CFM/sf	
Packaged HVAC Equipment			
Cooling	Overall Size	Auto-size	
	Typical Unit Size	65-90 kBtuh or 5.4-7.5 tons	less than 65 kBtu/h no requirement
	Efficiency	EER of 10.1	Per table 144-B, EER of 10.1 required (before 1/1/2010)
Heating	Size	Auto-size	
	Efficiency	COP of 3.2	Per table 144-B, COP of 3.2 required (before 1/1/2010)
HVAC System Fans			
Supply Fans	Power	88.52 BHP (auto-sized)	S 144(h) - Condenser fan motors of 7.5hp or larger shall have capability to operate at 2/3 full speed or less
	Motor Efficiency	High	default in eQUEST per Title 24-2005
	Fan Flow & OSA	Auto-size	
	Fan Type	Forward Curved Centrifugal w/ Discharge Dampers	
HVAC System #1 Fan Schedules			
	On at	Off at	
M	5pm	7am	
T	5pm	7am	
W	5pm	7am	
R	5pm	7am	
F	5pm	7am	
S	4pm	9am	
S	4pm	9am	
Hol	4pm	9am	
	Fan 'On' Mode	Continuous	
HVAC Zone Heating, Vent and Economizers			
Zone Heat Source & Capabilities / Delta T	Baseboards	none	
Economizer(s)	Type	none	S144(e)1 - systems w cooling capacity > 75 kBtu/h must have economizer

DHW SYSTEM

Non-Residential Domestic Water Heating			
Heater Specifications	Heater Fuel	Electricity	
	Efficiency Spec	Standby Loss	
	Heater Type	Storage	
	Hot Water Use	20.00 gal/person/day	asked plumbing - "sounds reasonable"
	Input Rating	41.8 kW	
Storage Tank	Tank Capacity	321 gal	

High-Rise Residential per Title 24-2008

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	Insulation R-value	16 h-ft2-degF/Btu	S 145(b) --> 151(f)8(c) --> S 113 - R-16 req'd
	Standy Loss	0.89 %/hr	S 145(b) --> 151(f)8(c) --> S 111 - CEC Appliance Stds
Water Temperatures	Supply Water	135.0 deg F	asked plumbing - 135 is mixed temp...sounds hot though
	Inlet	Equals Ground Temperature	
Pumping	Recirculation %	0.00%	

Residential Domestic Water Heating

Heater Specifications	Heater Fuel	Natural Gas	
	Efficiency Spec	Efficiency and Standby Loss	
	Heater Type	Storage	
	Thermal Efficiency	0.8	AFUE of 80% required
	Hot Water Use	20.00 gal/person/day	asked plumbing - "sounds reasonable"
	Input Rating	5203.3 kBtuh	
Storage Tank	Tank Capacity	5,679 gal	
	Insulation R-value	16 h-ft2-degF/Btu	S 145(b) --> 151(f)8(c) --> S 113 - R-16 req'd
	Standy Loss	3.25 %/hr	S 145(b) --> 151(f)8(c) --> S 111 - CEC Appliance Stds
Water Temperatures	Supply Water	110.0 deg F	asked plumbing - 110 is mixed temp
	Inlet	Equals Ground Temperature	
Pumping	Recirculation %	0.00%	

Commercial per Title 24-2008

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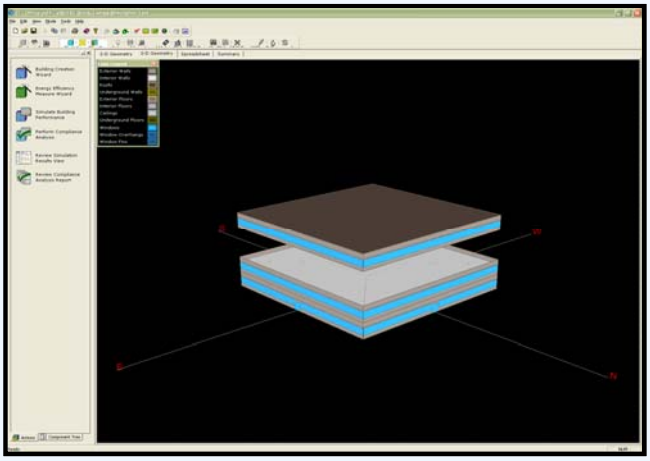

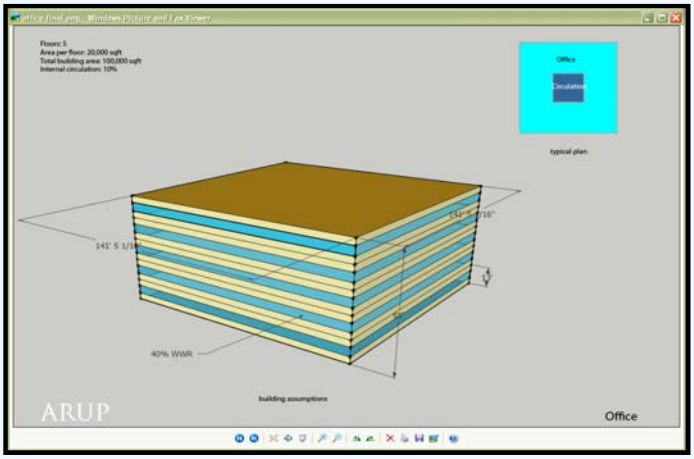

	flagged	eQUEST Category	default (Y/N)	eQUEST Input	DD	eQUEST Comments	Title 24 requirement
PROJECT & SITE DATA							
General Information							
		Project Name		TI - Office			
		Building Type		Office Bldg, Mid-Rise			total sf. --> 100,000 sf
		Energy Code Compliance Analysis		California Title 24			total energy consumption (gas + elec) --> 969.3 MWh
		Vintage		2006 or after			energy intensity --> **9.69 kWh/sf/yr**
		Building Location, Utilities & Rates Coverage		California (Title 24)			
		Region		Oakland Area (CZ03)			
		City		San Francisco AP			
		Electic Utility / Rate		PG&E (CA), A10s (kWh & kW charges, <499 kW secondary voltage)			
		Gas Utility / Rate		PG&E (CA), GNR-1 (bldgs w <20800 therms/mo)			
		Other Data Analysis Year		2010			
		Usage Details		Hourly Enduse Profile			
Compliance Analysis Settings							
		Scope of Permit		Envelope/Mech/Lighting			
		Building Type		Non-Residential			
Season Definitions							
		Descriptions of Seasons		Typical Use Throughout Year			
		Number of Seasons		1			
BLDG ENVELOPE & LOADS							
General Shell Info							
		Building Area [s.f.]		100,000			
		# of Floors Above Grade		5			
		# of Floors Below Grade		0			
Building Footprint							
		Footprint Shape		custom			
		Zoning Pattern		Perimeter/Core			
		Footprint & Zoning Definitions Perimeter Zone Depth		48.3 ft (90% perimeter zone)			
		Building Orientation		East North East			
		Floor - Floor Height		13 ft			
		Floor - Ceiling Height		9 ft			
Buliding Envelope Constructions							
		Roof Construction		Metal Frame, > 24 in o.c.			n/a
		Ext Finish		Roof, Built-up			No requirement

Commercial per Title 24-2008

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	Ext Color	Medium (abs=0.6)		Aged reflectance of 0.55, emittance of 0.75
	Ext Insulation	1 in polystytrene (R-4)		Metal building roofs in CZ 3 U-factor - 0.065 (R-15.4)
	Add'l Insulation	R-7 batt, no rad barrier	Total R-15.47	Metal building roofs in CZ 3 U-factor - 0.065 (R-15.4)
Walls	Construction	Metal Frame, 2x6, 24 in. o.c.		n/a
	Ext Finish / Color	Glass, spandrel		No requirement
	Ext Color	Medium (abs=0.6)		No requirement
	Ext Insulation	3/4in fiber bd sheathing (R-2)		Metal framed walls in CZ 3 U-factor - 0.082 (R-12.2)
	Add'l Insulation	R-21 batt		Metal framed walls in CZ 3 U-factor - 0.082 (R-12.2)
	Interior Insulation	no board insulation	Total R-12.31	Metal framed walls in CZ 3 U-factor - 0.082 (R-12.2)
Ground Floor	Exposure	Earth Contact		
	Interior Finish	Carpet (no pad)		
	Construction	4 in Concrete		
	Ext/Cav Insul	vert int bd, R-20, 4 ft deep....manually changed U-factor to **0.269** in DD	Total R-3.7	Mass floor has U-factor - 0.269 (R-3.7)
Infiltration	Perim	0.038 CFM/sf		? - infil specified per window and door in Title 24, eQUEST input is for entire wall area
	Core	0.001 CFM/sf		? - infil specified per window and door in Title 24, eQUEST input is for entire wall area
Building Interior Constructions				
Ceilings	Interior Finish	Lay-In Acoustic Tile		
	Batt Insultation	none		
Vertical Walls	Wall Type	Frame		
	Batt Insulation	none		
Floors	Interior Finish	Carpet (no pad)		
	Rigid Insulation	none		
	Construction	4 in concrete		
	Concrete Cap	none		
Exterior Doors				
Exterior Doors	Glass - S, N, E, W	1, 1, 1, 1		
	Height, Width	7 ft, 6 ft		
	Construction	specify properties		
	Glass Category & Type	NFRC Ufactor = 0.70, SHGC=0.69, VT=.78		Swinging Doors in CZ 3 U-factor - 0.70 (R-1.4), SHGC??
	Frame Type	Alum w/ Brk		
	Frame Wd (in)	3.0 in		
Exterior Windows				
Exterior Windows	Window Area Spec Method	% of Gross Wall Area (floor to floor)		
	Glass Category	specify properties		
	Glass Type **#1 (North)**	NFRC Ufactor=.77, SHGC=.61, VT=.81		Exterior Windows [WWR of 40%] in CZ 3 U-factor - 0.77 (R-1.29) & SHGC 0..61 (North) and 0.41 (Non-North)
	Frame Type	Alum x/ Brk, Oper, Mtl Spacer		
	Frame Wd (in)	1.50 in		
	Typ Window Width (ft)	0		
	Window Ht (ft)	5.22		
	Sill Ht (ft)	3		
	% Window (incl frame) S, N, E, W	0, 40, 0, 0		WWR of 40% - max allowed by Title 24
	Glass Type **#2 (Non-North)**	NFRC Ufactor=.77, SHGC=.41, VT=.81		Exterior Windows [WWR of 40%] in CZ 3 U-factor - 0.77 (R-1.29) & SHGC 0..61 (North) and 0.41 (Non-North)
	Frame Type	Alum x/ Brk, Oper, Mtl Spacer		
	Frame Wd (in)	1.50 in		
	Typ Window Width (ft)	0		
	Window Ht (ft)	5.22		
	Sill Ht (ft)	3		
	% Window (incl frame) S, N, E, W	40, 0, 40, 40		WWR of 40% - max allowed by Title 24
	Custom Window/Door Placement	none - default		
Exterior Window Shades and Blinds				
Exterior Window Shades and Blinds	Overhangs	none - default		No requirement
	Fins	none - default		No requirement
Window Blinds/Drapes	Type	none		No requirement
Roof Skylights		NONE		No requirement
Ground Floor Daylight Zoning		NONE		No requirement
Typical (Middle) Floor Daylight Zoning		NONE		No requirement
Top Floor Daylight Zoning		NONE		No requirement
Building Operation Schedule				No requirement

Commercial per Title 24-2008

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Use	Typical Use	Entire Year	
	Return at	Leave at	
M	8am	5pm	
T	8am	5pm	
W	8am	5pm	
R	8am	5pm	
F	8am	5pm	
S	Closed		
S	Closed		
Hol	Closed		

Activity Areas Allocation

Area Type	Percent Area %, Design Max Occup (sf/person), **Design Venitlation (CFM/per)**	
Office (Open Plan)	44, 200, 15	S 121.2(B) - 15 cfm * Occupants Occupants = 1/2 CBC egress = total sf divided by 100 divided by two.
Office (Executive/Private)	20, 200, 15	
Corridor	10, 200, 15	
Lobby (Office Reception/Waiting)	5, 200, 15	
Restrooms	5, 200, 15	
Conference Room	10, 200, 15	
Mech/Elec Room	4, 200, 15	
Copy Room (photocopying equip)	2, 200, 15	
Occupancy Profile	EL1 Occup Profile (S1)	

Zone Group Definitions

Non-HVAC Enduses to Model

Interior Enduses		Added Interior (task) lighting!	
Exterior Enduses	Exterior Lighting	Connected Intensity & Monthly Single Day Profiles	
	DHW	Model DHW Equip w Seasonal Profiles	
Laundry Facilities	Location of Equip	In-Unit	

Interior Lighting Loads and Profiles

Area Type	LPD (W/sf)	
Office (Open Plan)	0.81	TABLE 146-F, Offices > 250 s.f. (0.9)
Office (Executive/Private)	0.80	TABLE 146-F, Offices < 250 s.f. (1.1)
Corridor	0.6	TABLE 146-F, Corridors (0.6)
Lobby (Office Reception/Waiting)	1.35	TABLE 146-F, Main entry lobby (1.5)
Restrooms	0.6	TABLE 146-F, All other (0.6)
Conference Room	1.26	TABLE 146-F, conference room (1.4)
Mech/Elec Room	0.7	TABLE 146-F, All other (0.6)
Copy Room (photocopying equip)	0.6	TABLE 146-F, support areas (0.6)
Multiplier	1	
Ambient Profile	EL1 InsLtg Profile (S1)	
Task Profile	EL1 TskLtg Profile (S1)	

Office Equipment Loads and Profiles

Area Type	W/sf
Office (Open Plan)	0.00
Office (Executive/Private)	0.00
Corridor	0.00
Lobby (Office Reception/Waiting)	0.00
Restrooms	0.00
Conference Room	0.00
Mech/Elec Room	0.00
Copy Room (photocopying equip)	0.30
Profile	EL1 OffEq Profile (S1)

Misc Loads and Profiles

Process Loads	**1.5 W/sf** (latent ratio = 1), **0.225 W/sf** (ratio = 0, no internal heat gain contribution)

Area Type	Electric Load (W/sf)
Office (Open Plan)	0.75
Office (Executive/Private)	0.75
Corridor	0.00
Lobby (Office Reception/Waiting)	0.25
Restrooms	0.10
Conference Room	0.10

Commercial per Title 24-2008

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	Mech/Elec Room	0.10	
	Copy Room (photocopying equip)	0.70	
	Profile	EL1 Misc Profile (S1)	
Exterior Lighting Loads			
Connected Load	Exterior Lighting Load [W/ft2]	0.143	TABLE 147-A, Hardcape LZ3 = 0.092 W/ft2 AWA, and 770 W IWA, LWA ignored; TABLE 147-B, building facades 0.35 W/ft2
Domestic Water Heating (DHW) Profiles			
	Profile	EL1 DHW Profile (S1)	

HVAC SYSTEM

HVAC System Definition			
	Cooling Source	Chilled Water Coils	
	Heating Source	Hot Water Coils	
	System Type	**Standard VAV with HW Reheat**	
	System per Area	System per Floor	
	Return Air Path	Ducted	
	System Assignment to Thermal Zones	Apply to All Zones	
HVAC Zones: Temperature and Air Flows			
Seasonal T-stat setpts	Occupied (deg F) Cool / Heat	73 / 72	S 112(c) - t-stats shall be setback tstats, w controls able to control 4 time periods
	Unoccupied (deg F) Cool / Heat	75 / 70	
Design Temps	Cooling Design Temp (deg F) Indoor / Supply	75 / 55	per ASHRAE Handbook, Fundamentals
	Heating Design Temp (deg F) Indoor / Supply	72 / 95	per ASHRAE Handbook, Fundamentals
Air Flows	Minimum Design Flow	0.50 CFM/sf	
	VAV Minimum Flow Core	30%	
	VAV Minimum Flow Perimeter	30%	
HVAC System Fans			
Supply Fans	Power	**104.84** BHP (auto-sized)	
	Motor Efficiency	High	default in eQUEST per Title 24-2005
	Fan Flow & OSA	Auto-size	
	Fan Type	Vane-Axial w/ variable pitch blades???	S 144(c) - VAV motors shall either be: VSD, Vane-axial w variable pitch blades, or limiting controls
Return Fans	Power	**32.76** BHP (auto-sized)	
	Motor Efficiency	High	
	Fan Flow	Auto-size	
	Fan Type	Vane-Axial w/ variable pitch blades???	S 144(c) - VAV motors shall either be: VSD, Vane-axial w variable pitch blades, or limiting controls
HVAC System #1 Fan Schedules			
	On at	Off at	
M	7am	6pm	
T	7am	6pm	
W	7am	6pm	
R	7am	6pm	
F	7am	6pm	
S	OFF	OFF	
S	OFF	OFF	
Hol	OFF	OFF	
HVAC Zone Heating, Vent and Economizers			
Zone Heat Source & Capabilities / Delta T	Baseboards	none	
	Heat / Reheat: Hot Water	30.0 deg F delta T	
Economizer(s)	Type	Drybulb Temperature	S144(e)1 - systems w cooling capacity > 75 kBtu/h must have economizer
	High Limit	75 deg F	Table 144-C for Fixed drybulb and CZ3, OAT > 75 deg F
HVAC System Hot/Cold Deck Resets			
Cold Deck Reset(s)	Type	Outside Air Reset	
	Outside Hi/Low	62 / 55	
	Supply Min/Max	55 / 60	

Commercial per Title 24-2008

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DHW SYSTEM

Non-Residential Domestic Water Heating

Heater Specifications	Heater Fuel	Electricity	
	Efficiency Spec	Standby Loss	
	Heater Type	Instantaneous	
	Hot Water Use	1.00 gal/person/day	
	Input Rating	32.5 kW	
Storage Tank	Tank Capacity	2 gal	
	Insulation R-value	16 h-ft2-degF/Btu	S 145(b) --> S 113 - R-16 req'd
	Standy Loss	0.89 %/hr very different from default	S 145(b) --> 151(f)8(c) --> S 111 - CEC Appliance Stds
Water Temperatures	Supply Water	135.0 deg F	
	Inlet	Equals Ground Temperature	
Pumping	Recirculation %	0.00%	

CHW PLANT EQUIPMENT

Cooling Primary Equipment

Chilled Water System	Pump Configuration	Single System Pump(s) Only	
	Number of System Pumps	1	
	CHW Loop Flow	Variable	S 144(j)1 - variable flow required to be able to reduce to 50% design flowrate
	Pump Control	Two Speed VSD req'd?	S 144(j)6 - controls req'd to reduce to 30% of design power at 50% design flow
	Loop Pump, head, ft	-	
	Loop Pump, flow, gpm	-	
	Motor Efficiency	High	
	Estimated CHW Load	99,970 sf x 1.20 size factor / 480 sf/ton = **250 tons**	
Describe Chillers	Chiller Type	Screw	
	Condenser Type(s)	Packaged Air-Cooled	S-144(i)1 - CHW plants > 300 tons cannot have > 100 tons from air-cooled condesers
	Chiller Counts & Sizes	1, Auto-size, 150-300 tons	
	Chiller Efficiency	2.80 COP	TABLE 112-D, Aircooled w/ condenser, 2.80 COP

CHW System Control and Schedule

	Setpoint is:	Reset	S 144(j)4 - reset controls req'd for systems > 500 kBtu/h (41 tons / 147 kW)
	CHW Min Temp	44.0 deg F	
	CHW Max Temp	54.0 deg F	
	Operation	Standby	
	On at	Off at	
M	7am	6pm	
T	7am	6pm	
W	7am	6pm	
R	7am	6pm	
F	7am	6pm	
S	OFF	OFF	
S	OFF	OFF	
Hol	OFF	OFF	

HW PLANT EQUIPMENT

Heating Primary Equipment

Hot Water System	Pump configuration	Single System Pump(s) Only	
	Number of System Pumps	1	
	HW Loop Flow	Variable	S 144(j)1 - variable flow required to be able to reduce to 50% design flowrate
	Pump Control	Two Speed	S 144(j)6 - controls req'd to reduce to 30% of design power at 50% design flow
	Loop Pump, head, ft	-	
	Loop Pump, flow, gpm	-	
	Motor Efficiency	High	
Describe Boilers	Boiler Type	HW Boiler (Natural Draft)	
	Energy / Efficiency	Natural Gas, 80%	
	Boiler Output	Auto-size	

HW System Control and Schedule

	Setpoint is:	Reset	S 144(j)4 - reset controls req'd for systems > 500 kBtu/h (41 tons / 147 kW)
	HW Max Temp	180.0 deg F	

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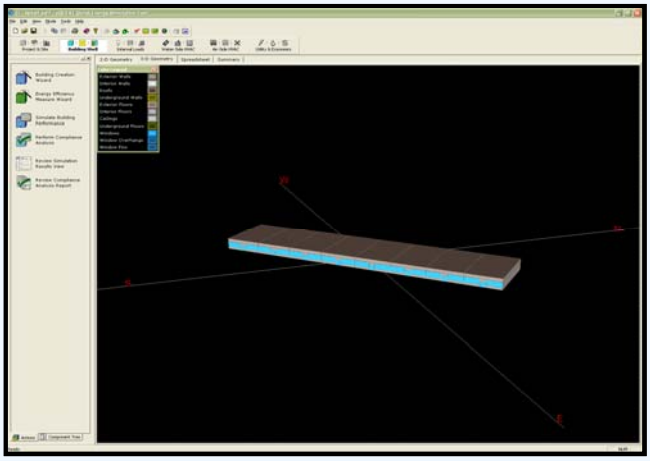
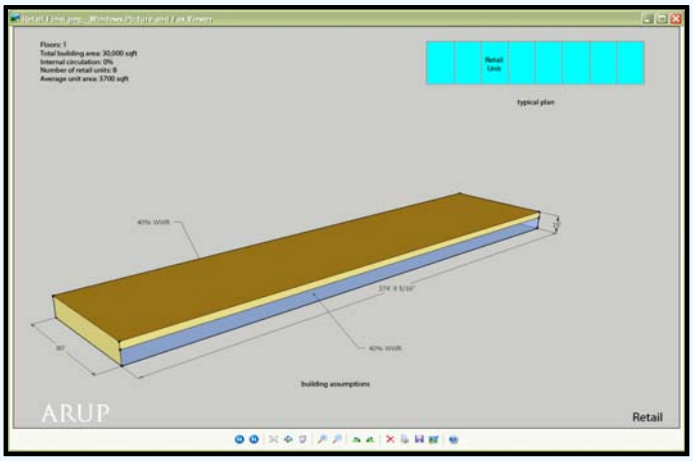
	HW Min Temp	140.0 deg F
	Operation	Standby
	On at	Off at
M	7am	6pm
T	7am	6pm
W	7am	6pm
R	7am	6pm
F	7am	6pm
S	OFF	OFF
S	OFF	OFF
Hol	OFF	OFF

Retail per Title 24-2008

ARUP





	flagged	eQUEST Category	default (Y/N)	eQUEST Input	DD	eQUEST Comments	Title 24 requirement
PROJECT & SITE DATA							
General Information							
		Project Name		TI - Retail			
		Building Type		Retail, Strip Mall			total sf. --> 30,000 sf
		Energy Code Compliance Analysis		California Title 24			total energy consumption (gas + elec) --> 278.82 MWh
		Vintage		2006 or after			energy intensity --> **9.29 kWh/sf/yr**
		Building Location, Utilities & Rates Coverage		California (Title 24)			
		Region		Oakland Area (CZ03)			
		City		San Francisco AP			
		Electic Utility / Rate		PG&E (CA), A10s (kWh & kW charges, <499 kW secondary voltage)			
		Gas Utility / Rate		PG&E (CA), GNR-1 (bldgs w <20800 therms/mo)			
		Other Data Analysis Year		2010			
		Usage Details		Hourly Enduse Profile			
Compliance Analysis Settings							
		Scope of Permit		Envelope/Mech/Lighting			
		Building Type		Non-Residential			
Season Definitions							
		Descriptions of Seasons		Typical Use Throughout Year			
		Number of Seasons		1			
BLDG ENVELOPE & LOADS							
General Shell Info							
		Building Area [s.f.]		30,000			
		# of Floors Above Grade		1			
		# of Floors Below Grade		0			
Building Footprint							
		Footprint Shape		custom			
		Zoning Pattern		custom			
		Building Orientation		South East			
		Floor - Floor Height		15 ft			
		Floor - Ceiling Height		11 ft			
Buliding Envelope Constructions							
		Roof Construction		Metal Frame, > 24 in o.c.			n/a
		Ext Finish		Roof, Built-up			No requirement
		Ext Color		Medium (abs=0.6)			Aged reflectance of 0.55, emittance of 0.75

Retail per Title 24-2008

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	Ext Insulation	1 in polystytrene (R-4)		Metal building roofs in CZ 3 U-factor - 0.065 (R-15.4)
	Add'l Insulation	R-7 batt, no rad barrier	Total R-15.47	Metal building roofs in CZ 3 U-factor - 0.065 (R-15.4)
Walls	Construction	Metal Frame, 2x6, 24 in. o.c.		n/a
	Ext Finish / Color	Stucco/Gunite		No requirement
	Ext Color	Medium (abs=0.6)		No requirement
	Ext Insulation	3/4in fiber bd sheathing (R-2)		Metal framed walls in CZ 3 U-factor - 0.082 (R-12.2)
	Add'l Insulation	R-21 batt		Metal framed walls in CZ 3 U-factor - 0.082 (R-12.2)
	Interior Insulation	no board insulation	Total R-12.36	Metal framed walls in CZ 3 U-factor - 0.082 (R-12.2)
Ground Floor	Exposure	Earth Contact		
	Interior Finish	Vinyl Tile		
	Construction	4 in Concrete		
	Ext/Cav Insul	vert int bd, R-20, 4 ft deep....manually changed U-factor to **0.269** in DD	Total R-3.7	Mass floor has U-factor - 0.269 (R-3.7)
Infiltration	Perim	0.038 CFM/sf		? - infil specified per window and door in Title 24, eQUEST input is for entire wall area
	Core	0.001 CFM/sf		? - infil specified per window and door in Title 24, eQUEST input is for entire wall area
Building Interior Constructions				
Ceilings	Interior Finish	Lay-In Acoustic Tile		
	Batt Insultation	none		
Vertical Walls	Wall Type	Frame		
Exterior Doors				
Exterior Doors	Glass - NW, SE, SW, NE	0, 8, 0, 0		
	Height, Width	7 ft, 6 ft		
	Construction	specify properties		
	Glass Category & Type	NFRC Ufactor = 0.70, SHGC=0.69, VT=.78		Swinging Doors in CZ 3 U-factor - 0.70 (R-1.4), SHGC??
	Frame Type	Alum w/ Brk		
	Frame Wd (in)	3.0 in		
Exterior Windows				
Exterior Windows	Window Area Spec Method	% of Gross Wall Area (floor to floor)		
	Glass Category	specify properties		
	Glass Type **#1 (North)**	NFRC Ufactor=.77, SHGC=.61, VT=.81		Exterior Windows [WWR of 40%] in CZ 3 U-factor - 0.77 (R-1.29) & SHGC 0..61 (North) and 0.41 (Non-North)
	Frame Type	Alum x/ Brk, Oper, Mtl Spacer		
	Frame Wd (in)	1.50 in		
	Typ Window Width (ft)	0		
	Window Ht (ft)	7		
	Sill Ht (ft)	3		
	% Window (incl frame) NW, SE, SW, NE	40, 0, 0, 0		WWR of 40% - max allowed by Title 24
	Glass Type **#2 (Non-North)**	NFRC Ufactor=.77, SHGC=.41, VT=.81		Exterior Windows [WWR of 40%] in CZ 3 U-factor - 0.77 (R-1.29) & SHGC 0..61 (North) and 0.41 (Non-North)
	Frame Type	Alum x/ Brk, Oper, Mtl Spacer		
	Frame Wd (in)	1.50 in		
	Typ Window Width (ft)	0		
	Window Ht (ft)	7		
	Sill Ht (ft)	3		
	% Window (incl frame) NW, SE, SW, NE	0, 40, 0, 0		WWR of 40% - max allowed by Title 24
	Custom Window/Door Placement	none - default		
Exterior Window Shades and Blinds				
Exterior Window Shades and Blinds	Overhangs	none - default		No requirement
	Fins	none - default		No requirement
Window Blinds/Drapes	Type	none		No requirement
Roof Skylights		NONE		No requirement
Top Floor Daylight Zoning		NONE		No requirement
Building Operation Schedule				No requirement
Use	Typical Sales	Entire Year		
	Return at	Leave at		
M	9am	8pm		
T	9am	8pm		
W	9am	8pm		
R	9am	8pm		
F	9am	8pm		
S	10am	8pm		
S	CLOSED	CLOSED		
Hol	CLOSED	CLOSED		

Retail per Title 24-2008

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Activity Areas Allocation

Area Type	Percent Area %, Design Max Occup (sf/person), **Design Venitlation (CFM/per)**	
Retail Sales & Wholesale Showroom	73, 60, 15	S 121.2(B) - 15 cfm * Occupants Occupants = 1/2 CBC egress = total sf divided by 30 divided by two.
Storage (Conditioned)	15, 60, 15	
Office (General)	5, 60, 15	
Restrooms	5, 60, 15	
Mech/Elec Room	2, 60, 15	
Occupancy Profile	EL1 Occup Profile (S1)	

Zone Group Definitions

Non-HVAC Enduses to Model

Interior Enduses		Added Interior (task) lighting!
Exterior Enduses	Exterior Lighting	Connected Intensity & Monthly Single Day Profiles
	DHW	Model DHW Equip w Seasonal Profiles
Laundry Facilities	Location of Equip	In-Unit

Interior Lighting Loads and Profiles

Area Type	LPD (W/sf)	
Retail Sales & Wholesale Showroom	1.44	TABLE 146-F, Retail (1.6)
Storage (Conditioned)	0.6	TABLE 146-F, All other (0.6)
Office (General)	0.89	TABLE 146-F, Offices < 250 s.f. (1.1)
Restrooms	0.6	TABLE 146-F, All other (0.6)
Mech/Elec Room	0.6	TABLE 146-F, All other (0.6)
Multiplier	1	
Ambient Profile	EL1 InsLtg Profile (S1)	

Office Equipment Loads and Profiles

Area Type	W/sf
Retail Sales & Wholesale Showroom	0.0
Storage (Conditioned)	0
Office (General)	0
Restrooms	0
Mech/Elec Room	0
Profile	EL1 OffEq Profile (S1)

Misc Loads and Profiles

Process Loads **1.5 W/sf** (latent ratio = 1)

Area Type	Electric Load (W/sf)
Retail Sales & Wholesale Showroom	0.25
Storage (Conditioned)	0.00
Office (General)	0.75
Restrooms	0.10
Mech/Elec Room	0.10
Profile	EL1 Misc Profile (S1)

Exterior Lighting Loads

Connected Load	Exterior Lighting Load [W/ft2]	0.213	TABLE 147-A, Hardcape LZ3 = 0.092 W/ft2 AWA, and 770 W IWA, LWA ignored; TABLE 147-B, building facades 0.35 W/ft2

Domestic Water Heating (DHW) Profiles

Profile	EL1 DHW Profile (S1)

HVAC SYSTEM

HVAC System Definition

Cooling Source	DX Coils
Heating Source	DX Coils (Heat Pump)
System Type	**Packaged Single Zone Heat Pump**
System per Area	System per Zone
Return Air Path	Ducted
System Assignment to Thermal Zones	Apply to All Zones

HVAC Zones: Temperature and Air Flows

Seasonal T-stat setpts	Occupied (deg F) Cool / Heat	73 / 72	S 112(c) - t-stats shall be setback tstats, w controls able to control 4 time periods

Retail per Title 24-2008

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	Unoccupied (deg F) Cool / Heat	75 / 70	
Design Temps	Cooling Design Temp (deg F) Indoor / Supply	75 / 55	per ASHRAE Handbook, Fundamentals
	Heating Design Temp (deg F) Indoor / Supply	72 / 95	per ASHRAE Handbook, Fundamentals
Air Flows	Minimum Design Flow	0.50 CFM/sf	

Packaged HVAC Equipment

Cooling	Overall Size	Auto-size	
	Typical Unit Size	65-90 kBtuh or 5.4-7.5 tons	less than 65 kBtu/h no requirement
	Efficiency	EER of 10.1	Per table 144-B, EER of 10.1 required (before 1/1/2010)
Heating	Size	Auto-size	
	Efficiency	COP of 3.2	Per table 144-B, COP of 3.2 required (before 1/1/2010)

HVAC System Fans

Supply Fans	Power	**17.10** BHP (auto-sized)	
	Motor Efficiency	High	default in eQUEST per Title 24-2005
	Fan Flow & OSA	Auto-size	

HVAC System #1 Fan Schedules

	On at	Off at
M	8am	9pm
T	8am	9pm
W	8am	9pm
R	8am	9pm
F	8am	9pm
S	9am	9pm
S	OFF	OFF
Hol	OFF	OFF
	Fan 'On' Mode	Continuous

HVAC Zone Heating, Vent and Economizers

Zone Heat Source & Capabilities / Delta T	Baseboards	none	
Economizer(s)	Type	none	S144(e)1 - systems w cooling capacity > 75 kBtu/h must have economizer

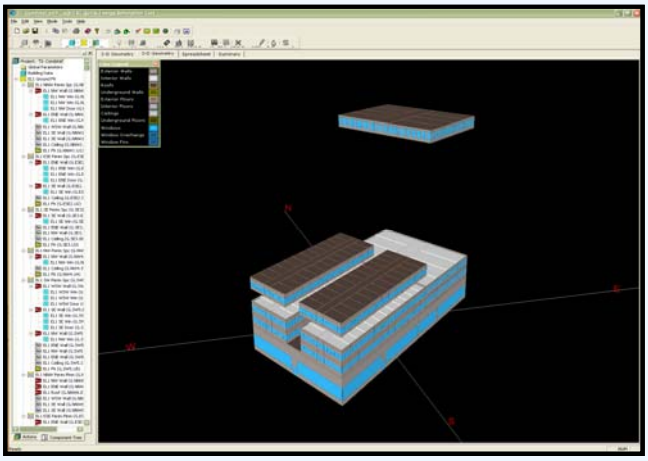
DHW SYSTEM

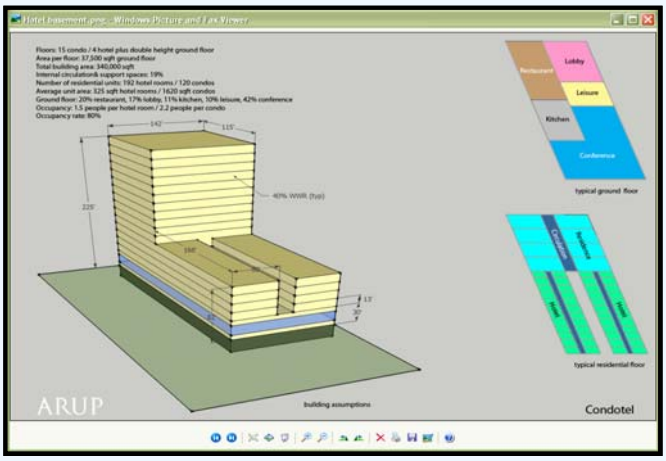
Non-Residential Domestic Water Heating

Heater Specifications	Heater Fuel	Electricity		
	Efficiency Spec	Standby Loss		
	Heater Type	Instantaneous		
	Hot Water Use	0.50 gal/person/day		
	Input Rating	16.3 kW		
Storage Tank	Tank Capacity	2 gal		
	Insulation R-value	16 h-ft2-degF/Btu		S 145(b) --> S 113 - R-16 req'd
	Standy Loss	0.89 %/hr	very different from default	S 145(b) --> 151(f)8(c) --> S 111 - CEC Appliance Stds
Water Temperatures	Supply Water	135.0 deg F		
	Inlet	Equals Ground Temperature		
Pumping	Recirculation %	0.00%		

Condotel per Title 24-2008

ARUP





	flagged	eQUEST Category	default (Y/N)	eQUEST Input	DD	eQUEST Comments	Title 24 requirement
PROJECT & SITE DATA							
General Information							
		Project Name		TI - Condotel			
		Building Type		Lodging, High-Rise Hotel			total bldg gross sf. --> 340,574 sf
		Energy Code Compliance Analysis		California Title 24			total energy consumption (gas + elec) --> **5,477 MWh**
		Vintage		2006 or after			energy intensity --> **16.1 kWh/sf/yr**
		Building Location, Utilities & Rates	Coverage		California (Title 24)		
		Region		Oakland Area (CZ03)			
		City		San Francisco AP			
		Electic Utility / Rate		PG&E (CA), E19s (kWh & kW charges, 499 < kW < 1000 secondary voltage)			
		Gas Utility / Rate		PG&E (CA), GNR-1 (bldgs w <20800 therms/mo)			
		Other Data	Analysis Year		2010		
		Usage Details		Hourly Enduse Profile			
Compliance Analysis Settings							
		Scope of Permit		Envelope/Mech/Lighting			
		Building Type		Nonres + HR Res + Hotel/Motel G/R			
Season Definitions							
		Descriptions of Seasons		Typical Use Throughout Year			
		Number of Seasons		1			
BLDG ENVELOPE & LOADS - Ground Floor							
General Shell Info							
		Shell Name		Ground Floor			
		Building Type		Lodging, High-Rise Hotel			
		Shell Location w/in Site	Position this Shell		-		
			...of Reference Shell:		-		
			Distance from Reference shell		-		
		Area and Floors	Building Area [s.f.]		37,469		
			# of Floors Above Grade		1		
			# of Floors Below Grade		0		
Building Footprint							
		Footprint Shape			custom		
		Zoning Pattern			custom		
		Building Orientation			East North East		
		Floor - Floor Height			30 ft		
		Floor - Ceiling Height			28 ft		
		Shell Location (x, y coordinates)			(0,0)		

Condotel per Title 24-2008

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Buliding Envelope Constructions			
Roof	Construction	Metal Frame, > 24 in o.c.	n/a
	Ext Finish	Roof, Built-up	No requirement
	Ext Color	Medium (abs=0.6)	No requirement
	Ext Insulation	1 in polystyrene (R-4)	Metal building roofs in CZ 3 U-factor - 0.065 (R-15.4)
	Add'l Insulation	R-7 batt, no rad barrier Total R-15.47	Metal building roofs in CZ 3 U-factor - 0.065 (R-15.4)
Walls	Construction	Metal Frame, 2x6, 24 in. o.c.	n/a
	Ext Finish / Color	Stucco/Gunite	No requirement
	Ext Color	Medium (abs=0.6)	No requirement
	Ext Insulation	3/4in fiber bd sheathing (R-2)	Metal framed walls in CZ 3 U-factor - 0.082 (R-12.2)
	Add'l Insulation	R-21 batt	Metal framed walls in CZ 3 U-factor - 0.082 (R-12.2)
	Interior Insulation	no board insulation Total R-12.36	Metal framed walls in CZ 3 U-factor - 0.082 (R-12.2)
Ground Floor	Exposure	Earth Contact	
	Interior Finish	Carpet (no pad)	
	Construction	6 in Concrete	
	Ext/Cav Insul	vert int bd, R-20, 4 ft deep....manually changed U-factor to **0.058** in DD Total R-3.7	Mass floor has U-factor - 0.058 (R-17)
	Interior Insulation	none	
Infiltration	Perim	0.038 CFM/sf	? - infil specified per window and door in Title 24, eQUEST input is for entire wall area
	Core	0.001 CFM/sf	? - infil specified per window and door in Title 24, eQUEST input is for entire wall area
Building Interior Constructions			
Ceilings	Interior Finish	Lay-In Acoustic Tile	
	Batt Insultation	none	
Vertical Walls	Wall Type	Frame	
Exterior Doors			
Exterior Doors	Glass - S, N, W, E	Air Lock Entry (glass) -- 1, 1, 1, 1	
	Height, Width	10 ft, 6 ft	
	Construction	specify properties	
	Glass Category & Type	NFRC Ufactor = 0.70, SHGC=0.26, VT=.78	Swinging Doors in CZ 3 U-factor - 0.70 (R-1.4), SHGC taken from TABLE 143-A Non-North windows SHGC (.41)
	Frame Type	Alum w/ Brk	
	Frame Wd (in)	3.0 in	
Exterior Windows			
Exterior Windows	Window Area Spec Method	% of Gross Wall Area (floor to floor)	
	Glass Category	specify properties	
	Glass Type **#1 (North)**	NFRC Ufactor=.77, SHGC=.61, VT=.81	Exterior Windows [WWR of 40%] in CZ 3 U-factor - 0.77 (R-1.29) & SHGC 0..61 (North) and 0.41 (Non-North)
	Frame Type	Alum x/ Brk, Oper, Mtl Spacer	
	Frame Wd (in)	1.50 in	
	Typ Window Width (ft)	-	
	Window Ht (ft)	13.0	
	Sill Ht (ft)	5.0	
	% Window (incl frame) S, N, W, E	40, 0, 0, 0	WWR of 40% - max allowed by Title 24
	Glass Type **#2 (Non-North)**	NFRC Ufactor=.77, SHGC=.41, VT=.81	Exterior Windows [WWR of 40%] in CZ 3 U-factor - 0.77 (R-1.29) & SHGC 0..61 (North) and 0.41 (Non-North)
	Frame Type	Alum x/ Brk, Oper, Mtl Spacer	
	Frame Wd (in)	1.50 in	
	Typ Window Width (ft)	-	
	Window Ht (ft)	13.0	
	Sill Ht (ft)	5.0	
	% Window (incl frame) S, N, W, E	0, 40, 0, 0	WWR of 40% - max allowed by Title 24
	Custom Window/Door Placement	none - default	
Exterior Window Shades and Blinds			
Exterior Window Shades and Blinds	Overhangs	none - default	No requirement
	Fins	none - default	No requirement
Window Blinds/Drapes	Type	none	No requirement
Roof Skylights		NONE	No requirement

Condotel per Title 24-2008

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Top Floor Daylight Zoning		NONE	No requirement
Building Operation Schedule			No requirement
Use	Typical Occupancy	Entire Year	
	Opens At	Closes At	
M	Open 24 hrs.	-	
T	Open 24 hrs.	-	
W	Open 24 hrs.	-	
R	Open 24 hrs.	-	
F	Open 24 hrs.	-	
S	Open 24 hrs.	-	
S	Open 24 hrs.	-	
Hol	Open 24 hrs.	-	
Activity Areas Allocation			
	Area Type	Percent Area %, Design Max Occup (sf/person), **Design Venitlation (CFM/per)**	
	Convention and Meeting Center	42, 60, 15	S 121.2(B) - 15 cfm * Occupants Occupants = 1/2 CBC egress = total sf divided by 30 divided by two.
	Dining Area	17, 60, 15	
	Lobby (Hotel)	16, 60, 15	
	Kitchen & Food Preparation	12, 60, 15	
	Leisure (Lobby (Main Entry & Assembly))	8, 60, 15	
	Restrooms	5, 60, 15	
	Occupancy Profile	EL1 Occup Profile (S1)	
Zone Group Definitions			
Non-HVAC Enduses to Model			
Interior Enduses			
Exterior Enduses	Exterior Lighting	Connected Intensity & Monthly Single Day Profiles	
	DHW	Model DHW Equip w Seasonal Profiles	
Laundry Facilities	Location of Equip	In-Unit	
Interior Lighting Loads and Profiles			
	Area Type	LPD (W/sf)	
	Convention and Meeting Center	1.26	TABLE 146-F, Convention, conference mtg cntrs (1.4)
	Dining Area	0.89	TABLE 146-F, Dining (1.1)
	Lobby (Hotel)	0.6	TABLE 146-F, Hotel Lobby (0.6)
	Kitchen & Food Preparation	1.44	TABLE 146-F, Kitchen, food preparation (1.6)
	Leisure (Lobby (Main Entry & Assembly))	1.35	TABLE 146-F, Hotel function area (1.5)
	Restrooms	0.6	TABLE 146-F, Corridors, restrooms, stairs (0.6)
	Multiplier	1	
	Ambient Profile	EL1 InsLtg Profile (S1)	
Office Equipment Loads and Profiles			
	Area Type	W/sf	
	Convention and Meeting Center	0.0	
	Dining Area	0.0	
	Lobby (Hotel)	0.0	
	Kitchen & Food Preparation	0.0	
	Leisure (Lobby (Main Entry & Assembly))	0.0	
	Restrooms	0.0	
	Profile	EL1 OffEq Profile (S1)	
Cooking Loads and Profiles			
	Area Type	Electric Load (W/sf)	
	Convention and Meeting Center	0.0	
	Dining Area	0.0	
	Lobby (Hotel)	0.0	
	Kitchen & Food Preparation	0.0	
	Leisure (Lobby (Main Entry & Assembly))	0.0	
	Restrooms	0.0	
	Profile	EL1 CookEq Profile (S1)	

Condotel per Title 24-2008

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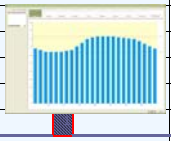
Self-Contained Refrig Loads and Profiles

Area Type	Refrig Equip Load (W/sf)
Convention and Meeting Center	0.00
Dining Area	0
Lobby (Hotel)	0
Kitchen & Food Preparation	0
Leisure (Lobby (Main Entry & Assembly))	0
Restrooms	0
Profile	EL1 S-C Refrig Profile (S1)



Misc Loads and Profiles

Process Loads **0.6 W/sf** (latent ratio = 1)

Area Type	Electric Load (W/sf)
Convention and Meeting Center	0.25
Dining Area	0.10
Lobby (Hotel)	0.25
Kitchen & Food Preparation	1.00
Leisure (Lobby (Main Entry & Assembly))	0.25
Restrooms	0.10
Profile	EL1 Misc Profile (S1)

Exterior Lighting Loads

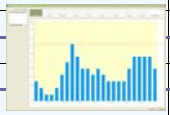
Connected Load	Exterior Lighting Load [W/sf]	.280, **60.0 kW** total exterior load	TABLE 147-A, Hardcape LZ3 = 0.092 W/ft2 AWA, and 770 W IWA, LWA ignored; TABLE 147-B, building facades 0.35 W/ft2
	Profiles	default profiles	

Romote Refrigeration Loads & Profiles

NONE

Domestic Water Heating (DHW) Profiles

Profile	EL1 DHW Profile (S1)



HVAC SYSTEM - Ground Floor

HVAC System Definition

System Type Name	Ground Floor HVAC	
Cooling Source	DX Coils	
Heating Source	DX Coils (Heat Pump)	
System Type	**Split System Single Zone Heat Pump**	
System per Area	System per Zone	
Return Air Path	Ducted	
System Assignment to Thermal Zones	changed all shell component(s) to Ground Floor, All Zones	

HVAC Zones: Temperature and Air Flows

Seasonal T-stat setpts	Occupied (deg F) Cool / Heat	73 / 72	S 112(c) - t-stats shall be setback tstats, w controls able to control 4 time periods
	Unoccupied (deg F) Cool / Heat	75 / 70	
Design Temps	Cooling Design Temp (deg F) Indoor / Supply	75 / 55	per ASHRAE Handbook, Fundamentals
	Heating Design Temp (deg F) Indoor / Supply	72 / 95	per ASHRAE Handbook, Fundamentals
Air Flows	Minimum Design Flow	0.50 CFM/sf	

Packaged HVAC Equipment

Cooling	Overall Size	Auto-size	
	Typical Unit Size	65-90 kBtuh or 5.4-7.5 tons	less than 65 kBtu/h no requirement
	Efficiency	EER of 10.1	Per table 144-B, EER of 10.1 required (before 1/1/2010)
Heating	Size	Auto-size	
	Efficiency	COP of 3.2	Per table 144-B, COP of 3.2 required (before 1/1/2010)

HVAC System Fans

Supply Fans	Power	**43.49** BHP (auto-sized)	
	Motor Efficiency	High	default in eQUEST per Title 24-2005
	Fan Flow & OSA	Auto-size	

HVAC System #1 Fan Schedules

	On at	Off at
M	On 24 hrs.	
T	On 24 hrs.	
W	On 24 hrs.	

Condotel per Title 24-2008

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R	On 24 hrs.			
F	On 24 hrs.			
S	On 24 hrs.			
S	On 24 hrs.			
Hol	On 24 hrs.			
	Fan 'On' Mode	Continuous		
HVAC Zone Heating, Vent and Economizers				
Zone Heat Source & Capabilities / Delta T	Baseboards	none		
Economizer(s)	Type	none		S144(e)1 - systems w cooling capacity > 75 kBtu/h must have economizer
DHW SYSTEM				
Non-Residential Domestic Water Heating				
Heater Specifications	Heater Fuel	Natural Gas		
	Efficiency Spec	Efficiency and Standby Loss		
	Heater Type	Storage		
	Thermal Efficiency	0.8		
	Hot Water Use	14.13 gal/person/day		
	Input Rating	7,928.0 kBtuh		
Storage Tank	Tank Capacity	5,948 gal		
	Insulation R-value	16 h-ft2-degF/Btu		S 145(b) --> S 113 - R-16 req'd
	Standy Loss	0.89 %/hr	very different from default	S 145(b) --> 151(f)8(c) --> S 111 - CEC Appliance Stds
Water Temperatures	Supply Water	135.0 deg F		
	Inlet	Equals Ground Temperature		
Pumping	Recirculation %	0.00%		
Residential Domestic Water Heating				
Heater Specifications	Heater Fuel	Natural Gas		
	Efficiency Spec	Efficiency and Standby Loss		
	Heater Type	Storage		
	Thermal Efficiency	0.8		
	Hot Water Use	20.0 gal/person/day		
	Input Rating	4,946.7 kBtuh		
Storage Tank	Tank Capacity	5,399 gal		
	Insulation R-value	16 h-ft2-degF/Btu		S 145(b) --> S 113 - R-16 req'd
	Standy Loss	0.89 %/hr	very different from default	S 145(b) --> 151(f)8(c) --> S 111 - CEC Appliance Stds
Water Temperatures	Supply Water	110.0 deg F		
	Inlet	Equals Ground Temperature		
Pumping	Recirculation %	0.00%		
CHW PLANT EQUIPMENT				
Cooling Primary Equipment				
Chilled Water System	Pump Configuration	Single System Pump(s) Only		
	Number of System Pumps	1		
	CHW Loop Flow	Variable		S 144(j)1 - variable flow required to be able to reduce to 50% design flowrate
	Pump Control	Two Speed	VSD req'd?	S 144(j)6 - controls req'd to reduce to 30% of design power at 50% design flow
	Loop Pump, head, ft	-		
	Loop Pump, flow, gpm	-		
	Motor Efficiency	High		
	Estimated CHW Load	303,044 sf x 1.20 size factor / 480 sf/ton = **757.6 tons**		
Describe Chillers	Chiller Type	Screw		
	Condenser Type(s)	Packaged Air-Cooled		S-144(i)1 - CHW plants > 300 tons cannot have > 100 tons from air-cooled condesers
	Chiller Counts & Sizes	4, Auto-size, 150-300 tons		
	Chiller Efficiency	2.80 COP		TABLE 112-D, Aircooled w/ condenser, 2.80 COP
CHW System Control and Schedule				
	Setpoint is:	Reset		S 144(j)4 - reset controls req'd for systems > 500 kBtu/h (41 tons / 147 kW)
	CHW Min Temp	44.0 deg F		
	CHW Max Temp	54.0 deg F		
	Operation	Standby		
	On at	Off at		

M	On 24 hrs.		
T	On 24 hrs.		
W	On 24 hrs.		
R	On 24 hrs.		
F	On 24 hrs.		
S	On 24 hrs.		
S	On 24 hrs.		
Hol	On 24 hrs.		

HW PLANT EQUIPMENT

Heating Primary Equipment

Hot Water System	Pump configuration	Single System Pump(s) Only	
	Number of System Pumps	1	
	HW Loop Flow	Variable	S 144(j)1 - variable flow required to be able to reduce to 50% design flowrate
	Pump Control	Two Speed	S 144(j)6 - controls req'd to reduce to 30% of design power at 50% design flow
	Loop Pump, head, ft	-	
	Loop Pump, flow, gpm	-	
	Motor Efficiency	High	
Describe Boilers	Boiler Type	HW Boiler (Natural Draft)	
	Energy / Efficiency	Natural Gas, 80%	
	Boiler Output	Auto-size	

HW System Control and Schedule

	Setpoint is:	Reset	S 144(j)4 - reset controls req'd for systems > 500 kBtu/h (41 tons / 147 kW)
	HW Max Temp	180.0 deg F	
	HW Min Temp	140.0 deg F	
	Operation	Standby	
	On at	Off at	
M	On 24 hrs.		
T	On 24 hrs.		
W	On 24 hrs.		
R	On 24 hrs.		
F	On 24 hrs.		
S	On 24 hrs.		
S	On 24 hrs.		
Hol	On 24 hrs.		

Condotel per Title 24-2008

ARUP

BLDG ENVELOPE & LOADS - Condominums

General Shell Info

	Shell Name	Condominiums	
	Building Type	Multifamily, High-Rise (interior entries)	
Shell Location w/in Site	Position this Shell	Immediately Above	
	...of Reference Shell:	Ground Floor	
	Distance from Reference shell	0.0 ft	
Area and Floors	Building Area [s.f.]	228,225	
	# of Floors Above Grade	15	
	# of Floors Below Grade	0	

Building Footprint

	Footprint Shape	custom	
	Zoning Pattern	custom	
	Building Orientation	East North East	
	Floor - Floor Height	13 ft	
	Floor - Ceiling Height	11 ft	
	Shell Location (x, y coordinates)	(0,0)	

Buliding Envelope Constructions

Roof	Construction	Metal Frame, > 24 in o.c.		n/a
	Ext Finish	Roof, Built-up		No requirement
	Ext Color	Medium (abs=0.6)		No requirement
	Ext Insulation	1 in polyisocyanurate (R-7)		Metal building roofs in CZ 3 U-factor - 0.065 (R-15.4)
	Add'l Insulation	R-3 batt, no rad barrier	Total U- 0.065	Metal building roofs in CZ 3 U-factor - 0.065 (R-15.4)
Walls	Construction	Metal Frame, 2x6, 24 in. o.c.		n/a
	Ext Finish / Color	Glass/Spandrel		No requirement
	Ext Color	Medium (abs=0.6)		No requirement
	Ext Insulation	1/2 in. fiber bd sheathing (R-1.3)		Metal framed walls in CZ 3 U-factor - 0.105 (R-9.5)
	Add'l Insulation	R-13 batt		Metal framed walls in CZ 3 U-factor - 0.105 (R-9.5)
	Interior Insulation	no board insulation	Total R-9.55	Metal framed walls in CZ 3 U-factor - 0.105 (R-9.5)
Ground Floor	Exposure	Over Conditioned Space (adiabatic)		
	Interior Finish	-		
	Construction	6 in Concrete		
	Ext/Cav Insul	5 in polystyrene (R-20)	Total R-17	Mass floor has U-factor - 0.058 (R-17)
	Interior Insulation	none		
Infiltration	Perim	0.038 CFM/sf		? - infil specified per window and door in Title 24, eQUEST input is for entire wall area
	Core	0.001 CFM/sf		? - infil specified per window and door in Title 24, eQUEST input is for entire wall area

Building Interior Constructions

Ceilings	Interior Finish	Drywall Finish
	Batt Insultation	none
Vertical Walls	Wall Type	Frame
	Batt Insultation	none
Floors	Interior Finish	Carpet w Fiber pad
	Rigid Insulation	none
	Construction	6 in concrete
	Concrete Cap	none

Exterior Doors

Exterior Doors

Exterior Windows

Exterior Windows	Window Area Spec Method	% of Gross Wall Area (floor to floor)	
	Glass Category	specify properties	
	Glass Type **#1 (North)**	NFRC Ufactor=.47, SHGC=.55, VT=.81	TABLE 143-B Exterior Windows [WWR of 40%] in CZ 3 U-factor - 0.47 (R-2.12) & SHGC 0..55 (North) and 0.26 (Non-North)
	Frame Type	Alum x/ Brk, Oper, Mtl Spacer	
	Frame Wd (in)	1.50 in	
	Typ Window Width (ft)	4.25	

Condotel per Title 24-2008

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	Window Ht (ft)	8	
	Sill Ht (ft)	3.0	
	% Window (incl frame) W, E, S, N	0, 0, 0, 40	WWR of 40% - max allowed by Title 24
	Glass Type **#2 (Non-North)**	NFRC Ufactor=.47, SHGC=.26, VT=.81	TABLE 143-B Exterior Windows [WWR of 40%] in CZ 3 U-factor - 0.47 (R-2.12) & SHGC 0..55 (North) and 0.26 (Non-North)
	Frame Type	Alum x/ Brk, Oper, Mtl Spacer	
	Frame Wd (in)	1.50 in	
	Typ Window Width (ft)	4.25	
	Window Ht (ft)	8	
	Sill Ht (ft)	3.0	
	% Window (incl frame) W, E, S, N	40, 40, 40, 0	WWR of 40% - max allowed by Title 24
	Custom Window/Door Placement	none - default	
Exterior Window Shades and Blinds			
Exterior Window Shades and Blinds	Overhangs	none - default	No requirement
	Fins	none - default	No requirement
Window Blinds/Drapes	Type	none	No requirement
Roof Skylights		NONE	No requirement
Top Floor Daylight Zoning		NONE	No requirement
Building Operation Schedule			No requirement
Use	Daytime Unoccupied, Typical Use	Entire Year	
	Return at	Leave at	
M	5pm	7am	
T	5pm	7am	
W	5pm	7am	
R	5pm	7am	
F	5pm	7am	
S	4pm	9am	
S	4pm	9am	
Hol	4pm	9am	
Activity Areas Allocation			
	Area Type	Percent Area %, Design Max Occup (sf/person), **Design Venitlation (CFM/per)**	
	Residential (Multifam Dwelling Unit)	71, 400, 15	S 121.2(B) - 15 cfm * Occupants Occupants = 1/2 CBC egress = total sf divided by 200 divided by two.
	Corridor	16, 400, 15	
	Storage (conditioned)	7, 400, 15	
	Laundry	6, 400, 15	
	Occupancy Profile	EL2 Occup Profile (S1)	
Zone Group Definitions			
Non-HVAC Enduses to Model			
Interior Enduses			
Exterior Enduses	Exterior Lighting	Connected Intensity & Monthly Single Day Profiles	
	DHW	Model DHW Equip w Seasonal Profiles	
Laundry Facilities	Location of Equip	In-Unit	
	# Dwelling Units per Floor	8	
	Laundry Loads/Unit/Wk	17.7	
	Washer Type	Vertical Axis	
	Dryer Fuel	Electricity	
Interior Lighting Loads and Profiles			
	Area Type	LPD (W/sf)	
	Residential (Multifam Dwelling Unit)	0.90	TABLE 146-F, Multi-Family, Dormitory (1.0)
	Corridor	0.6	TABLE 146-F, Corridors (0.6)
	Storage (conditioned)	0.6	TABLE 146-F, All other (0.6)
	Laundry	0.81	TABLE 146-F, Laundry (0.9)
	Multiplier	1	
	Ambient Profile	EL2 InsLtg Profile (S1)	
Office Equipment Loads and Profiles			

Condotel per Title 24-2008

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	Area Type	W/sf	
Cooking Loads and Profiles			
	Area Type	LPD (W/sf)	
	Residential (Multifam Dwelling Unit)	0.0	
	Corridor	0	
	Storage (conditioned)	0	
	Laundry	0	
	Ambient Profile	EL2 CookEq Profile (S1)	
Self-Contained Refrig Loads and Profiles			
	Area Type	Refrig Equip Load (W/sf)	
	Residential (Multifam Dwelling Unit)	0.07	
	Corridor	0	
	Storage (conditioned)	0	
	Laundry	0	
	Sensible Ht (Frac) for all	1	
	Profile	EL2 S-C Refrig Profile (S1)	
Misc Loads and Profiles	**Process Loads**	**0.75 W/sf** (latent ratio = 1)	
	Area Type	Electric Load (W/sf)	
	Residential (Multifam Dwelling Unit)	0.3	maybe need to look into appliances...baseline has minimum efficiency and proposed has highest efficiency available.
	Corridor	0	
	Storage (conditioned)	0	
	Laundry	0.15	
	Sensible Ht (Frac) for all	1	
	Profile	EL2 Misc Profile (S1)	
Exterior Lighting Loads		NONE	
Connected Load	Exterior Lighting Load [W/sf]	0.15	TABLE 147-A, Hardcape LZ3 = 0.092 W/ft2 AWA, and 770 W IWA, LWA ignored; TABLE 147-B, building facades 0.35 W/ft2
	Profiles	default profiles	
Romote Refrigeration Loads & Profiles		NONE	
Domestic Water Heating (DHW) Profiles			
	Profile	EL2 DHW Profile (S1)	

HVAC SYSTEM - Condominiums

HVAC System Definition			
	System Type Name	Condominium HVAC	
	Cooling Source	CHW Coils	
	Heating Source	HW Coils	
	System Type	**4-Pipe Fan Coils with HW Heat**	
	System per Area	System per Zone	
	System Assignment to Thermal Zones	changed all shell component(s) to Condominiums, All Zones	
HVAC Zones: Temperature and Air Flows			
Seasonal T-stat setpts	Occupied (deg F) Cool / Heat	73 / 72	S 112(c) - t-stats shall be setback tstats, w controls able to control 4 time periods
	Unoccupied (deg F) Cool / Heat	75 / 70	
Design Temps	Cooling Design Temp (deg F) Indoor / Supply	75 / 55	per ASHRAE Handbook, Fundamentals
	Heating Design Temp (deg F) Indoor / Supply	72 / 95	per ASHRAE Handbook, Fundamentals
Air Flows	Minimum Design Flow	0.50 CFM/sf	
	VAV Minimum Flow Core	30%	

Condotel per Title 24-2008

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	VAV Minimum Flow Perimeter	30%	
Packaged HVAC Equipment			
HVAC System Fans			
Supply Fans	Power	**83.60** BHP (auto-sized)	
	Motor Efficiency	High	default in eQUEST per Title 24-2005
	Fan Flow & OSA	Auto-size	
HVAC System #1 Fan Schedules			
	On at	Off at	
M	5pm	7am	
T	5pm	7am	
W	5pm	7am	
R	5pm	7am	
F	5pm	7am	
S	4pm	9am	
S	4pm	9am	
Hol	4pm	9am	
	Fan 'On' Mode	Continuous	
HVAC Zone Heating, Vent and Economizers			
Zone Heat Source & Capabilities / Delta T	Baseboards	none	
Economizer(s)			

Condotel per Title 24-2008

ARUP

BLDG ENVELOPE & LOADS - Hotel (Wings #1 & #2)

General Shell Info

	Shell Name	Hotel	
	Building Type	Lodging, High-Rise Hotel	
Shell Location w/in Site	Position this Shell	Immediately Above	
	...of Reference Shell:	Ground Floor	
	Distance from Reference shell	0.0 ft	
Area and Floors	Building Area [s.f.]	9,360; 9,360	
	# of Floors Above Grade	3; 3	
	# of Floors Below Grade	0; 0	

Building Footprint

	Footprint Shape	custom	
	Zoning Pattern	custom	
	Building Orientation	East North East	
	Floor - Floor Height	13 ft	
	Floor - Ceiling Height	11 ft	
	Shell Location (x, y coordinates)	(0,0)	

Buliding Envelope Constructions

Roof	Construction	Metal Frame, > 24 in o.c.		n/a
	Ext Finish	Roof, Built-up		No requirement
	Ext Color	Medium (abs=0.6)		No requirement
	Ext Insulation	1 1/2 in polyisocyanurate (R-10.5)		Metal building roofs in CZ 3 U-factor - 0.065 (R-15.4)
	Add'l Insulation	no batt or rad barrier	Total R-15.39	Metal building roofs in CZ 3 U-factor - 0.065 (R-15.4)
Walls	Construction	Metal Frame, 2x6, 24 in. o.c.		n/a
	Ext Finish / Color	Glass/Spandrel		No requirement
	Ext Color	Medium (abs=0.6)		No requirement
	Ext Insulation	none		Metal framed walls in CZ 3 U-factor - 0.105 (R-9.5)
	Add'l Insulation	R-13 batt		Metal framed walls in CZ 3 U-factor - 0.105 (R-9.5)
	Interior Insulation	no board insulation	Total R-9.5	Metal framed walls in CZ 3 U-factor - 0.105 (R-9.5)
Ground Floor	Exposure	Over Conditioned Space (adiabatic)		
	Interior Finish	none		
	Construction	4 in Concrete		
	Ext/Cav Insul	5 in polystyrene (R-20)	Total R-17	Mass floor has U-factor - 0.058 (R-17)
	Interior Insulation	none		
Infiltration	Perim	0.038 CFM/sf		? - infil specified per window and door in Title 24, eQUEST input is for entire wall area
	Core	0.001 CFM/sf		? - infil specified per window and door in Title 24, eQUEST input is for entire wall area

Building Interior Constructions

Ceilings	Interior Finish	Lay-In Acoustic Tile
	Batt Insultation	none
Vertical Walls	Wall Type	Frame
	Batt Insultation	none
Floors	Interior Finish	Carpet (no pad)
	Rigid Insulation	none
	Construction	4 in concrete
	Concrete Cap	none

Exterior Doors

Exterior Windows

Exterior Windows	Window Area Spec Method	% of Gross Wall Area (floor to floor)	
	Glass Category	specify properties	
	Glass Type **#1 (North)**	NFRC Ufactor=.47, SHGC=.55, VT=.81	TABLE 143-B Exterior Windows [WWR of 40%] in CZ 3 U-factor - 0.47 (R-2.12) & SHGC 0..55 (North) and 0.26 (Non-North)
	Frame Type	Alum x/ Brk, Oper, Mtl Spacer	
	Frame Wd (in)	1.50 in	
	Typ Window Width (ft)	4.25	

Condotel per Title 24-2008

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	Window Ht (ft)	5.22	
	Sill Ht (ft)	3.0	
	% Window (incl frame) S, N W, E	0, 40, 0, 0	WWR of 40% - max allowed by Title 24
	Glass Type **#2 (Non-North)**	NFRC Ufactor=.47, SHGC=.26, VT=.81	TABLE 143-B Exterior Windows [WWR of 40%] in CZ 3 U-factor - 0.47 (R-2.12) & SHGC 0..55 (North) and 0.26 (Non-North)
	Frame Type	Alum x/ Brk, Oper, Mtl Spacer	
	Frame Wd (in)	1.50 in	
	Typ Window Width (ft)	4.25	
	Window Ht (ft)	5.22	
	Sill Ht (ft)	3.0	
	% Window (incl frame) S, N, W, E	40, 0, 40, 40	WWR of 40% - max allowed by Title 24
	Custom Window/Door Placement	none - default	
Exterior Window Shades and Blinds			
Exterior Window Shades and Blinds	Overhangs	none - default	No requirement
	Fins	none - default	No requirement
Window Blinds/Drapes	Type	none	No requirement
Roof Skylights		NONE	No requirement
Top Floor Daylight Zoning		NONE	No requirement
Building Operation Schedule			No requirement
Use	Typical Occupancy	Entire Year	
	Opens At	Closes At	
M	Open 24 hrs.	-	
T	Open 24 hrs.	-	
W	Open 24 hrs.	-	
R	Open 24 hrs.	-	
F	Open 24 hrs.	-	
S	Open 24 hrs.	-	
S	Open 24 hrs.	-	
Hol	Open 24 hrs.	-	
Activity Areas Allocation			
	Area Type	Percent Area %, Design Max Occup (sf/person), **Design Venitlation (CFM/per)**	
	Hotel/Motel Guest Room (incl toilets)	75, 400, 15	S 121.2(B) - 15 cfm * Occupants Occupants = 1/2 CBC egress = total sf divided by 200 divided by two.
	Corridor	15, 400, 15	
	Laundry	6, 400, 15	
	Mech/Elec Room	2, 400, 15	
	Storage (Conditioned)	2, 400, 15	
	Occupancy Profile	EL3 Occup Profile (S1)	
Zone Group Definitions			
Non-HVAC Enduses to Model			
Interior Enduses			
Exterior Enduses	Exterior Lighting	Connected Intensity & Monthly Single Day Profiles	
	DHW	Model DHW Equip w Seasonal Profiles	
	Remote Refrigeration	Monthly Peak Load and Daily Profiles	
Interior Lighting Loads and Profiles			
	Area Type	LPD (W/sf)	
	Hotel/Motel Guest Room (incl toilets)	0.90	TABLE 146-F, Multi-Family, Dormitory (1.0)
	Corridor	0.6	TABLE 146-F, Corridors (0.6)
	Laundry	0.81	TABLE 146-F, Laundry (0.9)
	Mech/Elec Room	0.6	TABLE 146-F, All other (0.6)
	Storage (Conditioned)	0.6	TABLE 146-F, All other (0.6)
	Multiplier	1	
	Ambient Profile	EL3 InsLtg Profile (S1)	
Office Equipment Loads and Profiles			

Condotel per Title 24-2008

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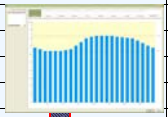
	Area Type	W/sf	
	Hotel/Motel Guest Room (incl toilets)	0.0	
	Corridor	0	
	Laundry	0	
	Mech/Elec Room	0	
	Storage (Conditioned)	0	
	Profile	EL3 OffEq Profile (S1)	

Cooking Loads and Profiles

	Area Type	W/sf	
	Hotel/Motel Guest Room (incl toilets)	0.0	
	Corridor	0	
	Laundry	0	
	Mech/Elec Room	0	
	Storage (Conditioned)	0	
	Profile	EL3 CookEq Profile (S1)	

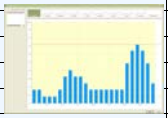
Self-Contained Refrig Loads and Profiles

	Area Type	Refrig Equip Load (W/sf)	
	Hotel/Motel Guest Room (incl toilets)	0.265	
	Corridor	0	
	Laundry	0	
	Mech/Elec Room	0	
	Storage (Conditioned)	0	
	Profile	EL3 S-C Refrig Profile (S1)	



Misc Loads and Profiles

	Process Loads	**0.7 W/sf** (latent ratio = 1)	
	Area Type	Electric Load (W/sf)	
	Hotel/Motel Guest Room (incl toilets)	0.25	
	Corridor	0.00	
	Laundry	0.15	
	Mech/Elec Room	0.10	
	Storage (Conditioned)	0.00	
	Profile	EL3 Misc Profile (S1)	



Exterior Lighting Loads		NONE	
Connected Load	Exterior Lighting Load [W/sf]	0.77	TABLE 147-A, Hardcape LZ3 = 0.092 W/ft2 AWA, and 770 W IWA, LWA ignored; TABLE 147-B, building facades 0.35 W/ft2
	Profiles	default profiles	
Romote Refrigeration Loads & Profiles		NONE	

Domestic Water Heating (DHW) Profiles

	Profile	EL3 DHW Profile (S1)	

HVAC SYSTEM - Hotel (Wings #1 & #2)

HVAC System Definition

	System Type Name	Hotel HVAC	
	Cooling Source	CHW Coils	
	Heating Source	HW Coils	
	System Type	**4-Pipe Fan Coils with HW Heat**	
	System per Area	System per Zone	
	System Assignment to Thermal Zones	changed all shell component(s) to Hotel (Wing #1) and Hotel (Wing #2), All Zones	

HVAC Zones: Temperature and Air Flows

Seasonal T-stat setpts	Occupied (deg F) Cool / Heat	73 / 72	S 112(c) - t-stats shall be setback tstats, w controls able to control 4 time periods
	Unoccupied (deg F) Cool / Heat	75 / 70	
Design Temps	Cooling Design Temp (deg F) Indoor / Supply	75 / 55	per ASHRAE Handbook, Fundamentals
	Heating Design Temp (deg F) Indoor / Supply	72 / 95	per ASHRAE Handbook, Fundamentals
Air Flows	Minimum Design Flow	0.50 CFM/sf	

Condotel per Title 24-2008

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Packaged HVAC Equipment

HVAC System Fans

Supply Fans	Power	**25.61** BHP (auto-sized)	
	Motor Efficiency	High	default in eQUEST per Title 24-2005
	Fan Flow & OSA	Auto-size	

HVAC System #1 Fan Schedules

	On at	Off at
M	On 24 hrs.	
T	On 24 hrs.	
W	On 24 hrs.	
R	On 24 hrs.	
F	On 24 hrs.	
S	On 24 hrs.	
S	On 24 hrs.	
Hol	On 24 hrs.	
	Fan 'On' Mode	Continuous

HVAC Zone Heating, Vent and Economizers

Zone Heat Source & Capabilities / Delta T	Baseboards	none
Economizer(s)		

Appendix C

LEED NC v3.0 Checklist

C1 LEED NC v3.0 Checklist

- In order to estimate energy savings required for LEED Gold certification, project team completed LEED NC v3.0 checklist for LEED Gold certification.

LEED 2009 for New Construction and Major Renovation
Project Scorecard

Project Name:
Project Address:

Yes	?	No			
22		4	SUSTAINABLE SITES		26 Points
Y			Prereq 1	Construction Activity Pollution Prevention	Required
1			Credit 1	Site Selection	1
5			Credit 2	Development Density and Community Connectivity	5
		1	Credit 3	Brownfield Redevelopment	1
6			Credit 4.1	Alternative Transportation - Public Transportation Access	6
1			Credit 4.2	Alternative Transportation - Bicycle Storage and Changing Rooms	1
3			Credit 4.3	Alternative Transportation - Low-Emitting and Fuel-Efficient Vehicles	3
		2	Credit 4.4	Alternative Transportation - Parking Capacity	2
1			Credit 5.1	Site Development - Protect or Restore Habitat	1
1			Credit 5.2	Site Development - Maximize Open Space	1
1			Credit 6.1	Stormwater Design - Quantity Control	1
1			Credit 6.2	Stormwater Design - Quality Control	1
1			Credit 7.1	Heat Island Effect - Nonroof	1
1			Credit 7.2	Heat Island Effect - Roof	1
		1	Credit 8	Light Pollution Reduction	1
Yes	?	No			
4			WATER EFFICIENCY		10 Points
					4
Y			Prereq 1	Water Use Reduction	Required
2			Credit 1	Water Efficient Landscaping	2 to 4
				Reduce by 50%	2
				No Potable Water Use or Irrigation	4
			Credit 2	Innovative Wastewater Technologies	2
2			Credit 3	Water Use Reduction	2 to 4
				Reduce by 30%	2
				Reduce by 35%	3
				Reduce by 40%	4
15		5	ENERGY & ATMOSPHERE		35 Points
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	Required
Y			Prereq 2	Minimum Energy Performance	Required
Y			Prereq 3	Fundamental Refrigerant Management	Required
9			Credit 1	Optimize Energy Performance	1 to 19
				Improve by 12% for New Buildings or 8% for Existing Building Renovations	1
				Improve by 14% for New Buildings or 10% for Existing Building Renovations	2
				Improve by 16% for New Buildings or 12% for Existing Building Renovations	3
				Improve by 18% for New Buildings or 14% for Existing Building Renovations	4
				Improve by 20% for New Buildings or 16% for Existing Building Renovations	5
				Improve by 22% for New Buildings or 18% for Existing Building Renovations	6
				Improve by 24% for New Buildings or 20% for Existing Building Renovations	7
				Improve by 26% for New Buildings or 22% for Existing Building Renovations	8
				9 Improve by 28% for New Buildings or 24% for Existing Building Renovations	9
				Improve by 30% for New Buildings or 26% for Existing Building Renovations	10
				Improve by 32% for New Buildings or 28% for Existing Building Renovations	11
				Improve by 34% for New Buildings or 30% for Existing Building Renovations	12
				Improve by 36% for New Buildings or 32% for Existing Building Renovations	13
				Improve by 38% for New Buildings or 34% for Existing Building Renovations	14
				Improve by 40% for New Buildings or 36% for Existing Building Renovations	15
				Improve by 42% for New Buildings or 38% for Existing Building Renovations	16
				Improve by 44% for New Buildings or 40% for Existing Building Renovations	17
				Improve by 46% for New Buildings or 42% for Existing Building Renovations	18
				Improve by 48%+ for New Buildings or 44%+ for Existing Building Renovations	19
4			Credit 2	On-Site Renewable Energy	1 to 7
				1% Renewable Energy	1
				3% Renewable Energy	2
				5% Renewable Energy	3
				7% Renewable Energy	4
				9% Renewable Energy	5
				11% Renewable Energy	6
				13% Renewable Energy	7
			Credit 3	Enhanced Commissioning	2
2			Credit 4	Enhanced Refrigerant Management	2
		3	Credit 5	Measurement and Verification	3
		2	Credit 6	Green Power	2
Yes	?	No			
6		7	MATERIALS & RESOURCES		14 Points

LEED 2009 for New Construction and Major Renovation
Project Scorecard

Project Name:
Project Address:

Yes	?	No			
Y			Prereq 1	Storage and Collection of Recyclables	Required
		3	Credit 1.1	Building Reuse - Maintain Existing Walls, Floors and Roof	1 to 3
				Reuse 55%	1
				Reuse 75%	2
				Reuse 95%	3
		1	Credit 1.2	Building Reuse - Maintain Interior Nonstructural Elements	1
2			Credit 2	Construction Waste Management	1 to 2
				50% Recycled or Salvaged	1
				75% Recycled or Salvaged	2
		2	Credit 3	Materials Reuse	1 to 2
				Reuse 5%	1
				Reuse 10%	2
1			Credit 4	Recycled Content	1 to 2
				10% of Content	1
				20% of Content	2
2			Credit 5	Regional Materials	1 to 2
				10% of Materials	1
				20% of Materials	2
1			Credit 6	Rapidly Renewable Materials	1
		1	Credit 7	Certified Wood	1

Yes	?	No		
11		4	INDOOR ENVIRONMENTAL QUALITY	15 Points

Y			Prereq 1	Minimum Indoor Air Quality Performance	Required
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	Required
		1	Credit 1	Outdoor Air Delivery Monitoring	1
1			Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction Indoor Air Quality Management Plan - During Construction	1
1			Credit 3.2	Construction Indoor Air Quality Management Plan - Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials - Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials - Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials - Flooring Systems	1
		1	Credit 4.4	Low-Emitting Materials - Composite Wood and Agrifiber Products	1
1			Credit 5	Indoor Chemical and Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems - Lighting	1
		1	Credit 6.2	Controllability of Systems - Thermal Comfort	1
1			Credit 7.1	Thermal Comfort - Design	1
		1	Credit 7.2	Thermal Comfort - Verification	1
1			Credit 8.1	Daylight and Views - Daylight	1
1			Credit 8.2	Daylight and Views - Views	1

Yes	?	No		
3			INNOVATION IN DESIGN	6 Points

2			Credit 1	Innovation in Design	1 to 5
				Innovation or Exemplary Performance	1
				Innovation or Exemplary Performance	1
				Innovation or Exemplary Performance	1
				Innovation	1
				Innovation	1
1			Credit 2	LEED® Accredited Professional	1

Yes	?	No		
2			REGIONAL PRIORITY	4 Points

2			Credit 1	Regional Priority	1 to 4
				Regionally Defined Credit Achieved	1
				Regionally Defined Credit Achieved	1
				Regionally Defined Credit Achieved	1
				Regionally Defined Credit Achieved	1

Yes	?	No		
63		20	PROJECT TOTALS (Certification Estimates)	110 Points

Certified: 40-49 points Silver: 50-59 points Gold: 60-79 points Platinum: 80+ points

Appendix D

ECM Costing Sheet

D1 ECM Costing Sheet

- Costing assumptions and calculations for each ECM analyzed for each generic building energy model. Provided input into which ECM's were eligible for % Cost Premium iteration.

COSTS per square foot of building

Residential

			flagged	Select ECM	LR Res	Select ECM	MR Res	Select ECM	HR Res
A	1	Thermal Mass			$ 0.27		$ 0.24		$ 0.24
A	2	Insulation			$ -		$ -		$ -
A	3	High Performance Glazing			$ 1.20		$ 1.07		$ 1.09
A	4	External Shading			$ 0.55		$ 0.49		$ 0.50
P	5	Daylighting		1	$ 0.20	1	$ 0.21	1	$ 0.18
P	6	Natural Ventilation		1	$ 2.71	1	$ 2.43	1	$ 2.47
M	7	High Efficiency Lighting		1	$ 1.56	1	$ 1.56	1	$ 1.56
M	8	Split System - SEER (cooling)		1	$ 0.51	1	$ 0.55	1	$ 0.45
M	9	Split System - HSPF (heating)			$ 0.88		$ 0.95		$ 0.78
M	10	Nat Vent w/ Baseboards		1	$ 1.19	1	$ 0.62	1	$ 0.41
M	11	Occupancy Sensors to Control Lighting		1	$ 0.20	1	$ 0.21	1	$ 0.18
E	12	Energy Star Equipment			$ 0.16		$ 0.17		$ 0.14
R	13	Solar Thermal for DHW			$ 0.45		$ 0.45		$ 0.45
					$ 6.37		$ 5.60		$ 5.24

Sum of selected ECM's

Commercial

			flagged	Select ECM	Office
A	1	Windows with Improved SHGC			$ 0.94
A	2	Thermal Mass w/ external insulation			$ -
A	3	External Shading			$ 0.28
P	4	Daylighting		1	$ 0.06
P	5	Skylights			$ 0.12
P	6	Natural Ventilation		1	$ 2.18
M	7	Radiant Heating Cooling		1	$ (2.41)
M	8	Underfloor Air Distrubution		1	$ (1.14)
M	9	Demand Control Ventilation		1	$ 0.33
M	10	Occupancy Sensors for Lighting		1	$ 0.06
M	11	Water Side Economizer			$ 0.51
M	12	Indirect Evaporative Cooling		1	$ 3.05
M	13	Heat Recovery		1	$ 0.39
M	14	High Efficiency Chiller		1	$ (0.07)
M	15	High Efficiency Boiler		1	$ 0.11
M	16	Variable Speed Pumps & Fans		1	$ 0.34
E	17	Energy Star Equipment			$ -
R	18	Solar Thermal for DHW			$ 0.56
					$ 2.89

Sum of selected ECM's

Retail

			flagged	Select ECM	Retail
A	1	Windows with Improved SHGC			$ 1.17
A	2	External Shading			$ 0.35
A	3	Thermal Mass w/ external insulation			$ -
P	4	Daylighting			$ 0.07
P	5	Skylights		1	$ 1.06
E	6	High Efficiency Lighting		1	$ 2.02
M	7	Demand Control Ventilation		1	$ 0.17
M	8	High Efficiency DX Units (Heat Pumps)			$ 0.53
M	9	Occupancy Sensors for Lighting			$ 0.07
E	10	Energy Star Equipment			$ -
R	11	Solar Thermal for DHW			n/a
					$ 3.25

Sum of selected ECM's

Condotel

			flagged	Select ECM	Condotel
A	1	Windows with Improved SHGC			$ 1.15
A	2	External Shading			$ 0.34
A	3	Thermal Mass			$ -
P	4	Daylighting		1	$ 0.24
P	5	Skylights		1	$ 0.02
P	6	Natural Ventilation		1	$ 2.66
E	7	High Efficiency Lighting		1	$ 1.56
M	8	High Efficiency Chiller		1	$ 0.12
M	9	High Efficiency Boiler		1	$ 0.06
M	10	Occupancy Sensors for Lighting		1	$ 0.19
M	11	Demand Control Ventilation		1	$ 0.01
M	12	High Efficiency Multi-Split Heat Pump			$ 0.15
M	13	Heat Recovery?		1	$ 0.09
M	14	Variable Speed Pumps & Fans		1	$ 0.03
E	15	Energy Star Equipment			$ 0.07
R	16	Solar Thermal for DHW			$ 0.92
					$ 4.99

Sum of selected ECM's

P	5	Daylighting
P	6	Natural Ventilation
M	7	High Efficiency Lighting
M	8	Split System - SEER (cooling)
M	9	Split System - HSPF (heating)
M	10	Nat Vent w/ Baseboards
M	11	Occupancy Sensors to Control Lighting
E	12	Energy Star Equipment
R	13	Solar Thermal for DHW

= input cell

Building Inputs - Residential	LR Res	MR Res	HR Res	Units
Bldg S.F	75,640	130,264	240,000	s.f.
# of floors	4	8	24	floors
flr to flr height	10	10	10	ft./floor
footprint	18,910	16,283	10,000	s.f.
Building Perimeter	862	666	416	linear ft
# of zones per floor	15	14	7	zones/floor
WWR	40%	40%	40%	%
Total Window SA	13,792	21,312	39,936	s.f.
Total Wall Area	20,688	31,968	59,904	s.f.
Total Roof Area	18,910	16,283	10,000	s.f.

San Francisco City Cost Index **123.8%** RSMeans Bldg Constr Costs, pg. 699 & pg. 737
for RSMeans values only!

incomplete	#	ECM		flagged	LR Res	MR Res	HR Res	Units	Assumptions/Sources
	1.0	Insulation	Estimated Cost Premium		$ 0.27	$ 0.24	$ 0.24	[$/s.f. bldg]	
			Rigid insulation, fiberglass, 6#/CF, unfaced, 2" thick **R8.7**		$ 2.95	$ 2.95	$ 2.95	[$/s.f. wall]	RSMeans Construction Costs 2009, pg. 194
			Rigid insulation, fiberglass, 6#/CF, unfaced, 3" thick **R13**		$ 3.74	$ 3.74	$ 3.74	[$/s.f. wall]	RSMeans Construction Costs 2009, pg. 194
			Estimated cost premium		$ 0.79	$ 0.79	$ 0.79	[$/s.f. wall]	calculated
		baseline roof R-15.34 (T24 15.4)	Total cost premium		$ 16,343.52	$ 25,254.72	$ 47,324.16	[$]	calculated
		baseline wall R-9.37 (T24 9.5)	Total cost premium (incl. RSMeans SF Cost Index)		$ 20,233.28	$ 31,265.34	$ 58,587.31	[$]	calculated
	2.0	Thermal Mass	Estimated Cost Premium		$ -	$ -	$ -	[$/s.f. bldg]	
		Assumed architectural feature & potential cost savings by using thermal mass in leu of metal frame			$ -	$ -	$ -		RSMeans SF Costs 2009, pg. 286
		Thus costs are zero'd (no premuim)							
	3.0	High Performance Glazing	Estimated Cost Premium		$ 1.20	$ 1.07	$ 1.09	[$/s.f. bldg]	
			Picture (i.e. fixed) window, std glass, 2x3' (material costs)		$ 159.00	$ 159.00	$ 159.00	[$/unit]	RSMeans SF Costs 2009, pg.320
			Picture (i.e. fixed) window, std glass, 2x3' (material costs)		$ 26.50	$ 26.50	$ 26.50	[$/s.f. window]	calculated
			+ low - e		10%	10%	10%	[% increase in cost]	RETScreen typical costs for windows
			+ argon		5%	5%	5%	[% increase in cost]	RETScreen typical costs for windows
			+ insulating edge space		5%	5%	5%	[% increase in cost]	RETScreen typical costs for windows
			Total cost premium		$ 5.30	$ 5.30	$ 5.30	[$/s.f. window]	calculated
			Total cost premium		$ 73,097.60	$ 112,953.60	$ 211,660.80	[$]	calculated
			Total cost premium (incl. RSMeans SF Cost Index)		$ 90,494.83	$ 139,836.56	$ 262,036.07	[$]	calculated
	4.0	External Shading	Estimated Cost Premium		$ 0.55	$ 0.49	$ 0.50	[$/s.f. bldg]	
		Typical window width and height - 4.25 ft.	Metal siding steel panel, .0135" thick, colored		6.27	6.27	6.27	[$/s.f. material]	RSMeans SF Costs 2009, pg.312
			# of windows		573	885	1658	[# of windows]	calc'd - non-north façade surface areas, assumed 75%

		linear feet of overhangs	3579	5531	10364	[l.ft.]	calc'd - assumed 1 ft extension on both sides of windows
		depth of overhang	1.5	1.5	1.5	[ft.]	assumed - taken from energy model
		amount of shading material	5369	8296	15546	[s.f. material]	calculated
		Cost premium	$ 33,662.74	$ 52,017.13	$ 97,473.55	[$]	calculated
		Total cost premium (incl. RSMeans SF Cost Index)	$ 41,674.47	$ 64,397.21	$ 120,672.26	[$]	calculated
5.0	Daylighting	Estimated Cost Premium	$ 0.20	$ 0.21	$ 0.18	[$/s.f. bldg]	
		# of Zones to include daylighting controls	60	112	168	[# of zones]	
		Daylighting sensors per zone	1	1	1	[# of sensors]	
		Daylighting sensors per bldg	60	112	168	[# of sensors]	
		Cost per daylighting sensor	$ 250.00	$ 250.00	$ 250.00	[$/sensor]	from Lutron rep, incl. switchbox and cabling, does NOT incl ballast!!
		Total Cost	$ 15,000.00	$ 28,000.00	$ 42,000.00	[$]	
6.0	Natural Ventilation	Estimated Cost Premium	$ 2.71	$ 2.43	$ 2.47	[$/s.f. bldg]	
		Picture (i.e. fixed) window, std glass, 2x3' (material costs)	$ 159.00	$ 159.00	$ 159.00	[$/unit]	RSMeans SF Costs 2009, pg.320
	does not include mechanical HVAC savings at all !!!	Picture (i.e. fixed) window, std glass, 2x3' (material costs)	26.5	26.5	26.5	[$/s.f. window]	calculated
		Al, awning std glass, 3'1"x 3'2" (material costs)	$ 370.00	$ 370.00	$ 370.00	[$/unit]	RSMeans SF Costs 2009, pg.319
		Al, awning std glass, 3'1"x 3'2" (material costs)	38.5	38.5	38.5	[$/s.f. window]	calculated
		Total cost premium	$ 12.00	$ 12.00	$ 12.00	[$/s.f. window]	calculated
		Total cost premium	$ 165,525.53	$ 255,777.27	$ 479,294.34	[$]	calculated
		Total cost premium (incl. RSMeans SF Cost Index)	$ 204,920.60	$ 316,652.25	$ 593,366.39	[$]	calculated
7.0	High Efficiency Lighting	Estimated Cost Premium	$ 1.56	$ 1.56	$ 1.56	[$/s.f. bldg]	
	Res lighting req'mnts	Spec grade 6" open downlight w/ 26W CFL	$ 165.00	$ 165.00	$ 165.00		Quote from Lightolier rep
	ballast cost vs luminaire cost	High efficiency LED downlight, 20W	$ 205.00	$ 205.00	$ 205.00		Quote from Lightolier rep, new LED downlight called Lightolier SSL LED
		Approximate % cost increase	20%	20%	20%		calculated
		Baseline Lighting System costs	$ 8.00	$ 8.00	$ 8.00	[$/s.f. bldg]	Assumption, based off experience
		HE LED cost premium	$ 1.56	$ 1.56	$ 1.56	[$/s.f. bldg]	calculated
		HE LED total cost premium	$ 118,072.20	$ 203,338.93	$ 374,634.15		calculated
8.0	Split System - SEER (cooling)	Estimated Cost Premium	$ 0.51	$ 0.55	$ 0.45	[$/s.f. bldg]	
		Cooling baseline COP, proposed COP	3.2, **3.66**	3.2, **3.66**	3.2, **3.66**		Title 24 min, approx SEER 12, SEER 15, calculated
		unit capacity	5	5	5	[tons]	Unit capacities per Carrier cost estimate
	Cooling COP = 3.048	HE cost premium	$ 1,600.00	$ 1,600.00	$ 1,600.00	[$/unit]	Cost premuim from SEER 13 to 15, per Carrier cost estimate
	Cooling Capacity per zone = 2 tons	HE cost premium	$ 320.00	$ 320.00	$ 320.00	[$/ton cooling]	calculated
	Heating Capacity per zone = 36.2 Btu/h/s.f.	Cooling Capacity per zone	2	2	2	[tons cooling]	From eQUEST Auto-size function
	3.47 tons heating	Total Cooling Capacity	120	224	336	[tons cooling]	calculated
		Total Estimated Cost Premium	$ 38,400.00	$ 71,680.00	$ 107,520.00	[$]	calculated
9.0	Split System - HSPF (heating)	Estimated Cost Premium	$ 0.88	$ 0.95	$ 0.78	[$/s.f. bldg]	
	existing EER of 10.1, COP heating of 3.2	Heating baseline COP, proposed COP	3.2, **3.66**	3.2, **3.66**	3.2, **3.66**		Title 24 min, approx SEER 12, SEER 15, calculated
		unit capacity	5	5	5	[tons]	Unit capacities per Carrier cost estimate
		HE cost premium	$ 1,600.00	$ 1,600.00	$ 1,600.00	[$/unit]	Cost premuim from SEER 13 to 15, per Carrier cost estimate
		HE cost premium	$ 320.00	$ 320.00	$ 320.00	[$/ton heating]	calculated
		Heating Capacity per zone	3.47	3.47	3.47	[tons heating]	From eOUEST Auto-size function
		Total Heating Capacity	208.2	388.64	582.96	[tons heating]	calculated
		Total Estimated Cost Premium	$ 66,624.00	$ 124,364.80	$ 186,547.20	[$]	calculated
10.0	Nat Vent w/ Baseboards	Estimated Cost Premium	$ 1.19	$ 0.62	$ 0.41	[$/s.f. bldg]	
		System Max Heating Load	381.2	610.2	750.8	[kBtu/h]	Energy Model
		Cast iron, gas-fired, hot water boiler	$ 8,775.00	$ 14,800.00	$ 16,000.00	[$/boiler]	RSMeans Mechanical Cost Data 2009, pg.349 (400, 600, 765 MBH)
		HW Distribution copper piping (incl insul)	$ 32.72	$ 32.72	$ 32.72	[$/linear foot]	RSMeans Mechanical Cost Data 2009, pg.512
		Baseboard radiators w copper tube	$ 46.57	$ 46.57	$ 46.57	[$/linear foot]	RSMeans Mechanical Cost Data 2009, pg.512 (6ft/baseboard)
		HW Distribution piping linear feet per floor	1,040	700	370	[linear feet/floor]	Estimate using floor plan, incl supply & return
		Baseboard cost premium	$ 273,334.49	$ 396,510.76	$ 678,479.78	[$]	
		Split DX cooling system, air cooled condenser, apt corridors, 3.66 ton	$ 2.20	$ 2.20	$ 2.20	[$/s.f.]	RSMeans Mechanical Cost Data 2009, pg.555
		10% premium (simulated heat pump system)	$ 2.42	$ 2.42	$ 2.42	[$/s.f.]	Estimate from Carrier rep for heat pump cost premiums

11.0	Occupancy Sensors to Control Lighting	Estimated Cost Premium	$ 0.20	$ 0.21	$ 0.18	[$/s.f. bldg]	
	dual technology sensors…need costing on IR wall-mounted…	Assumed number per floor	15	14	7	[#/floor]	1 per zone
		Total number per bldg	60	112	168	[#/bldg]	
		Cost per occ sensor (incl install)	$ 250.00	$ 250.00	$ 250.00	[$/sensor]	from Lutron rep, incl. switchbox and cabling, Dual Tech sensor
		Total cost per bldg	$ 15,000.00	$ 28,000.00	$ 42,000.00	[$]	
12.0	Energy Star Equipment	Estimated Cost Premium	$ 0.16	$ 0.17	$ 0.14	[$/s.f. bldg]	
		Refrigerator	$ 30.00	$ 30.00	$ 30.00	[$ premium / unit]	ENERGY STAR Refrigerator Savings Calculator
		Television	$ -	$ -	$ -	[$ premium / unit]	ENERGY STAR Television Savings Calculator
		Dishwasher	$ -	$ -	$ -	[$ premium / unit]	ENERGY STAR Dishwasher Savings Calculator
		Clothes Washer	$ 129.00	$ 129.00	$ 129.00	[$ premium / unit]	ENERGY STAR Clothes Waster Savings Calculator
		Computer	$ 42.00	$ 42.00	$ 42.00	[$ premium / unit]	ENERGY STAR Computer Savings Calculator
		Total per Unit	$ 201.00	$ 201.00	$ 201.00	[$/unit]	
		Total per bldg	$ 12,060.00	$ 22,512.00	$ 33,768.00	[$]	
13.0	Solar Thermal for DHW	Estimated Cost Premium	$ 0.45	$ 0.45	$ 0.45	[$/s.f. bldg]	
		System Capital Cost Estimate	$ 34,126.98	$ 58,673.47	$ 108,333.33	[$]	Calculated, 30% ITC included, BoS included
		Peak Month Solar Fraction	50%	50%	50%		Calculated
		Average Annual Solar Fraction	36%	36%	36%		Calculated

incomplete	#	ECM
P	1	Windows with Improved SHGC
P	2	Thermal Mass w/ external insulation
P	3	External Shading
P	4	Daylighting
P	5	Skylights
P	6	Natural Ventilation
M	7	Radiant Heating Cooling
M	8	Underfloor Air Distribution
M	9	Demand Control Ventilation
M	10	Occupancy Sensors for Lighting
M	11	Water Side Economizer
M	12	Indirect Evaporative Cooling
M	13	Heat Recovery?
M	14	High Efficiency Chiller
M	15	High Efficiency Boiler
M	16	Variable Speed Pumps & Fans
E	17	Energy Star Equipment
R	18	Solar Thermal for DHW

= input cell

Building Inputs - Commercial

Bldg S.F	100,000	s.f.
# of floors	5	floors
flr to flr height	13	ft./floor
footprint	20,000	s.f.
Building Perimeter	564	linear ft
# of zones per floor	5	zones/floor
WWR	40%	%
Total Window SA	14,664	s.f.
Total Wall Area	21,996	s.f.
Total Roof Area	20,000	s.f.

San Francisco City Cost Index **123.8%** RSMeans Bldg Constr Costs, pg. 699 & pg. 737
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#	ECM	flagged	Values	Units	Assumptions/Sources
1.0	Windows with Improved SHGC — Estimated Cost Premium		$ 0.94	[$/s.f. bldg]	
	Curtain Wall - Glazing Panel, 1" thick, clear		$ 29.15	[$/s.f. window]	RSMeans SF Costs 2009, pg.321
	Heat reflective film inside		$ 39.50	[$/s.f. window]	RSMeans SF Costs 2009, pg.321
	Light and heat reflective flass, tinted		$ 43.50	[$/s.f. window]	RSMeans SF Costs 2009, pg.321
	Total cost premium		$ 10.35	[$/s.f. window]	calculated
	Total cost premium		$ 75,886.20	[$]	S and W facades only
	Total cost premium (incl. RSMeans SF Cost Index)		$ 93,947.12	[$]	calculated
2.0	Thermal Mass w/ external insulation — Estimated Cost Premium		$ -	[$/s.f. bldg]	
	Assumed architectural feature & potential cost savings by using thermal mass in leu of metal frame				
	Thus costs are zero'd (no premuim)				
3.0	External Shading — Estimated Cost Premium		$ 0.28	[$/s.f. bldg]	
	Metal siding steel panel, .0135" thick, colored		$ 6.27	[$/s.f. material]	RSMeans SF Costs 2009, pg.312
	total window surface area		14,664	[s.f.]	40% WWR
	window height		7	[ft.]	From energy model
	total window width		2095	[ft.]	calculated
	linear feet of overhangs		1571	[l.f.]	calculated - only on non-north windows, assumed 75% factor
	depth of fins		0.5	[ft.]	From energy model

	depth of overhang	1.5	[ft.]	From energy model
	amount of shading material	2378	[s.f. material]	calculated, includes fins on (3) facades equal to window height
	Cost premium	$ 22,362.40	[$]	calculated
4.0	**Daylighting** — Estimated Cost Premium	$ 0.06	[$/s.f. bldg]	
	# of Zones to include daylighting controls	25	[# of zones]	
	Daylighting sensors per zone	1	[# of sensors]	
	Daylighting sensors per bldg	25	[# of sensors]	
	Cost per daylighting sensor	$ 250.00	[$/sensor]	from Lutron rep, incl. switchbox and cabling, does NOT incl ballast!!
	Total Cost	$ 6,250.00	[$]	
5.0	**Skylights** — Estimated Cost Premium	$ 0.12	[$/s.f. bldg]	
	Skylights, plastic dome, 20 to 30 s.f., single glaze	$ 25.19	[$/s.f. skylight]	RSMeans SF Costs 2009, pg. 332, 2% of Roof Area, **5x5** each
	Percent of roof area	2%	[%]	from energy model
	Total cost premium	$ 10,076.00	[$]	calculated
	Total cost premium (incl. RSMeans SF Cost Index)	$ 12,474.09	[$]	calculated
6.0	**Natural Ventilation** — Estimated Cost Premium	$ 2.18	[$/s.f. bldg]	
	Picture (i.e. fixed) window, std glass, 2x3' (material costs)	$ 159.00	[$/unit]	RSMeans SF Costs 2009, pg.320
	Picture (i.e. fixed) window, std glass, 2x3' (material costs)	26.5	[$/s.f. window]	calculated
	Al, awning std glass, 3'1"x 3'2" (material costs)	$ 370.00	[$/unit]	RSMeans SF Costs 2009, pg.319
	Al, awning std glass, 3'1"x 3'2" (material costs)	38.5	[$/s.f. window]	calculated
	Total cost premium	$ 12.00	[$/s.f. window]	calculated
	Total cost premium	$ 175,990.89	[$]	calculated
	Total cost premium (incl. RSMeans SF Cost Index)	$ 217,876.72	[$]	calculated
7.0	**Radiant Heating Cooling** — Estimated Cost Premium	$ (2.41)	[$/s.f. bldg]	
	PROPOSED — Estimated occupants	500	[people/bldg]	S 121.2(B) - 11/2 CBC egress = total sf divided by 100 divided by two.
	Ventilation requirements	15	[CFM/person]	S 121.2(B)
	Total ventilation requirement (min required by code)	7500	[CFM/buliding]	calculated
	Mechanical Ventilation constant volume AHU, 7500 CFM	$ 4.25	[$/CFM]	RSMeans Mech page 535, $/CFM calculated
	Mechanical Ventilation constant volume AHU, 7500 CFM	$ 31,875.00	[$]	calculated
	Galvanized steel ducting, 12x8"	$ 37.25	[$/linear feet]	RSMeans Mech page 536, $/CFM calculated
	Ventilation system required ductwork	2,500	[linear feet]	calculated from energy model floor plans
ASSUMPTIONS:	Ventilation system required ductwork	$ 93,125.00	[$]	calculated
10 manifolds / floor	**Radiant Floor Heating and Cooling System**			From Mech contractor ofWARMZONE Radiant Heating, proprietary tool
12 runs / manifold	Materials (PEX tubing)	$ 283,000.00	[$]	From Mech contractor ofWARMZONE Radiant Heating, proprietary tool
1 pump / floor	Labor	$ 160,000.00	[$]	From Mech contractor ofWARMZONE Radiant Heating, proprietary tool
$75/hr labor	Contingency	9%	[%}	From Mech contractor ofWARMZONE Radiant Heating, proprietary tool
material markup 20%	Contingency	$ 39,870.00	[$]	calculated
contractor overhead 20%	Tax	11%	[%}	Assumption
9% contingency	Tax	$ 53,115.70	[$]	calculated
	Total Radiant Floor System Costs	$ 535,985.70	[$]	calculated
	Total Proposed cost to be added	$ 660,985.70	[$]	calculated
	BASELINE — Baseline building AHU total CFM	95,626	[CFM/building]	from energy model
	VAV rooftop AHU	$ 2.63	[$/CFM]	RSMeans Mech page 535, $/CFM calculated, (3) different AHU's meet loa
	VAV rooftop AHU	$ 251,496.38	[$]	calculated
	VAV boxes + ducting, w/ HW reheat	$ 6.80	[$/CFM]	RSMeans Mech page 538, $/CFM calculated, ~2000 CFM/box
	VAV boxes + ducting, w/ HW reheat	$ 650,256.80	[$]	calculated
	hydronics (piping)	wash	n/a	Assumed not to affect cost premium significantly

	chiller & boiler plants	wash	n/a	Assumed not to affect cost premium significantly
	circulation pumps, misc	wash	n/a	Assumed not to affect cost premium significantly
	Total Baseline cost to be subtracted	$ 901,753.18	[$]	calculated
	Net cost premium	$ (240,767.48)	[$]	
8.0	**Underfloor Air Distribution** — Estimated Cost Premium	$ (1.14)	[$/s.f. bldg]	
	Baseline Electric Screw Chiller plant capacity	250	[tons]	from energy model - 3000 MBH = 250 tons
	Baseline Electric Screw Chiller plant cost	$ 600.00	[$/ton]	approx cost for **175 ton** Carrier air-cooled chillers, 0-200 tons
	Reduction in Chiller Size	20%	[%}	Assumption
	VAV rooftop AHU	$ 2.63	[$/CFM]	RSMeans Mech page 535, $/CFM calculated, (3) different AHU's meet loa
	Design CFM	95,626	[CFM]	from Energy Model, for the (3) VAV AHU's
	Reduction in AHU CFM	20%	[%}	Assumption
	Ductwork	wash		Assumption
	Boiler plant capacity	3091	[MBH]	from energy model
	Baseline Boiler cost	$ 18,000.00	[$/boiler]	Raypak 1500 MBH low efficiency (83%) copper fin boiler
	Increase in Boiler Capacity and cost	20%	[%}	Assumption
	VAV boxes + ducting, w/ HW reheat	$ 6.80	[$/CFM]	RSMeans Mech page 538, $/CFM calculated, ~2000 CFM/box
	Raised Floor approximate cost - Floor Construction Light Gauge Steel	$ 5.95	[$/s.f.]	RSMeans SF Costs 2009, pg.269
	Additive Displacement Ventilation Costs	$ 616,600.00	[$]	calculated
	Subtractive Displacement Ventilation Costs	$ 730,556.08	[$]	calculated
	Total Cost Premium	$ (113,956.08)	[$]	calculated
9.0	**Demand Control Ventilation** — Estimated Cost Premium	$ 0.33	[$/s.f. bldg]	
	Assumed amount of CO2 sensors per floor	10	[sensors/floor]	Assumed - based off of experience (see drawing)
	CO2 sensors per building	50	[sensors/bldg]	calculated
	Installed cost per sensor	$ 650.00	[$/sensor]	US DOE FEMP Demand Control Ventilation Report, 2004
	Total Cost Premium	$ 32,500.00	[$]	calculated
10.0	**Occupancy Sensors for Lighting** — Estimated Cost Premium	$ 0.06	[$/s.f. bldg]	
	Assumed number per floor	5	[#/floor]	1 per zone
	Total number per bldg	25	[#/bldg]	calculated
	Cost per occ sensor (incl install)	$ 250.00	[$/sensor]	from Lutron rep, incl. switchbox and cabling, Dual Tech sensor
	Total cost per bldg	$ 6,250.00	[$]	calculated
11.0	**Water Side Economizer** — Estimated Cost Premium	$ 0.51	[$/s.f. bldg]	
	Condenser water additional piping required	10	[linear feet]	Assumed
	CHW additional piping required	10	[linear feet]	Assumed
	Condenser water piping, 4" diameter, black steel, welded + insulation	$ 60.00	[$/linear foot]	RSMeans Mech pg.529, calculated
	CHW piping, 4" diameter, black steel, welded + insulation	$ 60.00	[$/linear foot]	RSMeans Mech pg.530, calculated
	Plate/Frame Heat Exchanger cost, 400 GPM	$ 32,795.00	[$]	RSMeans Mech pg.365, calculated
	Valves, fittings, and controls	20%	[% premium]	Assumed
	Total cost premium	$ 40,794.00	[$]	calculated
	Total cost premium (incl. RSMeans SF Cost Index)	$ 50,502.97	[$]	calculated
12.0	**Indirect Evaporative Cooling** — Estimated Cost Premium	$ 3.05	[$/s.f. bldg]	
	Approx IEC system cooling capacity	50	[tons cooling]	from Energy Model
	AHU without IEC	$ 5.00	[$/CFM]	from Des-Champs quote by nsw-airelink rep
new chiller plant capacity == 2.5 mbtuh = 208 tons	AHU with IEC	$ 8.50	[$/CFM]	from Des-Champs quote by nsw-airelink rep
so assume 200 ton chiller	Design CFM	95,626	[CFM]	from Energy Model, for the (3) VAV AHU's
~ 60 gpm	AHU Cost without IEC	$ 478,130.00	[$]	calculated

		AHU Cost with IEC	$ 812,821.00	[$]	calculated
		Baseline Electric Screw Chiller cost per ton	$ 600.00	[$/ton]	approx cost for **175 ton** Carrier air-cooled chillers, 0-200 tons
		Chiller Plant savings	50	[avoided tons]	Assumption
		Total cost premium	$ 304,691.00	[$]	calculated
13.0	**Heat Recovery?**	Estimated Cost Premium	$ 0.39	[$/s.f. bldg]	
	Sensible Wheel - 3 nos - (2)1500cfm, (1)4500cfm	Cost of 1500 CFM air to air enthaply wheel	$ 7,185.00	[$/wheel]	RSMeans Mechanical Cost Data pg. 373, averaged 1000 and 2000 CFM
	use CHW return to preheat/cool outside air, heat pipe etc. on 100% OA systems	Cost of 4500 CFM air to air enthaply wheel	$ 10,600.00	[$/wheel]	RSMeans Mechanical Cost Data pg. 373
		Total enthalpy wheel cost	$ 24,970.00	[$]	calculated -- (2) 1500 CFM, (1) 4500 CFM
	savings on reducing boiler plant capacity??	Additional cost mulitplier (ducting, controls, etc.)	25%	[% additional]	Assumption
		Total system cost premium	$ 31,212.50	[$]	calculated
		Total cost premium (incl. RSMeans SF Cost Index)	$ 38,641.08	[$]	calculated
14.0	**High Efficiency Chiller**	Estimated Cost Premium	$ (0.07)	[$/s.f. bldg]	
		Baseline Chiller efficiency	2.8	COP	Title 24-2008 minimum
		Baseline Chiller efficiency	1.26	[kW/ton]	calculated
		Baseline Electric Screw Chiller plant capacity	250	[tons]	from energy model - 3000 MBH = 250 tons
		Baseline Electric Screw Chiller plant cost	$ 600.00	[$/ton]	approx cost for **175 ton** Carrier air-cooled chillers, 0-200 tons
		Proposed Electric Screw Chiller efficiency	0.8	[kW/ton]	chiller (0.6) + wet cooling (0.2)
		Proposed Electric Screw Chiller cost	$ 300.00	[$/ton]	chiller only
		Proposed total chiller cost + wet cooling	$ 580.00	[$/ton]	RSMeans Mechanical Cost Data pg. 529, including wet cooling
		Cost Premium	$ (20.00)	[$/ton]	calculated
		Cost Premium	$ (7,000.00)	[$]	calculated
15.0	**High Efficiency Boiler**	Estimated Cost Premium	$ 0.11	[$/s.f. bldg]	
		Baseline Gas-Fired Boiler efficiency	80%	AFUE	Title 24-2008 minimum
		Boiler plant capacity	3091	[MBH]	from energy model
		Baseline Boiler cost	$ 18,000.00	[$/boiler]	Raypak 1500 MBH low efficiency (83%) copper fin boiler
		Proposed Gas-Fired Condensing Boiler efficiency	95%	AFUE	Cleaver Brooks 1500 MBH condensing stainless boiler
		Proposed Boiler cost	$ 29,000.00	[$/boiler]	Cleaver Brooks 1500 MBH condensing stainless boiler
		Cost Premium	$ 11,000.00	[$ total]	hybrid system (one condensing, one normal)
					NOTE - Raypak 1500 MBH condensing boiler = $38,000
16.0	**Variable Speed Pumps & Fans**	Estimated Cost Premium	$ 0.34	[$/s.f. bldg]	
		Cost of VFD for motors around 5hp	$ 350.00	[$/hp]	Estimation based off Variable Frequency Drives. The Energy Observer, J
	VAV #1 Supply / Return Fan Motor capacity 12 / 3.5 kW	Total hp of motors in 10hp size range	13.4	[hp]	Sum of motors in size range, from energy model
	VAV #2 Supply / Return Fan Motor capacity 35 / 13 kW	Cost of VFD for motors around 10hp	$ 160.00	[$/hp]	Variable Frequency Drives. The Energy Observer, June 2007.
	VAV #3 Supply / Return Fan Motor capacity 12 / 4 kW	Total hp of motors in 10hp size range	61.7	[hp]	Sum of motors in size range, from energy model
	CHW Pump Motor capacity 9 kW	Cost of VFD for motors around 40hp	$ 100.00	[$/hp]	Variable Frequency Drives. The Energy Observer, June 2007.
	HW Pump Motor capacity 2.5 kW	Total hp of motors in 40hp size range	46.9	[hp]	Sum of motors in size range, from energy model
		Installation premium	75%	[%]	Estimation based off Variable Frequency Drives. The Energy Observer, J
		Cost Premium	$ 33,686.33	[$]	calculated
17.0	**Energy Star Equipment**	Estimated Cost Premium		[$/s.f. bldg]	
	LEED Gold baseline, assumed cost baseline				
18.0	**Solar Thermal for DHW**	Estimated Cost Premium	$ 0.56	[$/s.f. bldg]	
		System Capital Cost Estimate	$ 55,675.62		

Peak Month Solar Fraction	90%
Average Annual Solar Fraction	21%

W	1	Windows with Improved SHGC
W	2	External Shading
W	3	Thermal Mass w/ external insulation
P	4	Daylighting
P	5	Skylights
E	6	High Efficiency Lighting
M	7	Demand Control Ventilation
M	8	High Efficiency Heat Pump
M	9	Occupancy Sensors for Lighting & HVAC
E	10	Energy Star Equipment
R	1	Solar Thermal for DHW

= input cell

Building Inputs - Retail

Bldg S.F	30,000	s.f.
# of floors	1	floors
flr to flr height	15	ft./floor
footprint	30,000	s.f.
Building Perimeter	910	linear ft
# of zones per floor	8	zones/floor
WWR	40%	%
Total Window SA	5,460	s.f.
Total Wall Area	8,190	s.f.
Total Roof Area	30,000	s.f.

San Francisco City Cost Index **123.8%** RSMeans Bldg Constr Costs, pg. 699 & pg. 737
for RSMeans values only!

Incomplete	#	ECM		Flagged	Values	Units	Assumptions/Sources
	1.0	Windows with Improved SHGC	Estimated Cost Premium		$ 1.17	[$/s.f. bldg]	
			Curtain Wall - Glazing Panel, 1" thick, clear		$ 29.15	[$/s.f. window]	RSMeans SF Costs 2009, pg.321
			Heat reflective film inside		$ 39.50	[$/s.f. window]	RSMeans SF Costs 2009, pg.321
			Light and heat reflective flass, tinted		$ 43.50	[$/s.f. window]	RSMeans SF Costs 2009, pg.321
			Total cost premium		$ 10.35	[$/s.f. window]	calculated
			Total cost premium		$ 28,255.50	[$]	S and W facades only
			Total cost premium (incl. RSMeans SF Cost Index)		$ 34,980.31	[$]	calculated
	2.0	External Shading	Estimated Cost Premium		$ 0.35	[$/s.f. bldg]	
			Metal siding steel panel, .0135" thick, colored		$ 6.27	[$/s.f. material]	RSMeans SF Costs 2009, pg.312
			total window surface area		5,460	[s.f.]	40% WWR
			window height		7	[ft.]	From energy model
			total window width		780	[ft.]	calculated
			linear feet of overhangs		585	[l.f.]	calculated - only on non-north windows, assumed 75% factor
			depth of fins		0.5	[ft.]	From energy model
			depth of overhang		1.5	[ft.]	From energy model
			amount of shading material		899	[s.f. material]	calculated, includes fins on (3) facades equal to window height
			Cost premium		$ 8,450.39	[$]	calculated
	3.0	Thermal Mass w/ external insulation	Estimated Cost Premium		$ -	[$/s.f. bldg]	

Assumed architectural feature & potential cost savings by using thermal mass in leu of metal frame
Thus costs are zero'd (no premuim)

4.0	**Daylighting**			
	Estimated Cost Premium	$ 0.07	[$/s.f. bldg]	
	# of Zones to include daylighting controls	8	[# of zones]	
	Daylighting sensors per zone	1	[# of sensors]	
	Daylighting sensors per bldg	8	[# of sensors]	
	Cost per daylighting sensor	$ 250.00	[$/sensor]	from Lutron rep, incl. switchbox and cabling, does NOT incl ballast!!
	Total Cost	$ 2,000.00	[$]	
5.0	**Skylights**			
	Estimated Cost Premium	$ 1.06	[$/s.f. bldg]	
	Skylights, plastic dome, 30 to 65 s.f., single glaze	$ 21.34	[$/s.f. skylight]	RSMeans SF Costs 2009, pg. 332, 4% of Roof Area, **8x8** each
	Percent of roof area	4%	[%]	from energy model
	Total cost premium	$ 25,608.00	[$]	calculated
	Total cost premium (incl. RSMeans SF Cost Index)	$ 31,702.70	[$]	calculated
6.0	**High Efficiency Lighting**			
	Estimated Cost Premium	$ 2.02	[$/s.f. bldg]	
	Incandescent Fixture - MR16, 1 W/s.f.	$ 1.01	[$/s.f.]	RSMeans SF Costs 2009, pg. 421
	Cost premium multiplier for Ceramic Metal Halide lamps	2	[x]	
	Total cost premium for HE lighting	$ 2.02	[$/s.f. bldg]	
7.0	**Demand Control Ventilation**			
	Estimated Cost Premium	$ 0.17	[$/s.f. bldg]	
	Assumed quantity of CO2 sensors per floor	1	[sensors/zone]	Assumed - based off of experience (see drawing)
	CO2 sensors per building	8	[sensors/bldg]	calculated
	Installed cost per sensor	$ 650.00	[$/sensor]	US DOE FEMP Demand Control Ventilation Report, 2004
	Total Cost Premium	$ 5,200.00	[$]	calculated
8.0	**High Efficiency Heat Pump**			
	Estimated Cost Premium	$ 0.53	[$/s.f. bldg]	
	Heating baseline COP, proposed COP	3.2, **3.66**		Title 24 min, approx SEER 12, SEER 15, calculated
	unit capacity	5	[tons]	Unit capacities per Carrier cost estimate
	HE cost premium	$ 1,600.00	[$/unit]	Cost premuim from SEER 13 to 15, per Carrier cost estimate
	HE cost premium	$ 320.00	[$/ton heating]	calculated
	Heating Capacity per zone	6.25	[tons heating]	From eQUEST Auto-size function
	Total Heating Capacity	50	[tons heating]	calculated
	Total Estimated Cost Premium	$ 16,000.00	[$]	calculated
9.0	**Occupancy Sensors for Lighting & HVAC**			
	Estimated Cost Premium	$ 0.07	[$/s.f. bldg]	
	Assumed number per floor	8	[#/floor]	1 per zone
	Total number per bldg	8	[#/bldg]	calculated
	Cost per occ sensor (incl install)	$ 250.00	[$/sensor]	from Lutron rep, incl. switchbox and cabling, Dual Tech sensor
	Total cost per bldg	$ 2,000.00	[$]	calculated

10.0	Energy Star Equipment	Estimated Cost Premium	$ -	[$/s.f. bldg]	
	LEED Gold baseline, assumed cost baseline				
11.0	Solar Thermal for DHW	Estimated Cost Premium	n/a	[$/s.f. bldg]	
	no HW consumption/demand	System Capital Cost Estimate	#DIV/0!		
		Peak Month Solar Fraction	50%		
		Average Annual Solar Fraction	#DIV/0!		

P	1	Windows with Improved SHGC
P	2	External Shading
P	3	Thermal Mass
P	4	Daylighting
P	5	Skylights
P	6	Natural Ventilation
E	7	High Efficiency Lighting
M	8	High Efficiency Chiller
M	9	High Efficiency Boiler
M	10	Occupancy Sensors for Lighting
M	11	Demand Control Ventilation
M	12	High Efficiency Multi Spit Heat Pumps
M	13	Heat Recovery?
M	14	Variable Speed Pumps & Fans
E	15	Energy Star Equipment
R	16	Solar Thermal for DHW

= input cell

Building Inputs - Condotel			Ground Floor	Condo tower	Hotel towers
Bldg S.F	340,574	s.f.	37,469	228,225	74,880
# of floors	15	floors	1	15	4
flr to flr height	13	ft./floor	30	13	13
footprint	40,186	s.f.	40,186	21,442	20,160
Building Perimeter	828	linear ft	828	514	792
# of zones per floor	n/a	zones/floor	5	9	48
WWR	40%	%	40%	40%	40%
Total Window SA	61,052	s.f.	9,936	37,138	13,978
Total Wall Area	91,578	s.f.	14,904	55,708	20,966
Total Roof Area	40,186	s.f.	0	21,442	20,160

San Francisco City Cost Index **123.8%** RSMeans Bldg Constr Costs, pg. 699 & pg. 737
for RSMeans values only!

incomplete	#	ECM	flagged	Values	Units	Assumptions/Sources
	1.0	**Windows with Improved SHGC**				
		Estimated Cost Premium		$ 1.15	[$/s.f. bldg]	
		Curtain Wall - Glazing Panel, 1" thick, clear		$ 29.15	[$/s.f. window]	RSMeans SF Costs 2009, pg.321
		Heat reflective film inside		$ 39.50	[$/s.f. window]	RSMeans SF Costs 2009, pg.321
		Light and heat reflective flass, tinted		$ 43.50	[$/s.f. window]	RSMeans SF Costs 2009, pg.321
		Total cost premium		$ 10.35	[$/s.f. window]	calculated
		Total cost premium		$ 315,944.10	[$]	S and W facades only
		Total cost premium (incl. RSMeans SF Cost Index)		$ 391,138.80	[$]	calculated
	2.0	**External Shading**				
		Estimated Cost Premium		$ 0.34	[$/s.f. bldg]	
		Metal siding steel panel, .0135" thick, colored		$ 6.27	[$/s.f. material]	RSMeans SF Costs 2009, pg.312
		total window surface area		61,052	[s.f.]	40% WWR
		window height		7	[ft.]	From energy model
		total window width		8722	[ft.]	calculated
		linear feet of overhangs		6541	[l.f.]	calculated - only on non-north windows, assumed 75% factor
		depth of fins		0.5	[ft.]	From energy model
		depth of overhang		1.5	[ft.]	From energy model
		amount of shading material		9833	[s.f. material]	calculated, includes fins on (3) facades equal to window height
		Cost premium		$ 92,478.69	[$]	calculated
	3.0	**Thermal Mass**		$ -		
		Assumed architectural feature & potential cost savings by using thermal mass in leu of metal frame Thus costs are zero'd (no premuim)				

4.0	**Daylighting**			
	Estimated Cost Premium	$ 0.24	[$/s.f. bldg]	
	# of Zones to include daylighting controls	332	[# of zones]	
	Daylighting sensors per zone	1	[# of sensors]	
	Daylighting sensors per bldg	332	[# of sensors]	
	Cost per daylighting sensor	$ 250.00	[$/sensor]	from Lutron rep, incl. switchbox and cabling, does NOT incl ballast!!
	Total Cost	$ 83,000.00	[$]	
5.0	**Skylights**			
	Estimated Cost Premium	$ 0.02	[$/s.f. bldg]	
	Skylights, plastic dome, 10 to 20 s.f., single glaze	$ 29.93	[$/s.f. skylight]	RSMeans SF Costs 2009, pg. 332, **11 units**, **4x4** each
	Area per skylight	16	[s.f./skylight]	calculated
	Quanitity of skylights used in energy model	11	[#]	from energy model
	Total cost premium	$ 5,267.68	[$]	calculated
	Total cost premium (incl. RSMeans SF Cost Index)	$ 6,521.39	[$]	calculated
6.0	**Natural Ventilation**			
	Estimated Cost Premium	$ 2.66	[$/s.f. bldg]	
	Picture (i.e. fixed) window, std glass, 2x3' (material costs)	$ 159.00	[$/unit]	RSMeans SF Costs 2009, pg.320
	Picture (i.e. fixed) window, std glass, 2x3' (material costs)	26.5	[$/s.f. window]	calculated
	Al, awning std glass, 3'1"x 3'2" (material costs)	$ 370.00	[$/unit]	RSMeans SF Costs 2009, pg.319
	Al, awning std glass, 3'1"x 3'2" (material costs)	38.5	[$/s.f. window]	calculated
	Total cost premium	$ 12.00	[$/s.f. window]	calculated
	Total cost premium	$ 732,719.29	[$]	calculated
	Total cost premium (incl. RSMeans SF Cost Index)	$ 907,106.49	[$]	calculated
7.0	**High Efficiency Lighting**			
	Estimated Cost Premium	$ 1.56	[$/s.f. bldg]	
	Spec grade 6" open downlight w/ 26W CFL	$ 165.00		Quote from Lightolier rep
	High efficiency LED downlight, 20W	$ 205.00		Quote from Lightolier rep, new LED downlight ca
	Approximate % cost increase	20%		calculated
	Baseline Lighting System costs	$ 8.00		Assumption, based off experience
	HE LED cost premium	$ 1.56		calculated
	HE LED total cost premium	$ 531,627.71		calculated
8.0	**High Efficiency Chiller**			
	Estimated Cost Premium	$ 0.12	[$/s.f. bldg]	
	Baseline Chiller efficiency	2.8	COP	Title 24-2008 minimum
	Baseline Chiller efficiency	1.26	[kW/ton]	calculated
	Baseline Electric Centrifugal Chiller plant capacity	750	[tons]	from energy model - 4096 MBH = 341 tons (2) of them
	Baseline Centrifugal Chiller plant cost	$ 550.00	[$/ton]	approx cost for (2) **341 ton** Carrier air-cooled chillers, 200-400 tons
	Proposed Centrifugal Chiller efficiency	0.75	[kW/ton]	chiller (0.55) + wet cooling (0.2)
	Proposed Centrifugal Chiller cost	$ 450.00	[$/ton]	chiller only
	Proposed total chiller cost + wet cooling	$ 668.00	[$/ton]	RSMeans Mechanical Cost Data pg. 529, including wet cooling
	Cost Premium	$ 118.00	[$/ton]	calculated
	Cost Premium	$ 41,300.00	[$]	calculated
9.0	**High Efficiency Boiler**			
	Estimated Cost Premium	$ 0.06	[$/s.f. bldg]	
	Baseline Gas-Fired Boiler efficiency	80%	AFUE	Title 24-2008 minimum
	Boiler plant capacity	6400	[MBH]	from energy model
	Baseline Boiler cost	$ 18,000.00	[$/boiler]	Raypak 1500 MBH low efficiency (83%) copper fin boiler
	Proposed Gas-Fired Condensing Boiler efficiency	95%	AFUE	Cleaver Brooks 1500 MBH condensing stainless boiler

		Proposed Boiler cost	$ 29,000.00	[$/boiler]	Cleaver Brooks 1500 MBH condensing stainless boiler
		Cost Premium	$ 22,000.00	[$ total]	hybrid system (two condensing, two normal)
					NOTE - Raypak 1500 MBH condensing boiler = $38,000
10.0	Occupancy Sensors for Lighting	Estimated Cost Premium	$ 0.19	[$/s.f. bldg]	
		# of Zones to include occupancy controls	332	[# of zones]	1 per zone
		Total number per bldg	332	[#/bldg]	calculated
		Cost per occ sensor (incl install)	$ 200.00	[$/sensor]	from Lutron rep, incl. switchbox and cabling, IR sensor
		Total cost per bldg	$ 66,400.00	[$]	calculated
11.0	Demand Control Ventilation	Estimated Cost Premium	$ 0.01	[$/s.f. bldg]	
	just for ground floor	Assumed amount of CO2 sensors on ground floor	6	[# of sensors]	Assumed - based off of experience (see drawing)
		CO2 sensors per building	6	[sensors/bldg]	calculated
		Installed cost per sensor	$ 650.00	[$/sensor]	US DOE FEMP Demand Control Ventilation Report, 2004
		Total Cost Premium	$ 3,900.00	[$]	calculated
		Total Cost Premium	$ 0.10	[$/ground floor s.f.]	calculated
12.0	High Efficiency Multi-Split Heat Pump	Estimated Cost Premium	$ 0.15	[$/s.f. bldg]	
		Cooling baseline COP, proposed COP	3.2, **3.66**		Title 24 min, approx SEER 12, SEER 15, calculated
		Cost premium for HE DX units	39%	[%]	Cost premuim from SEER 13 to 15, per Carrier cost estimate for 5 ton unit
		Average Cooling Capacity per zone	19	[tons cooling]	From eQUEST Auto-size function
		Total Cooling Capacity	95	[tons cooling]	calculated
		Baseline DX system cost	$ 1,422.00	[$/ton cooling]	RSMeans Mech pg.546, restaurants, schools, and banks princing
		HE cost premium	$ 554.58	[$/ton cooling]	calculated
		Total Estimated Cost Premium	$ 52,685.10	[$]	calculated
13.0	Heat Recovery?	Estimated Cost Premium	$ 0.09	[$/s.f. bldg]	
	Sensible Wheel - 15,000 CFM				
		Cost of 15,000 CFM air to air enthaply wheel	$ 19,050.00	[$/wheel]	RSMeans Mechanical Cost Data pg. 373, averaged 10000 and 20000 CFM
		Total enthalpy wheel cost	$ 19,050.00	[$]	calculated -- (2) 1500 CFM, (1) 4500 CFM
	savings on reducing boiler plant capacity??	Additional cost mulitplier (ducting, controls, etc.)	25%	[% additional]	Assumption
		Total system cost premium	$ 23,812.50	[$]	calculated
		Total cost premium (incl. RSMeans SF Cost Index)	$ 29,479.88	[$]	calculated
14.0	Variable Speed Pumps & Fans	Estimated Cost Premium	$ 0.03	[$/s.f. bldg]	
	CHW Pump Motor capacity 25 kW				
	HW Pump Motor capacity 7.5 kW	Cost of VFD for motors around 10hp	$ 160.00	[$/hp]	Variable Frequency Drives. The Energy Observer, June 2007.
		Total hp of motors in 10hp size range	10.1	[hp]	Sum of motors in size range, from energy model
		Cost of VFD for motors around 40hp	$ 100.00	[$/hp]	Variable Frequency Drives. The Energy Observer, June 2007.
		Total hp of motors in 40hp size range	33.5	[hp]	Sum of motors in size range, from energy model
		Installation premium	75%	[%]	Estimation based off Variable Frequency Drives. The Energy Observer, Ju
		Cost Premium	$ 8,679.62	[$]	calculated
15.0	Energy Star Equipment	Estimated Cost Premium	$ 0.07	[$/s.f. bldg]	
		Refrigerator	$ 30.00	[$ premium / unit]	ENERGY STAR Refrigerator Savings Calculator
		Television	$ -	[$ premium / unit]	ENERGY STAR Television Savings Calculator
		Dishwasher	n/a	[$ premium / unit]	ENERGY STAR Dishwasher Savings Calculator

		Clothes Washer	n/a	[$ premium / unit]	ENERGY STAR Clothes Waster Savings Calculator
		Computer	$ 42.00	[$ premium / unit]	ENERGY STAR Computer Savings Calculator
		Total per Unit	$ 72.00	[$/unit]	
		Total per bldg	$ 23,544.00	[$]	
16.0	Solar Thermal for DHW	Estimated Cost Premium	$ 0.92	[$/s.f. bldg]	
		System Capital Cost Estimate	$ 312,131.52		
		Peak Month Solar Fraction	50%		
		Average Annual Solar Fraction	32%		

Appendix E

Building Energy Calculations

E1 Building Energy Calculations

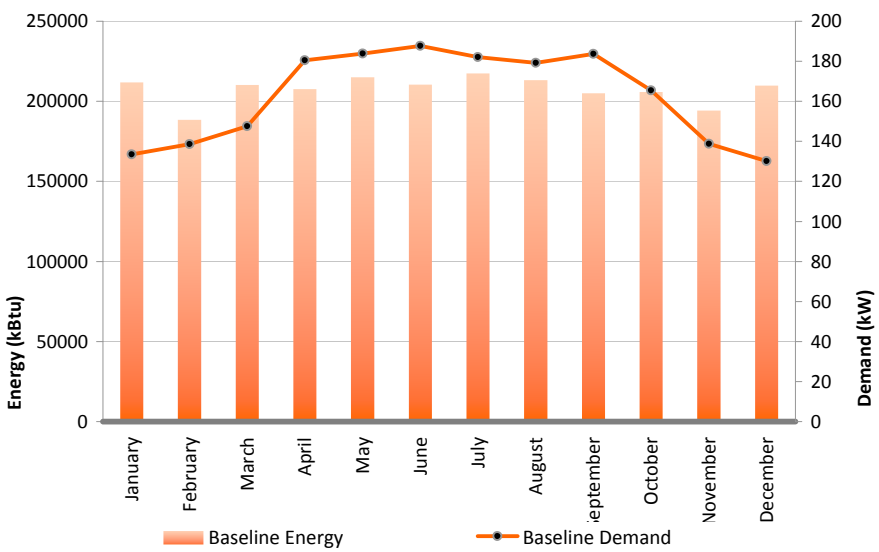
- Collation of ECM energy savings and costing data to apply ECM's to baseline building to reach each iteration of energy performance.

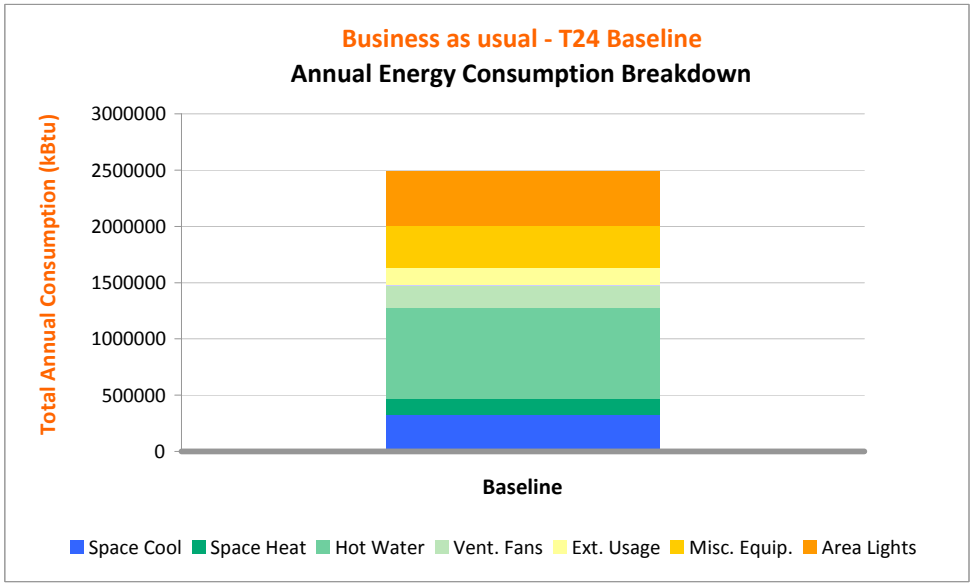
Low Rise Residential: Building Energy Calculations

ARUP

BAU - T24 | *T24, 2008 equivalent* | *Building Area 75640 sf*

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	42,632	66,352	134
February	37,047	61,971	139
March	41,147	69,789	148
April	41,256	66,842	181
May	43,896	65,341	184
June	43,470	62,104	188
July	45,683	61,541	182
August	44,862	60,183	179
September	43,099	58,042	184
October	42,552	60,571	166
November	39,218	60,435	139
December	42,463	64,926	130
Totals	**507,326**	**758,097**	**188**

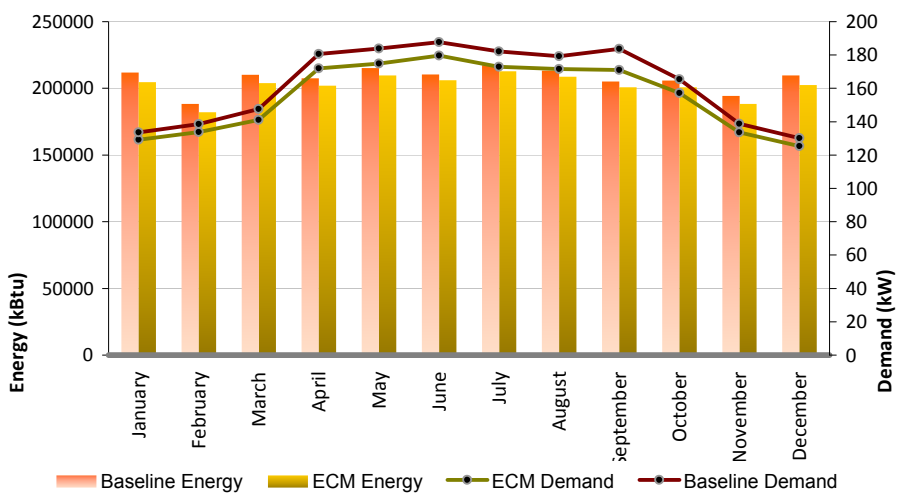




E-1 Thermal mass

LEED Gold Baseline

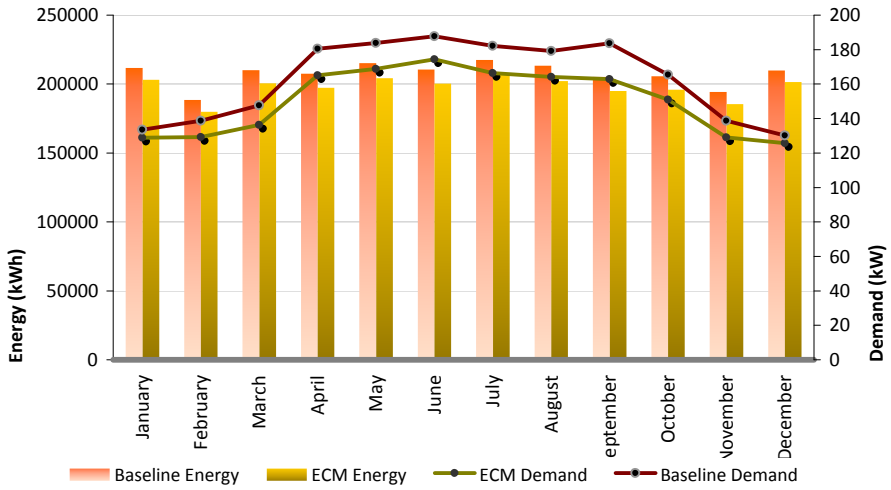
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	40,506	66,352	129
February	35,201	61,972	134
March	39,340	69,792	141
April	39,582	66,846	172
May	42,327	65,347	175
June	42,211	62,111	180
July	44,345	61,547	173
August	43,513	60,189	172
September	41,851	58,049	171
October	41,128	60,575	157
November	37,471	60,438	134
December	40,300	64,926	125
Totals	**487,774**	**758,144**	**180**
Savings	**19,553**	**-47**	**8**
% Savings	**4%**	**0%**	**4%** Incremental



E-2 External overhangs

LEED Gold Baseline

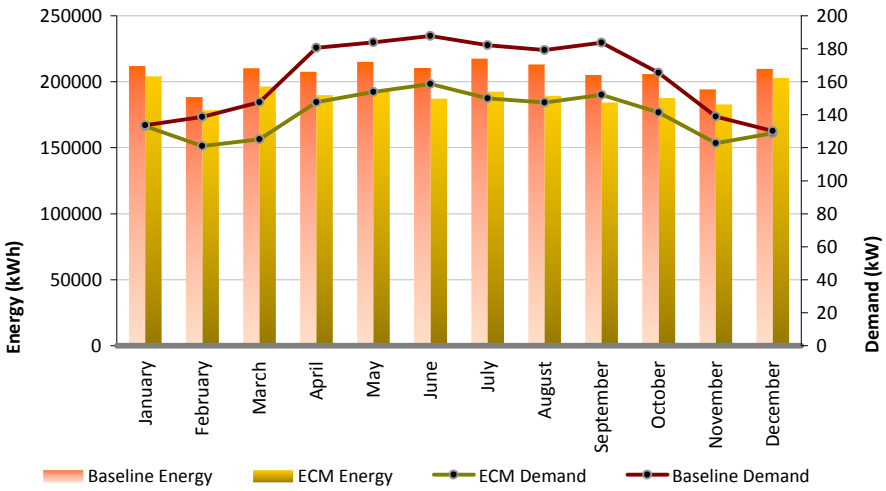
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	40,107	66,360	129
February	34,576	61,981	129
March	38,327	69,803	136
April	38,216	66,857	165
May	40,731	65,358	169
June	40,537	62,121	174
July	42,492	61,558	166
August	41,587	60,201	164
September	40,149	58,059	163
October	39,671	60,585	151
November	36,674	60,448	129
December	40,010	64,935	126
Totals	**473,077**	**758,266**	**174**
Savings	**34,249**	**-169**	**13**
% Savings	**7%**	**0%**	**7%** Incremental



E-3 High performance windows

LEED Gold Baseline

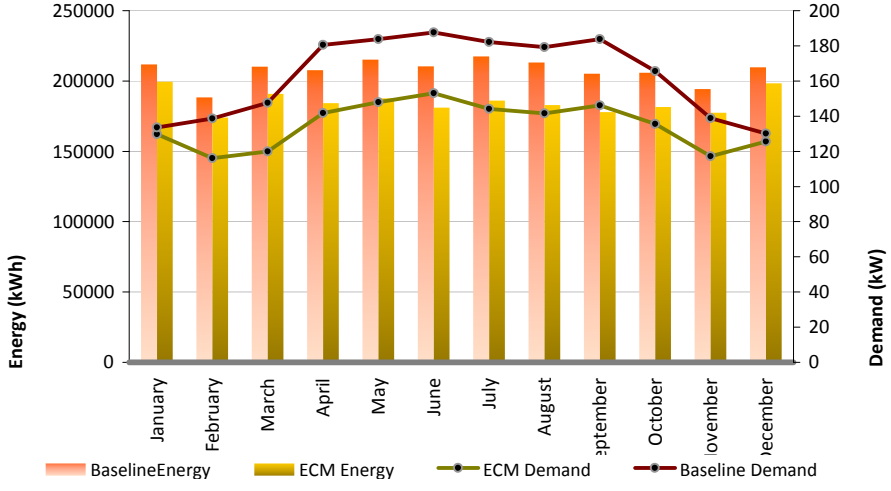
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	40,351	66,374	133
February	34,161	61,996	121
March	37,097	69,823	125
April	36,016	66,878	148
May	37,609	65,378	154
June	36,678	62,140	159
July	38,411	61,576	150
August	37,850	60,218	147
September	36,974	58,072	152
October	37,254	60,597	141
November	35,853	60,458	123
December	40,444	64,948	129
Totals	448,698	758,458	159
Savings	58,629	-361	29
% Savings	12%	0%	15% Incremental



E-4 Energy star equipment

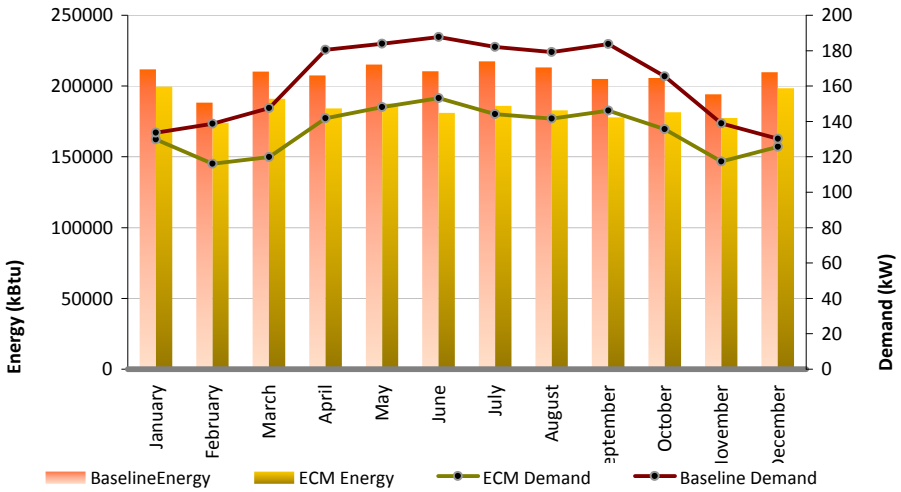
LEED Gold Baseline

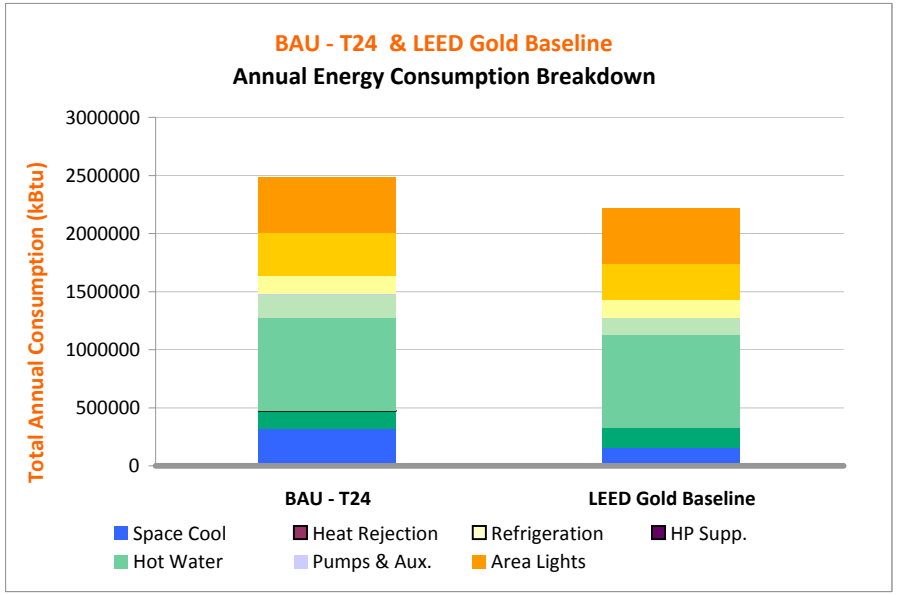
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	39,012	66,377	130
February	32,815	61,999	116
March	35,502	69,827	120
April	34,388	66,881	142
May	35,840	65,381	148
June	34,846	62,142	153
July	36,491	61,578	144
August	35,967	60,220	142
September	35,104	58,075	146
October	35,414	60,600	136
November	34,306	60,462	117
December	39,133	64,951	126
Totals	428,817	758,493	153
Savings	78,509	-396	35
% Savings	15%	0%	18% Incremental



E-4 LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	39,012	66,377	130
February	32,815	61,999	116
March	35,502	69,827	120
April	34,388	66,881	142
May	35,840	65,381	148
June	34,846	62,142	153
July	36,491	61,578	144
August	35,967	60,220	142
September	35,104	58,075	146
October	35,414	60,600	136
November	34,306	60,462	117
December	39,133	64,951	126
Totals	**428,817**	**758,493**	**153**
Savings	**78,509**	**-396**	**35**
% Savings	**15%**	**0%**	**18%** Cumulative

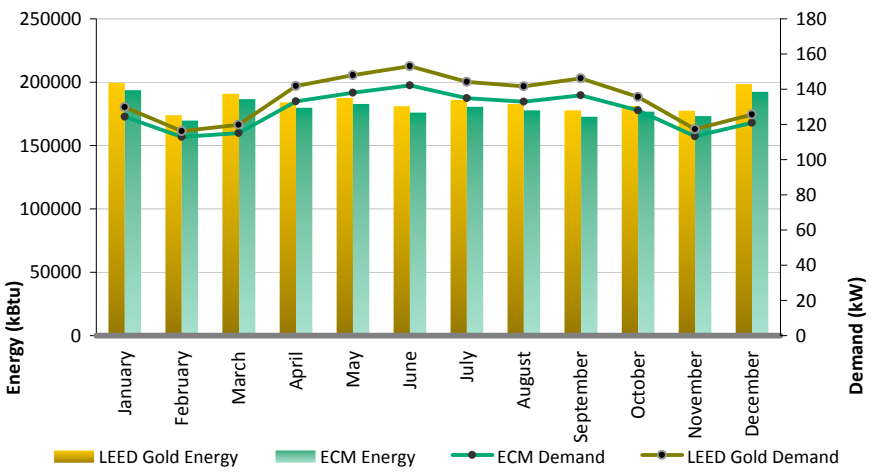




E-5 Heat pump efficiency

ECM √

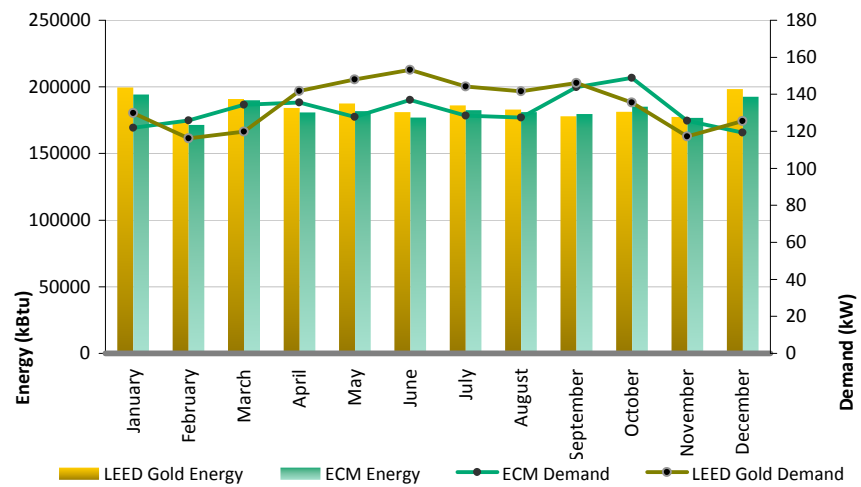
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	37,299	66,377	124
February	31,572	61,999	113
March	34,208	69,827	115
April	33,087	66,881	133
May	34,432	65,381	138
June	33,370	62,142	142
July	34,889	61,578	135
August	34,442	60,220	133
September	33,575	58,075	136
October	34,065	60,600	128
November	33,082	60,462	113
December	37,391	64,952	121
Totals	411,413	758,494	142
Savings	17,404	-1	11
% Savings	4%	0%	7% Independent
Cost $/sf	$1.39	$ Savings	$2772
Est. Premium	$105140	Simple Payback	38



E-6 Daylighting

ECM √

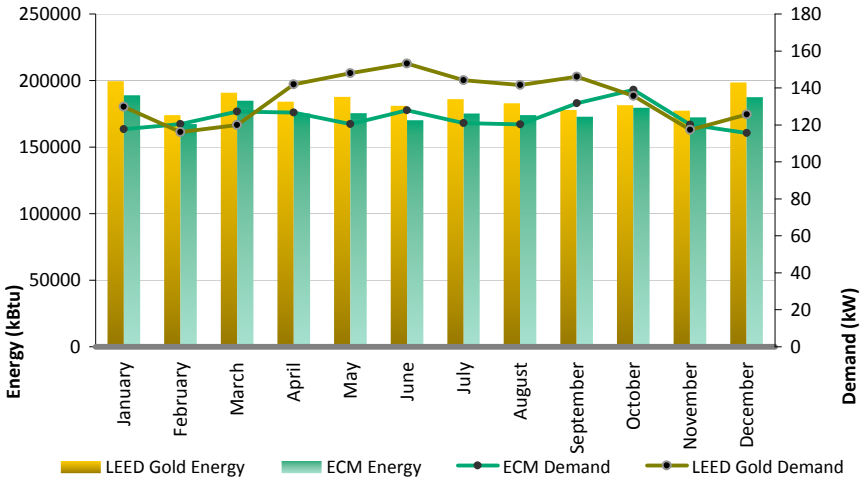
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	37,484	66,358	122
February	32,110	61,979	126
March	35,193	69,803	134
April	33,396	66,856	136
May	34,123	65,358	128
June	33,675	62,121	137
July	35,455	61,559	128
August	35,410	60,201	127
September	35,636	58,058	144
October	36,546	60,583	149
November	34,120	60,446	126
December	37,423	64,933	119
Totals	420,571	758,255	149
Savings	8,246	238	4
% Savings	2%	0%	3% Independent
Cost $/sf	$0.20	$ Savings	$1315
Est. Premium	$15128	Simple Payback	12



E-7 Natural vent w/ HW baseboards — ECM

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	35,960	66,358	118
February	30,854	61,979	120
March	33,732	69,803	127
April	31,777	66,856	127
May	32,299	65,358	120
June	31,688	62,121	128
July	33,317	61,559	121
August	33,386	60,201	120
September	33,672	58,058	132
October	34,846	60,583	139
November	32,822	60,446	120
December	35,904	64,933	116
Totals	400,257	758,255	139
Savings	28,560	238	14
% Savings	7%	0%	9% Independent

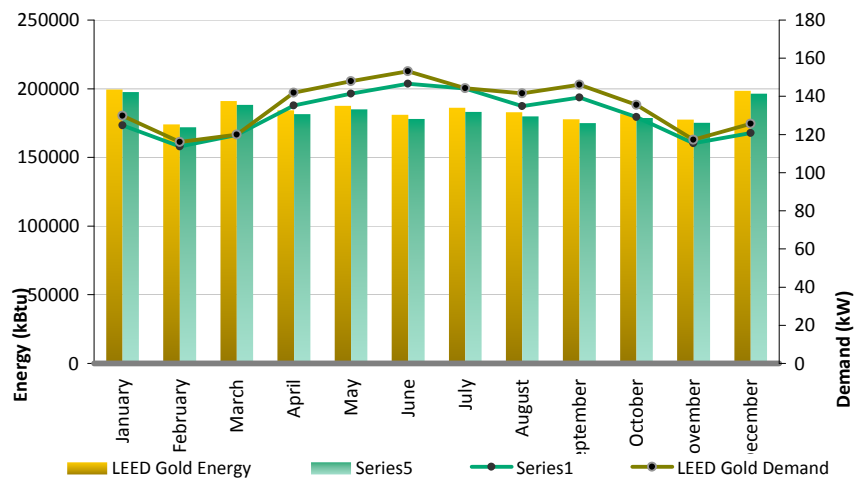
Cost $/sf	$2.71	$ Savings	$4551
Est. Premium	$204984	Simple Payback	45



E-8 High efficiency lighting — ECM √

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	38,466	66,379	125
February	32,210	62,002	114
March	34,704	69,830	120
April	33,565	66,884	135
May	35,074	65,384	141
June	33,935	62,145	147
July	35,609	61,581	144
August	35,052	60,223	135
September	34,231	58,078	139
October	34,627	60,603	129
November	33,610	60,464	115
December	38,536	64,954	121
Totals	419,619	758,527	147
Savings	9,198	-34	7
% Savings	2%	0%	4% Independent

Cost $/sf	$1.56	$ Savings	$1465
Est. Premium	$117998	Simple Payback	81



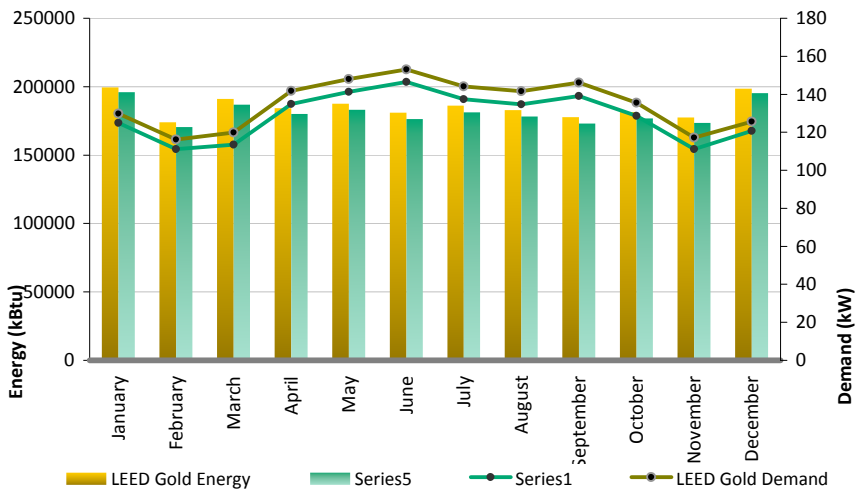
E-9 Lighting occupancy sensors

ECM √

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	37,987	66,381	125
February	31,813	62,003	111
March	34,315	69,831	114
April	33,146	66,885	135
May	34,506	65,384	141
June	33,486	62,144	146
July	35,042	61,580	137
August	34,555	60,222	135
September	33,722	58,077	139
October	34,040	60,603	129
November	33,147	60,465	111
December	38,162	64,956	121
Totals	**413,923**	**758,531**	**146**
Savings	**14,894**	**-38**	**7**
% Savings	**3%**	**0%**	**4%**

Independent

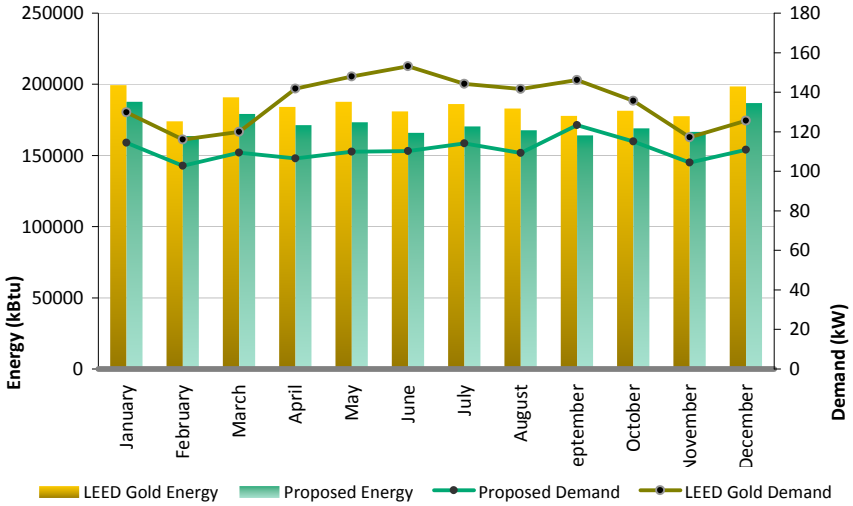
Cost $/sf	$0.20	$ Savings	$2372
Est. Premium	$ 15,128	Simple Payback	6

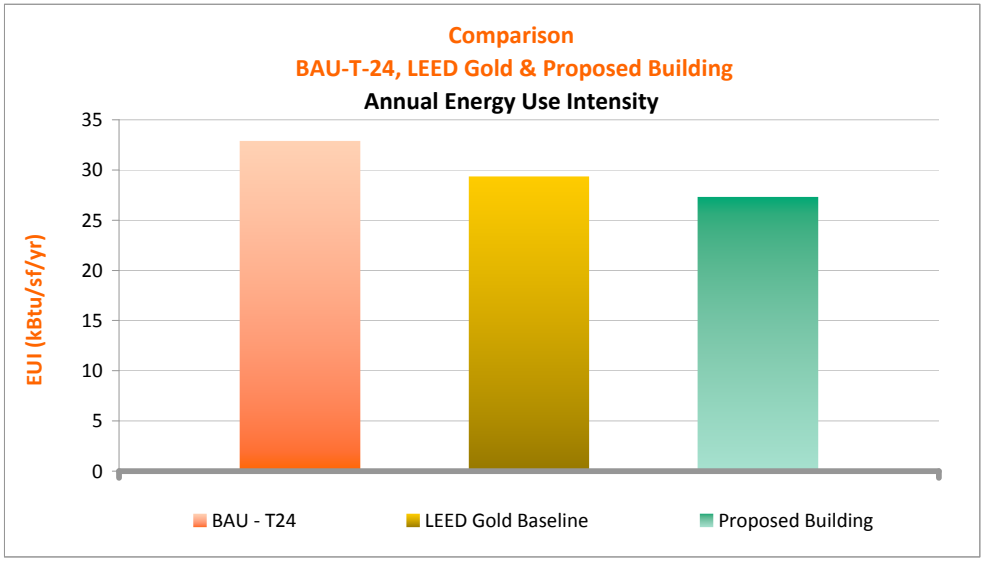


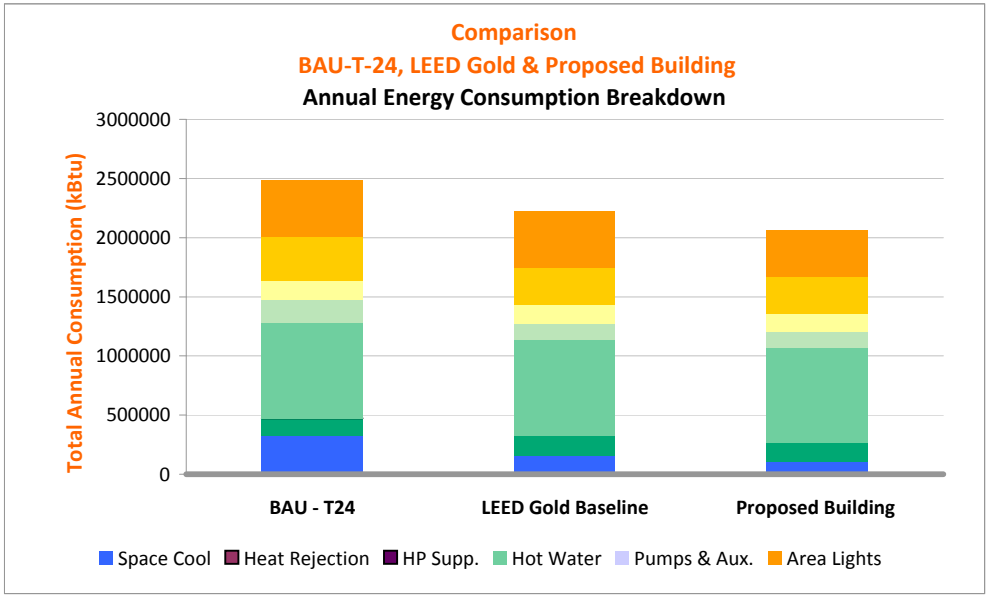
Proposed Building

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	35,560	66,384	114
February	29,816	62,006	103
March	32,069	69,834	109
April	30,584	66,888	107
May	31,660	65,387	110
June	30,386	62,148	110
July	31,913	61,583	114
August	31,536	60,225	109
September	31,100	58,079	123
October	31,766	60,606	115
November	31,128	60,468	104
December	35,685	64,959	111
Totals	383,201	758,567	123
Savings	45,616	-74	30
% Savings	11%	0%	19% Combined

Cost $/sf	$3.35	$ Savings	$7266
Est. Premium	$ 253,394	Simple Payback	35





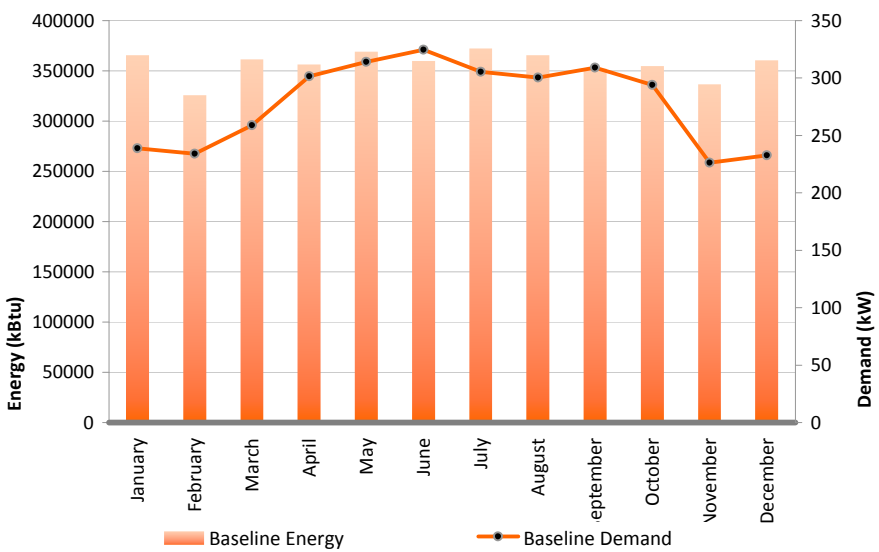


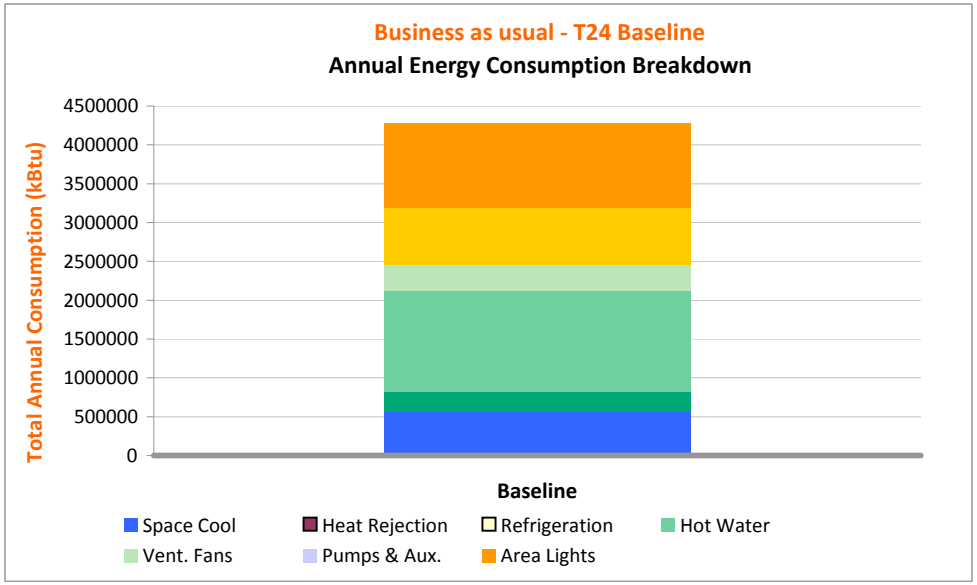
Mid Rise Residential: Building Energy Calculations

ARUP

BAU - T24 | *T24, 2008 equivalent* | *Building Area 130264 sf*

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	73,664	114,149	239
February	64,194	106,612	234
March	70,794	120,065	259
April	70,717	114,976	302
May	75,223	112,385	314
June	74,127	106,801	325
July	78,126	105,823	305
August	76,839	103,489	300
September	74,018	99,809	309
October	73,462	104,178	294
November	68,157	103,959	226
December	72,926	111,684	233
Totals	**872,246**	**1,303,930**	**325**



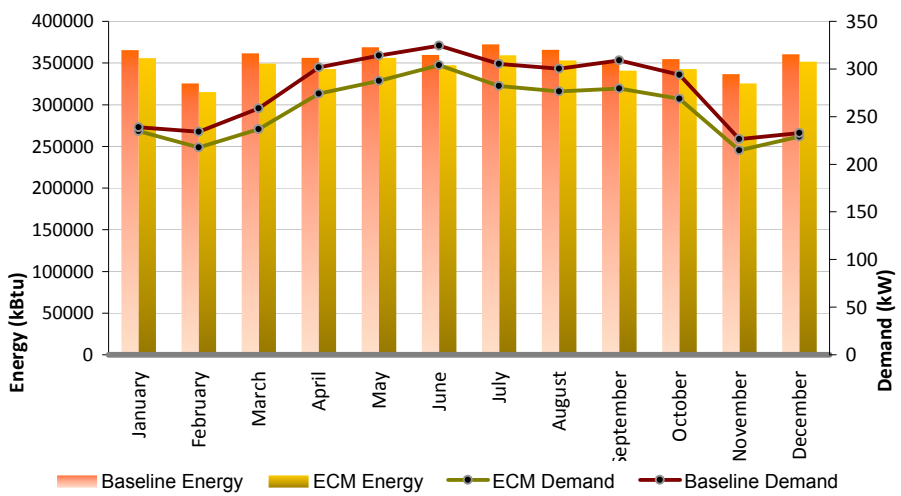


E-1 Thermal mass

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	70,863	114,161	235
February	61,169	106,627	218
March	67,132	120,083	237
April	66,818	114,999	274
May	71,431	112,409	287
June	70,537	106,826	304
July	74,312	105,848	282
August	73,180	103,511	277
September	70,604	99,831	280
October	69,963	104,194	269
November	64,907	103,974	215
December	70,300	111,696	229
Totals	831,217	1,304,159	304
Savings	41,029	-229	21
% Savings	5%	0%	6%

Incremental

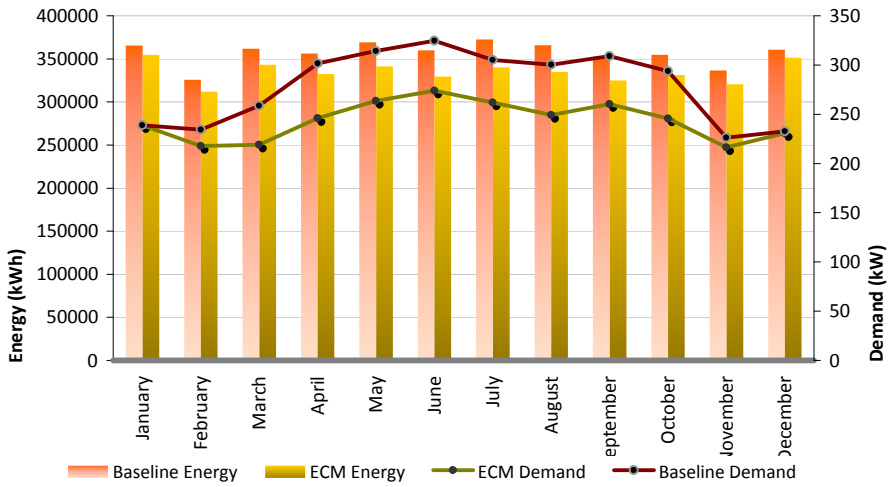


E-2 High performance glazing

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	70,526	114,183	239
February	60,211	106,652	218
March	65,356	120,117	219
April	63,732	115,039	246
May	67,065	112,447	264
June	65,274	106,865	274
July	68,661	105,884	262
August	67,798	103,545	249
September	65,964	99,857	260
October	66,512	104,217	246
November	63,461	103,989	216
December	70,224	111,718	231
Totals	794,785	1,304,513	274
Savings	77,461	-583	51
% Savings	9%	0%	16%

Incremental

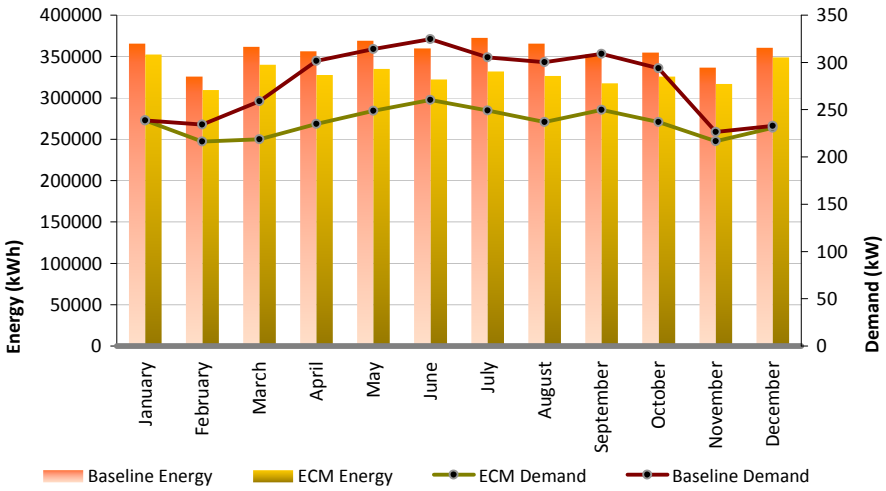


E-3 External shading

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	69,772	114,193	239
February	59,452	106,664	216
March	64,413	120,135	219
April	62,333	115,061	235
May	65,266	112,472	249
June	63,134	106,890	260
July	66,206	105,912	249
August	65,351	103,570	237
September	63,858	99,876	250
October	64,865	104,231	237
November	62,430	104,000	217
December	69,569	111,728	231
Totals	776,647	1,304,732	260
Savings	95,599	-802	64
% Savings	11%	0%	20%

Incremental

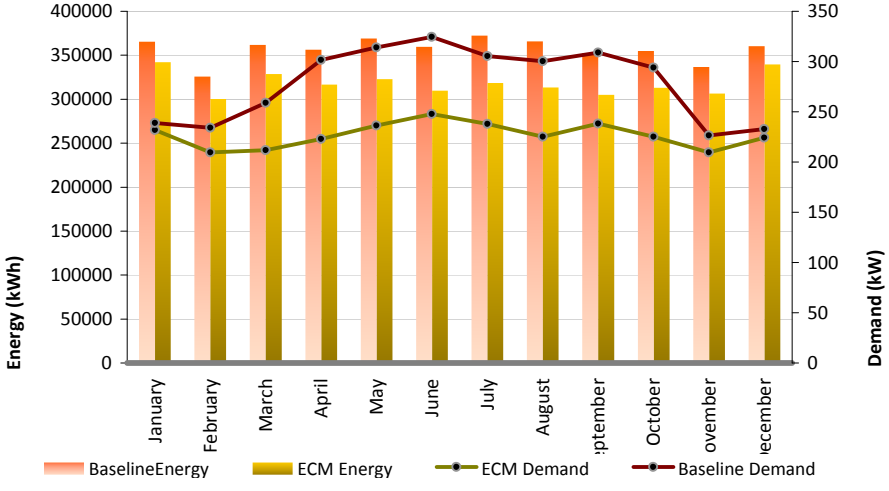


E-4 Energy star equipment

LEED Gold Baseline

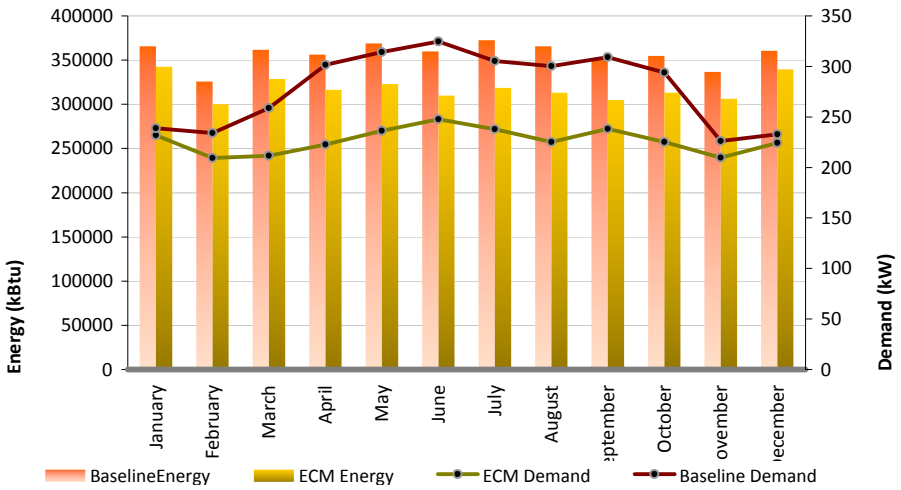
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	66,844	114,204	232
February	56,724	106,673	210
March	61,146	120,146	212
April	59,052	115,071	223
May	61,699	112,482	236
June	59,493	106,899	248
July	62,303	105,921	238
August	61,459	103,579	225
September	60,097	99,885	238
October	61,169	104,241	225
November	59,292	104,010	210
December	66,811	111,739	224
Totals	736,087	1,304,850	248
Savings	136,159	-920	77
% Savings	16%	0%	24%

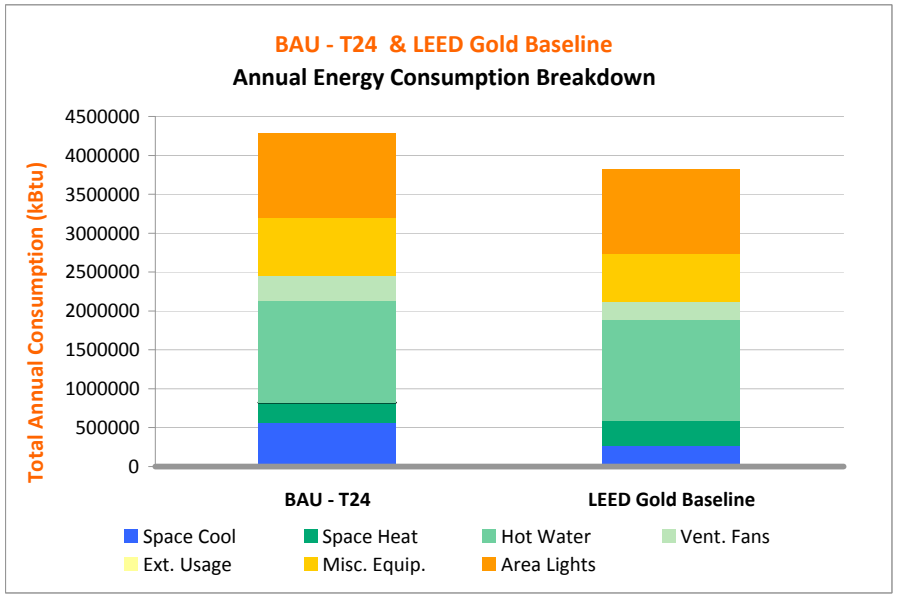
Incremental



E-4 LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	66,844	114,204	232
February	56,724	106,673	210
March	61,146	120,146	212
April	59,052	115,071	223
May	61,699	112,482	236
June	59,493	106,899	248
July	62,303	105,921	238
August	61,459	103,579	225
September	60,097	99,885	238
October	61,169	104,241	225
November	59,292	104,010	210
December	66,811	111,739	224
Totals	**736,087**	**1,304,850**	**248**
Savings	**136,159**	**-920**	**77**
% Savings	**16%**	**0%**	**24%** Cumulative



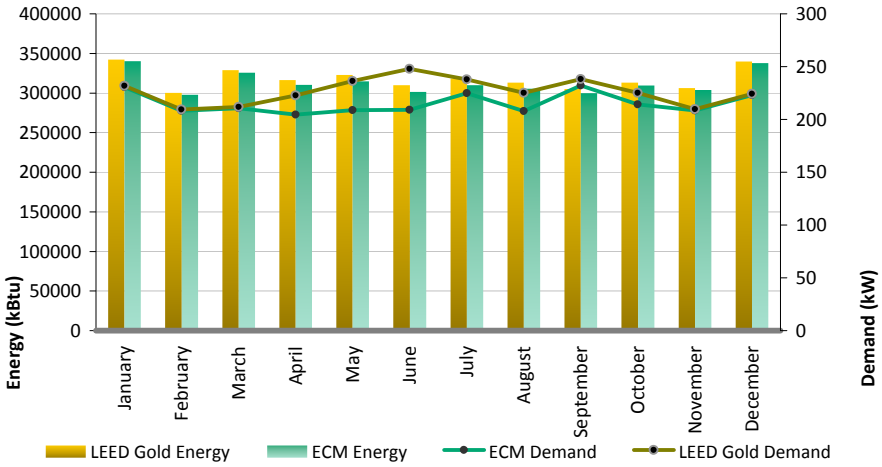


E-5 Daylighting

ECM

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	66,227	114,205	231
February	56,047	106,675	208
March	60,218	120,148	211
April	57,184	115,073	205
May	59,307	112,484	209
June	56,965	106,901	209
July	59,787	105,923	225
August	59,144	103,580	208
September	58,612	99,886	232
October	60,179	104,242	214
November	58,606	104,011	209
December	66,236	111,741	223
Totals	718,511	1,304,869	232
Savings	17,576	-19	16
% Savings	2%	0%	6% Independent

Cost $/sf	$1.39	$ Savings	$2800
Est. Premium	$ 181,067	Simple Payback	65

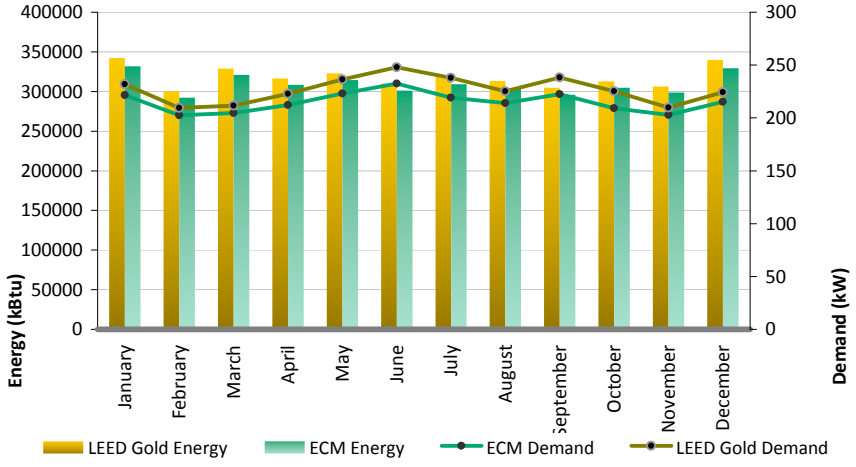


E-6 High efficiency heat pumps

ECM

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	63,817	114,204	222
February	54,426	106,673	203
March	58,775	120,146	205
April	56,713	115,071	212
May	59,174	112,482	223
June	56,949	106,899	233
July	59,554	105,921	219
August	58,834	103,579	214
September	57,445	99,885	223
October	58,719	104,241	209
November	57,041	104,011	203
December	63,780	111,739	215
Totals	705,227	1,304,851	233
Savings	30,861	-1	15
% Savings	4%	0%	6% Independent

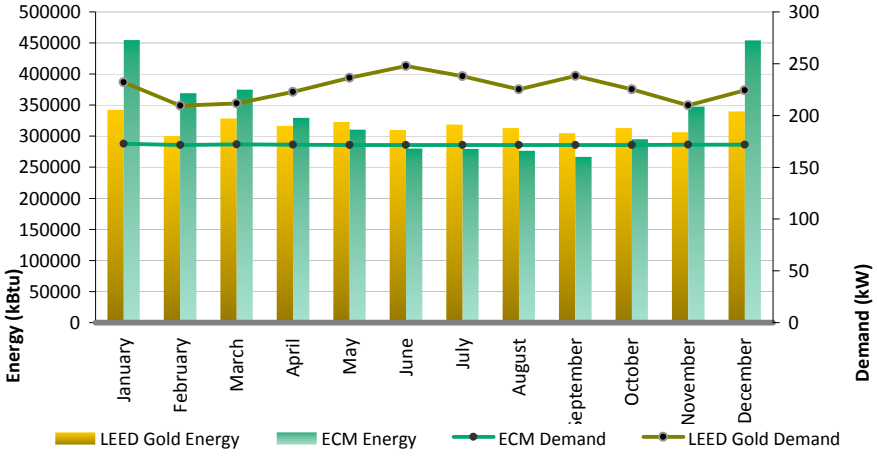
Cost $/sf	$0.20	$ Savings	$4916
Est. Premium	$ 26,053	Simple Payback	5



E-7 Natural vent w/ HW baseboards — ECM

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	50,458	282,488	173
February	45,019	215,758	172
March	49,394	206,468	172
April	47,757	166,561	172
May	49,574	141,530	172
June	47,396	118,290	172
July	49,254	111,350	171
August	49,051	109,389	171
September	47,532	104,800	171
October	49,538	126,039	172
November	48,156	183,198	172
December	50,086	283,515	172
Totals	583,215	2,049,386	173
Savings	152,872	-744,536	75
% Savings	21%	-57%	30%

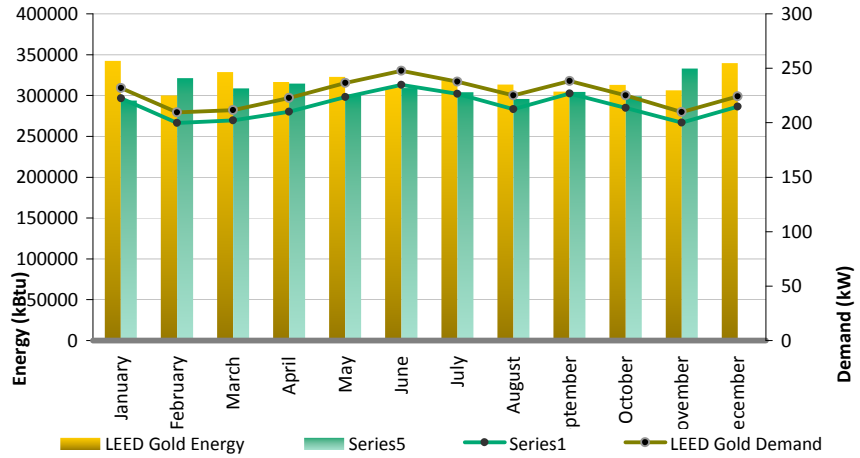
Cost $/sf	$2.71	$ Savings	$20213
Est. Premium	$ 353,015	Simple Payback	17



E-8 High efficiency lighting — ECM

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	64,890	114,211	223
February	54,820	106,680	200
March	58,929	120,152	202
April	56,755	115,077	210
May	59,189	112,487	224
June	56,929	106,904	235
July	59,577	105,925	227
August	58,744	103,584	212
September	57,386	99,890	227
October	58,610	104,246	214
November	57,113	104,016	200
December	64,875	111,746	215
Totals	707,817	1,304,918	235
Savings	28,270	-68	13
% Savings	4%	0%	5% Independent

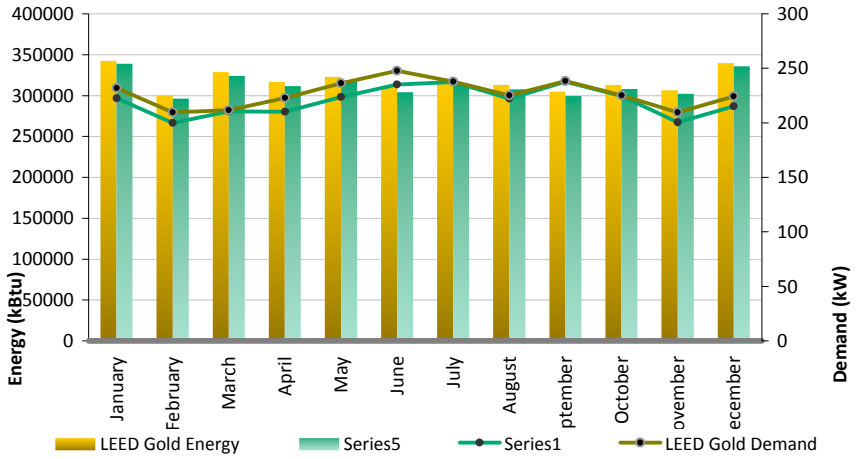
Cost $/sf	$1.56	$ Savings	$4503
Est. Premium	$ 203,212	Simple Payback	45



E-9 Lighting occupancy sensors *ECM*

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	65,816	114,207	223
February	55,617	106,677	200
March	59,713	120,150	211
April	57,578	115,075	210
May	60,303	112,485	224
June	57,826	106,903	235
July	60,671	105,924	238
August	59,756	103,583	222
September	58,458	99,889	238
October	59,751	104,245	225
November	58,032	104,014	200
December	65,699	111,743	215
Totals	**719,218**	**1,304,895**	**238**
Savings	**16,869**	**-45**	**10**
% Savings	**2%**	**0%**	**4%** Independent

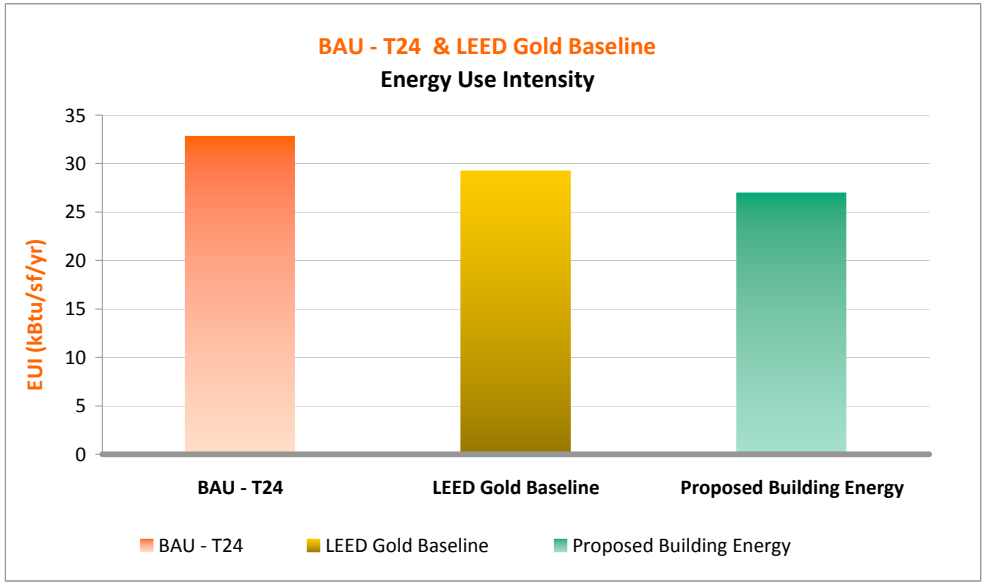
Cost $/sf	**$0.20**	**$ Savings**	**$2687**
Est. Premium	**$ 26,053**	**Simple Payback**	**10**

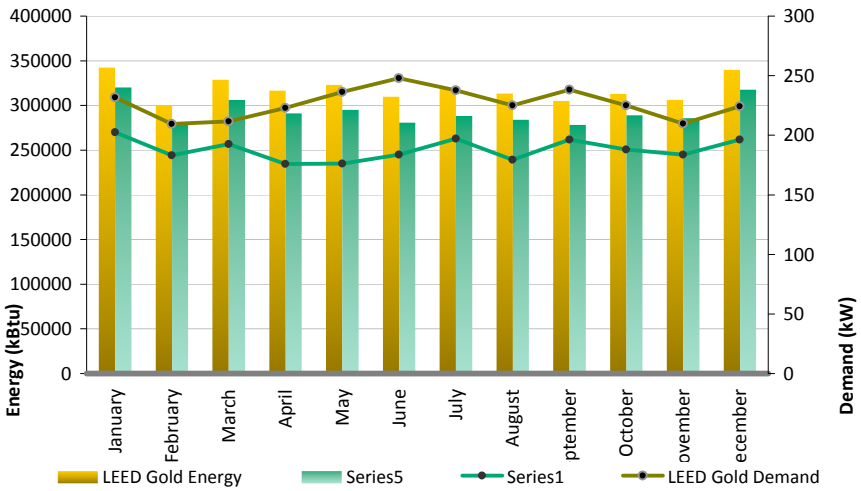


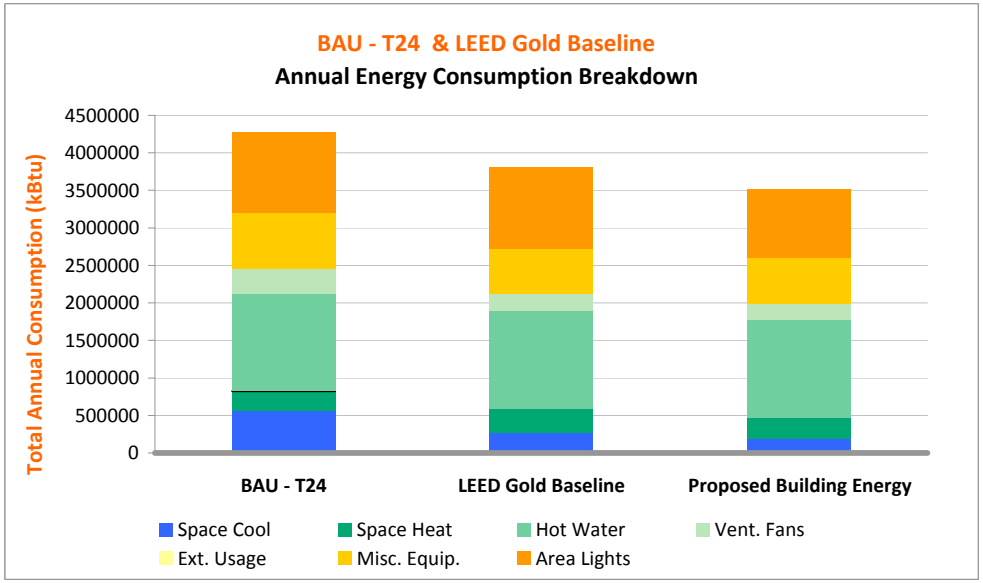
Proposed Building Energy

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	60,389	114,215	203
February	50,944	106,684	183
March	54,528	120,157	193
April	51,582	115,082	176
May	53,475	112,492	176
June	50,979	106,909	184
July	53,432	105,930	197
August	52,868	103,588	179
September	52,227	99,893	196
October	54,124	104,250	188
November	53,232	104,020	184
December	60,301	111,751	196
Totals	**648,081**	**1,304,971**	**203**
Savings	**88,006**	**-121**	**45**
% Savings	**12%**	**0%**	**18%** Combined

Cost $/sf	**$3.35**	**$ Savings**	**$14019**
Est. Premium	**$ 436,384**	**Simple Payback**	**31**





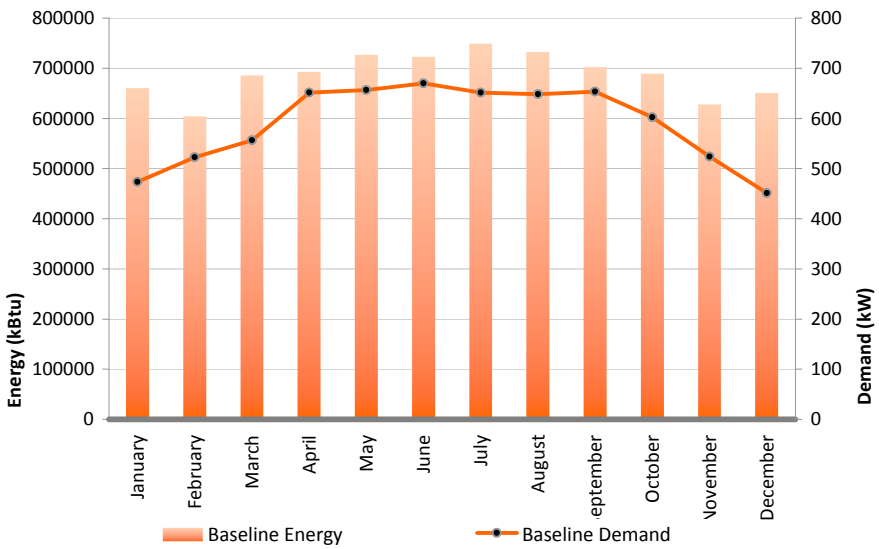


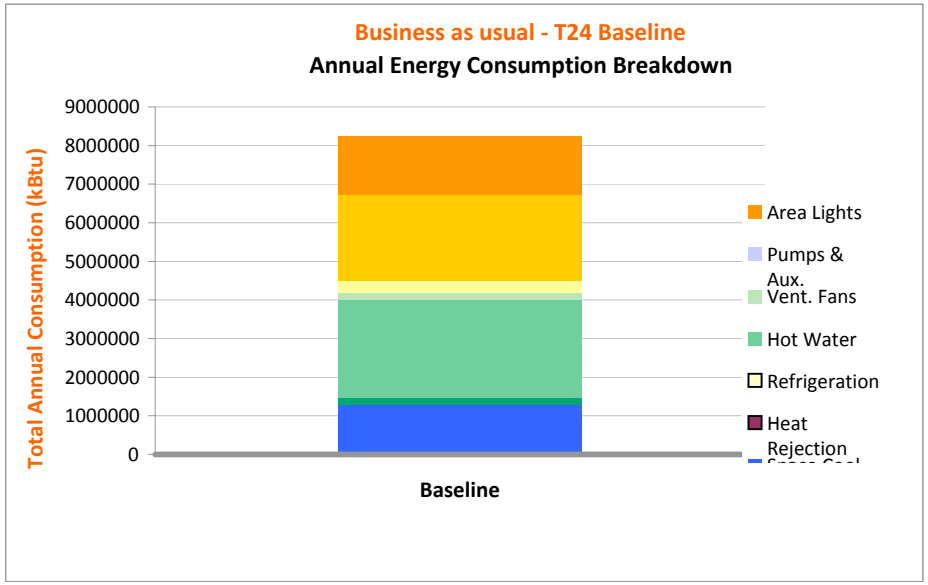
High Rise Residential: Building Energy Calculations

ARUP

BAU - T24 | *T24, 2008 equivalent* | *Building Area 240000 sf*

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	131,809	210,577	473
February	119,370	196,708	522
March	136,085	221,562	556
April	140,781	212,232	651
May	152,080	207,494	657
June	154,016	197,239	670
July	162,218	195,453	651
August	158,688	191,135	648
September	151,840	184,334	653
October	145,620	192,327	603
November	127,843	191,843	524
December	130,266	206,037	451
Totals	**1,710,617**	**2,406,941**	**670**



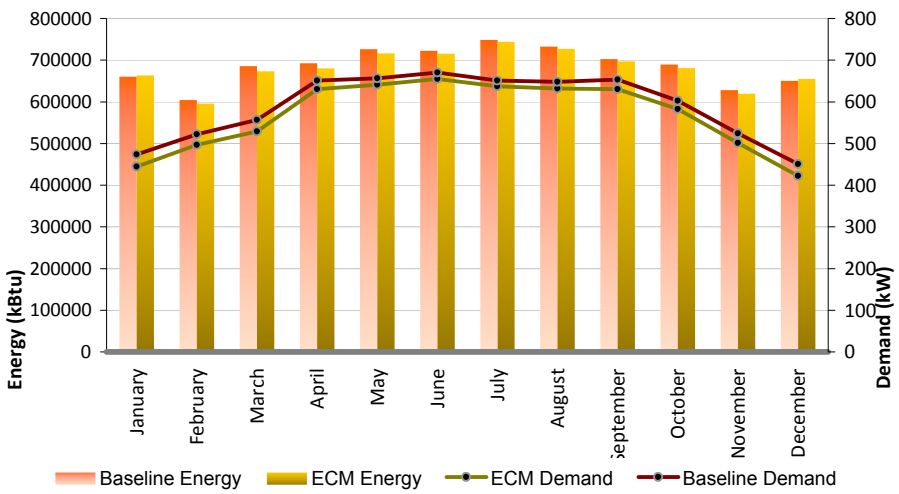


E-1 Thermal mass

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	132,787	210,609	445
February	116,956	196,735	497
March	132,466	221,588	529
April	137,054	212,254	631
May	149,128	207,514	641
June	152,013	197,255	655
July	160,738	195,467	637
August	157,089	191,149	632
September	150,369	184,349	630
October	143,184	192,342	583
November	125,372	191,867	501
December	131,502	206,070	422
Totals	1,688,659	2,407,199	655
Savings	21,959	-258	15
% Savings	1%	0%	2%

Incremental

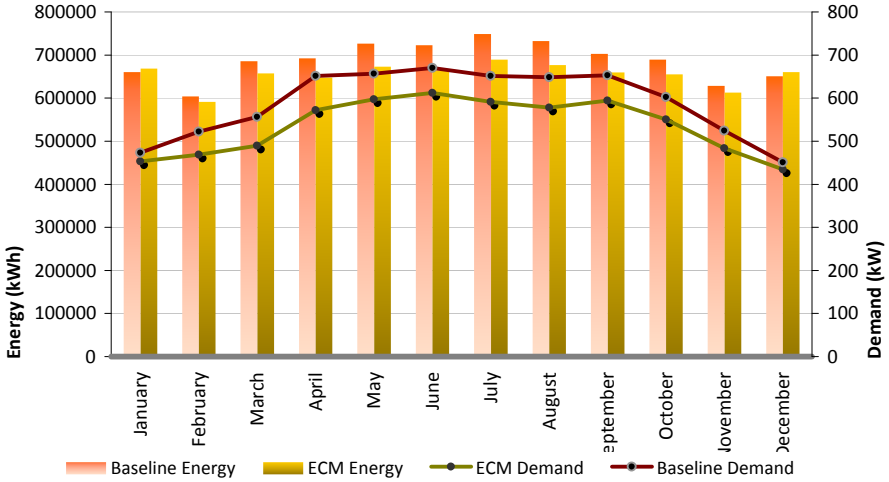


E-2 High performance glazing

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	134,189	210,628	453
February	115,670	196,760	468
March	127,807	221,624	490
April	127,682	212,293	572
May	136,406	207,548	598
June	136,739	197,290	612
July	144,754	195,499	592
August	142,337	191,179	578
September	139,230	184,372	594
October	135,641	192,365	550
November	123,363	191,880	483
December	133,226	206,089	434
Totals	1,597,044	2,407,527	612
Savings	113,573	-586	58
% Savings	7%	0%	9%

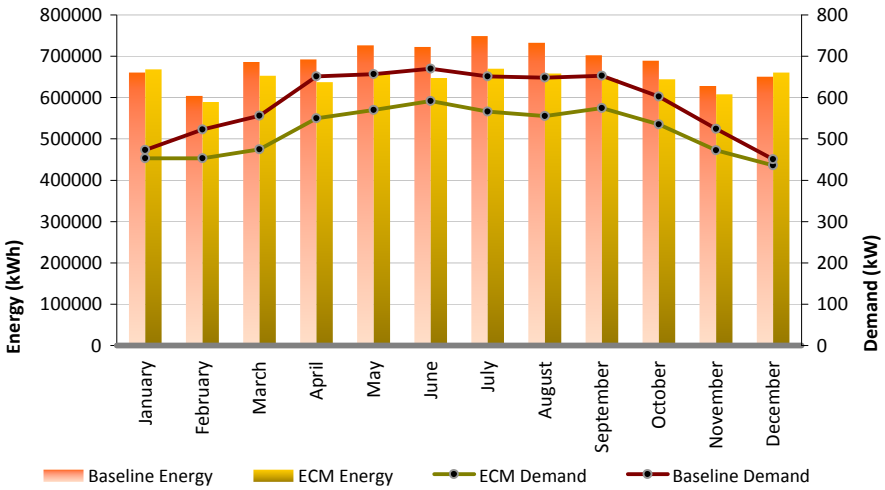
Incremental



E-3 External shading

LEED Gold Baseline

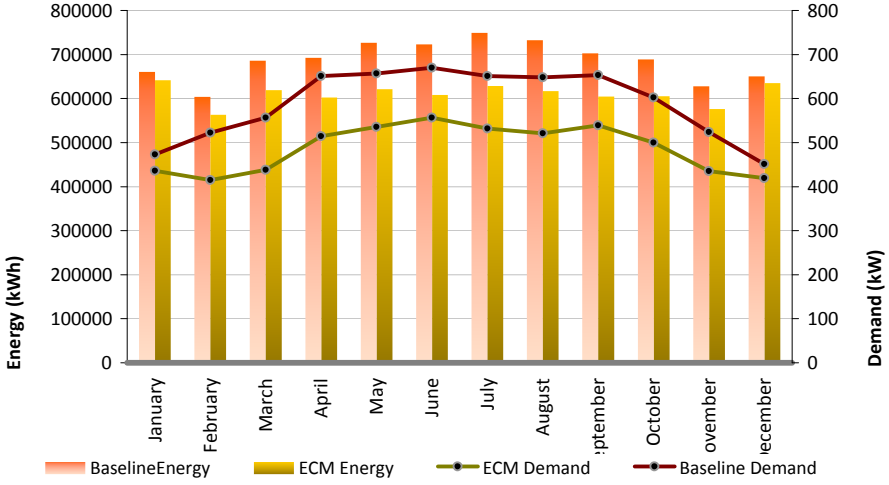
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	134,141	210,640	453
February	115,151	196,775	453
March	126,303	221,648	475
April	124,654	212,320	550
May	132,500	207,576	570
June	132,003	197,315	592
July	139,079	195,526	566
August	137,001	191,206	555
September	135,012	184,395	574
October	132,554	192,384	535
November	122,027	191,898	472
December	133,234	206,103	436
Totals	1,563,658	2,407,786	592
Savings	146,960	-845	78
% Savings	9%	0%	12% Incremental



E-4 Energy star equipment

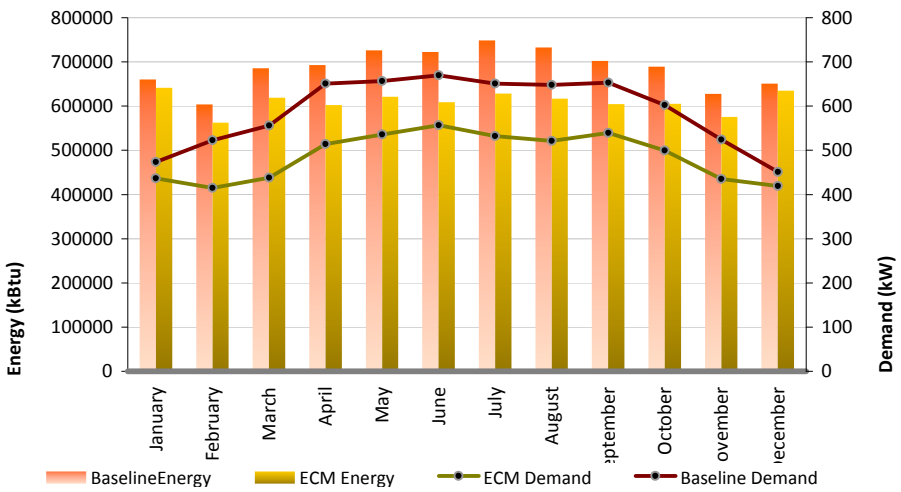
LEED Gold Baseline

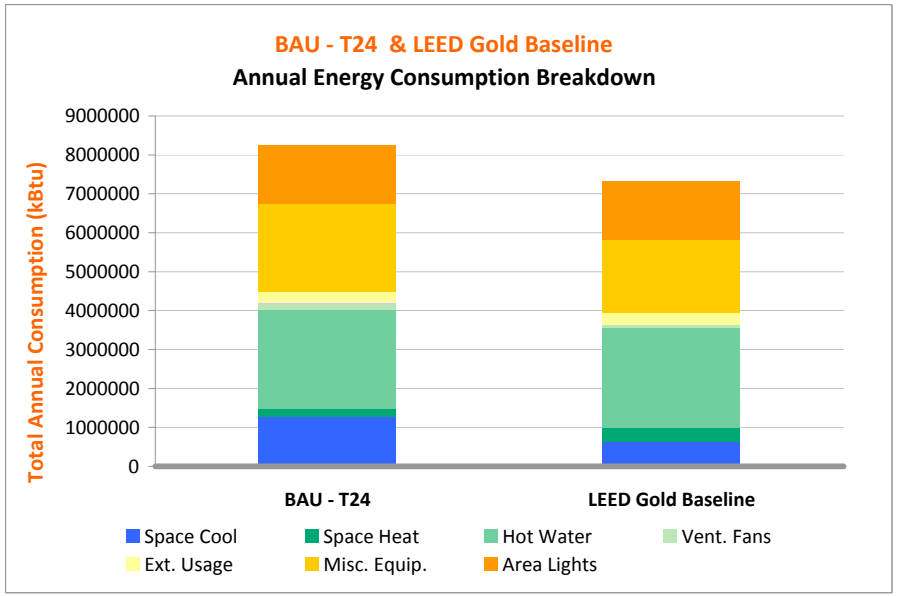
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	126,351	210,650	436
February	107,298	196,785	415
March	116,488	221,658	438
April	114,339	212,331	514
May	121,263	207,587	536
June	120,517	197,325	557
July	126,861	195,536	532
August	124,828	191,216	521
September	123,225	184,404	539
October	120,911	192,394	500
November	112,533	191,908	435
December	125,641	206,113	420
Totals	1,440,256	2,407,907	557
Savings	270,361	-966	113
% Savings	16%	0%	17% Incremental



E-4 LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	126,351	210,650	436
February	107,298	196,785	415
March	116,488	221,658	438
April	114,339	212,331	514
May	121,263	207,587	536
June	120,517	197,325	557
July	126,861	195,536	532
August	124,828	191,216	521
September	123,225	184,404	539
October	120,911	192,394	500
November	112,533	191,908	435
December	125,641	206,113	420
Totals	**1,440,256**	**2,407,907**	**557**
Savings	**270,361**	**-966**	**113**
% Savings	**16%**	**0%**	**17%** Cumulative



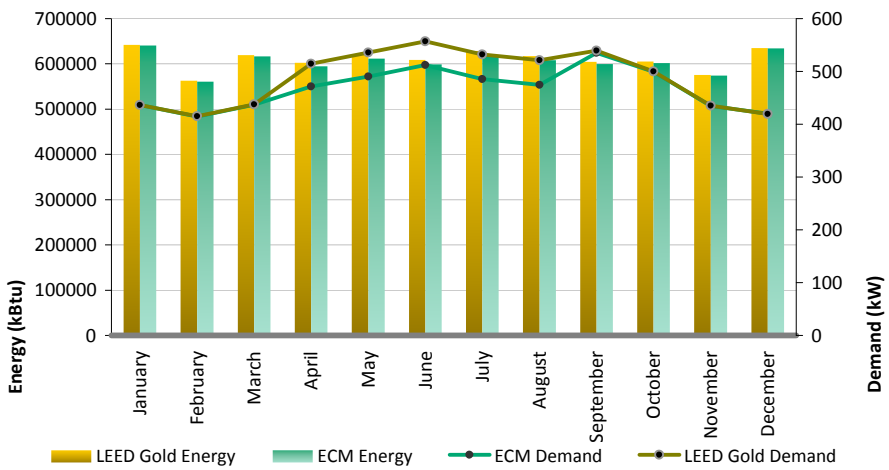


E-5 Daylighting

ECM √

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	126,094	210,651	437
February	106,713	196,786	415
March	115,665	221,660	437
April	112,151	212,333	472
May	118,446	207,589	490
June	117,664	197,327	512
July	124,041	195,537	486
August	122,224	191,217	474
September	121,715	184,405	535
October	119,917	192,395	499
November	111,946	191,909	435
December	125,396	206,114	420
Totals	1,421,971	2,407,923	535
Savings	18,286	-16	22
% Savings	1%	0%	4% Independent

Cost $/sf	$1.23	$ Savings	$2913
Est. Premium	$ 295,200	Simple Payback	101

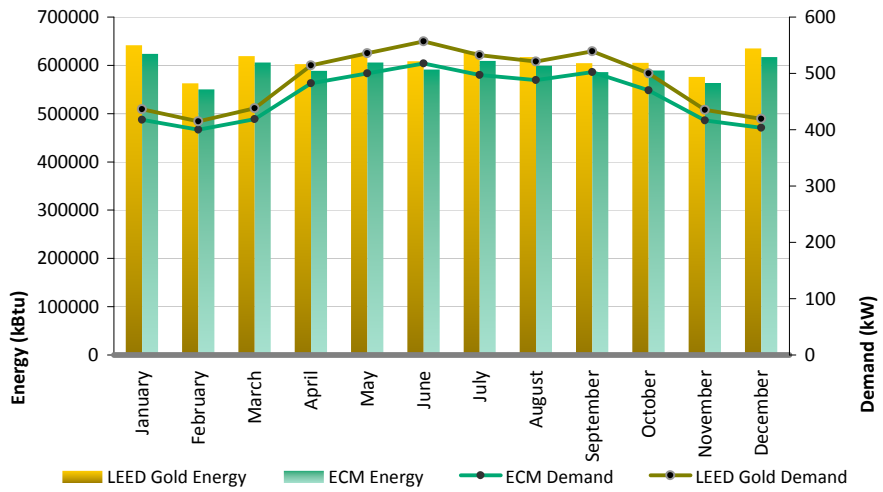


E-6 High efficiency heat pumps

ECM √

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	121,018	210,650	417
February	103,550	196,785	400
March	112,679	221,658	419
April	110,382	212,331	482
May	116,719	207,587	500
June	115,472	197,325	518
July	121,313	195,536	497
August	119,566	191,216	488
September	117,727	184,404	503
October	116,405	192,394	470
November	108,927	191,908	417
December	120,378	206,113	403
Totals	1,384,134	2,407,907	518
Savings	56,122	0	39
% Savings	4%	0%	7% Independent

Cost $/sf	$0.18	$ Savings	$8940
Est. Premium	$43200	Simple Payback	5

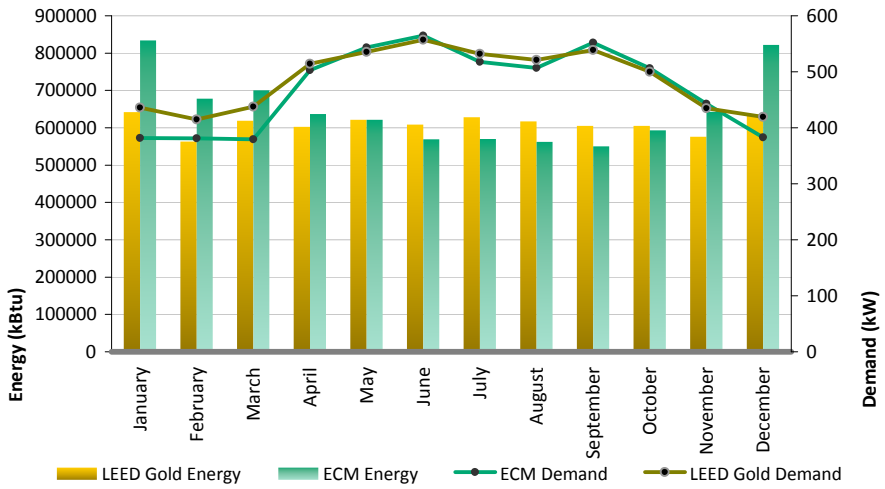


E-7 Natural vent w/ HW baseboards

ECM √

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	110,495	457,386	382
February	97,708	344,421	381
March	105,780	338,960	380
April	101,561	290,273	503
May	105,309	262,233	543
June	100,928	224,879	564
July	104,426	213,381	518
August	103,145	210,157	507
September	102,843	199,626	552
October	105,290	233,753	506
November	103,266	290,791	443
December	109,854	447,558	383
Totals	1,250,605	3,513,418	564
Savings	189,651	-1,105,511	-7
% Savings	13%	-46%	-1% Independent

Cost $/sf	$0.41	$ Savings	$24684
Est. Premium	$ 98,400	Simple Payback	4

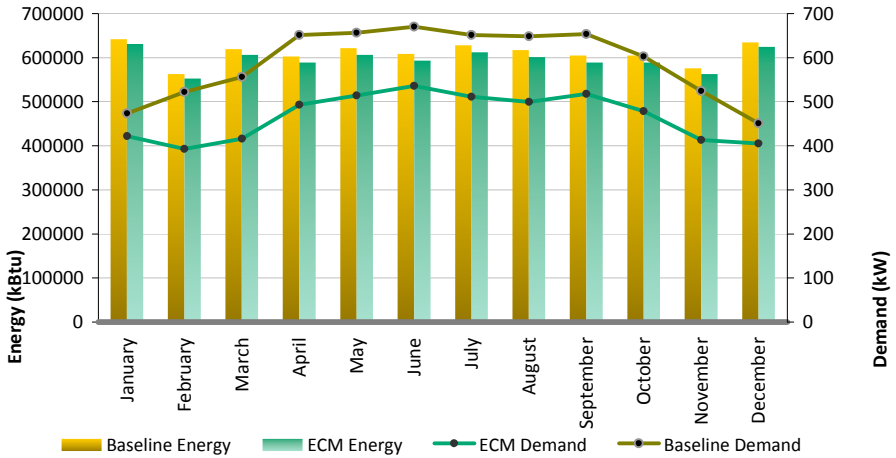


E-8 High efficiency lighting

ECM √

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	123,203	210,640	422
February	104,251	196,776	393
March	112,667	221,649	416
April	110,309	212,321	493
May	116,894	207,577	514
June	116,109	197,316	536
July	122,146	195,526	511
August	120,111	191,207	500
September	118,651	184,395	518
October	116,313	192,385	478
November	108,797	191,898	413
December	122,654	206,103	405
Totals	1,392,103	2,407,793	536
Savings	48,153	114	21
% Savings	3%	0%	4% Incremental

Cost $/sf	$1.56	$ Savings	$7671
Est. Premium	$ 374,400	Simple Payback	0



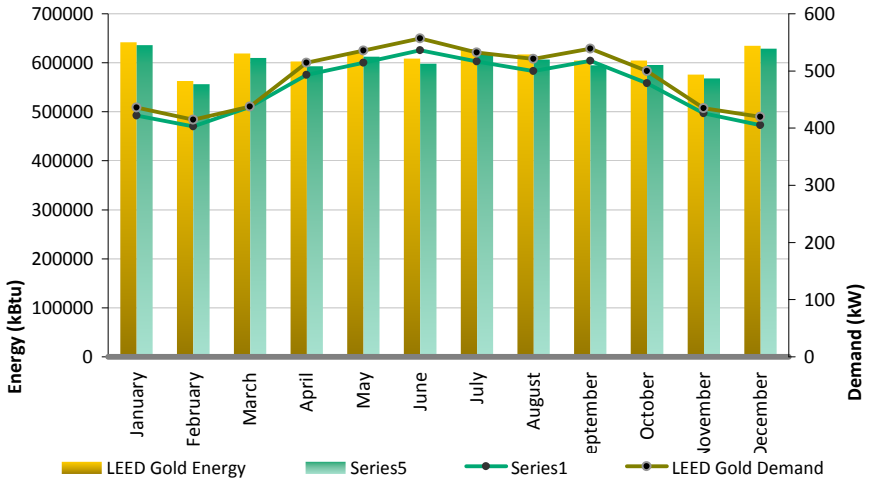
E-9 Lighting occupancy sensors

ECM √

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	124,646	210,636	422
February	105,431	196,773	403
March	113,870	221,646	437
April	111,640	212,318	493
May	118,755	207,573	514
June	117,511	197,313	536
July	123,912	195,524	517
August	121,739	191,204	500
September	120,303	184,393	518
October	118,244	192,381	478
November	110,325	191,895	426
December	123,832	206,099	405
Totals	**1,410,209**	**2,407,755**	**536**
Savings	**30,048**	**152**	**21**
% Savings	**2%**	**0%**	**4%**

Independent

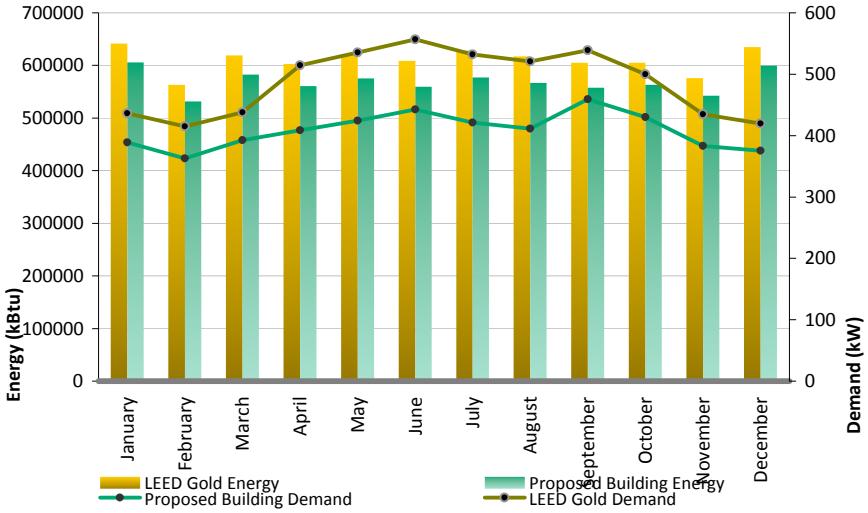
Cost $/sf	$0.18	$ Savings	$4787
Est. Premium	$ 43,200	Simple Payback	$0

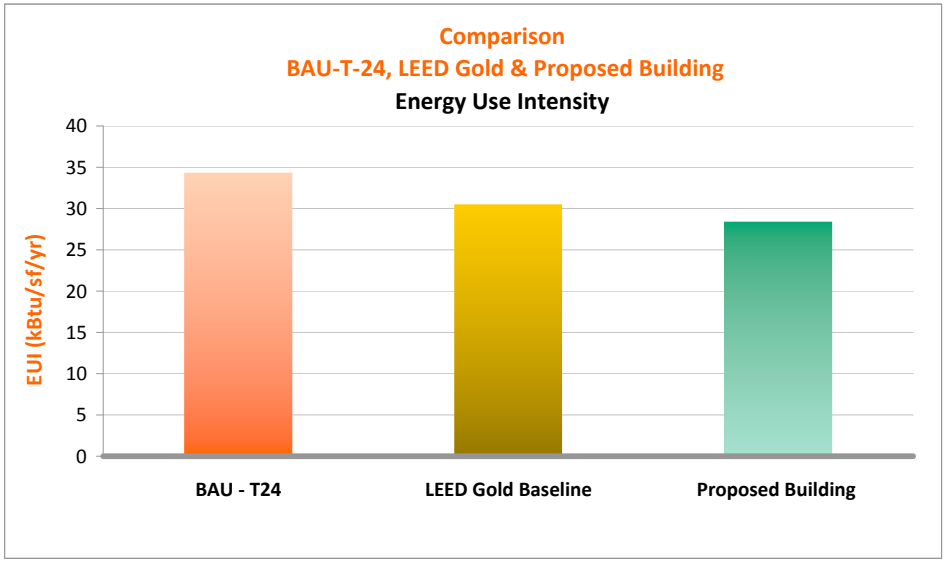


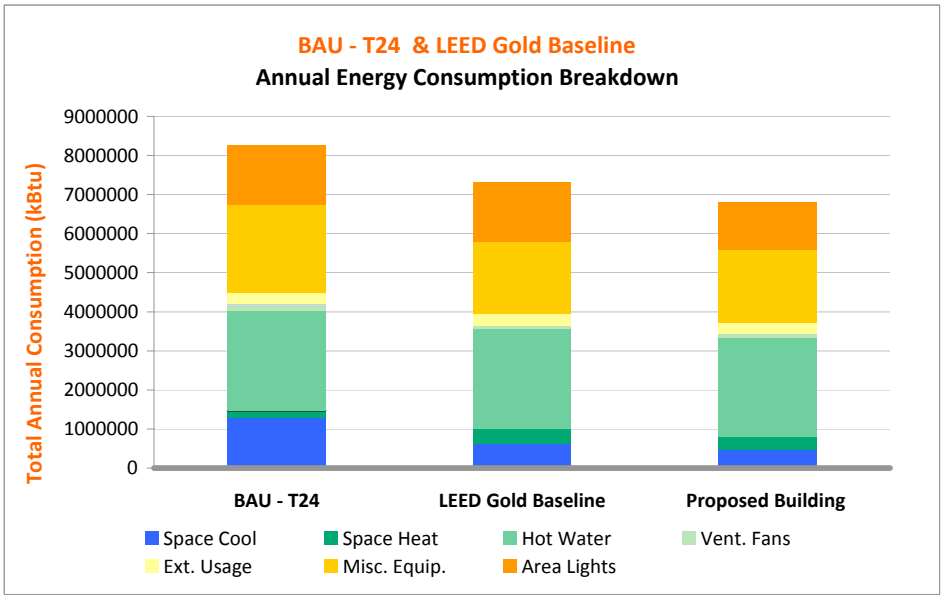
Proposed Building

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	115,875	210,645	389
February	98,117	196,781	363
March	105,795	221,655	392
April	102,097	212,327	409
May	107,734	207,583	424
June	106,104	197,322	443
July	111,774	195,532	421
August	110,082	191,212	411
September	109,346	184,400	459
October	108,677	192,390	430
November	102,682	191,904	383
December	115,273	206,108	375
Totals	**1,293,556**	**2,407,859**	**459**
Savings	**146,700**	**48**	**97**
% Savings	**10%**	**0%**	**17%** Combined

Cost $/sf	**$3.89**	**$ Savings**	**$23370**
Est. Premium	**$ 933,600**	**Simple Payback**	**40**





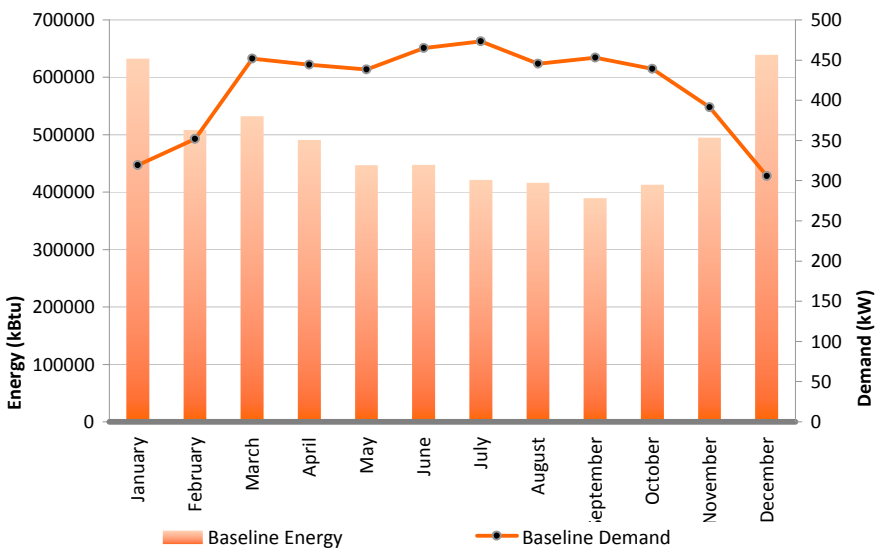


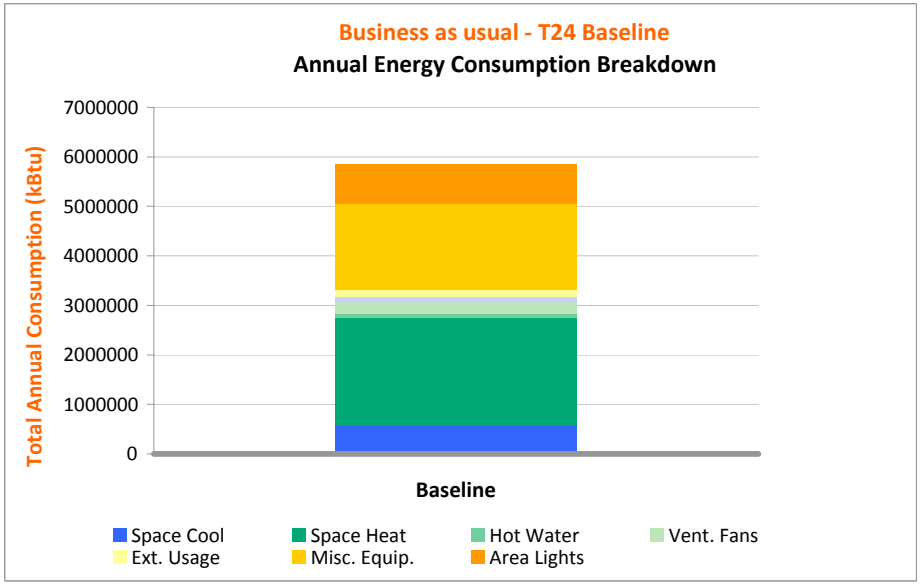
Commercial: Building Energy Calculations

ARUP

BAU - T24 | *T24, 2008 equivalent* | *Building Area 100000 sf*

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	73,786	381,012	319
February	72,794	259,868	352
March	88,565	229,797	452
April	89,915	184,306	444
May	87,159	149,610	438
June	101,699	100,345	465
July	103,197	69,390	473
August	105,342	56,922	445
September	99,048	51,882	453
October	89,532	107,555	439
November	79,225	224,773	391
December	79,359	368,540	306
Totals	**1,069,621**	**2,184,000**	**473**



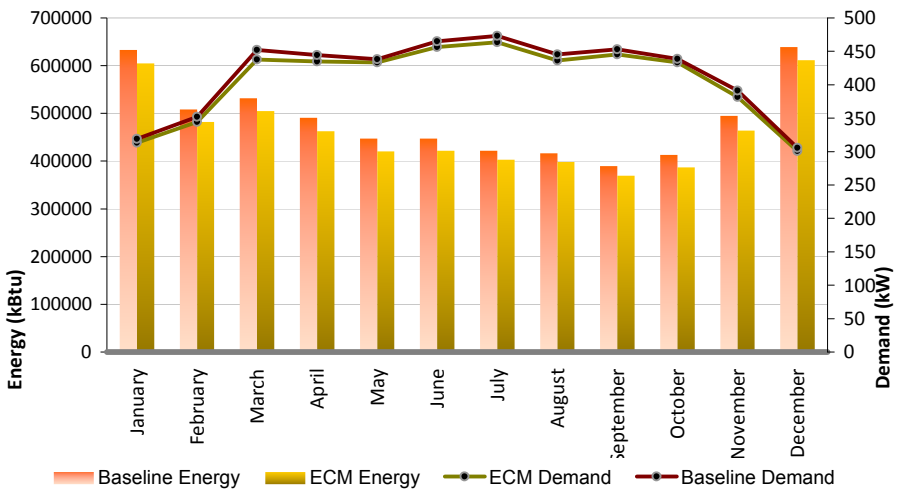


E-1 Thermal mass

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	73,064	355,745	313
February	72,069	236,210	344
March	87,527	206,384	438
April	88,572	160,645	435
May	85,724	128,190	433
June	100,149	80,363	457
July	101,800	55,347	463
August	103,958	43,643	436
September	97,465	37,154	445
October	87,903	86,727	434
November	78,207	197,388	382
December	78,639	342,893	301
Totals	1,055,077	1,930,689	463
Savings	14,544	253,311	10
% Savings	1%	13%	2%

Incremental

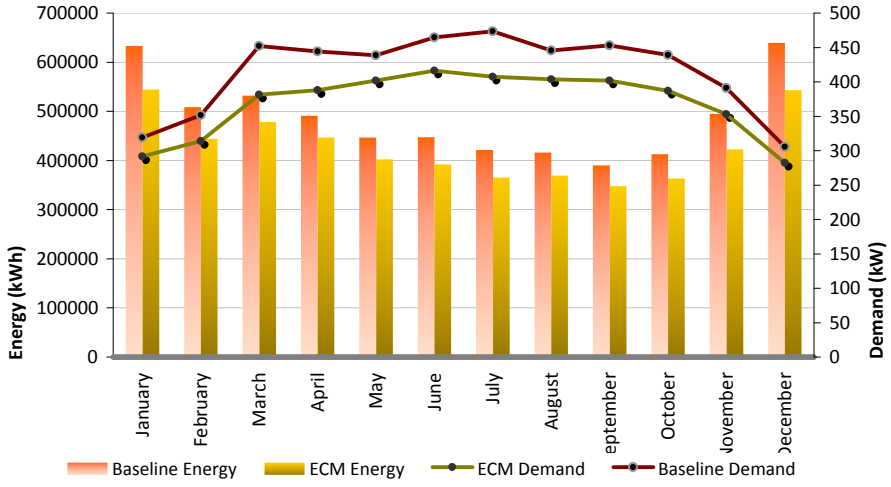


E-2 High performance glazing

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	70,833	302,667	291
February	69,817	205,704	314
March	84,617	190,197	381
April	84,503	158,692	388
May	79,887	129,790	402
June	91,051	81,436	416
July	90,341	56,743	407
August	93,925	48,641	404
September	89,435	42,663	402
October	82,767	80,858	387
November	76,000	163,470	353
December	76,204	283,290	282
Totals	989,380	1,744,151	416
Savings	80,241	439,849	57
% Savings	8%	25%	14%

Incremental

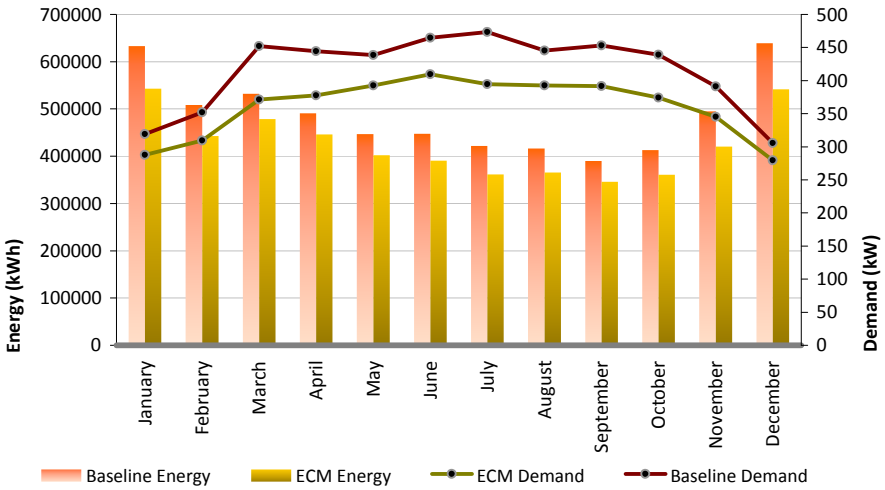


E-3 External shading

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	70,529	302,150	288
February	69,462	206,036	309
March	84,076	191,525	371
April	83,668	160,509	377
May	78,987	132,738	392
June	89,676	84,316	409
July	88,494	59,406	394
August	92,213	50,927	392
September	88,134	45,466	392
October	81,906	81,620	375
November	75,549	162,530	345
December	75,876	282,909	279
Totals	978,570	1,760,132	409
Savings	91,051	423,868	64
% Savings	9%	24%	16%

Incremental

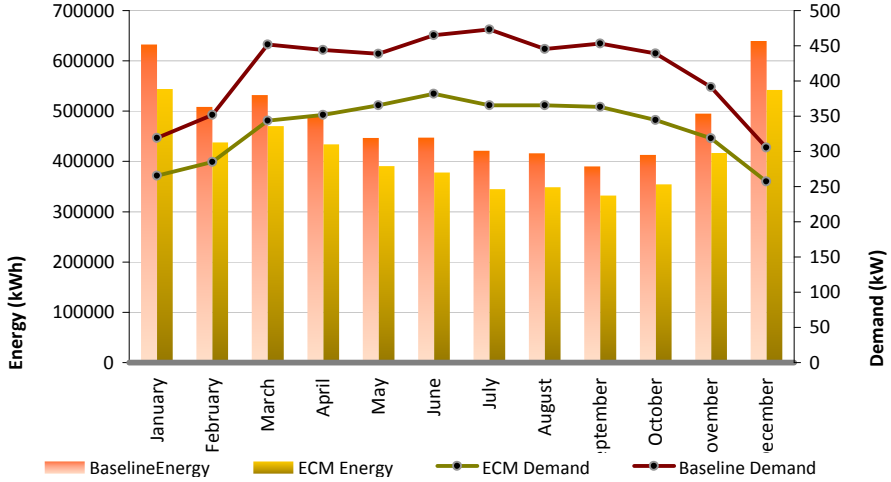


E-4 Energy star equipment

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	65,234	321,613	265
February	64,130	218,975	285
March	77,609	205,249	344
April	77,135	170,872	352
May	72,933	142,054	366
June	82,786	95,364	382
July	81,380	67,233	365
August	84,816	59,325	366
September	81,334	54,416	363
October	75,835	95,607	345
November	69,923	178,499	319
December	70,115	302,977	257
Totals	903,230	1,912,184	382
Savings	166,391	271,816	91
% Savings	18%	14%	24%

Incremental

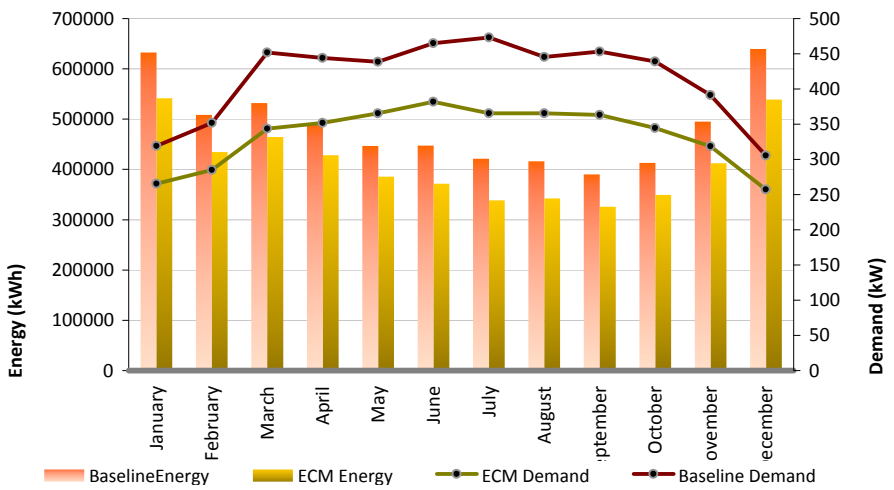


E-5 Daylighting

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	63,984	323,027	253
February	62,894	220,046	274
March	75,893	205,871	326
April	75,302	171,339	344
May	71,305	142,368	357
June	80,865	95,565	374
July	79,487	67,360	356
August	82,911	59,458	357
September	79,464	54,740	353
October	74,174	95,985	335
November	68,469	178,849	298
December	68,523	305,452	245
Totals	**883,271**	**1,920,060**	**374**
Savings	**186,350**	**263,940**	**99**
% Savings	**21%**	**14%**	**27%**

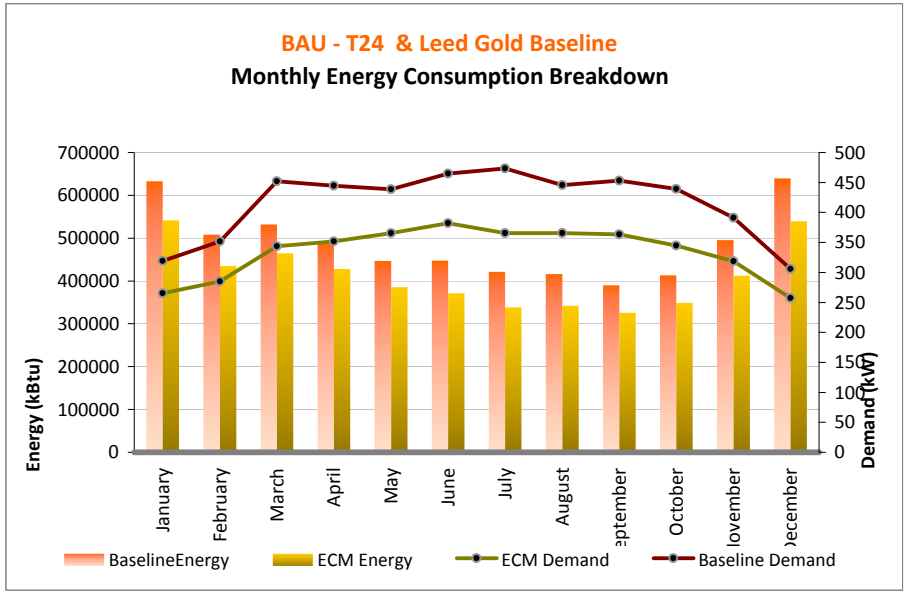
Incremental

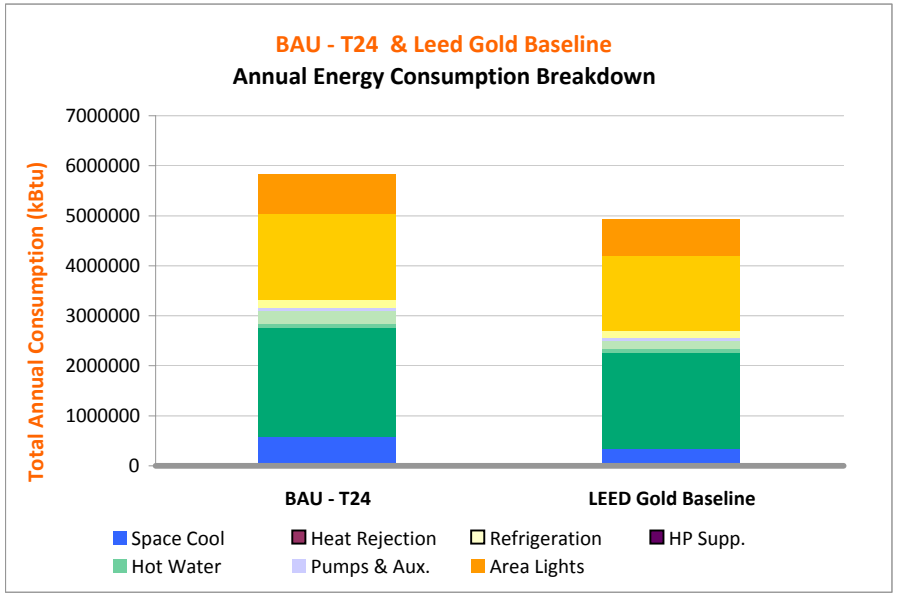


E-5 LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	63,984	323,027	253
February	62,894	220,046	274
March	75,893	205,871	326
April	75,302	171,339	344
May	71,305	142,368	357
June	80,865	95,565	374
July	79,487	67,360	356
August	82,911	59,458	357
September	79,464	54,740	353
October	74,174	95,985	335
November	68,469	178,849	298
December	68,523	305,452	245
Totals	**883,271**	**1,920,060**	**374**
Savings	**186,350**	**263,940**	**99**
% Savings	**21%**	**14%**	**27%**

Cumulative



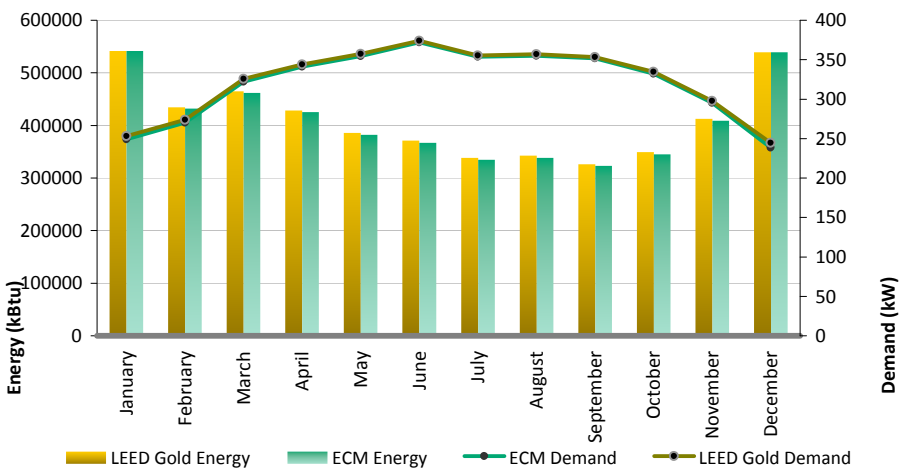


E-6 Variable speed fans & pumps

ECM √

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	62,421	328,383	249
February	61,391	222,765	270
March	74,178	208,601	322
April	73,721	173,770	341
May	69,721	144,094	355
June	79,300	96,653	372
July	78,155	68,045	354
August	81,624	60,043	355
September	78,252	55,844	352
October	72,647	97,035	332
November	66,766	181,174	295
December	66,947	310,494	238
Totals	865,123	1,946,901	372
Savings	18,148	-26,841	2
% Savings	2%	-1%	1% Independent

Cost $/sf	$0.34	$ Savings	$2742
Est. Premium	$34000	Simple Payback	12

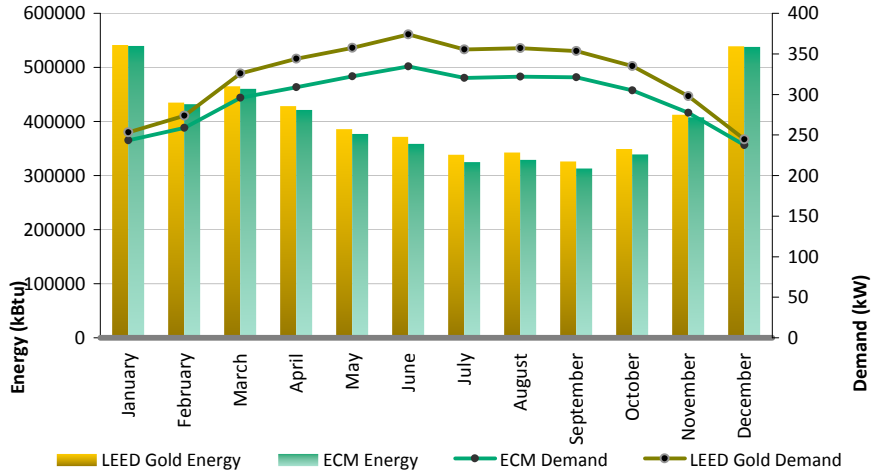


E-7 High efficiency chiller

ECM √

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	63,536	323,027	243
February	62,087	220,046	259
March	74,541	205,871	296
April	73,287	171,339	309
May	68,818	142,368	322
June	77,051	95,565	335
July	75,391	67,360	320
August	78,989	59,458	322
September	75,718	54,740	321
October	71,261	95,985	305
November	67,123	178,849	277
December	68,066	305,452	237
Totals	855,868	1,920,060	335
Savings	27,403	0	39
% Savings	3%	0%	11% Independent

Cost $/sf	$0.00	$ Savings	$4365
Est. Premium	$0	Simple Payback	0

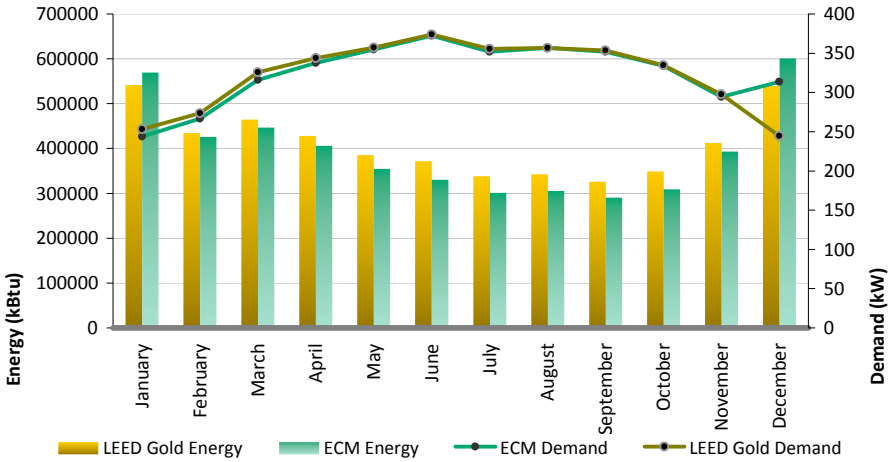


E-8 Demand control ventilation

ECM √

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	65,533	346,063	244
February	61,442	216,498	266
March	73,273	196,888	316
April	72,501	158,774	338
May	67,888	122,803	355
June	77,002	67,663	372
July	76,195	40,979	352
August	79,901	32,676	357
September	76,460	29,254	352
October	70,165	69,489	334
November	66,063	167,651	294
December	72,555	353,168	313
Totals	858,978	1,801,906	372
Savings	24,293	118,154	2
% Savings	3%	6%	0% Independent

Cost $/sf	$0.33	$ Savings	$4527
Est. Premium	$33000	Simple Payback	7

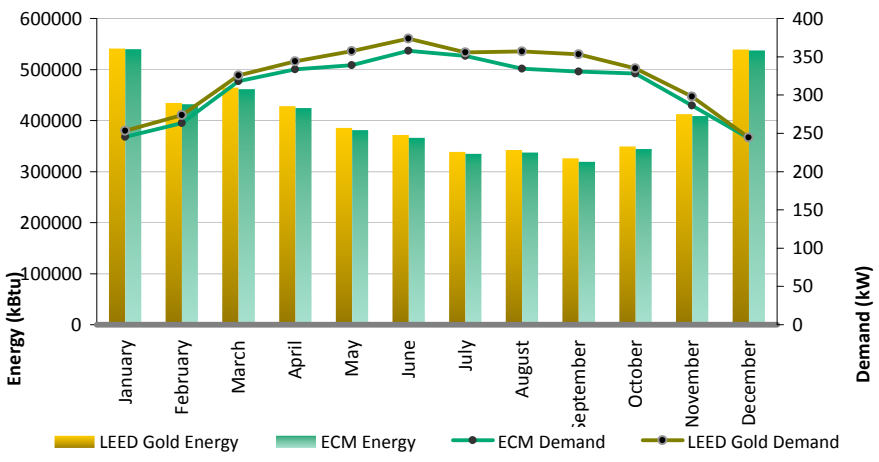


E-9 Indirect evaporative cooling

ECM √

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	63,374	323,679	245
February	61,977	220,671	263
March	74,648	206,641	318
April	73,927	172,381	333
May	69,737	143,111	339
June	79,106	96,328	358
July	78,100	68,239	351
August	81,230	60,379	334
September	77,310	55,340	331
October	72,656	96,607	328
November	67,102	179,661	286
December	67,838	305,813	244
Totals	867,005	1,928,850	358
Savings	16,266	-8,790	16
% Savings	2%	0%	4% Independent

Cost $/sf	$3.05	$ Savings	$2542
Est. Premium	$305000	Simple Payback	120



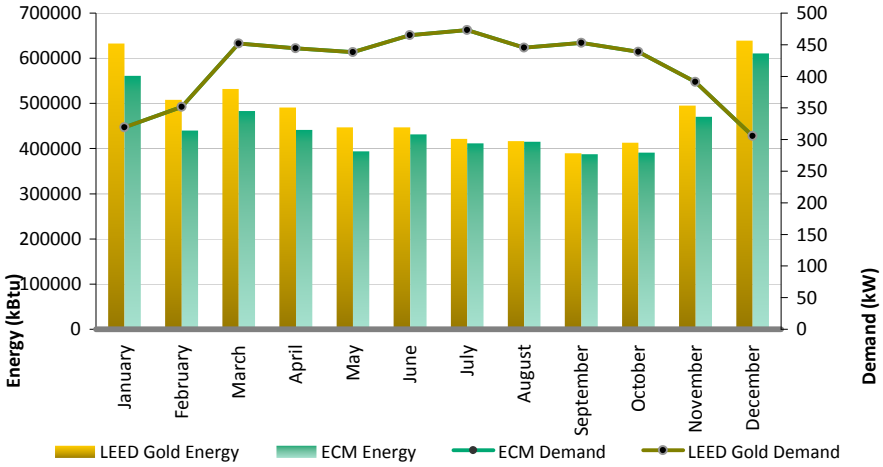
E-10 Heat recovery

ECM

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	75,144	304,810	319
February	74,180	187,105	352
March	90,365	174,646	452
April	91,496	129,014	444
May	89,203	89,766	438
June	103,571	78,269	465
July	104,399	55,512	473
August	107,264	48,953	445
September	101,336	41,506	453
October	91,004	80,666	439
November	80,551	195,553	391
December	81,792	331,686	306
Totals	1,090,305	1,717,485	473
Savings	-207,034	202,575	-99
% Savings	-23%	11%	-27%

Independent

Cost $/sf	$0.39	$ Savings	-$31854
Est. Premium	$39000	Simple Payback	-1



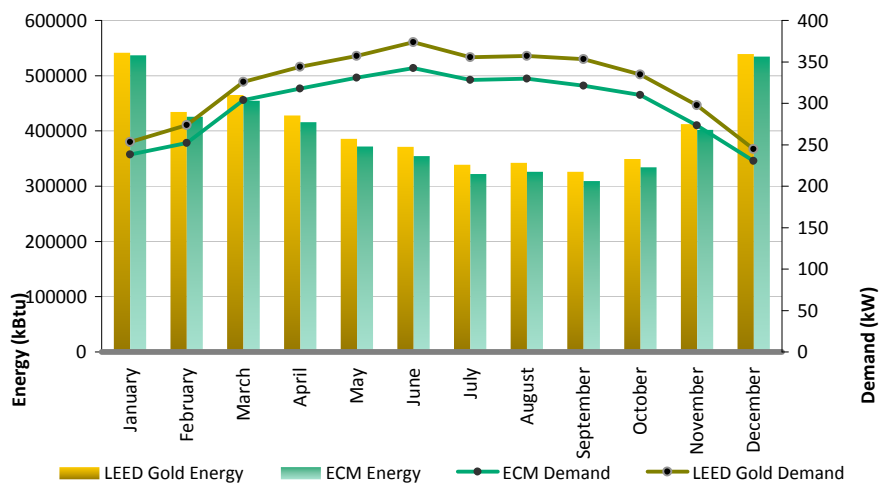
E-11 Radiant heating & cooling

ECM √

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	59,080	335,409	238
February	58,577	226,082	252
March	71,080	211,966	304
April	70,554	175,070	318
May	66,624	144,748	331
June	75,625	96,514	342
July	74,507	67,716	328
August	77,898	60,227	330
September	74,459	55,061	321
October	69,583	96,971	310
November	64,087	183,072	273
December	63,581	317,364	231
Totals	825,655	1,970,200	342
Savings	57,616	-50,140	32
% Savings	7%	-3%	8%

Independent

Cost $/sf	$0.00	$ Savings	$8899
Est. Premium	$0	Simple Payback	0

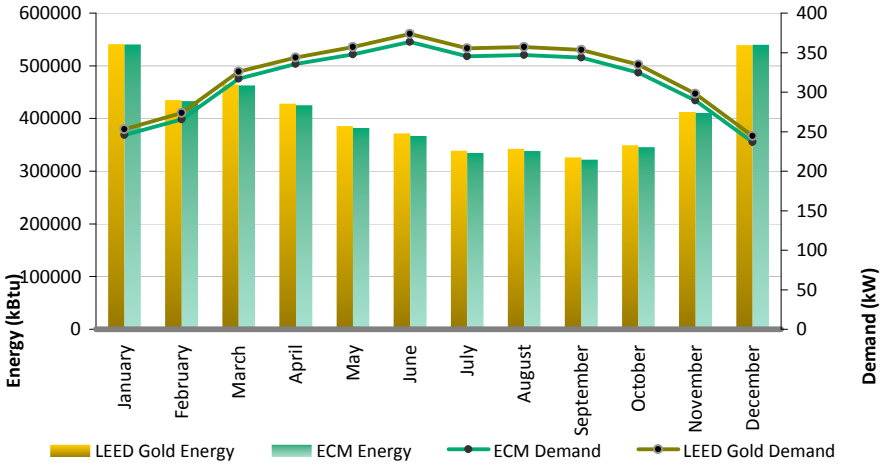


E-12 Lighting occupancy sensors

ECM √

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	62,331	328,078	246
February	61,238	224,276	266
March	73,899	210,745	317
April	73,316	175,163	336
May	69,371	145,073	348
June	78,666	98,540	364
July	77,327	70,818	345
August	80,680	62,768	347
September	77,359	58,125	344
October	72,244	98,891	325
November	66,680	183,237	290
December	66,741	311,922	237
Totals	859,852	1,967,636	364
Savings	23,419	-47,576	10
% Savings	3%	-2%	3% Independent

Cost $/sf	$0.06	$ Savings	$3466
Est. Premium	$6000	Simple Payback	2

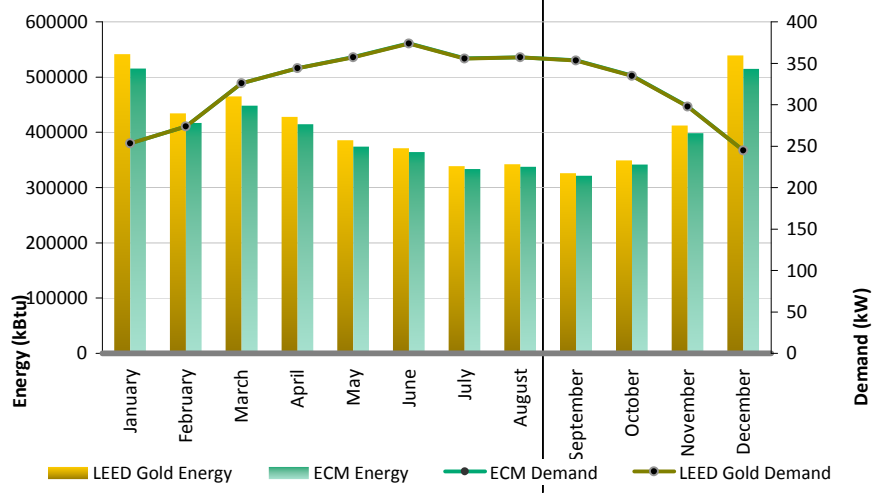


E-13 High efficiency boiler

ECM √

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	64,026	297,084	253
February	62,937	202,361	274
March	75,945	189,305	326
April	75,352	157,551	344
May	71,352	130,916	358
June	80,919	87,957	374
July	79,540	61,950	356
August	82,966	54,503	357
September	79,517	50,208	354
October	74,222	88,250	335
November	68,515	164,493	298
December	68,568	280,867	245
Totals	883,859	1,765,445	374
Savings	-588	154,615	0
% Savings	0%	8%	0% Independent

Cost $/sf	$0.11	$ Savings	$766
Est. Premium	$11000	Simple Payback	14



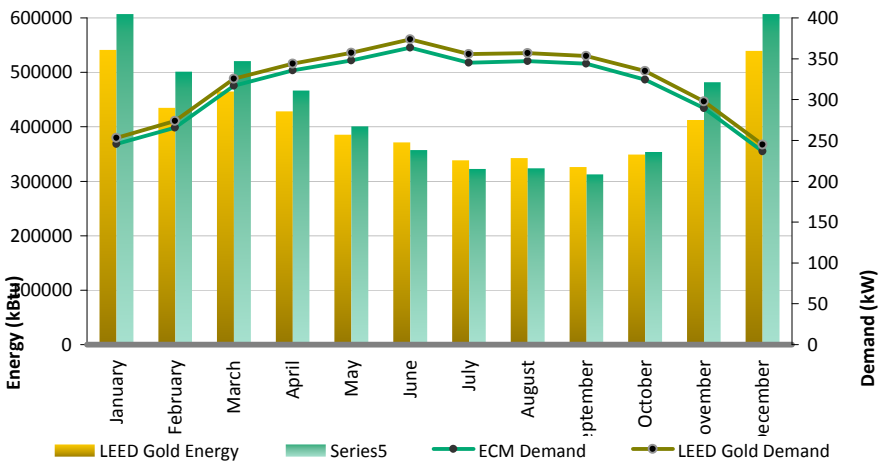
E-14 Displacement ventilation

ECM √

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	62,310	398,157	235
February	60,465	295,222	244
March	72,284	273,763	270
April	70,558	225,817	299
May	66,237	174,749	313
June	73,179	107,402	333
July	71,106	79,864	324
August	75,015	67,838	316
September	73,470	61,875	338
October	68,604	119,930	304
November	65,603	258,200	267
December	66,582	381,120	229
Totals	825,413	2,443,937	338
Savings	57,858	-523,877	36
% Savings	7%	-27%	10%

Independent

Cost $/sf	$0.00	$ Savings	$6304
Est. Premium	$0	Simple Payback	0



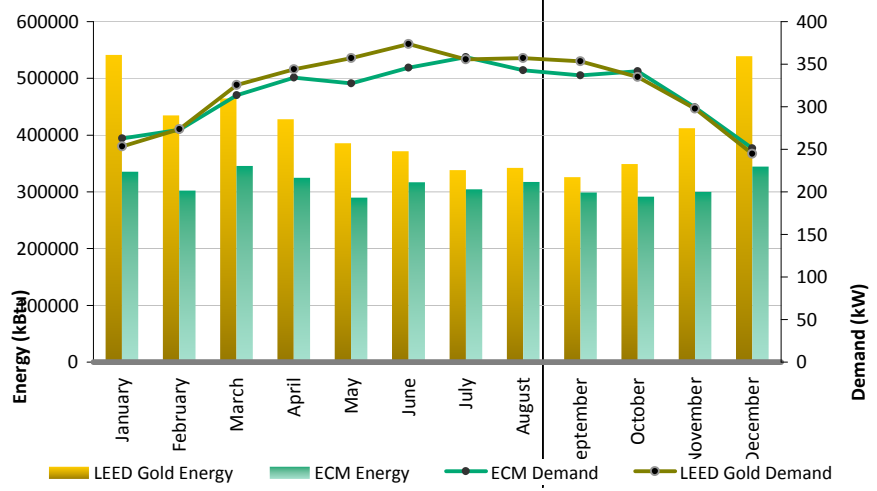
E-15 Water side economizer

ECM

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	61,396	125,786	263
February	60,891	94,279	273
March	73,838	93,829	313
April	73,449	74,151	334
May	68,977	54,220	327
June	78,895	47,561	346
July	78,839	35,549	358
August	82,523	36,172	343
September	78,148	32,257	337
October	72,616	43,549	342
November	66,746	72,161	299
December	66,564	117,685	251
Totals	862,883	827,199	358
Savings	20,388	1,092,861	15
% Savings	2%	57%	4%

Independent

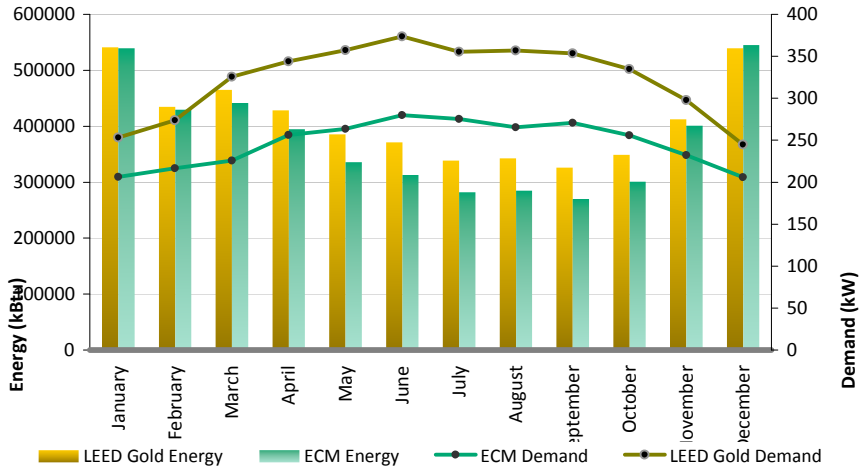
Cost $/sf	$0.51	$ Savings	$9324
Est. Premium	$51000	Simple Payback	5

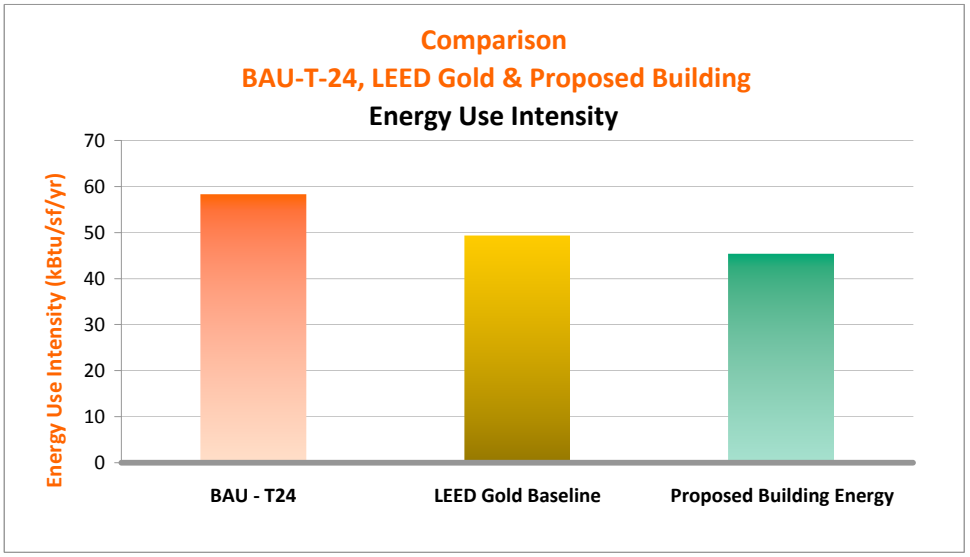


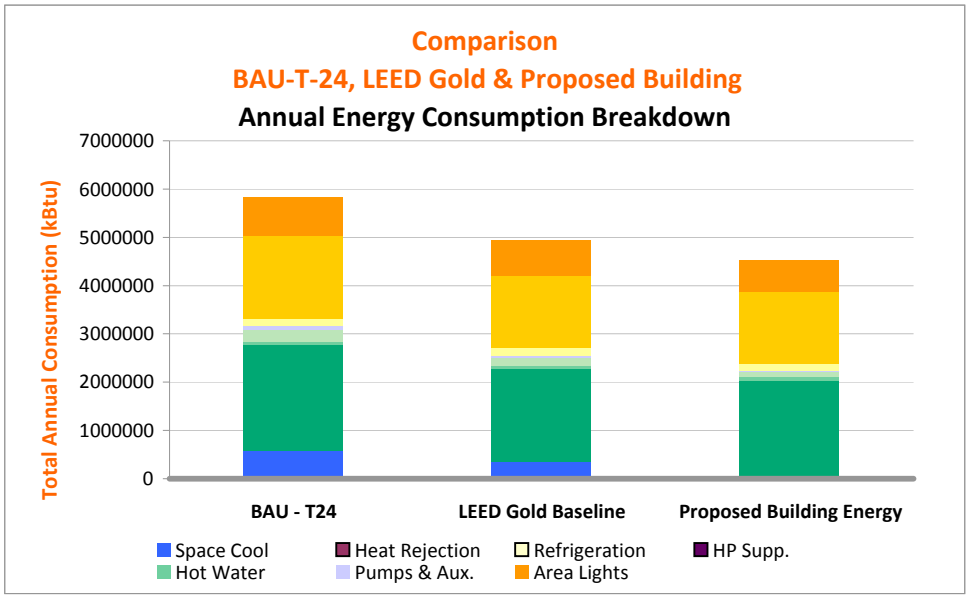
Proposed Building Energy

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	58,730	339,270	206
February	56,577	236,529	216
March	66,762	213,751	226
April	64,632	174,086	256
May	59,456	132,905	263
June	65,579	89,317	280
July	63,834	64,433	275
August	67,755	53,513	266
September	65,364	47,006	271
October	61,354	91,393	256
November	60,128	195,985	232
December	63,057	330,061	206
Totals	753,228	1,968,249	280
Savings	130,043	-48,189	94
% Savings	15%	-3%	25% Combined

Cost $/sf	$3.89	$ Savings	$20448
Est. Premium	$389000	Simple Payback	19





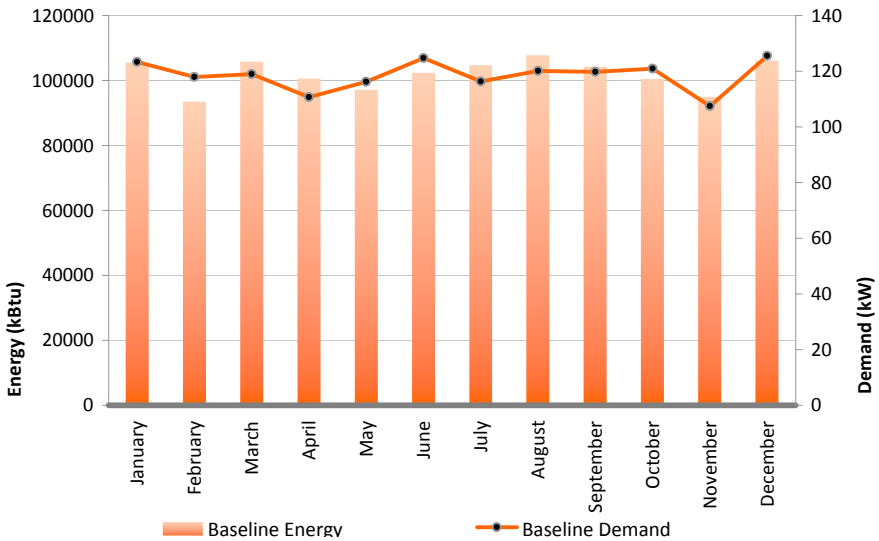


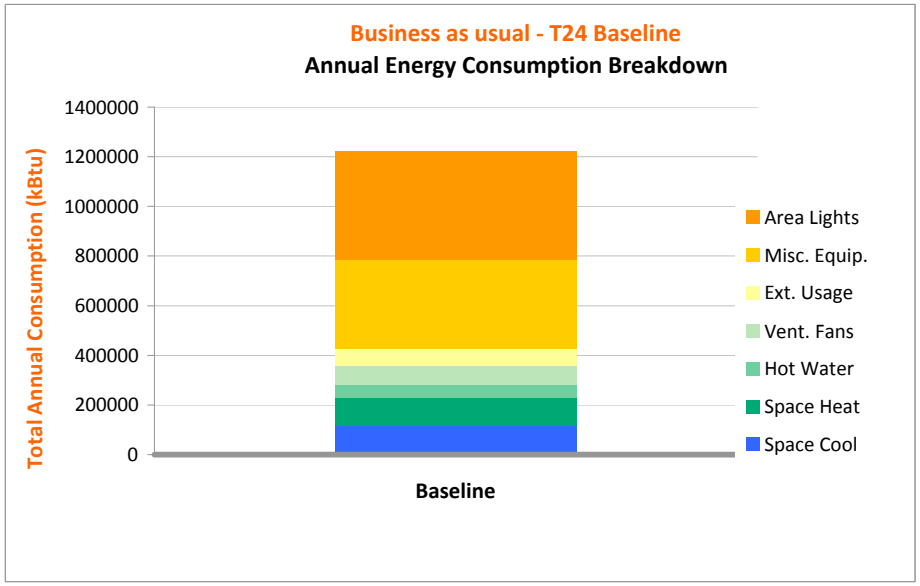
Retail: Building Energy Calculations

ARUP

BAU - T24 | *T24, 2008 equivalent* | *Building Area 30000 sf*

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	30,929	0	123
February	27,394	0	118
March	31,018	0	119
April	29,487	0	111
May	28,483	0	116
June	30,015	0	125
July	30,691	0	116
August	31,592	0	120
September	30,546	0	120
October	29,461	0	121
November	27,837	0	107
December	31,110	0	126
Totals	**358,563**	**0**	**126**

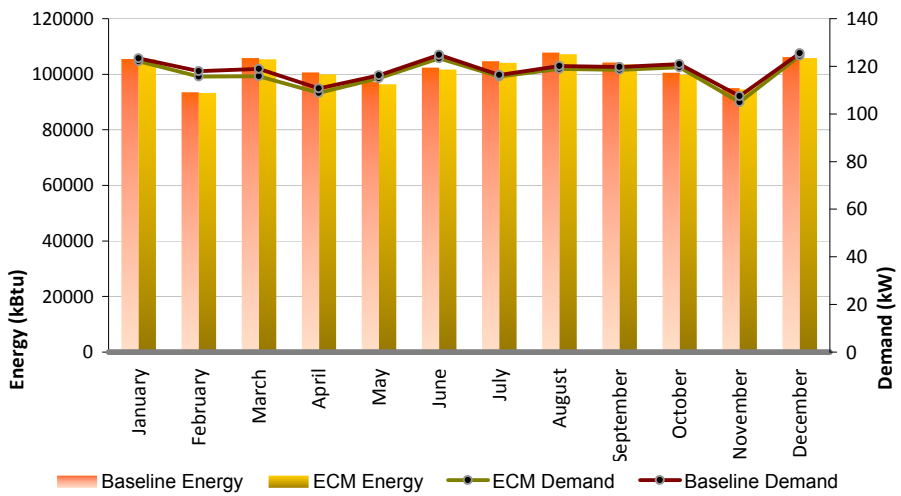




E-1 Thermal mass

LEED Gold Baseline

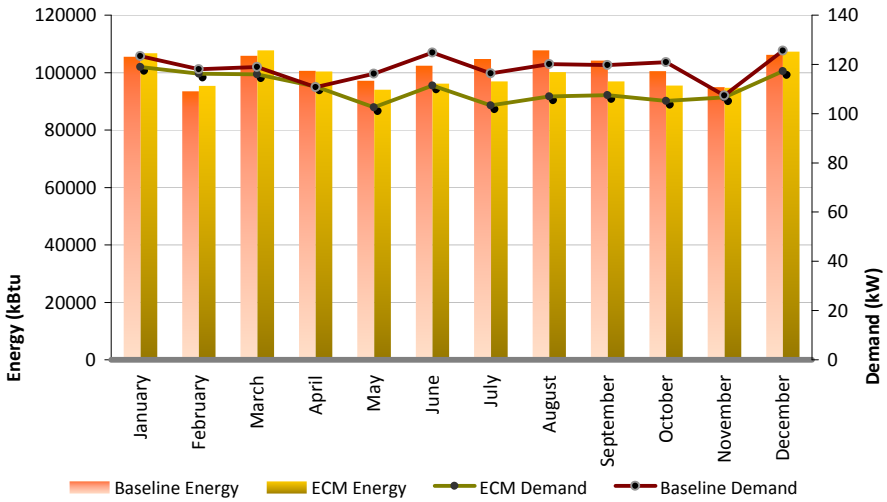
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	30,892	0	122
February	27,350	0	116
March	30,873	0	116
April	29,310	0	109
May	28,265	0	115
June	29,791	0	123
July	30,526	0	116
August	31,418	0	119
September	30,359	0	118
October	29,278	0	120
November	27,714	0	105
December	31,020	0	124
Totals	356,795	0	124
Savings	1,768	0	1
% Savings	0%		1% Incremental



E-2 High performance glazing

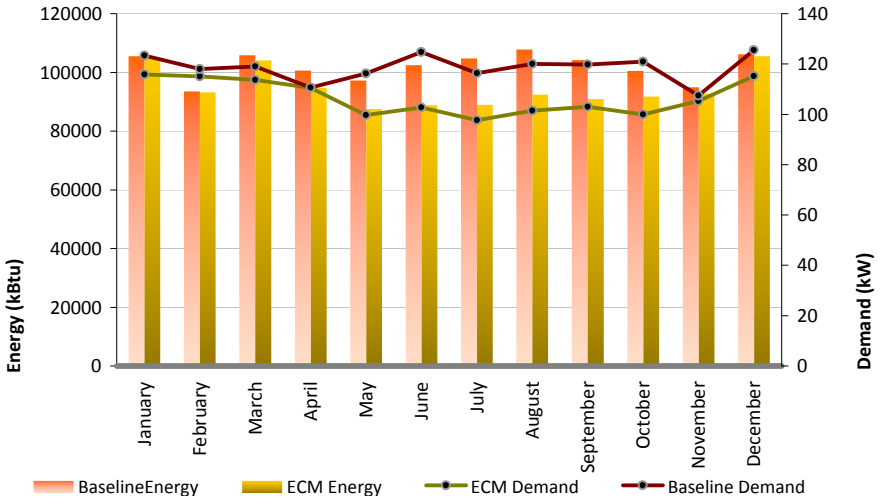
LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	31,298	0	119
February	27,960	0	116
March	31,587	0	116
April	29,429	0	111
May	27,553	0	103
June	28,188	0	111
July	28,403	0	103
August	29,345	0	107
September	28,397	0	107
October	27,997	0	105
November	27,768	0	107
December	31,434	0	117
Totals	349,359	0	119
Savings	9,204	0	7
% Savings	3%		5% Incremental



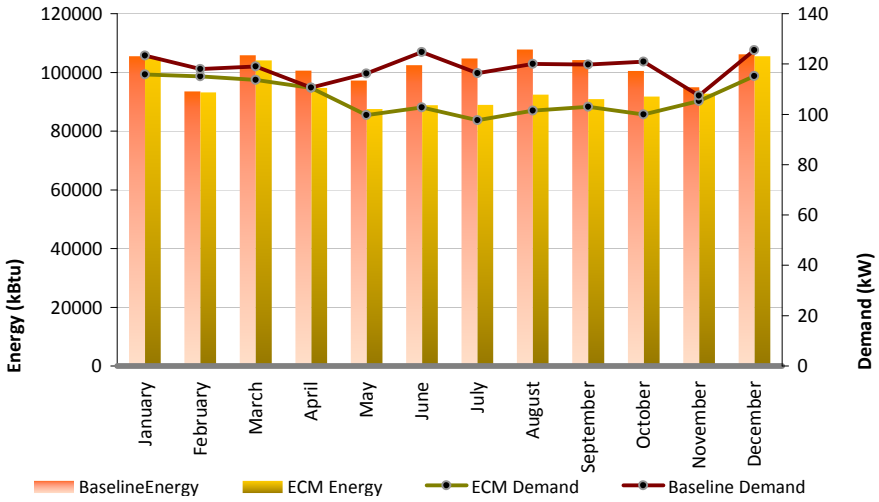
E-3 Daylighting — LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	30,808	0	116
February	27,320	0	115
March	30,492	0	114
April	27,769	0	110
May	25,645	0	100
June	26,025	0	103
July	26,074	0	98
August	27,077	0	101
September	26,643	0	103
October	26,887	0	100
November	27,176	0	105
December	30,930	0	115
Totals	332,846	0	116
Savings	25,717	0	10
% Savings	7%		8% Incremental



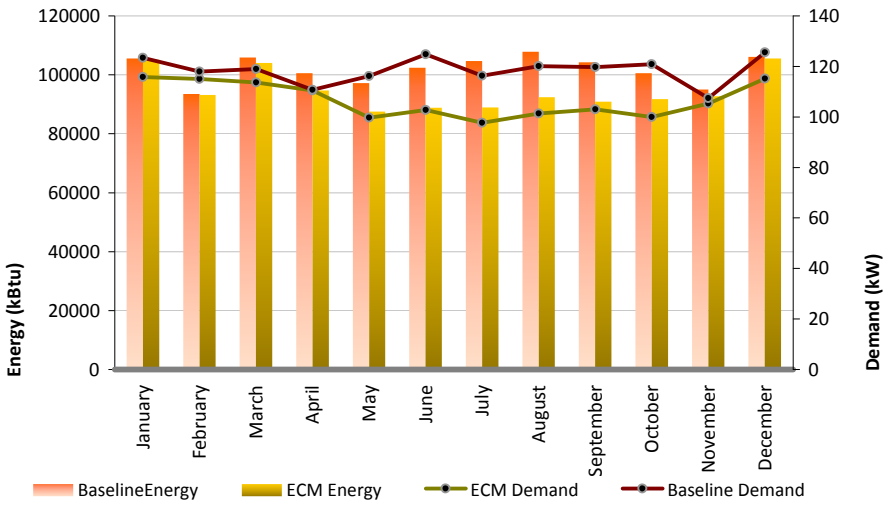
E-4 High efficiency DX units — LEED Gold Baseline

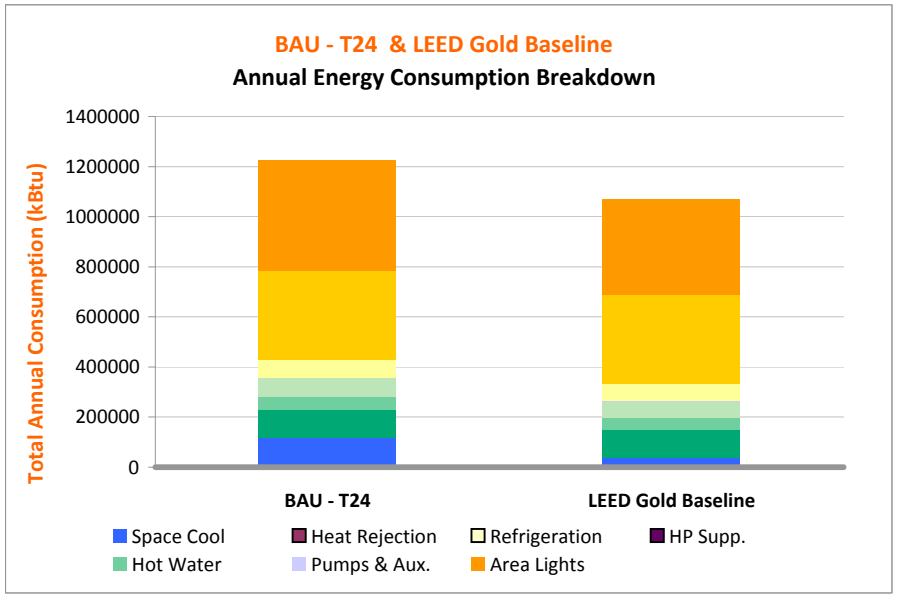
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	28,554	0	101
February	25,552	0	99
March	28,618	0	97
April	26,227	0	97
May	24,360	0	89
June	24,690	0	90
July	24,732	0	88
August	25,688	0	90
September	25,244	0	91
October	25,674	0	89
November	25,841	0	94
December	28,836	0	100
Totals	314,016	0	101
Savings	44,547	0	24
% Savings	12%		19% Incremental



E-4 LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	28,554	0	101
February	25,552	0	99
March	28,618	0	97
April	26,227	0	97
May	24,360	0	89
June	24,690	0	90
July	24,732	0	88
August	25,688	0	90
September	25,244	0	91
October	25,674	0	89
November	25,841	0	94
December	28,836	0	100
Totals	**314,016**	**0**	**101**
Savings	**44,547**	**0**	**24**
% Savings	**12%**		**19%** Cumulative

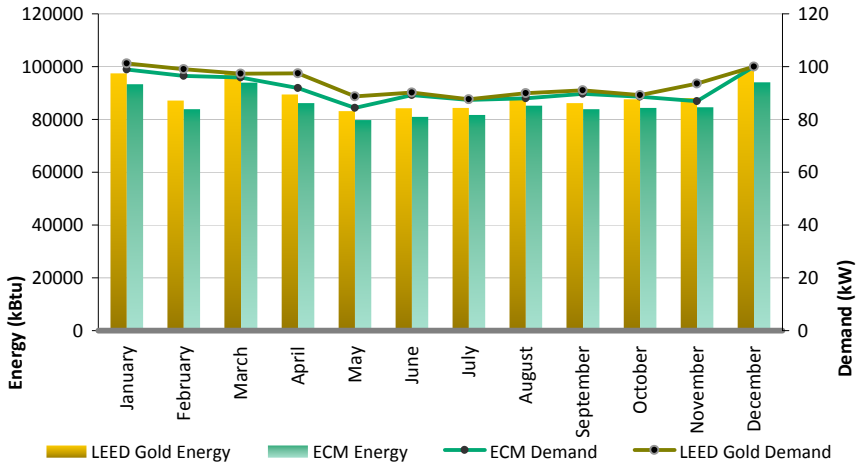




E-5 Demand control ventialtion

ECM √

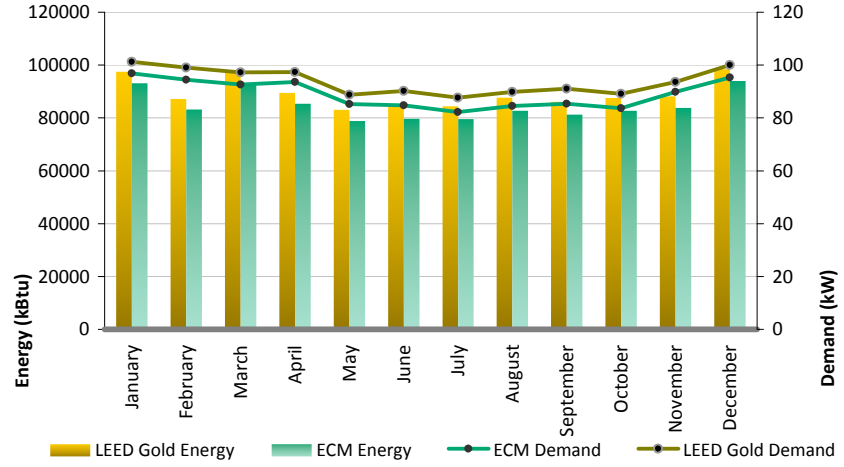
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	27,354	0	99
February	24,581	0	96
March	27,540	0	96
April	25,269	0	92
May	23,360	0	84
June	23,747	0	89
July	23,940	0	87
August	24,974	0	88
September	24,575	0	90
October	24,723	0	89
November	24,797	0	87
December	27,584	0	100
Totals	302,444	0	100
Savings	11,572	0	1
% Savings	4%		1% Independent
Est. Cost $/sf	$0.17	$ Savings	$1843
Est. Premium	$5100	Simple Payback	3



E-6 High efficiency lighting

ECM √

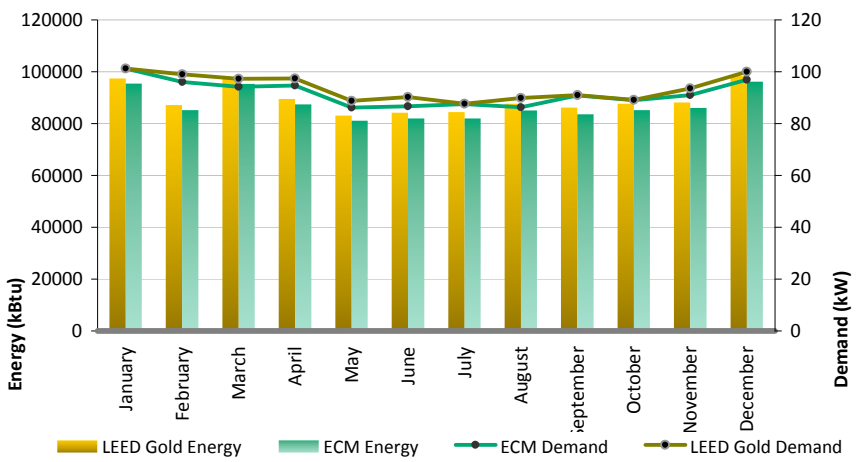
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	27,288	0	97
February	24,382	0	95
March	27,312	0	93
April	25,033	0	94
May	23,107	0	85
June	23,353	0	85
July	23,308	0	82
August	24,226	0	84
September	23,804	0	85
October	24,227	0	84
November	24,569	0	90
December	27,531	0	95
Totals	298,141	0	97
Savings	15,875	0	4
% Savings	5%		4% Independent
Est. Cost $/sf	$0.00	$ Savings	$2529
Est. Premium	$0	Simple Payback	0



E-7 Lighting occupancy sensors

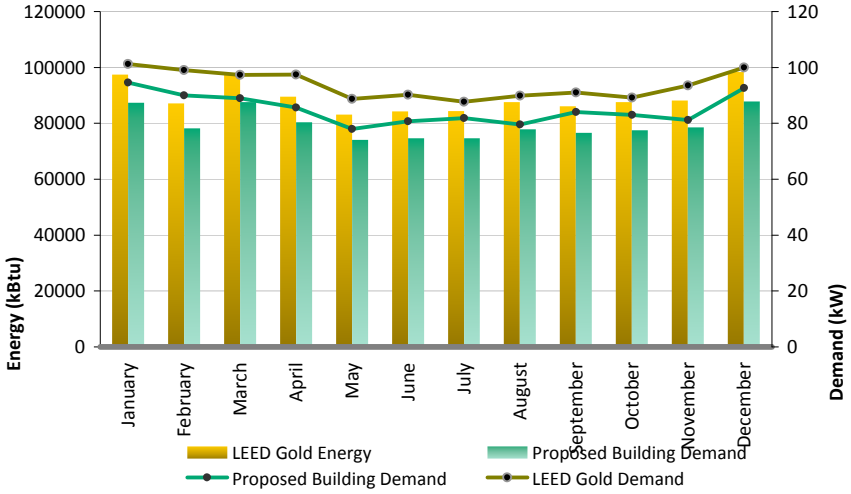
ECM √

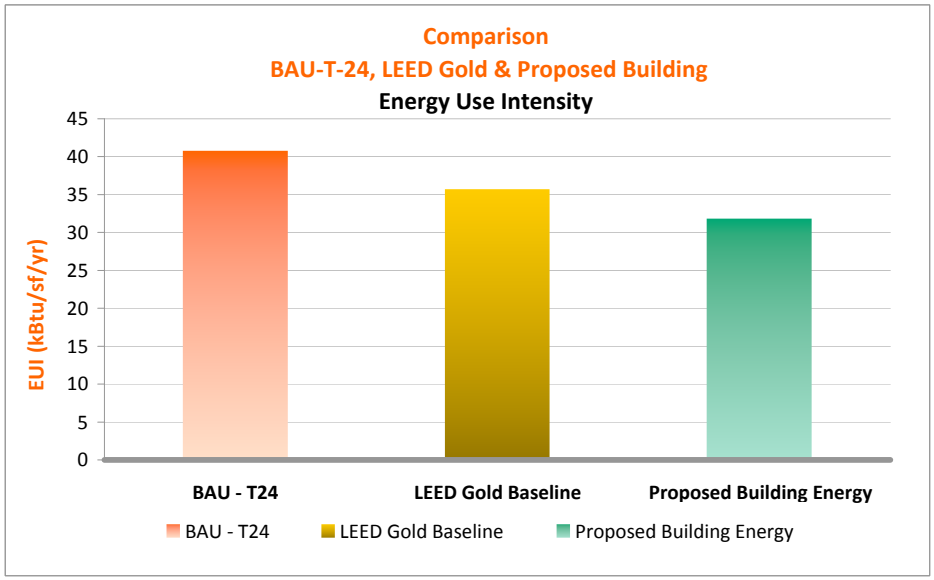
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	27,958	0	101
February	24,971	0	96
March	27,933	0	94
April	25,611	0	95
May	23,756	0	86
June	24,012	0	87
July	24,033	0	88
August	24,939	0	86
September	24,490	0	91
October	24,979	0	89
November	25,208	0	91
December	28,178	0	97
Totals	**306,069**	**0**	**101**
Savings	**7,947**	**0**	**0**
% Savings	**3%**		**0%** Independent
Est. Cost $/sf	**$0.07**		**$1266**
Est. Premium	**$2100**		**2**

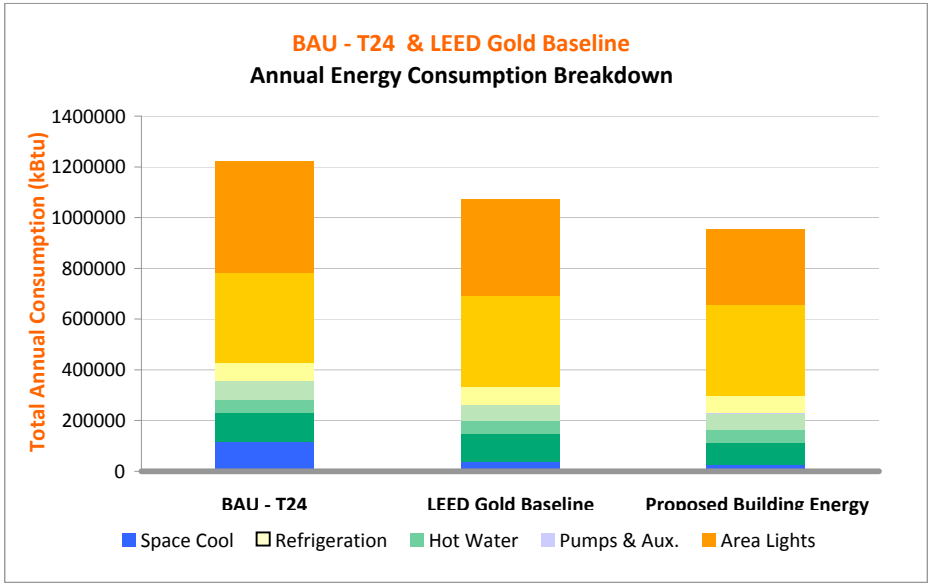


Proposed Building Energy

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	25,590	0	95
February	22,929	0	90
March	25,683	0	89
April	23,572	0	86
May	21,705	0	78
June	21,890	0	81
July	21,884	0	82
August	22,818	0	80
September	22,468	0	84
October	22,711	0	83
November	23,038	0	81
December	25,729	0	93
Totals	280,018	0	95
Savings	33,998	0	7
% Savings	11%		7% Combined
Cost $/sf	$0.24	$ Savings	$5416
Est. Premium	$7200	Simple Payback	1





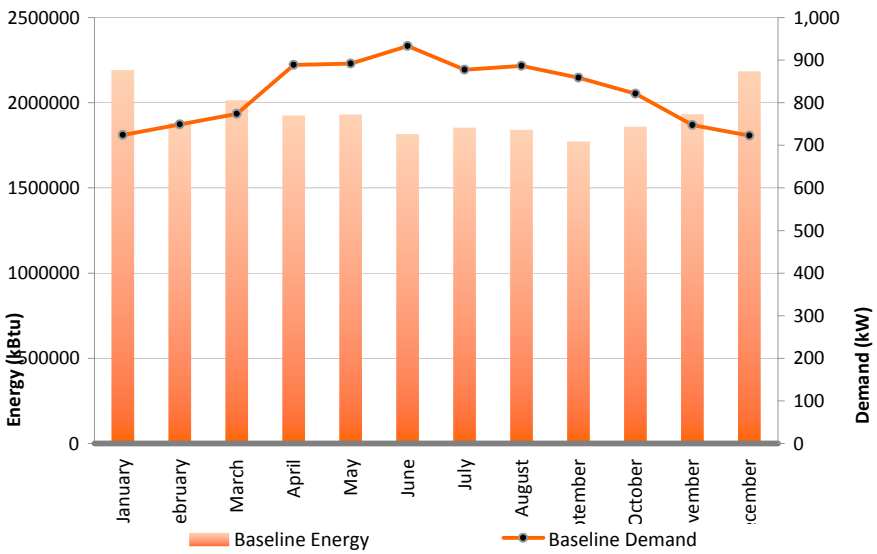


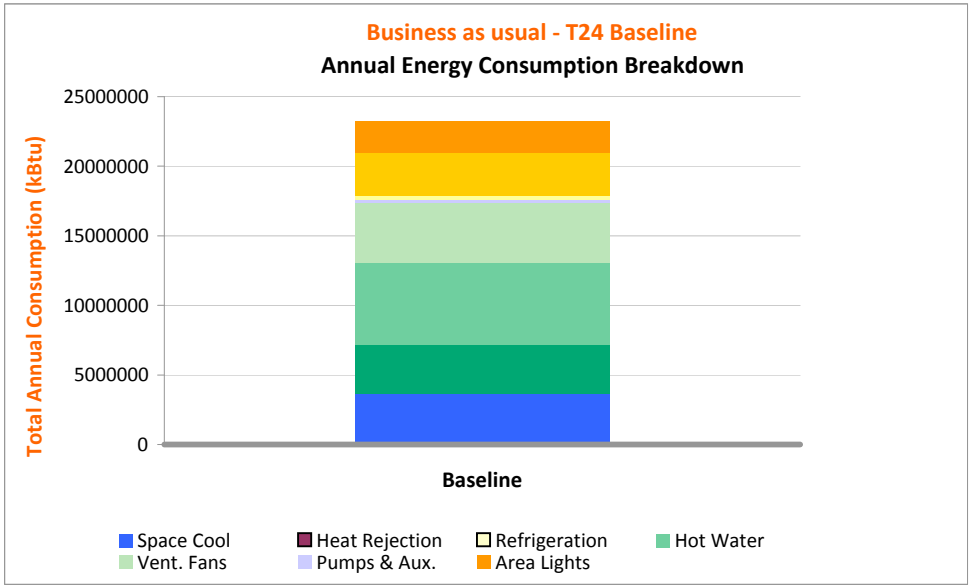
Condotel: Building Energy Calculations

ARUP

BAU - T24 | *T24, 2008 equivalent* | *Building Area* | *284414 sf*

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	310,658	1,132,828	724
February	291,392	887,698	749
March	332,121	883,027	774
April	335,048	782,302	889
May	352,903	725,996	892
June	352,306	614,989	933
July	367,026	601,098	877
August	365,633	592,559	887
September	353,561	566,070	859
October	349,074	668,354	821
November	315,727	856,088	748
December	309,939	1,127,076	723
Totals	**4,035,388**	**9,438,085**	**933**



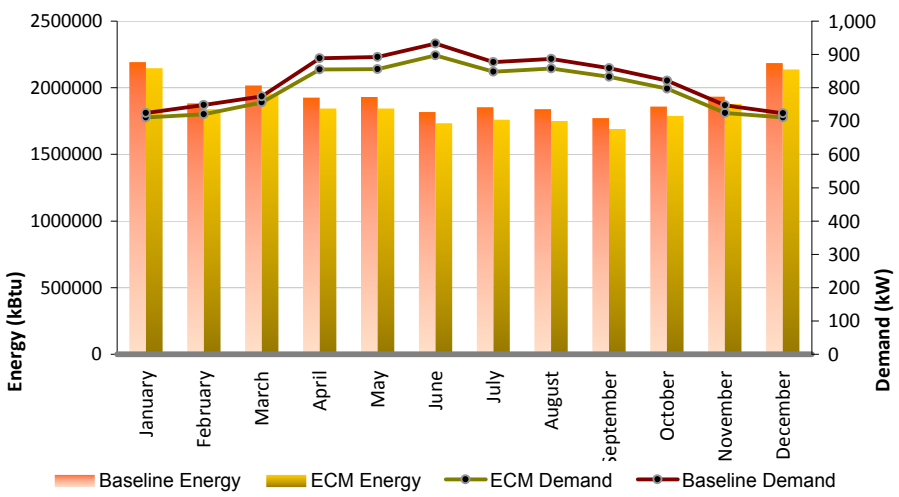


E-1 Thermal mass

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	305,241	1,105,095	711
February	285,762	864,796	720
March	326,388	838,046	756
April	329,491	720,745	855
May	347,866	657,842	856
June	348,102	546,627	897
July	363,240	521,371	848
August	361,924	516,614	858
September	349,405	497,955	833
October	343,722	615,261	798
November	310,262	818,971	724
December	304,142	1,098,660	710
Totals	3,975,545	8,801,983	897
Savings	59,843	636,102	36
% Savings	1%	7%	4%

Incremental

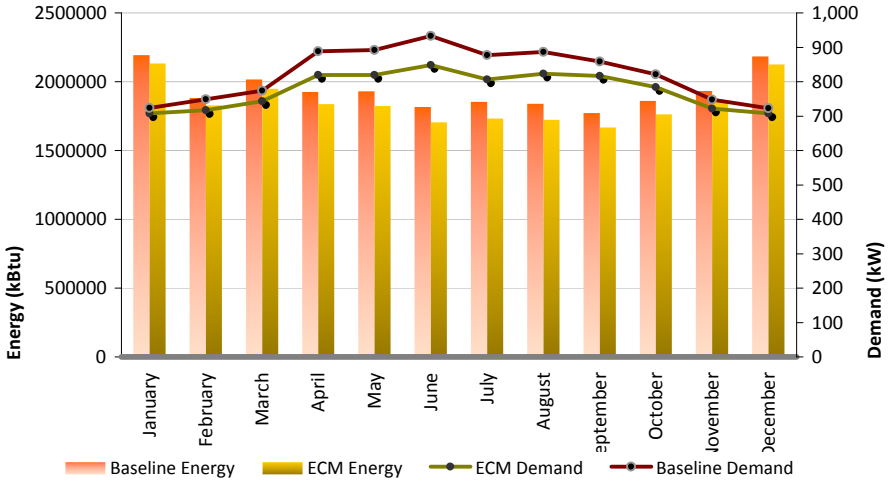


E-2 High performance glazing

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	303,685	1,095,290	708
February	283,632	860,705	717
March	322,233	848,250	743
April	322,141	737,870	820
May	338,368	667,793	819
June	336,690	556,615	848
July	351,650	532,008	806
August	351,572	522,860	823
September	341,596	500,783	817
October	338,197	609,721	784
November	308,561	805,187	721
December	303,543	1,090,147	708
Totals	3,901,868	8,827,229	848
Savings	133,520	610,856	85
% Savings	3%	6%	9%

Incremental

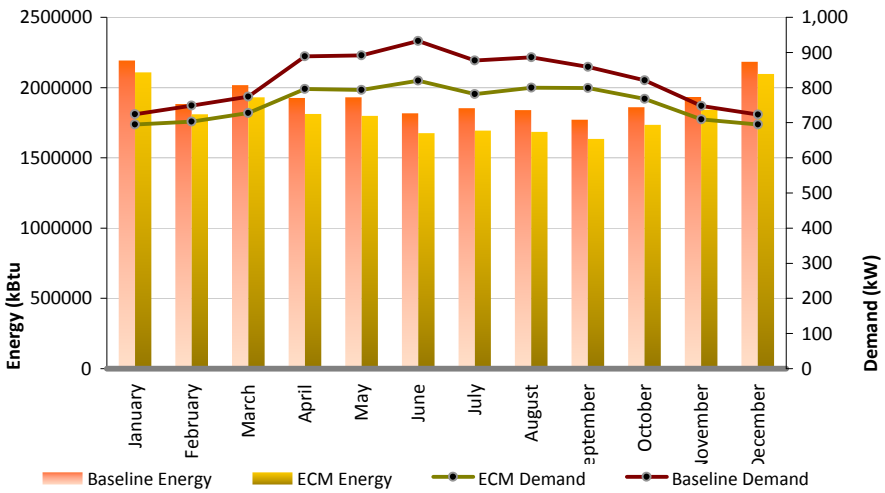


E-3 External shading

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	294,741	1,102,959	695
February	274,260	875,385	703
March	310,923	869,189	728
April	310,457	752,544	796
May	325,859	686,786	793
June	323,842	571,056	820
July	338,297	540,182	781
August	338,673	529,900	799
September	329,987	508,555	799
October	327,441	617,534	768
November	299,044	821,298	709
December	293,788	1,093,776	695
Totals	3,767,312	8,969,164	820
Savings	268,076	468,921	113
% Savings	7%	5%	12%

Incremental

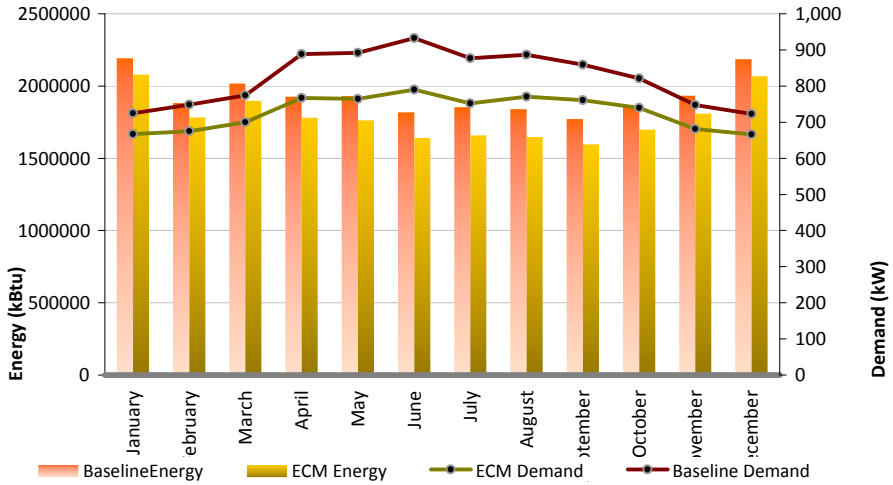


E-4 Enegy star equipment

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	282,705	1,115,228	667
February	263,454	883,045	675
March	298,882	877,618	700
April	299,093	760,203	767
May	314,116	691,336	764
June	312,501	575,162	790
July	326,551	543,360	752
August	326,891	533,054	770
September	318,520	510,658	761
October	315,495	621,645	739
November	287,367	829,592	681
December	281,711	1,106,173	666
Totals	3,627,286	9,047,074	790
Savings	408,102	391,011	143
% Savings	10%	4%	15%

Incremental

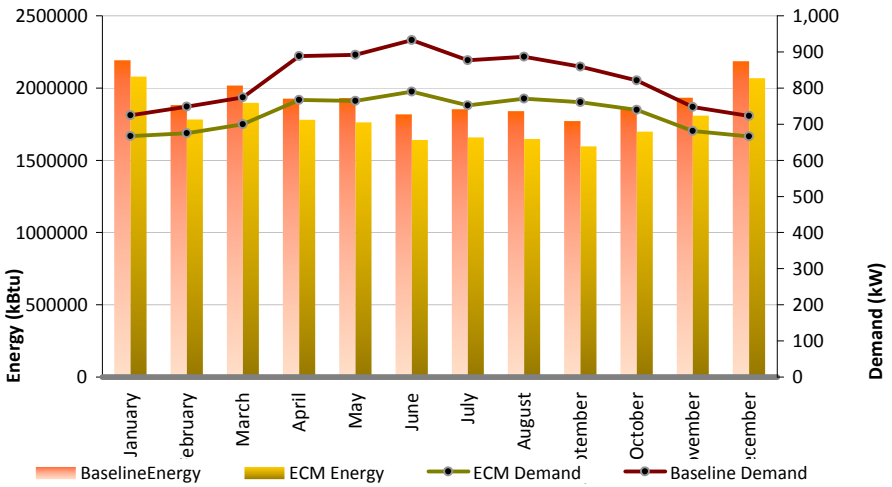


E-5 High efficiency DX units

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	282,644	1,115,228	667
February	263,288	883,045	675
March	298,510	877,618	695
April	298,222	760,203	758
May	312,670	691,336	754
June	310,403	575,162	777
July	324,050	543,360	742
August	324,510	533,054	761
September	316,011	510,658	753
October	313,944	621,645	732
November	287,019	829,592	681
December	281,675	1,106,173	666
Totals	**3,612,946**	**9,047,074**	**777**
Savings	**422,442**	**391,011**	**156**
% Savings	**10%**	**4%**	**17%**

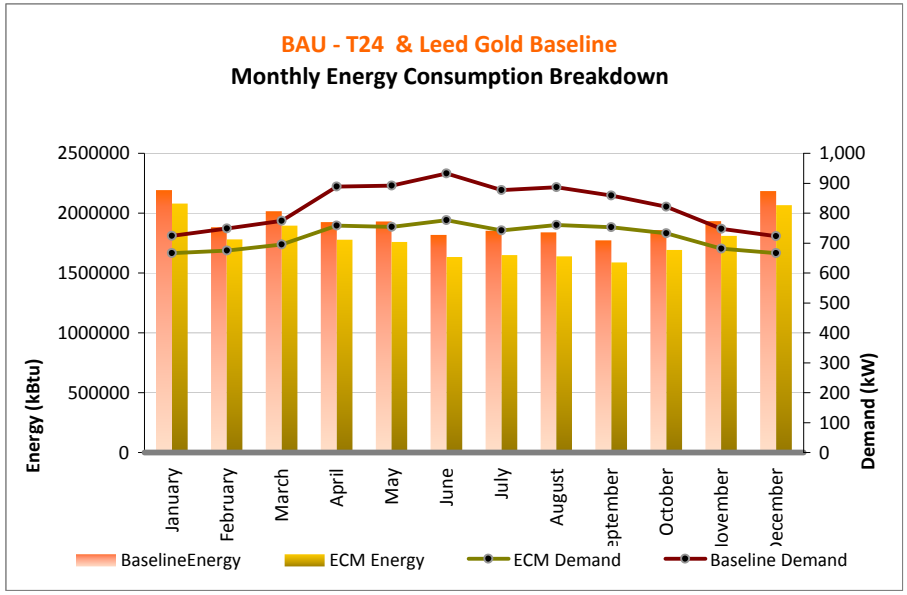
Incremental

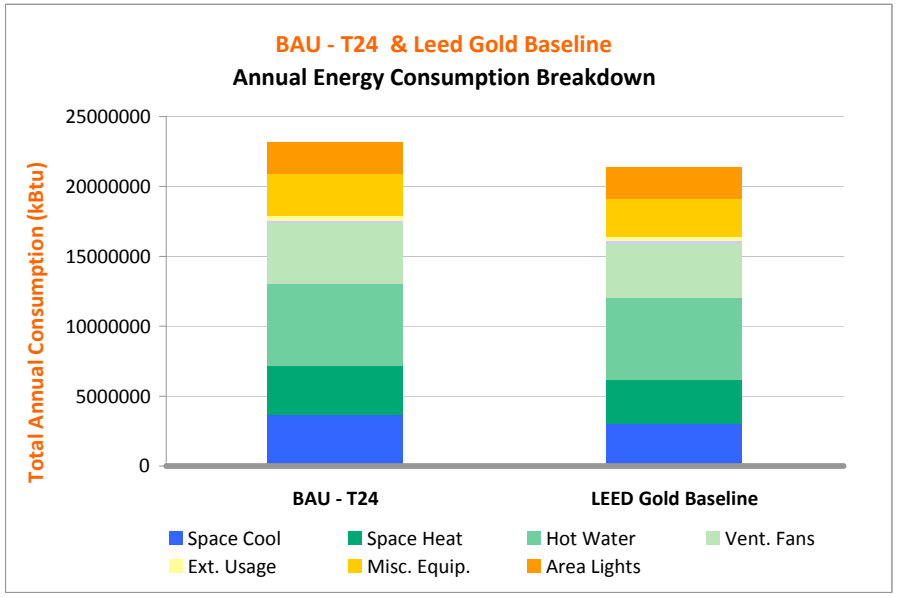


E-5 LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	282,644	1,115,228	667
February	263,288	883,045	675
March	298,510	877,618	695
April	298,222	760,203	758
May	312,670	691,336	754
June	310,403	575,162	777
July	324,050	543,360	742
August	324,510	533,054	761
September	316,011	510,658	753
October	313,944	621,645	732
November	287,019	829,592	681
December	281,675	1,106,173	666
Totals	**3,612,946**	**9,047,074**	**777**
Savings	**422,442**	**391,011**	**156**
% Savings	**10%**	**4%**	**17%**

Cumulative

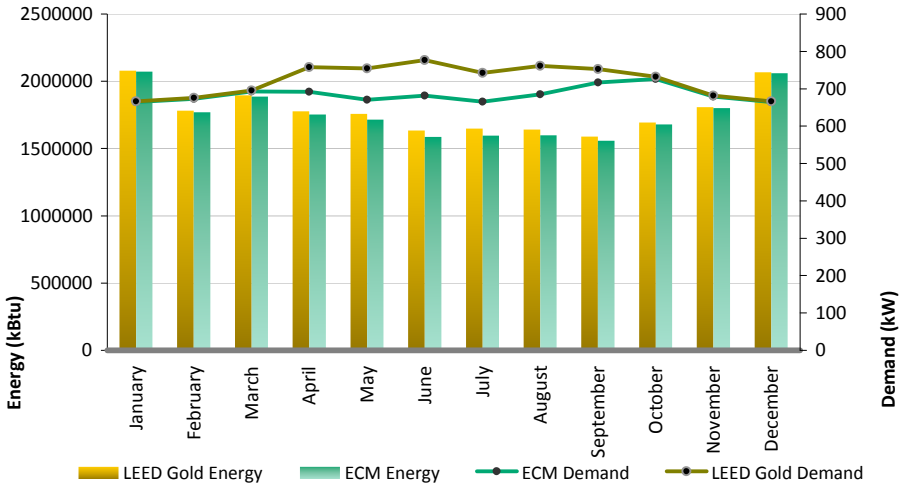




E-6 Daylighting

ECM √

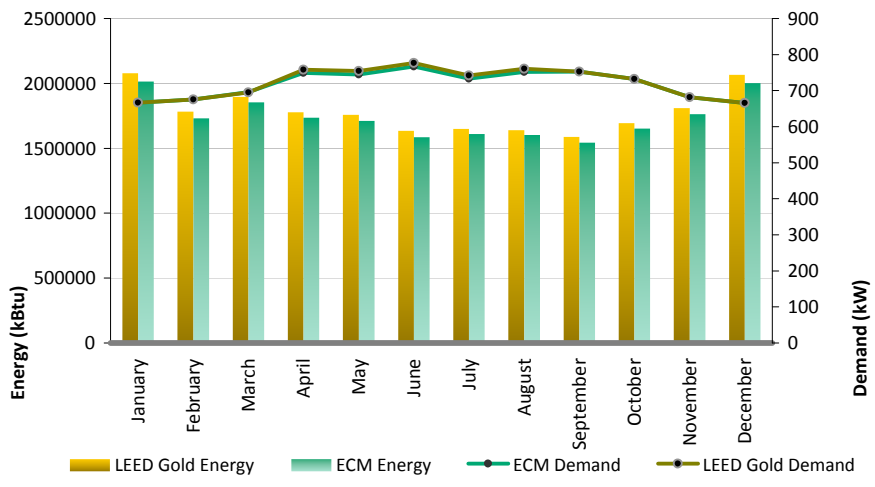
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	277,373	1,125,242	665
February	256,911	894,231	673
March	289,581	897,794	693
April	284,938	780,783	692
May	295,593	706,757	670
June	292,811	586,833	681
July	306,176	551,639	665
August	309,297	542,007	685
September	305,353	516,202	716
October	306,266	634,347	726
November	280,569	843,305	679
December	276,412	1,115,894	664
Totals	3,481,280	9,195,034	726
Savings	131,666	-147,960	50
% Savings	4%	-2%	6% Independent
Cost $/sf	$0.18	$ Savings	$20152
Est. Premium	$51195	Simple Payback	3



E-7 Variable speed fans & pumps

ECM √

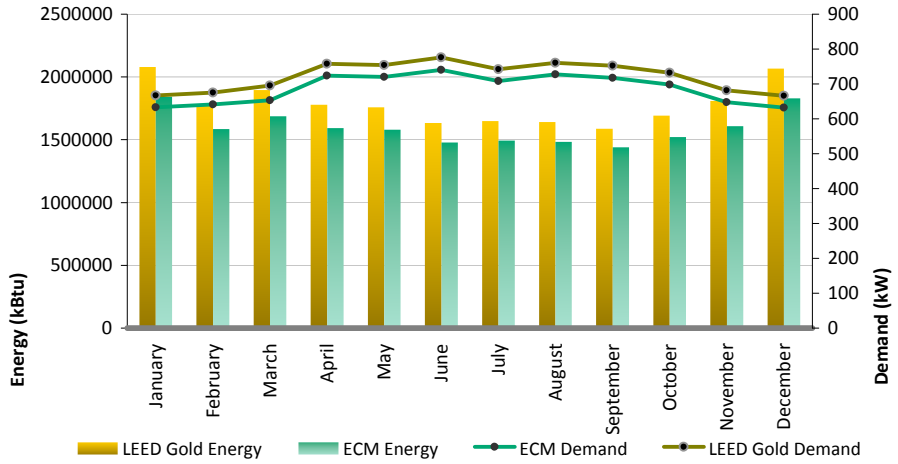
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	262,738	1,118,890	667
February	245,325	892,763	675
March	278,630	904,280	695
April	278,991	784,041	749
May	292,784	711,589	745
June	291,103	591,091	767
July	304,142	572,631	733
August	304,663	562,502	752
September	296,812	529,775	753
October	294,089	647,891	732
November	267,777	849,314	681
December	261,768	1,109,383	666
Totals	3,378,821	9,274,150	767
Savings	234,125	-227,076	9
% Savings	6%	-3%	1% Independent
Cost $/sf	$0.34	$ Savings	$36034
Est. Premium	$96701	Simple Payback	3



E-8 Demand control ventilation

ECM √

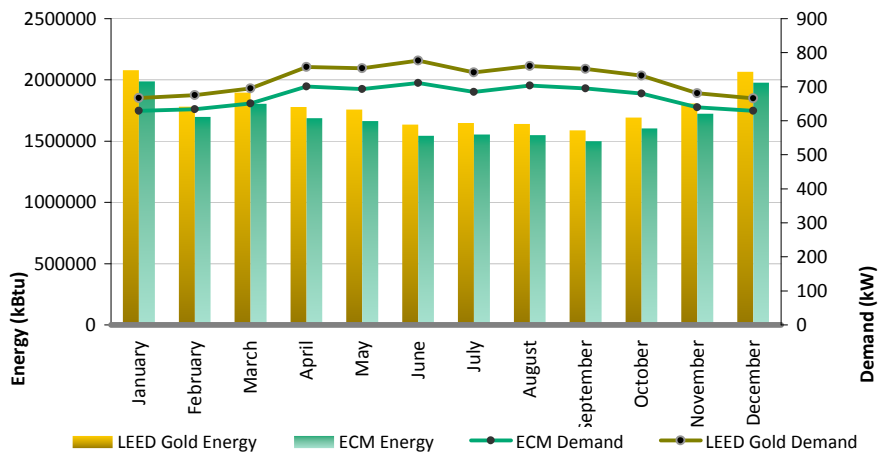
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	245,984	1,002,598	633
February	230,007	800,272	642
March	261,381	796,007	653
April	261,681	700,766	724
May	274,427	644,223	720
June	273,343	545,859	741
July	285,604	518,063	709
August	286,191	507,757	727
September	278,825	488,394	718
October	276,017	580,653	698
November	251,180	752,202	648
December	245,060	992,839	632
Totals	3,169,696	8,329,633	741
Savings	443,250	717,441	36
% Savings	14%	9%	5% Independent
Cost $/sf	$0.00	$ Savings	$74599
Est. Premium	$0	Simple Payback	0



E-9 High efficiency chiller & boiler

ECM √

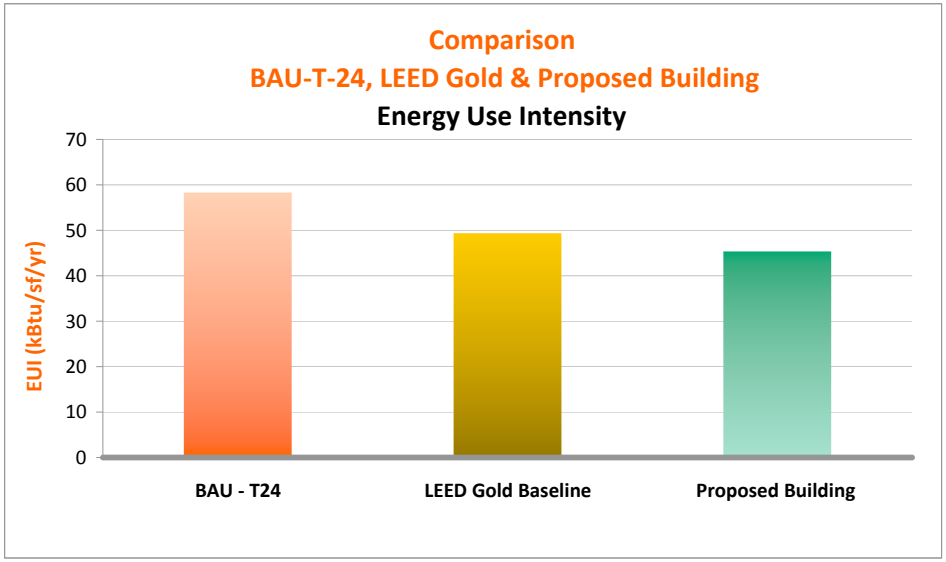
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	267,788	1,074,999	630
February	247,131	855,950	634
March	278,527	855,458	651
April	276,411	744,490	700
May	288,667	680,074	693
June	285,133	570,004	711
July	297,248	540,957	685
August	298,221	530,807	704
September	290,129	508,614	695
October	290,450	613,073	680
November	268,670	806,280	640
December	266,982	1,065,936	629
Totals	3,355,357	8,846,642	711
Savings	257,589	200,432	66
% Savings	7%	2%	8% Independent
Cost $/sf	$0.33	$ Savings	$42148
Est. Premium	$93857	Simple Payback	2

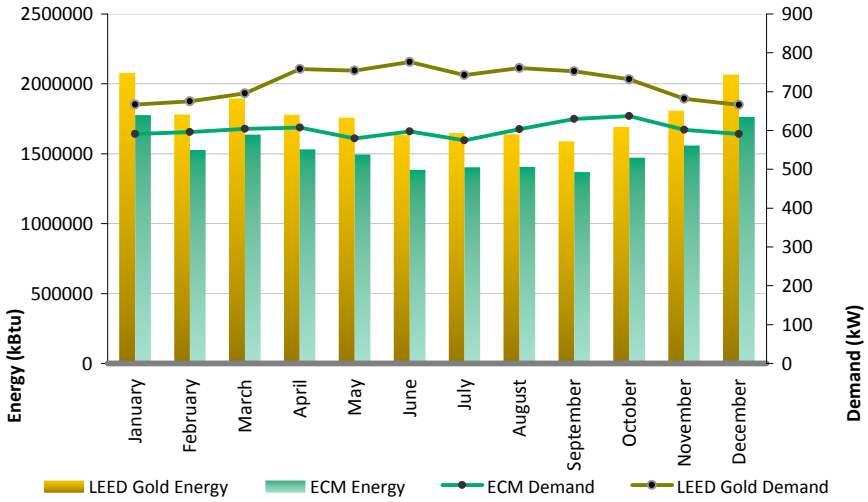


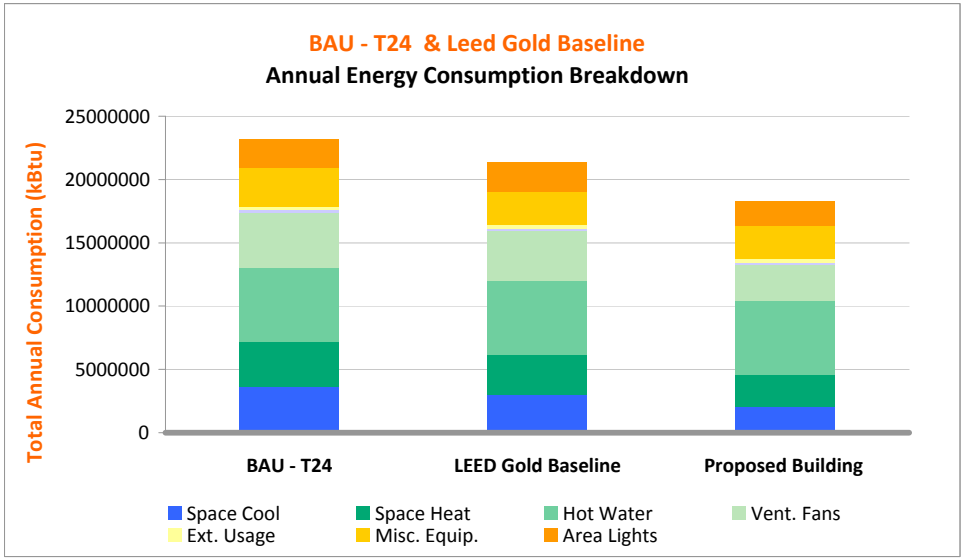
Proposed Building

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	235,336	973,973	591
February	216,167	789,801	596
March	242,271	811,387	604
April	236,397	725,641	607
May	243,613	664,248	579
June	240,333	564,293	597
July	251,060	547,006	575
August	254,718	537,049	603
September	251,819	509,325	630
October	254,594	603,308	637
November	235,725	755,811	602
December	234,581	963,338	591
Totals	**2,896,614**	**8,445,180**	**637**
Savings	**716,332**	**601,894**	**139**
% Savings	**20%**	**7%**	**18%** Combined

Cost $/sf	**$4.01**	**$ Savings**	**$117458**
Est. Premium	**$0**	**Simple Payback**	**0**



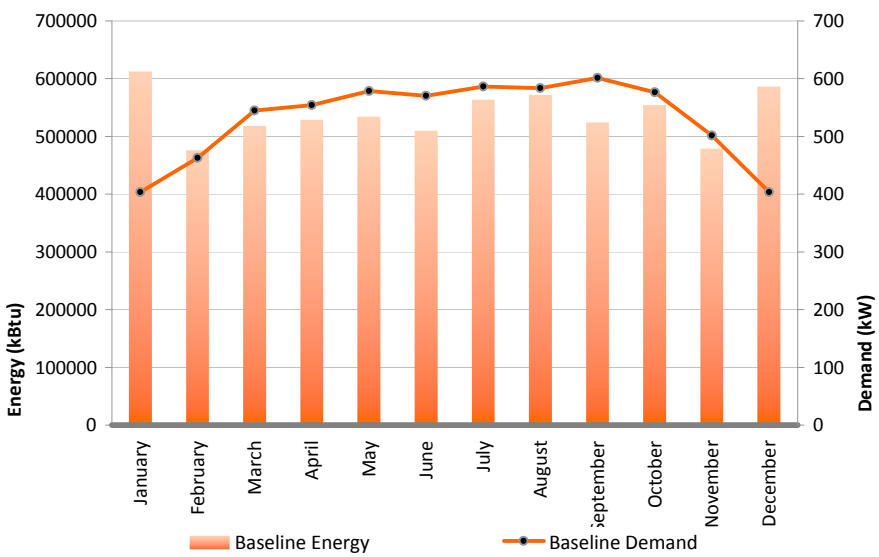


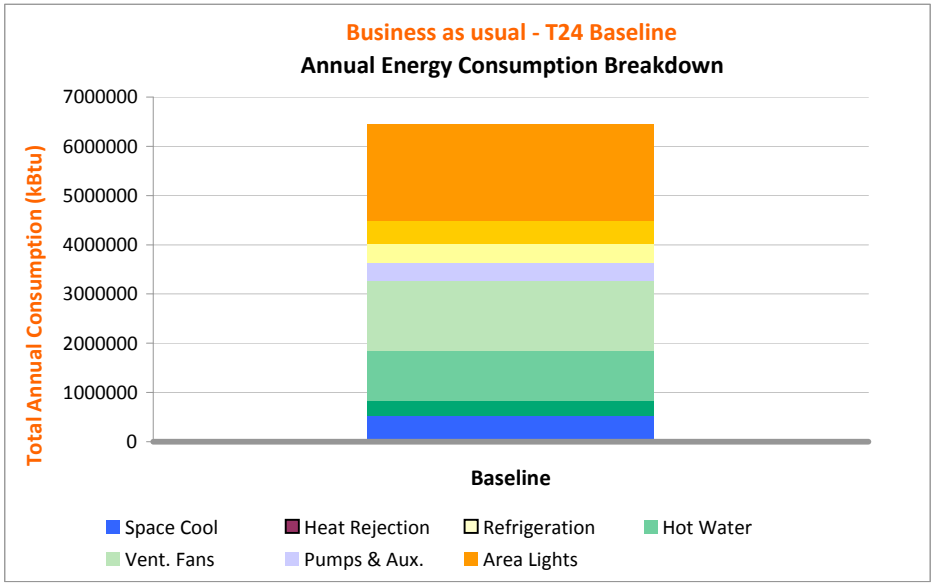


Adaptive Reuse: Building Energy Calculations

BAU - T24 | *T24, 2008 equivalent* | *Building Area 165000 sf*

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	119,243	205,706	403
February	106,848	111,591	463
March	119,599	110,396	545
April	125,626	100,152	554
May	129,379	92,907	579
June	126,008	79,824	570
July	140,076	85,521	586
August	143,016	84,240	584
September	131,010	77,442	601
October	136,532	88,447	576
November	111,137	99,916	501
December	119,234	179,519	403
Totals	**1,507,707**	**1,315,661**	**601**



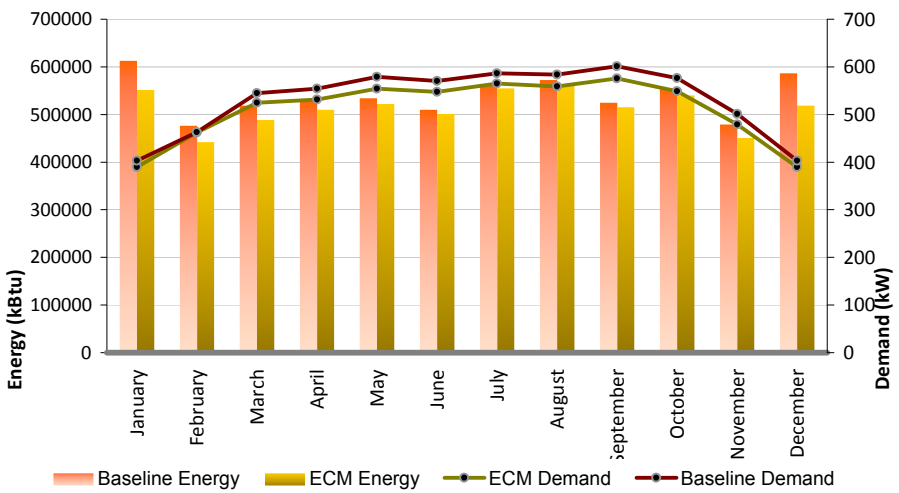


E-1 Thermal mass

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	115,472	157,412	390
February	103,608	88,191	462
March	116,259	91,573	525
April	122,278	92,714	531
May	126,577	89,803	554
June	123,446	79,824	548
July	137,603	85,521	565
August	140,283	84,240	559
September	128,436	76,752	576
October	133,436	85,161	549
November	107,942	82,235	479
December	115,452	124,611	390
Totals	1,470,793	1,138,037	576
Savings	36,915	177,624	26
% Savings	2%	14%	4%

Incremental

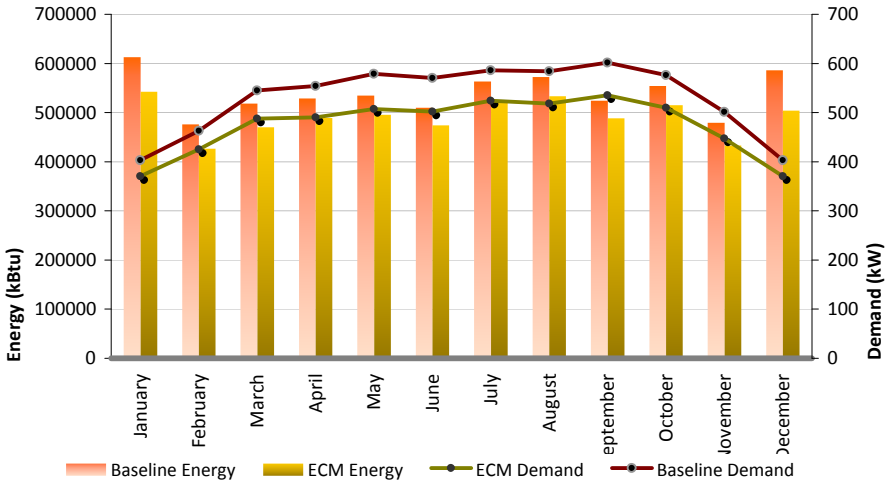


E-2 High performance glazing

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	110,168	166,815	370
February	98,669	89,689	425
March	110,500	92,874	488
April	115,762	94,369	490
May	118,928	89,804	507
June	115,514	79,824	502
July	128,400	85,521	524
August	131,563	84,240	519
September	120,705	76,752	535
October	125,972	85,161	510
November	102,802	82,509	448
December	110,160	128,197	370
Totals	1,389,141	1,155,755	535
Savings	118,566	159,906	66
% Savings	8%	12%	11%

Incremental

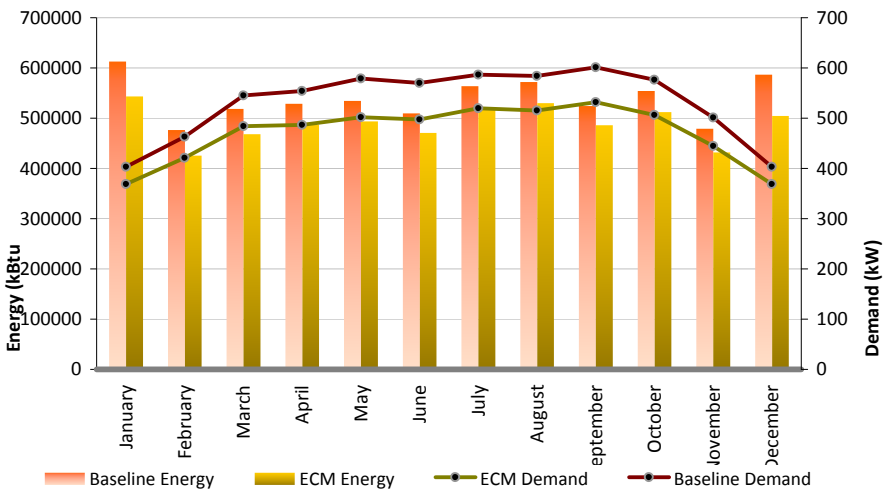


E-3 External shading

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	109,720	169,091	369
February	98,235	90,202	421
March	109,989	93,044	484
April	115,183	94,461	486
May	118,172	90,379	502
June	114,628	79,824	498
July	127,457	85,521	520
August	130,643	84,240	515
September	119,897	76,752	532
October	125,217	85,161	506
November	102,307	82,736	444
December	109,712	130,025	369
Totals	1,381,160	1,161,436	532
Savings	126,547	154,225	70
% Savings	8%	12%	12%

Incremental

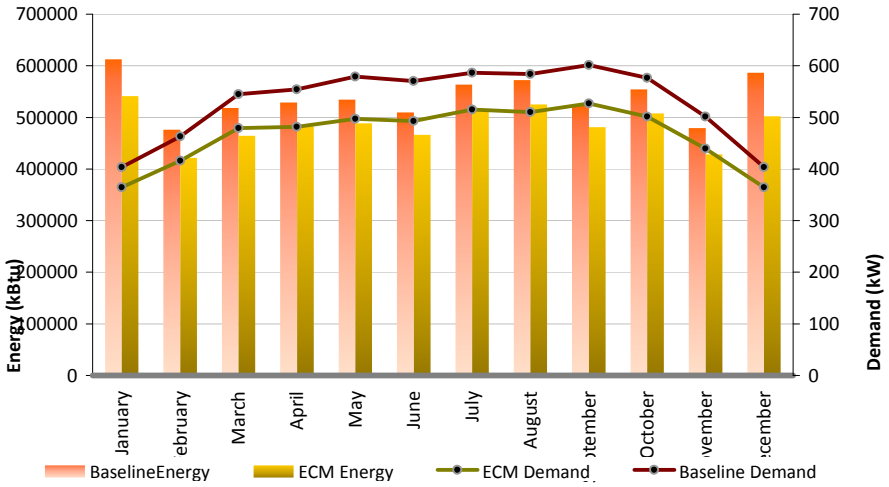


E-4 Enegy star equipment

LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	108,454	171,217	365
February	97,073	90,453	416
March	108,683	93,698	479
April	113,826	94,517	482
May	116,743	90,386	497
June	113,261	79,824	493
July	125,970	85,521	515
August	129,166	84,240	510
September	118,543	76,752	527
October	123,776	85,161	502
November	101,114	83,601	440
December	108,446	132,006	365
Totals	1,365,056	1,167,376	527
Savings	142,651	148,285	74
% Savings	9%	11%	12%

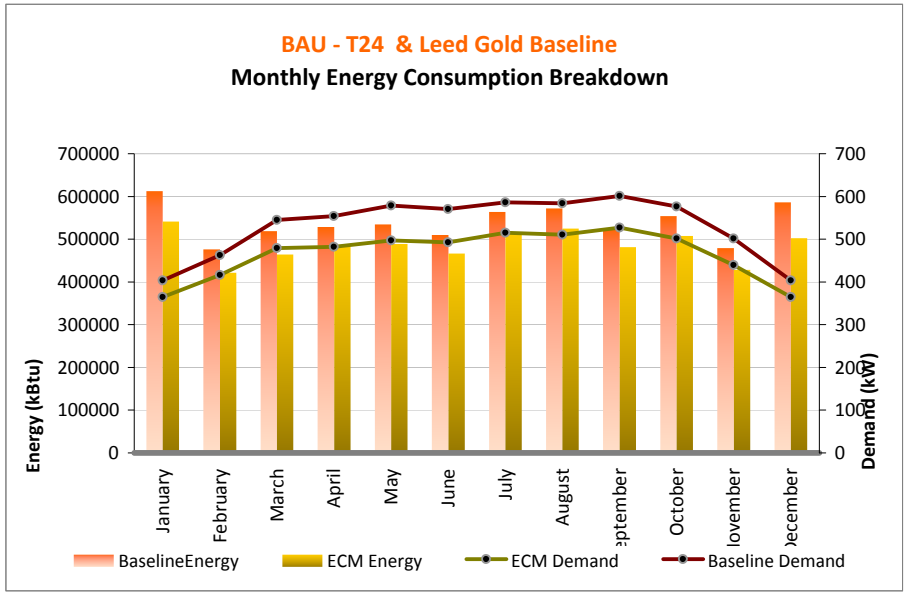
Incremental

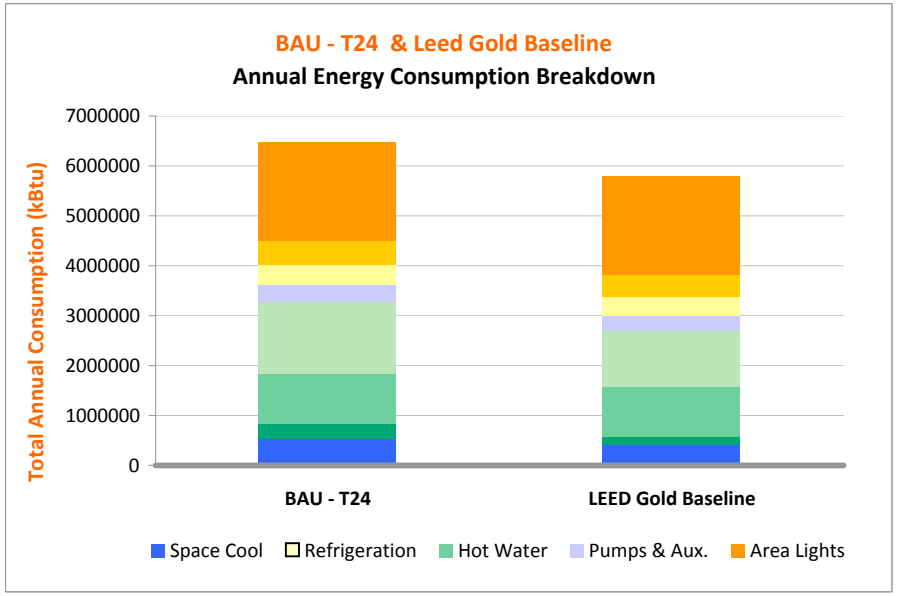


E-4 LEED Gold Baseline

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	108,454	171,217	365
February	97,073	90,453	416
March	108,683	93,698	479
April	113,826	94,517	482
May	116,743	90,386	497
June	113,261	79,824	493
July	125,970	85,521	515
August	129,166	84,240	510
September	118,543	76,752	527
October	123,776	85,161	502
November	101,114	83,601	440
December	108,446	132,006	365
Totals	**1,365,056**	**1,167,376**	**527**
Savings	**142,651**	**148,285**	**74**
% Savings	**9%**	**11%**	**12%**

Cumulative

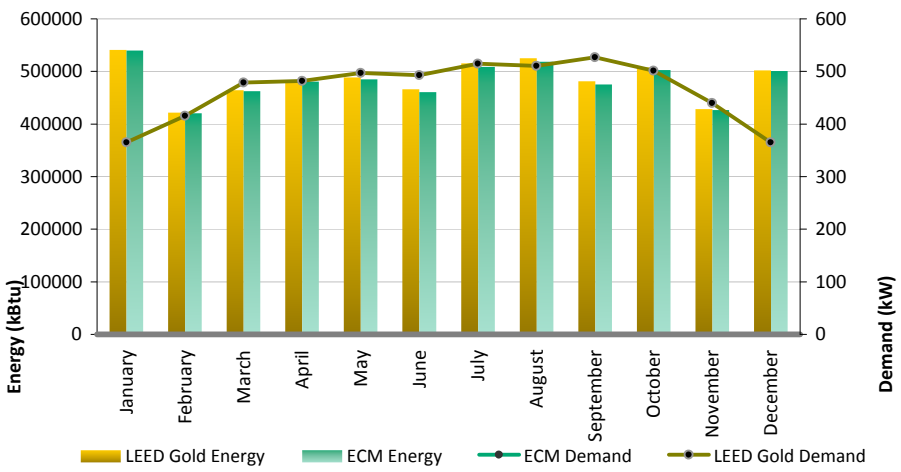




E-5 High efficiency chiller

ECM

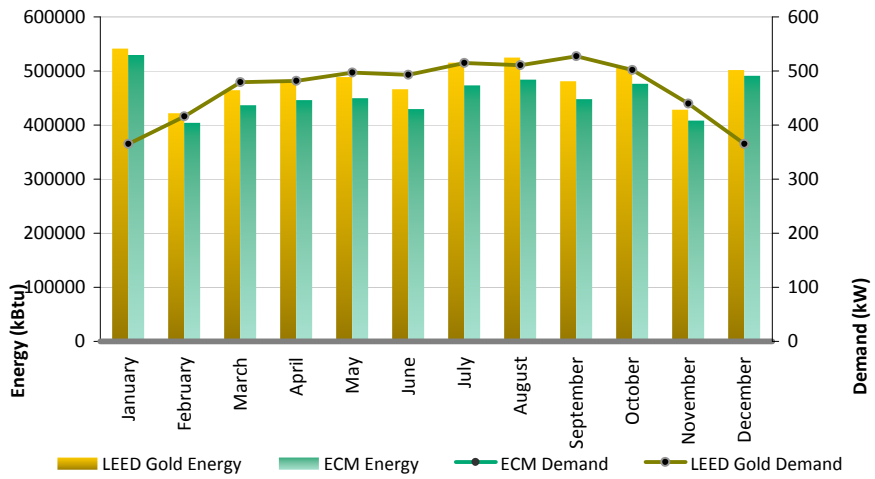
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	108,055	171,217	#N/A
February	96,672	90,453	#N/A
March	108,127	93,698	#N/A
April	113,159	94,517	#N/A
May	115,621	90,386	#N/A
June	111,687	79,824	#N/A
July	124,066	85,521	#N/A
August	127,341	84,240	#N/A
September	116,863	76,752	#N/A
October	122,408	85,161	#N/A
November	100,585	83,601	#N/A
December	108,048	132,006	#N/A
Totals	1,352,631	1,167,376	#N/A
Savings	12,426	0	#N/A
% Savings	1%	0%	#N/A Independent
Cost $/sf	$1.56	$ Savings	$1979
Est. Premium	$257400	Simple Payback	130



E-6 Daylighting

ECM

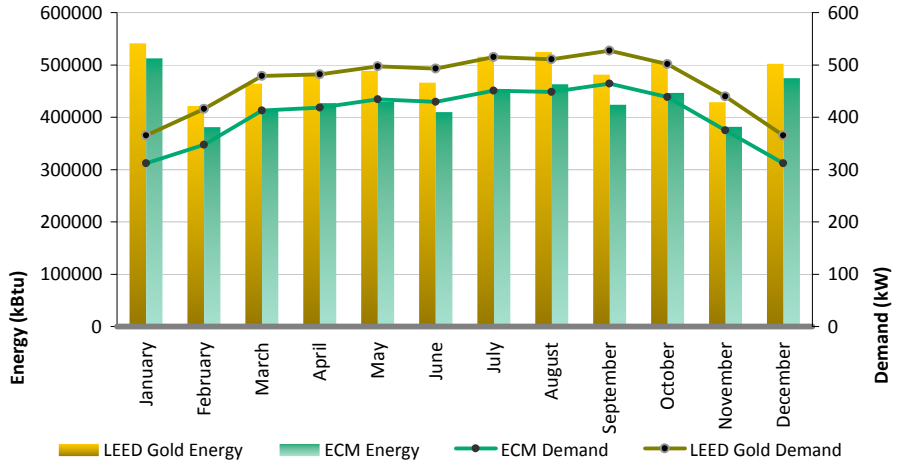
	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	102,785	179,020	#N/A
February	91,273	92,559	#N/A
March	100,389	94,443	#N/A
April	102,983	94,953	#N/A
May	105,207	90,994	#N/A
June	102,522	79,824	#N/A
July	113,713	85,521	#N/A
August	117,233	84,240	#N/A
September	108,794	76,752	#N/A
October	114,647	85,161	#N/A
November	94,985	84,363	#N/A
December	102,151	142,406	#N/A
Totals	1,256,682	1,190,236	#N/A
Savings	108,374	-22,860	#N/A
% Savings	8%	-2%	#N/A Independent
Cost $/sf	$0.34	$ Savings	$17137
Est. Premium	$56100	Simple Payback	3



E-7 High efficiency lighting *ECM*

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	93,132	194,899	312
February	82,993	97,765	347
March	92,855	96,556	413
April	97,218	95,462	418
May	99,223	91,240	434
June	96,789	79,824	429
July	107,677	85,521	451
August	110,945	84,240	448
September	101,755	76,752	464
October	105,910	85,161	438
November	86,690	85,863	375
December	93,127	156,749	312
Totals	**1,168,314**	**1,230,032**	**464**
Savings	**196,742**	**-62,656**	**63**
% Savings	**14%**	**-5%**	**12%** Independent

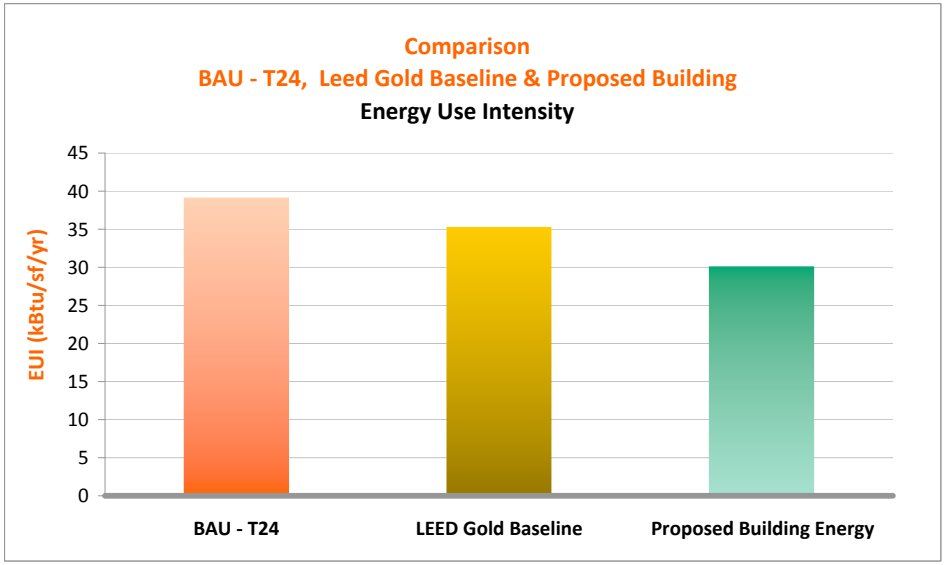
Cost $/sf	**$0.34**	**$ Savings**	**$30993**
Est. Premium	**$56100**	**Simple Payback**	**2**

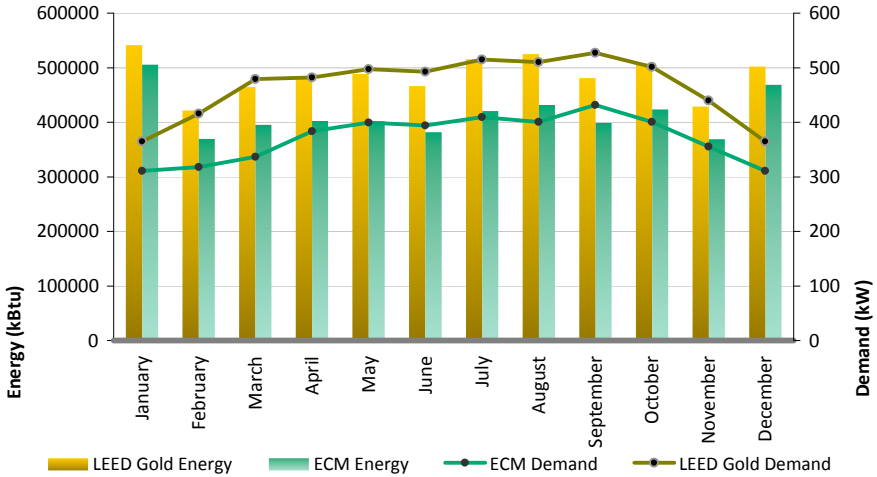


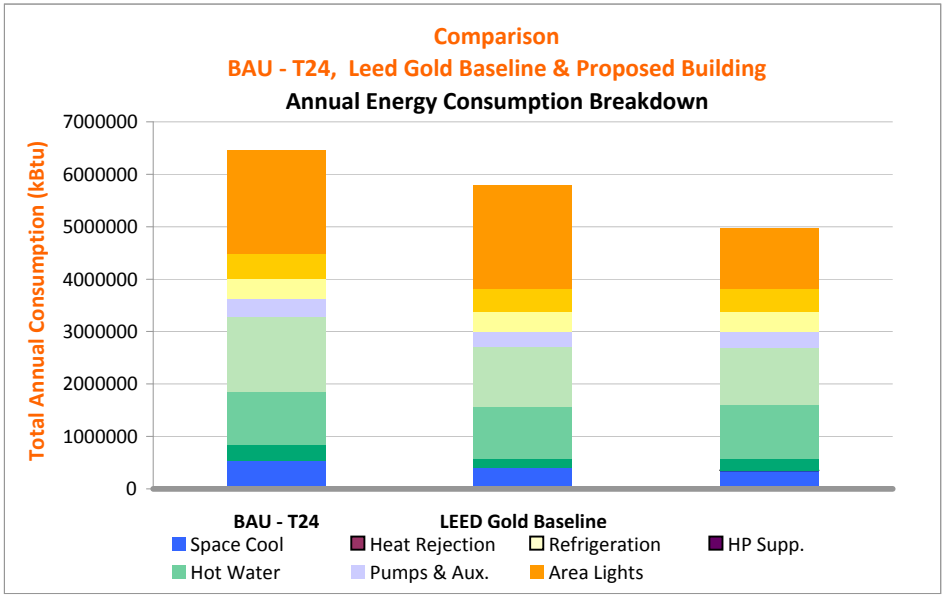
Proposed Building Energy

	Consumption		Demand
	Energy	Gas	Demand
	kWh	kBtu	kW
January	89,393	200,602	311
February	79,170	99,353	318
March	87,256	97,376	337
April	89,791	95,759	384
May	91,021	91,331	400
June	88,584	79,824	394
July	98,234	85,521	410
August	101,848	84,240	401
September	94,309	76,752	432
October	99,163	85,161	400
November	82,519	87,461	355
December	88,963	164,966	311
Totals	1,090,251	1,248,346	432
Savings	274,806	-80,970	95
% Savings	20%	-7%	18% Combined

Cost $/sf	$2.42	$ Savings	$43326
Est. Premium	$399300	Simple Payback	9







Appendix F

Site Energy Profile Summary and Generic Building Energy Profiles

F1 Site Energy Profile Summary and Generic Building Energy Profiles

- Site wide energy profile summaries for each analysis iteration.
- Energy demand profiles and data for each generic building type for each iteration.
- Summary tables include infrastructure loads, as well as historical and existing buildings on-site that are not part of the TI & YB redevelopment.

Treasure Island Site Energy Simulation Results

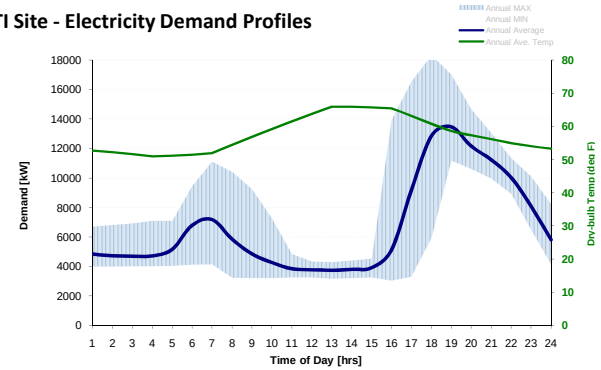
ARUP

ITERATION #1: Minimum Title 24-2008 Perscriptive

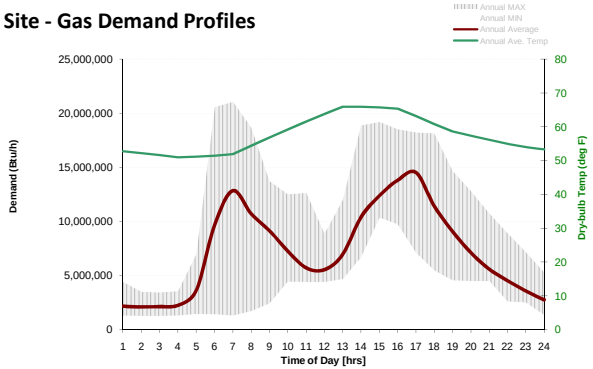
	Representative Models	Representative Models	Treasure Island Site Building Square Footage	Yerba Buena Island Site Building Square Footage	Total Square Footage	Site Building Square Footage Multiplier	Percent of Total Site Square Footage	Representative Model Peak Heating Load	Representative Model Peak Cooling Load	Heating / Cooling Site-Wide Diversity Factor	Demand Site-Wide Diversity Factor	Consumption Site-Wide Diversity Factor	Energy Peak Demand Intensity Assumption	Energy Peak Demand Intensity Assumption	Annual Operating Hours Assumption	Total Site Energy: Demand: Electricity Peak Demand	Total Site Energy: Demand: Gas Peak Demand	Total Site Energy: Consumption: Annual Electricity Consumption	Total Site Energy: Consumption: Annual Gas Consumption	Energy Intensity: Demand: Electricity Peak Demand Intensity	Energy Intensity: Demand: Gas Peak Demand Intensity	Energy Intensity: Consumption: Annual Electricity Consumption Intensity	Energy Intensity: Consumption: Annual Gas Consumption Intensity	Energy Intensity: Consumption: Total Combined Annual Energy Consumption Intensity
		[sq. ft.]	[sq. ft.]	[sq. ft.]	[sq. ft.]	x	[%]	[kBtu/h]	[kBtu/h]	[%]	[%]	[%]	[W/s.f.]	[Btu/s.f.]	[% hrs/yr]	(kW)	(Btu/h)	(kWh/yr)	(therms/yr)	(W/s.f.)	(Btu/h/s.f.)	(kWh/s.f.)	(kBtu/s.f.)	(kBtu/s.f.)
Single Fam	LR Res		771,800	400,000																				
4-Story Flats	LR Res		550,000	0																				
5-Story Flats	LR Res		3,224,100	0																				
LR Res total	LR Res	75,640	4,545,900	400,000	4,945,900	65.4	41%	381	1,122	40%	40%	20%	n/a	n/a	n/a	7364.5	9,544,776	26,538,180	396,560	1.49	1.93	5.37	8.02	26.3
Midrise	MR Res		693,000	0																				
MR Res total	MR Res	130,264	693,000	0	693,000	5.3	6%	608	1,940	40%	40%	20%	n/a	n/a	n/a	1036.3	1,336,686	3,712,256	55,495	1.50	1.93	5.36	8.01	26.3
High Rise	HR Res		1,028,700	0																				
Icon Tower	HR Res		567,000	0																				
Neighborhood Tower	MR Res		2,184,600	0																				
HR Res total	HR Res	240,000	3,780,300	0	3,780,300	15.8	31%	750	3,568	40%	40%	20%	n/a	n/a	n/a	6332.3	7,294,883	21,555,492	303,299	1.68	1.93	5.70	8.02	27.5
New Office	Commercial	100,000	100,000	0	100,000	1.0	1%	1,010	2,735	40%	40%	20%	n/a	n/a	n/a	284.1	873,684	856,177	17,449	2.84	8.74	8.56	17.45	46.7
New Retail	Retail	30,000	270,000	0	270,000	9.0	2%	613	289	40%	40%	20%	n/a	n/a	n/a	677.8	0	2,581,651	0	2.51	0.00	9.56	0.00	32.6
Hotel	Condotel		178,750	24,375																				
Condotel	Condotel		157,950	0																				
Hotel total	Condotel	340,574	336,700	24,375	361,075	1.1	3%	1,330	3,900	40%	40%	20%	n/a	n/a	n/a	593.4	2,034,850	3,422,466	80,048	1.64	5.64	9.48	22.17	54.5
Bldg 1 AR	AR		80,000	0																				
Bldg 2 AR	AR		95,000	0																				
Bldg 3 AR	AR		150,000	0																				
Adaptive Resue Total	AR	100,000	325,000	0	325,000	3.3	3%	3,035	4,105	40%	40%	20%	n/a	n/a	n/a	923.4	2,839,473	2,782,574	56,708	2.84	8.74	8.56	17.45	46.7
Parking Garage	n/a	n/a	1,679,750	36,720	1,716,470	1.0	14%	n/a	n/a	0%	0%	0%	0.60	0.000	100%	1029.9	0	9,021,766	0	0.60	0.00	5.26	0.00	17.9
Existing Bldgs On-Site	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600.0	0	1,569,500	0	n/a	n/a	n/a	n/a	n/a
RESERVED																								
RESERVED																								
RESERVED																								
RESERVED																								
RESERVED																								
RESERVED																								
Treasure Island Site	n/a	n/a	11,730,650	461,095	12,191,745		100%									18,320	20,832,610	77,982,568	852,850	1.50	1.7	6.4	7.0	28.8

= Input Cells

TI Site - Electricity Demand Profiles



TI Site - Gas Demand Profiles



Graphs above show energy demand profiles for Treasure Island site for the following time period: Annual

Treasure Island Site Energy Simulation Results

ARUP

ITERATION #2: City of San Francisco Green Building Ordinance

	Representative Models	Representative Models	Treasure Island Site Building Square Footage	Yerba Buena Island Site Building Square Footage	Total Square Footage	Site Building Square Footage Multiplier	Percent of Total Site Square Footage	Representative Model Peak Heating Load	Representative Model Peak Cooling Load	Heating / Cooling Site-Wide Diversity Factor	Demand Site-Wide Diversity Factor	Consumption Site-Wide Diversity Factor	Energy Peak Demand Intensity Assumption	Energy Peak Demand Intensity Assumption	Annual Operating Hours Assumption	Total Site Energy: Demand: Electricity Peak Demand	Total Site Energy: Demand: Gas Peak Demand	Total Site Energy: Consumption: Annual Electricity Consumption	Total Site Energy: Consumption: Annual Gas Consumption	Energy Intensity: Demand: Electricity Peak Demand Intensity	Energy Intensity: Demand: Gas Peak Demand Intensity	Energy Intensity: Consumption: Annual Electricity Consumption Intensity	Energy Intensity: Consumption: Annual Gas Consumption Intensity	Energy Intensity: Consumption: Total Combined Annual Energy Consumption Intensity
		[sq. ft.]	[sq. ft.]	[sq. ft.]	[sq. ft.]	x	[%]	[kBtu/h]	[kBtu/h]	[%]	[%]	[%]	[W/s.f.]	[Btu/s.f.]	[% hrs/yr]	(kW)	(Btu/h)	(kWh/yr)	(therms/yr)	(W/s.f.)	(Btu/h/s.f.)	(kWh/s.f.)	(kBtu/s.f.)	(kBtu/s.f.)
Single Fam	LR Res		771,800	400,000																				
4-Story Flats	LR Res		550,000	0																				
5-Story Flats	LR Res		3,224,100	0																				
LR Res total	LR Res	75,640	4,545,900	400,000	4,945,900	65.4	41%	383	660	40%	40%	20%	n/a	n/a	n/a	6007.5	9,545,404	22,431,390	396,767	1.21	1.93	4.54	8.02	23.5
Midrise	MR Res		693,000	0																				
MR Res total	MR Res	130,264	693,000	0	693,000	5.3	6%	636	1,316	40%	40%	20%	n/a	n/a	n/a	791.1	1,336,817	3,132,765	55,534	1.14	1.93	4.52	8.01	23.4
High Rise	HR Res		1,028,700	0																				
Icon Tower	HR Res		567,000	0																				
Neighborhood Tower	MR Res		2,184,600	0																				
HR Res total	HR Res	240,000	3,780,300	0	3,780,300	15.8	31%	1,120	2,190	40%	40%	20%	n/a	n/a	n/a	5262.7	7,295,015	18,148,676	303,420	1.39	1.93	4.80	8.03	24.4
New Office	Commercial	100,000	100,000	0	100,000	1.0	1%	1,075	1,682	40%	40%	20%	n/a	n/a	n/a	224.5	873,180	707,086	15,352	2.24	8.73	7.07	15.35	39.5
New Retail	Retail	30,000	270,000	0	270,000	9.0	2%	560	420	40%	40%	20%	n/a	n/a	n/a	546.4	0	2,260,914	0	2.02	0.00	8.37	0.00	28.6
Hotel	Condotel		178,750	24,375																				
Condotel	Condotel		157,950	0																				
Hotel total	Condotel	340,574	336,700	24,375	361,075	1.1	3%	1,170	2,651	40%	40%	20%	n/a	n/a	n/a	502.1	1,910,750	3,076,591	76,517	1.39	5.29	8.52	21.19	50.3
Bldg 1 AR	AR		80,000	0																				
Bldg 2 AR	AR		95,000	0																				
Bldg 3 AR	AR		150,000	0																				
Adaptive Resue Total	AR	100,000	325,000	0	325,000	3.3	3%	2,840	3,464	40%	40%	20%	n/a	n/a	n/a	729.5	2,837,835	2,298,031	49,893	2.24	8.73	7.07	15.35	39.5
Parking Garage	n/a	n/a	1,679,750	36,720	1,716,470	1.0	14%	n/a	n/a	0%	0%	0%	0.60	0.000	100%	1029.9	0	9,021,766	0	0.60	0.00	5.26	0.00	17.9
Existing Bldgs On-Site	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600.0	0	1,569,500	0	n/a	n/a	n/a	n/a	n/a
RESERVED																								
RESERVED																								
RESERVED																								
RESERVED																								
RESERVED																								
RESERVED																								
Treasure Island Site	n/a	n/a	11,730,650	461,095	12,191,745		100%									15,458	20,608,049	68,864,155	847,590	1.27	1.7	5.6	7.0	26.2

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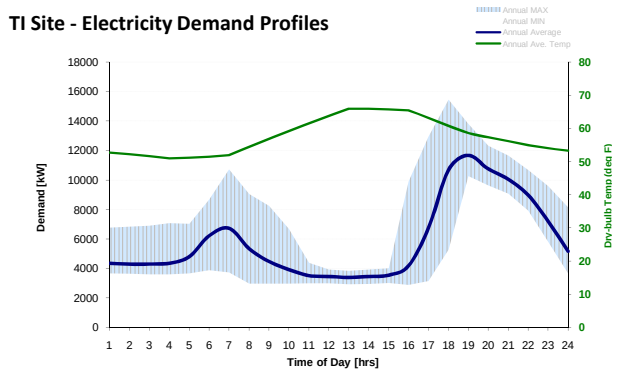

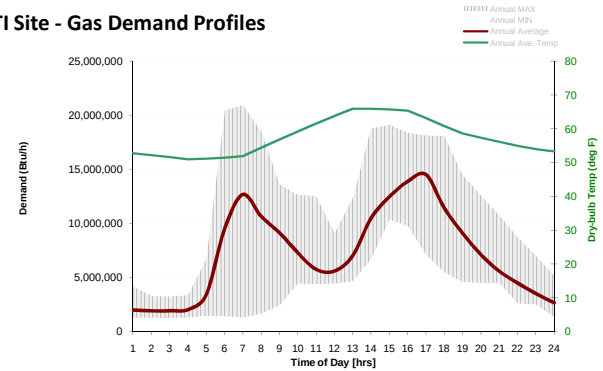

Graphs above show energy demand profiles for Treasure Island site for the following time period: Annual

Treasure Island Site Energy Simulation Results

ARUP

ITERATION #3: % Construction Cost Premium for Energy Measures

	Representative Models	Representative Models	**Treasure Island** Site Building Square Footage	**Yerba Buena** Island Site Building Square Footage	Total Square Footage	Site Building Square Footage Multiplier	Percent of Total Site Square Footage	Representative Model Peak Heating Load	Representative Model Peak Cooling Load	Heating / Cooling Site-Wide Diversity Factor	Demand Site-Wide Diversity Factor	Consumption Site-Wide Diversity Factor	Energy Peak Demand Intensity Assumption	Energy Peak Demand Intensity Assumption	Annual Operating Hours Assumption	Total Site Energy – Demand: Electricity Peak Demand	Total Site Energy – Demand: Gas Peak Demand	Total Site Energy – Consumption: Annual Electricity Consumption	Total Site Energy – Consumption: Annual Gas Consumption	Energy Intensity – Demand: Electricity Peak Demand Intensity	Energy Intensity – Demand: Gas Peak Demand Intensity	Energy Intensity – Consumption: Annual Electricity Consumption Intensity	Energy Intensity – Consumption: Annual Gas Consumption Intensity	Energy Intensity – Consumption: Total Combined Annual Energy Consumption Intensity
		[sq. ft.]	[sq. ft.]	[sq. ft.]	[sq. ft.]	x	[%]	[kBtu/h]	[kBtu/h]	[%]	[%]	[%]	[W/s.f.]	[Btu/s.f.]	[% hrs/yr]	(kW)	(Btu/h)	(kWh/yr)	(therms/yr)	(W/s.f.)	(Btu/h/s.f.)	(kWh/s.f.)	(kBtu/s.f.)	(kBtu/s.f.)
Single Fam	LR Res		771,800	400,000																				
4-Story Flats	LR Res		550,000	0																				
5-Story Flats	LR Res		3,224,100	0																				
LR Res total	LR Res	75,640	4,545,900	400,000	4,945,900	65.4	41%	392	638	40%	40%	20%	n/a	n/a	n/a	4841.1	9,545,639	20,045,241	396,806	0.98	1.93	4.05	8.02	21.9
Midrise	MR Res		693,000	0																				
MR Res total	MR Res	130,264	693,000	0	693,000	5.3	6%	651	1,250	40%	40%	20%	n/a	n/a	n/a	646.6	1,336,852	2,758,213	55,539	0.93	1.93	3.98	8.01	21.6
High Rise	HR Res		1,028,700	0																				
Icon Tower	HR Res		567,000	0																				
Neighborhood Tower	MR Res		2,184,600	0																				
HR Res total	HR Res	240,000	3,780,300	0	3,780,300	15.8	31%	1,145	2,068	40%	40%	20%	n/a	n/a	n/a	4342.2	7,294,987	16,300,108	303,414	1.15	1.93	4.31	8.03	22.7
New Office	Commercial	100,000	100,000	0	100,000	1.0	1%	758	1,274	40%	40%	20%	n/a	n/a	n/a	168.0	672,000	602,582	15,746	1.68	6.72	6.03	15.75	36.3
New Retail	Retail	30,000	270,000	0	270,000	9.0	2%	545	353	40%	40%	20%	n/a	n/a	n/a	510.8	0	2,016,130	0	1.89	0.00	7.47	0.00	25.5
Hotel	Condotel		178,750	24,375																				
Condotel	Condotel		157,950	0																				
Hotel total	Condotel	340,574	336,700	24,375	361,075	1.1	3%	1,073	2,362	40%	40%	20%	n/a	n/a	n/a	405.3	1,704,794	2,456,783	71,629	1.12	4.72	6.80	19.84	43.1
Bldg 1 AR	AR		80,000	0																				
Bldg 2 AR	AR		95,000	0																				
Bldg 3 AR	AR		150,000	0																				
Adaptive Resue Total	AR	100,000	325,000	0	325,000	3.3	3%	2,888	3,136	40%	40%	20%	n/a	n/a	n/a	546.0	2,184,000	1,958,390	51,174	1.68	6.72	6.03	15.75	36.3
Parking Garage	n/a	n/a	1,679,750	36,720	1,716,470	1.0	14%	n/a	n/a	0%	0%	0%	0.60	0.000	100%	1029.9	0	9,021,766	0	0.60	0.00	5.26	0.00	17.9
Existing Bldgs On-Site	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600.0	0	1,569,500	0	n/a	n/a	n/a	n/a	n/a
RESERVED																								
RESERVED																								
RESERVED																								
RESERVED																								
RESERVED																								
RESERVED																								
Treasure Island Site	n/a	n/a	11,730,650	461,095	12,191,745		100%									12,993	20,245,621	63,087,468	843,134	1.07	1.7	5.2	6.9	24.6

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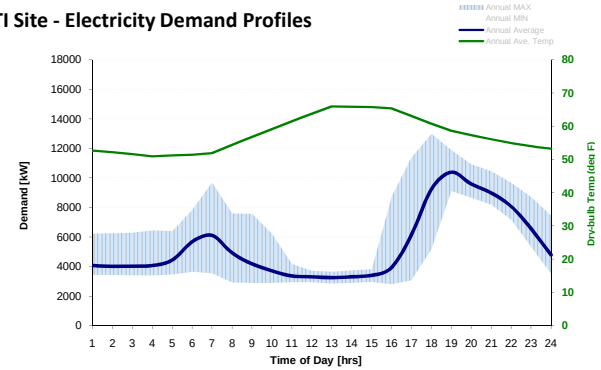
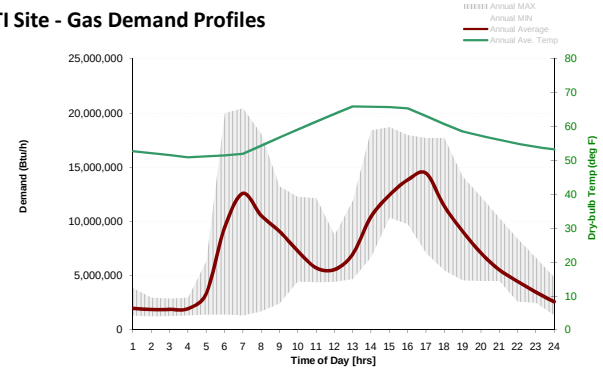
TI Site - Electricity Demand Profiles



TI Site - Gas Demand Profiles



Graphs above show energy demand profiles for Treasure Island site for the following time period: Annual

Treasure Island Site Energy Simulation Results

ARUP

ITERATION #4: % cost premium minus LR & MR Res cooling

	Representative Models	Representative Models	Treasure Island Site Building Square Footage	Yerba Buena Island Site Building Square Footage	Total Square Footage	Site Building Square Footage Multiplier	Percent of Total Site Square Footage	Representative Model Peak Heating Load	Representative Model Peak Cooling Load	Heating / Cooling Site-Wide Diversity Factor	Demand Site-Wide Diversity Factor	Consumption Site-Wide Diversity Factor	Energy Peak Demand Intensity Assumption	Energy Peak Demand Intensity Assumption	Annual Operating Hours Assumption	Total Site Energy: Demand: Electricity Peak Demand	Total Site Energy: Demand: Gas Peak Demand	Total Site Energy: Consumption: Annual Electricity Consumption	Total Site Energy: Consumption: Annual Gas Consumption	Energy Intensity: Demand: Electricity Peak Demand Intensity	Energy Intensity: Demand: Gas Peak Demand Intensity	Energy Intensity: Consumption: Annual Electricity Consumption Intensity	Energy Intensity: Consumption: Annual Gas Consumption Intensity	Energy Intensity: Consumption: Total Combined Annual Energy Consumption Intensity
		[sq. ft.]	[sq. ft.]	[sq. ft.]	[sq. ft.]	x	[%]	[kBtu/h]	[kBtu/h]	[%]	[%]	[%]	[W/s.f.]	[Btu/s.f.]	[% hrs/yr]	(kW)	(Btu/h)	(kWh/yr)	(therms/yr)	(W/s.f.)	(Btu/h/s.f.)	(kWh/s.f.)	(kBtu/s.f.)	(kBtu/s.f.)
Single Fam	LR Res		771,800	400,000																				
4-Story Flats	LR Res		550,000	0																				
5-Story Flats	LR Res		3,224,100	0																				
LR Res total	LR Res	75,640	4,545,900	400,000	4,945,900	65.4	41%	392	0	40%	40%	20%	n/a	n/a	n/a	3567.8	30,519,760	16,028,753	511,597	0.72	6.17	3.24	10.34	21.4
Midrise	MR Res		693,000	0																				
MR Res total	MR Res	130,264	693,000	0	693,000	5.3	6%	651	0	40%	40%	20%	n/a	n/a	n/a	489.9	3,670,776	2,170,700	77,182	0.71	5.30	3.13	11.14	21.8
High Rise	HR Res		1,028,700	0																				
Icon Tower	HR Res		567,000	0																				
Neighborhood Tower	MR Res		2,184,600	0																				
HR Res total	HR Res	240,000	3,780,300	0	3,780,300	15.8	31%	1,145	2,068	40%	40%	20%	n/a	n/a	n/a	4342.2	7,294,987	16,300,108	303,414	1.15	1.93	4.31	8.03	22.7
New Office	Commercial	100,000	100,000	0	100,000	1.0	1%	758	1,274	40%	40%	20%	n/a	n/a	n/a	168.0	672,000	602,582	15,746	1.68	6.72	6.03	15.75	36.3
New Retail	Retail	30,000	270,000	0	270,000	9.0	2%	545	353	40%	40%	20%	n/a	n/a	n/a	510.8	0	2,016,130	0	1.89	0	7.47	0	25.5
Hotel	Condotel		178,750	24,375																				
Condotel	Condotel		157,950	0																				
Hotel total	Condotel	340,574	336,700	24,375	361,075	1.1	3%	1,073	2,362	40%	40%	20%	n/a	n/a	n/a	405.3	1,704,794	2,456,783	71,629	1.12	4.72	6.80	19.84	43.1
Bldg 1 AR	AR		80,000	0																				
Bldg 2 AR	AR		95,000	0																				
Bldg 3 AR	AR		150,000	0																				
Adaptive Resue Total	AR	100,000	325,000	0	325,000	3.3	3%	2,888	3,136	40%	40%	20%	n/a	n/a	n/a	546.0	2,184,000	1,958,390	51,174	1.68	6.72	6.03	15.75	36.3
Parking Garage	n/a	n/a	1,679,750	36,720	1,716,470	1.0	14%	n/a	n/a	0%	0%	0%	0.60	0.000	100%	1029.9	0	9,021,766	0	0.60	0	5.26	0	17.9
Existing Bldgs On-Site	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600.0	0	1,569,500	0	n/a	n/a	n/a	n/a	n/a
RESERVED																								
RESERVED																								
RESERVED																								
RESERVED																								
RESERVED																								
RESERVED																								
Treasure Island Site	n/a	n/a	11,730,650	461,095	12,191,745		100%									11,435	42,553,072	58,483,468	979,568	0.94	3.5	4.8	8.0	24.4

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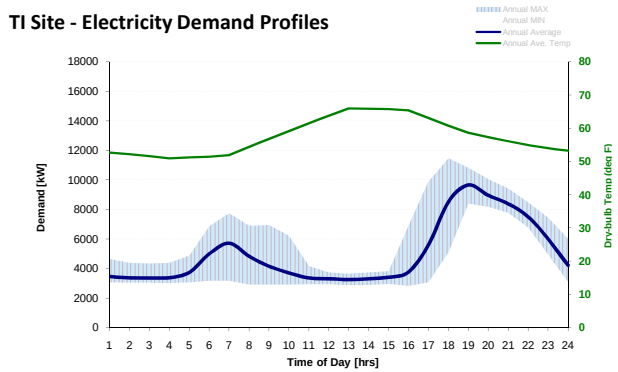
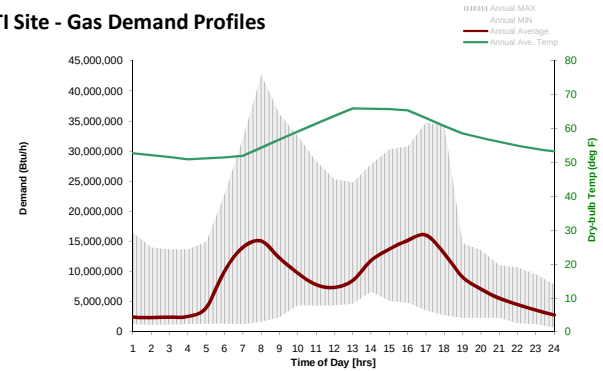
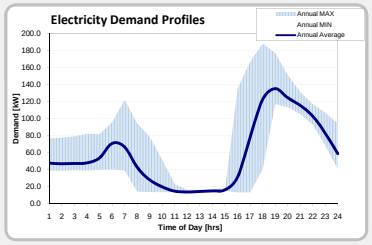


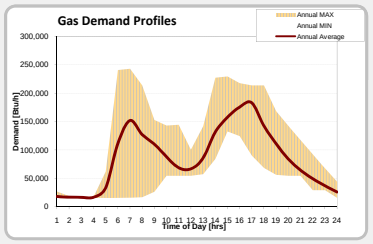


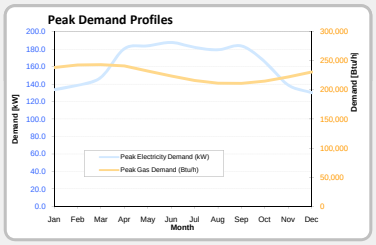
Graphs above show energy demand profiles for Treasure Island site for the following time period: Annual

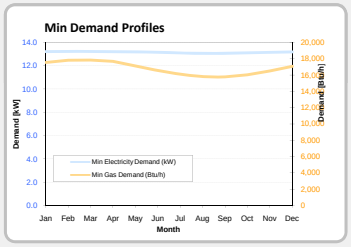
Low-Rise Residential eQUEST Simulation Results

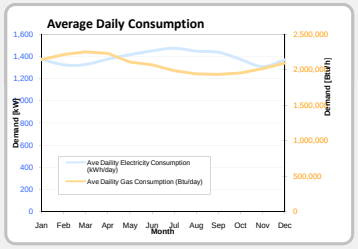
ITERATION: Title 24 - 2008 baseline











Electricity Demand Profiles - LR Res

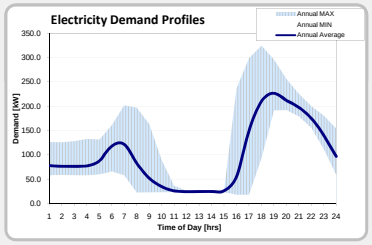
Hour	Annual Average	Annual MAX	Annual MIN	Jan Average	Jan MAX	Jan MIN	Feb Average	Feb MAX	Feb MIN	Mar Average	Mar MAX	Mar MIN	Apr Average	Apr MAX	Apr MIN	May Average	May MAX	May MIN	Jun Average	Jun MAX	Jun MIN	Jul Average	Jul MAX	Jul MIN	Aug Average	Aug MAX	Aug MIN	Sep Average	Sep MAX	Sep MIN	Oct Average	Oct MAX	Oct MIN	Nov Average	Nov MAX	Nov MIN	Dec Average	Dec MAX	Dec MIN
	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)
1	47.9	76.3	38.5	55.9	76.3	42.8	48.5	60.6	41.9	46.6	60.2	41.1	44.7	51.8	41.8	44.5	46.7	39.7	45.3	48.0	42.0	45.2	48.4	43.5	45.3	48.1	43.5	45.9	50.4	43.6	44.7	52.6	40.6	47.9	62.5	38.5	55.2	69.4	43.3
2	46.6	77.4	38.5	55.0	77.4	42.6	47.9	59.4	41.5	45.4	55.2	41.3	44.3	49.7	41.8	44.0	45.8	40.8	44.4	47.0	39.5	44.7	46.1	43.5	44.7	46.0	43.2	44.7	50.2	41.9	43.6	45.8	38.5	45.9	62.0	40.0	54.8	74.3	45.4
3	47.0	79.0	39.1	55.7	79.0	43.0	48.4	56.8	43.0	46.3	57.1	42.6	44.6	51.7	40.4	44.1	47.4	40.8	44.3	46.5	40.6	44.7	45.6	43.8	44.6	46.1	42.5	44.6	48.9	41.4	43.3	46.0	39.1	46.8	62.7	39.9	56.5	77.1	45.3
4	47.6	81.9	38.7	56.2	81.9	42.8	49.7	61.4	43.5	47.3	61.8	41.9	45.5	53.2	40.8	44.1	47.7	42.0	44.2	46.0	39.3	44.7	45.6	42.7	44.6	45.9	42.7	44.5	48.2	40.7	43.5	48.3	38.7	48.3	66.5	39.7	58.9	81.0	45.3
5	53.5	81.4	39.4	56.4	81.4	43.3	50.8	62.4	43.8	48.1	63.3	41.2	54.7	67.2	41.6	52.9	59.5	42.6	54.5	59.6	44.0	54.4	59.2	43.5	54.4	59.4	43.4	54.2	61.8	42.4	52.8	61.8	41.8	49.1	64.2	39.4	59.3	78.7	45.4
6	70.6	95.8	40.1	64.8	95.4	42.8	60.8	70.5	44.3	59.0	77.2	40.1	77.1	95.8	46.5	74.1	90.1	46.6	78.8	94.2	45.2	76.3	91.5	48.7	77.2	90.0	47.7	77.1	93.0	47.4	73.8	90.1	44.3	58.5	78.8	43.2	68.7	90.3	48.3
7	66.4	121.8	38.7	82.9	121.8	45.2	81.8	105.3	47.3	80.8	104.5	45.6	58.1	88.2	46.4	54.6	59.9	45.8	56.0	57.6	45.8	55.1	65.2	45.5	54.5	57.4	45.8	54.0	57.4	45.5	54.0	59.7	45.5	78.0	105.1	47.7	87.9	116.7	51.7
8	42.7	94.0	14.0	57.8	64.5	46.2	57.0	60.0	46.8	57.0	60.0	45.6	31.3	71.2	14.2	33.9	80.6	14.1	31.2	88.5	14.1	34.3	94.0	14.0	31.8	82.6	14.0	32.3	82.9	14.0	31.7	79.2	14.0	55.2	59.8	45.8	59.5	73.4	50.4
9	27.5	78.4	13.8	35.6	75.6	14.2	30.7	66.8	14.2	28.3	74.5	14.2	24.0	72.6	14.0	26.0	48.7	14.0	23.0	48.6	13.9	24.8	48.6	13.9	23.7	48.5	13.8	24.0	48.5	13.8	26.8	75.7	13.8	30.9	72.9	14.1	32.8	78.4	14.1
10	19.6	51.0	13.2	28.3	51.0	14.0	25.1	48.8	14.0	23.1	51.0	14.0	16.1	48.7	13.3	15.5	20.2	13.3	14.9	20.1	13.2	15.2	20.1	13.2	15.0	20.1	13.2	15.1	20.0	13.2	16.3	47.2	13.2	25.3	49.4	13.9	26.0	50.9	13.9
11	14.3	22.5	13.1	16.3	22.5	13.3	15.4	20.3	13.3	15.0	22.5	13.3	13.7	20.3	13.2	13.4	13.8	13.2	13.4	13.8	13.2	13.4	13.7	13.1	13.3	13.7	13.1	13.3	13.7	13.1	13.5	19.0	13.1	15.4	21.3	13.2	15.7	22.4	13.3
12	13.5	16.1	13.1	13.8	16.1	13.2	13.4	13.9	13.2	13.5	13.9	13.2	13.6	13.9	13.4	13.6	13.8	13.5	13.5	13.8	13.5	13.5	13.8	13.4	13.5	13.7	13.4	13.5	13.7	13.4	13.5	13.8	13.1	13.4	13.8	13.1	13.6	16.1	13.2
13	13.9	16.1	13.5	13.9	16.1	13.5	13.6	13.9	13.5	13.6	13.9	13.5	14.1	14.8	13.5	14.2	14.8	14.0	14.1	14.7	13.9	14.1	14.6	13.9	14.0	14.6	13.9	14.0	14.6	13.9	14.1	14.6	13.6	13.5	13.8	13.5	13.8	16.1	13.5
14	14.8	17.0	13.9	14.5	17.0	14.0	14.2	14.8	14.0	14.2	14.8	14.0	15.2	16.5	14.0	15.3	16.4	15.0	15.2	16.3	14.9	15.1	16.2	14.9	15.1	16.2	14.9	15.1	16.2	14.8	15.1	16.2	14.3	14.1	14.7	13.9	14.2	16.2	14.0
15	15.9	17.6	14.9	15.6	17.6	15.1	15.3	16.5	15.1	15.3	16.5	15.1	16.5	17.0	15.1	16.3	16.9	15.1	16.4	16.8	15.0	16.3	16.8	15.0	16.3	16.7	14.9	16.3	16.7	14.9	16.2	16.8	15.0	15.2	16.3	14.9	15.2	16.4	15.0
16	30.7	135.4	13.1	16.5	19.2	15.2	16.5	17.0	15.2	16.7	18.0	15.2	31.3	105.5	13.4	45.0	129.9	13.3	38.1	118.6	13.2	46.0	135.4	13.1	41.9	124.9	13.1	42.0	129.7	13.1	40.6	126.8	13.1	16.3	16.8	15.0	16.4	16.9	15.1
17	77.5	166.6	13.2	31.3	83.7	13.3	31.5	89.5	13.4	30.5	105.7	13.4	95.7	140.9	13.4	111.9	155.1	49.9	116.1	152.6	69.1	121.4	166.6	83.4	117.4	153.2	66.5	114.5	160.3	64.6	98.4	152.8	39.8	30.9	82.2	13.2	27.2	60.1	13.3
18	122.2	187.7	39.9	73.1	112.0	45.1	72.4	121.2	40.1	79.3	133.9	45.1	146.1	180.6	52.6	158.6	183.8	128.2	165.5	187.7	135.2	167.9	182.1	144.1	164.6	179.3	138.8	157.2	183.7	132.7	142.1	165.5	126.5	69.9	115.2	39.9	66.3	101.4	43.9
19	135.0	176.9	116.7	124.7	133.6	116.7	127.0	138.7	119.7	132.3	147.6	120.5	133.9	155.5	122.5	139.5	165.0	122.0	148.0	176.9	125.4	148.8	164.6	132.0	143.7	161.2	130.6	139.8	152.7	125.7	131.4	145.9	120.7	127.2	138.8	120.5	122.8	130.2	117.4
20	124.3	150.9	113.4	118.6	124.2	113.6	120.4	127.5	114.8	123.9	135.3	116.9	122.0	138.2	115.4	124.5	141.2	115.8	130.9	150.9	116.2	132.0	141.9	122.1	129.1	140.7	120.8	128.5	139.3	119.5	122.8	135.7	113.6	120.9	127.9	115.8	117.5	122.0	113.4
21	115.2	131.3	104.9	113.0	120.1	108.5	114.3	119.8	110.0	117.1	126.4	110.4	112.4	123.2	107.4	113.3	124.9	107.5	117.7	131.3	107.5	118.7	125.3	110.3	117.4	125.5	109.8	118.0	126.8	111.4	113.5	125.7	104.9	114.5	121.0	108.8	112.2	119.4	106.3
22	102.6	116.7	92.4	106.1	116.2	99.0	106.2	111.7	101.4	108.9	116.6	101.8	97.7	110.9	92.6	97.3	103.6	92.6	100.6	108.5	94.0	101.5	105.2	95.8	100.9	106.8	96.0	101.7	107.2	97.1	98.5	113.4	92.4	106.6	110.7	99.9	105.9	116.7	100.5
23	82.5	106.5	67.7	94.0	105.5	88.1	91.7	95.9	88.4	94.4	100.7	91.2	73.9	96.0	67.9	72.5	78.2	67.7	74.8	79.7	71.3	76.0	79.9	72.4	75.5	79.7	71.4	76.5	84.2	69.3	74.1	97.2	68.0	93.0	98.5	88.9	94.2	106.5	88.4
24	58.5	93.8	40.2	75.2	93.8	67.1	70.3	75.8	64.8	70.8	76.5	67.1	49.0	74.0	43.1	46.9	54.5	40.2	48.2	57.7	43.1	49.5	57.5	43.0	48.7	57.8	43.7	49.8	59.2	44.2	48.4	76.5	41.1	70.4	79.1	66.4	75.1	88.2	65.6
	1,390	2,192	984	1,375	1,802	1,113	1,323	1,628	1,117	1,327	1,707	1,118	1,375	1,857	1,038	1,416	1,758	1,148	1,449	1,796	1,183	1,474	1,798	1,239	1,447	1,748	1,211	1,437	1,779	1,191	1,373	1,826	1,119	1,307	1,654	1,099	1,370	1,739	1,136
		187.7			133.6			138.7			147.6			180.6			183.8			187.7			182.1			179.3			183.7			165.5			138.8			130.2	
			13.1			13.2			13.2			13.2			13.2			13.2			13.2			13.1			13.1			13.1			13.1			13.1			13.2

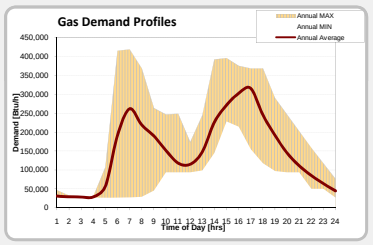
Gas Demand Profiles - LR Res

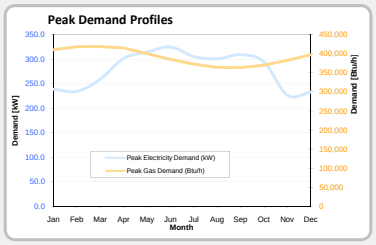
Hour	Annual Average	Annual MAX	Annual MIN	Jan Average	Jan MAX	Jan MIN	Feb Average	Feb MAX	Feb MIN	Mar Average	Mar MAX	Mar MIN	Apr Average	Apr MAX	Apr MIN	May Average	May MAX	May MIN	Jun Average	Jun MAX	Jun MIN	Jul Average	Jul MAX	Jul MIN	Aug Average	Aug MAX	Aug MIN	Sep Average	Sep MAX	Sep MIN	Oct Average	Oct MAX	Oct MIN	Nov Average	Nov MAX	Nov MIN	Dec Average	Dec MAX	Dec MIN
	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)
1	18,259	27,068	15,790	21,049	26,600	17,546	20,777	27,028	17,815	20,204	27,068	17,822	18,264	26,764	17,687	17,529	18,227	17,133	16,873	17,639	16,589	16,447	17,124	16,119	16,115	16,809	15,825	16,097	16,783	15,790	16,642	24,175	16,037	19,324	24,951	16,499	19,898	25,831	17,072
2	17,005	19,001	15,797	18,005	18,694	17,564	18,206	18,978	17,837	18,140	19,001	17,842	17,756	18,798	17,698	17,168	17,192	17,142	16,614	16,637	16,590	16,143	16,153	16,129	15,848	15,861	15,833	15,821	15,838	15,797	16,110	17,050	16,047	16,886	17,586	16,520	17,447	18,179	17,092
3	16,864	17,901	15,800	17,595	17,627	17,563	17,863	17,880	17,846	17,868	17,901	17,844	17,728	17,757	17,706	17,174	17,196	17,148	16,620	16,644	16,594	16,149	16,158	16,134	15,854	15,867	15,839	15,827	15,844	15,800	16,085	16,103	16,054	16,562	16,593	16,528	17,118	17,139	17,096
4	16,869	17,907	15,804	17,599	17,629	17,571	17,869	17,884	17,854	17,874	17,907	17,850	17,734	17,762	17,712	17,179	17,200	17,153	16,625	16,648	16,598	16,154	16,163	16,140	15,858	15,872	15,844	15,832	15,849	15,804	16,090	16,110	16,061	16,569	16,596	16,535	17,122	17,142	17,102
5	33,267	62,437	15,830	17,601	17,631	17,574	17,872	17,887	17,858	17,879	17,912	17,854	47,519	62,437	17,725	44,955	60,247	17,163	47,011	58,082	16,610	43,273	56,195	16,153	43,639	55,015	15,848	43,181	54,915	15,830	41,763	55,903	16,074	16,574	16,599	16,540	17,125	17,144	17,108
6	111,445	241,125	15,832	44,665	61,786	17,579	48,416	62,892	17,863	51,327	62,979	17,859	169,841	241,125	17,731	156,384	232,436	17,175	168,809	223,801	16,617	152,053	216,309	16,159	154,994	211,577	15,858	152,819	211,175	15,832	144,753	215,051	16,078	44,012	57,752	16,553	46,065	59,864	17,109
7	152,064	243,288	15,804	153,264	238,408	17,578	170,895	242,927	17,868	185,387	243,288	17,862	164,332	241,114	18,801	141,212	204,443	18,208	151,324	196,857	17,610	137,074	190,280	17,114	139,038	186,124	16,796	137,210	185,771	16,770	130,699	189,177	16,096	154,022	222,367	16,557	162,093	230,746	17,112
8	127,206	213,977	17,052	138,663	209,697	18,632	153,718	213,664	18,948	166,032	213,977	18,943	128,635	212,063	29,383	112,638	146,283	28,402	117,125	140,874	27,403	108,446	136,184	26,569	108,069	133,228	26,053	107,028	132,980	26,005	104,013	135,413	17,052	138,501	195,608	17,540	145,608	202,966	18,135
9	110,359	153,065	26,467	111,629	150,051	29,093	120,826	152,854	29,614	128,070	153,065	29,619	116,886	151,706	61,040	109,677	136,277	58,909	108,588	131,220	56,757	103,931	126,881	54,923	101,164	124,132	53,779	100,756	123,899	53,679	100,682	126,178	26,467	108,896	139,994	27,280	114,015	145,249	28,264
10	88,078	143,141	54,649	110,569	139,823	60,402	115,206	142,432	61,528	118,163	142,642	61,568	79,803	143,141	62,275	76,532	138,037	60,055	70,485	132,916	57,869	70,733	128,515	56,022	66,948	125,729	54,856	67,225	125,495	54,743	70,337	127,808	54,649	104,173	130,438	56,439	108,399	135,373	58,568
11	68,737	144,496	54,707	79,215	141,644	61,705	78,174	144,288	62,800	76,095	144,496	62,860	69,826	143,159	62,247	67,442	96,158	60,020	63,551	92,637	57,833	62,632	89,578	55,985	60,256	87,661	54,826	60,326	87,513	54,707	62,928	89,118	55,726	71,387	132,119	57,630	73,612	137,129	59,809
12	66,894	100,681	54,675	69,525	98,731	61,714	69,685	100,540	62,788	68,813	100,681	62,843	71,048	99,709	62,224	71,133	93,243	59,991	65,928	89,852	57,806	65,409	86,876	55,954	63,059	85,019	54,803	63,219	84,886	54,675	65,341	86,432	55,693	63,757	92,102	57,626	65,957	95,611	59,809
13	85,831	142,135	57,620	74,046	95,766	61,710	73,278	97,517	62,776	71,331	97,649	62,831	100,026	142,135	62,319	103,490	137,029	87,956	96,090	131,997	84,719	95,207	127,587	81,953	91,731	124,822	80,230	91,944	124,627	80,040	94,774	126,903	81,532	67,510	89,330	57,620	69,731	92,745	59,804
14	131,585	227,602	84,360	107,560	140,690	90,400	106,661	143,310	92,021	104,044	143,504	92,121	157,553	227,602	91,343	161,718	219,392	146,064	152,611	211,260	140,639	149,936	204,164	135,980	144,532	199,697	133,056	144,640	199,372	132,749	148,552	203,023	117,571	98,078	131,179	84,360	101,342	136,212	87,557
15	157,559	229,742	132,710	166,638	225,177	149,988	167,376	229,434	152,761	165,515	229,742	152,955	166,320	227,607	151,515	164,195	207,984	146,040	154,006	200,280	140,621	151,567	193,553	135,963	146,456	189,314	133,027	146,620	189,027	132,710	151,313	192,482	135,185	152,965	209,895	139,885	158,347	217,957	145,207
16	175,647	217,804	124,747	169,923	213,483	149,958	169,833	217,521	152,734	166,980	217,804	152,927	198,272	215,757	142,436	190,572	204,377	137,270	187,473	196,718	132,194	179,352	190,105	127,762	175,563	185,956	125,019	174,879	185,630	124,747	177,860	189,146	127,034	155,773	198,969	139,846	161,170	206,647	145,183
17	183,250	213,948	90,247	193,394	209,768	140,861	200,398	213,662	143,487	204,183	213,948	143,693	195,050	211,981	102,965	180,592	204,367	99,260	180,504	196,706	95,617	171,213	190,083	92,421	168,076	185,946	90,472	167,155	185,611	90,247	168,261	189,143	91,915	182,095	195,535	131,395	189,478	202,993	136,429
18	142,540	213,949	68,561	181,904	209,760	101,850	190,874	213,667	103,728	196,847	213,949	103,869	129,260	211,931	78,092	116,750	160,853	75,318	113,769	154,915	72,579	110,003	149,744	70,195	106,370	146,473	68,713	106,121	146,233	68,561	108,839	148,897	69,799	172,766	195,531	95,060	180,102	202,994	98,678
19	111,301	168,458	56,426	118,449	165,090	77,266	121,915	168,185	78,676	123,651	168,458	78,778	118,191	166,833	64,222	110,294	136,608	61,954	108,994	131,578	59,714	104,410	127,205	57,764	101,618	124,433	56,558	101,220	124,226	56,426	102,556	126,484	57,455	110,423	153,914	72,155	114,712	159,828	74,876
20	84,551	143,026	54,653	111,322	140,166	63,549	115,801	142,790	64,700	118,595	143,026	64,783	74,362	141,671	62,159	68,504	112,236	59,978	64,623	108,120	57,816	63,877	104,544	55,933	60,996	102,279	54,766	61,085	102,108	54,653	63,594	103,955	55,637	104,786	130,736	59,381	109,016	135,711	61,596
21	64,232	117,473	54,676	70,283	115,142	61,510	70,560	117,285	62,627	69,895	117,473	62,705	67,008	116,381	62,169	64,629	88,141	59,992	61,544	84,927	57,830	60,276	82,136	55,953	58,182	80,371	54,782	58,183	80,238	54,676	59,950	81,681	55,648	64,265	107,439	57,484	66,430	111,488	59,615
22	50,086	92,227	29,404	66,294	90,416	61,519	66,962	92,080	62,638	66,643	92,227	62,716	44,083	91,374	33,264	42,382	65,278	32,138	38,530	62,922	31,011	38,832	60,874	30,069	37,063	59,585	29,471	37,248	59,487	29,404	39,465	60,546	29,922	61,196	84,402	57,492	63,342	87,567	59,620
23	37,229	68,278	29,421	44,305	66,960	32,980	43,202	68,168	33,537	41,460	68,278	33,569	36,827	67,647	33,280	35,676	42,503	32,155	33,601	41,002	31,035	33,068	39,697	30,086	32,095	38,879	29,486	32,124	38,817	29,421	33,654	53,202	29,936	39,943	62,542	30,895	41,093	64,877	32,007
24	26,151	44,425	15,769	36,902	43,599	32,992	36,872	44,352	33,549	36,267	44,425	33,579	21,727	44,013	17,665	19,963	25,931	17,111	18,831	25,053	16,558	19,003	24,287	16,098	17,873	23,812	15,806	18,176	23,776	15,769	19,652	38,679	16,027	34,041	40,767	30,908	35,164	42,276	32,014
	2,076,980	3,263,153	1,116,800	2,140,399	2,854,338	1,379,103	2,213,242	2,907,225	1,403,853	2,251,263	2,911,400	1,405,292	2,228,050	3,240,467	1,303,655	2,107,787	2,781,637	1,343,734	2,070,131	2,679,284	1,295,199	1,985,190	2,590,393	1,253,577	1,941,397	2,534,459	1,227,545	1,934,737	2,530,100	1,224,836	1,953,912	2,612,659	1,189,693	2,014,504	2,662,943	1,288,725	2,094,387	2,763,667	1,336,860
		243,288			238,408			242,927			243,288			241,125			232,436			223,801			216,309			211,577			211,175			215,051			222,367			230,746	
			15,769			17,546			17,815			17,822			17,665			17,111			16,558			16,098			15,806			15,769			16,027			16,499			17,072

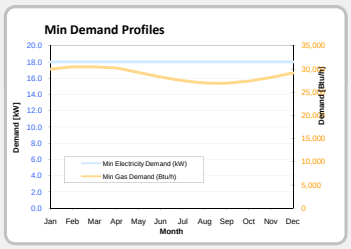
Mid-Rise Residential eQUEST Simulation Results

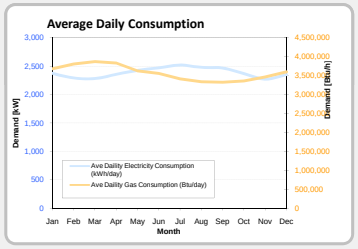
ITERATION: Title 24 - 2008 baseline











Electricity Demand Profiles - MR Res

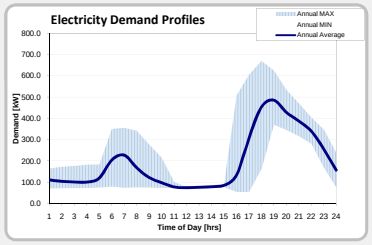
Hour	Annual Average MR Res Demand (kW)	Annual MAX MR Res Demand (kW)	Annual MIN MR Res Demand (kW)	Jan Average MR Res Demand (kW)	Jan MAX MR Res Demand (kW)	Jan MIN MR Res Demand (kW)	Feb Average MR Res Demand (kW)	Feb MAX MR Res Demand (kW)	Feb MIN MR Res Demand (kW)	Mar Average MR Res Demand (kW)	Mar MAX MR Res Demand (kW)	Mar MIN MR Res Demand (kW)	Apr Average MR Res Demand (kW)	Apr MAX MR Res Demand (kW)	Apr MIN MR Res Demand (kW)	May Average MR Res Demand (kW)	May MAX MR Res Demand (kW)	May MIN MR Res Demand (kW)	Jun Average MR Res Demand (kW)	Jun MAX MR Res Demand (kW)	Jun MIN MR Res Demand (kW)	Jul Average MR Res Demand (kW)	Jul MAX MR Res Demand (kW)	Jul MIN MR Res Demand (kW)	Aug Average MR Res Demand (kW)	Aug MAX MR Res Demand (kW)	Aug MIN MR Res Demand (kW)	Sep Average MR Res Demand (kW)	Sep MAX MR Res Demand (kW)	Sep MIN MR Res Demand (kW)	Oct Average MR Res Demand (kW)	Oct MAX MR Res Demand (kW)	Oct MIN MR Res Demand (kW)	Nov Average MR Res Demand (kW)	Nov MAX MR Res Demand (kW)	Nov MIN MR Res Demand (kW)	Dec Average MR Res Demand (kW)	Dec MAX MR Res Demand (kW)	Dec MIN MR Res Demand (kW)
1	77.6	126.5	57.9	92.4	126.5	70.3	80.3	102.3	64.1	76.0	100.7	64.7	71.9	89.6	64.2	72.5	77.5	61.4	73.4	80.0	57.9	74.9	79.4	71.7	74.7	79.5	70.3	75.0	81.6	69.2	71.6	90.3	62.2	77.4	102.4	59.6	91.2	114.1	71.7
2	76.2	126.0	58.6	90.8	126.0	68.1	79.4	99.6	70.3	74.3	91.9	65.7	71.4	81.7	63.8	71.5	75.7	63.3	72.8	77.4	66.4	72.9	76.2	69.0	73.2	75.6	69.3	73.0	81.2	62.4	69.8	76.1	58.6	75.4	101.6	62.5	90.3	120.4	74.9
3	76.5	128.2	58.7	91.8	128.2	72.7	80.3	94.4	71.9	74.4	94.3	60.3	72.4	85.4	63.5	70.7	76.9	62.5	71.8	76.5	60.4	72.9	75.6	68.4	72.5	76.5	66.8	72.6	79.3	59.4	69.2	75.8	58.7	77.1	102.3	67.4	92.9	124.7	75.8
4	77.0	132.8	57.8	92.7	132.8	72.4	82.2	99.8	72.5	76.3	101.3	61.0	74.1	87.8	64.0	68.3	77.4	60.5	70.3	75.8	59.1	72.2	76.3	65.2	71.2	76.1	57.8	71.6	78.2	62.9	69.8	78.3	59.9	79.5	108.2	62.9	96.5	130.6	75.3
5	87.1	131.5	60.2	92.9	131.5	73.0	83.9	102.8	72.8	78.2	103.4	62.3	89.8	111.2	63.6	84.1	98.7	60.2	88.5	99.4	60.8	88.6	100.2	71.3	88.4	99.4	61.4	87.3	101.6	65.8	85.5	101.0	63.6	80.7	104.5	69.5	97.1	127.1	75.3
6	117.9	161.0	66.2	107.0	155.0	73.7	100.6	116.6	73.8	96.7	126.9	70.4	128.1	161.0	76.9	123.3	154.4	73.0	134.0	160.2	80.4	130.3	155.6	80.1	130.7	153.9	71.2	129.9	157.2	70.8	123.4	154.4	66.2	96.5	129.0	69.8	113.0	146.7	80.6
7	121.8	202.1	57.8	140.1	202.1	81.0	138.3	176.0	81.6	135.4	174.6	73.3	109.1	146.8	83.6	110.9	141.9	100.4	110.2	150.3	100.4	111.5	154.3	100.4	109.6	137.7	100.4	110.0	134.8	100.4	108.0	128.5	80.3	130.8	176.4	79.6	148.1	193.8	89.0
8	83.1	197.0	22.8	107.0	123.3	100.4	106.6	123.5	100.4	107.0	130.2	100.4	62.9	161.3	22.8	72.1	177.1	22.8	61.8	187.0	22.8	69.5	197.0	22.8	63.9	175.3	22.8	65.5	177.5	22.8	68.8	162.6	22.8	107.2	126.8	100.4	106.1	118.2	100.4
9	51.8	163.9	22.8	70.2	149.0	22.8	62.8	149.5	22.8	56.4	163.9	22.8	42.8	159.6	22.8	46.0	87.3	23.4	40.4	87.3	23.4	44.0	87.3	23.4	41.9	87.3	23.4	42.5	87.3	23.4	48.5	162.7	23.4	65.4	160.8	22.8	61.8	144.6	22.8
10	34.7	89.4	23.4	49.2	89.4	23.4	44.0	87.3	23.4	40.1	89.4	23.4	28.5	87.3	23.4	27.6	34.3	24.0	26.7	34.3	24.0	27.3	34.3	24.0	27.0	34.3	24.0	27.1	34.3	24.0	29.3	87.1	24.0	44.8	89.2	23.4	45.0	89.4	23.4
11	25.6	36.4	23.6	28.5	36.4	24.0	27.4	34.3	24.0	26.7	36.4	24.0	24.5	34.3	23.6	24.1	24.3	23.6	24.1	24.3	23.6	24.1	24.3	23.6	24.1	24.3	23.6	24.1	24.3	23.6	24.4	34.1	23.6	27.5	36.2	24.0	27.7	36.4	24.0
12	24.2	26.4	23.6	24.4	26.4	23.6	24.1	24.3	23.6	24.1	24.3	23.6	24.3	24.4	23.7	24.2	24.4	23.7	24.3	24.4	23.7	24.2	24.4	23.7	24.3	24.4	23.7	24.3	24.4	23.7	24.2	24.4	23.6	24.1	24.3	23.6	24.3	26.4	23.6
13	24.3	26.5	23.7	24.5	26.5	23.7	24.2	24.4	23.7	24.3	24.4	23.7	24.3	24.4	24.0	24.3	24.4	24.0	24.4	24.4	24.0	24.3	24.4	24.0	24.3	24.4	24.0	24.3	24.4	24.0	24.3	24.4	23.7	24.2	24.4	23.7	24.4	26.5	23.7
14	24.4	26.5	24.0	24.6	26.5	24.0	24.3	24.4	24.0	24.4	24.4	24.0	24.4	24.7	24.3	24.5	24.7	24.4	24.5	24.7	24.4	24.5	24.7	24.4	24.5	24.7	24.4	24.5	24.7	24.4	24.4	24.7	24.0	24.3	24.4	24.0	24.4	26.5	24.0
15	25.8	28.3	23.2	24.7	26.5	24.4	24.5	24.7	24.4	24.5	24.7	24.4	26.7	28.3	23.2	26.5	28.3	23.2	26.9	28.3	23.2	26.7	28.3	23.2	26.8	28.3	23.2	26.8	28.3	23.2	26.5	28.3	23.2	24.5	24.7	24.4	24.4	24.7	24.4
16	54.5	236.8	18.0	26.5	30.4	23.2	26.7	28.3	23.2	27.1	28.3	23.2	58.2	209.4	18.0	83.6	231.1	18.0	68.0	220.0	18.0	81.9	235.5	18.0	75.3	227.5	18.0	75.5	236.8	18.0	75.2	236.8	18.0	26.6	28.3	23.2	26.7	28.3	23.2
17	149.1	298.9	18.0	60.8	164.5	18.0	62.1	187.1	18.0	56.3	205.4	18.0	100.4	268.5	18.0	215.4	288.8	115.5	218.4	283.4	151.8	226.7	298.9	177.6	222.3	287.5	146.0	219.1	296.4	145.0	199.7	293.9	110.5	61.9	176.8	18.0	50.5	138.8	18.0
18	210.2	324.6	93.5	146.4	214.6	94.1	153.8	234.2	94.6	165.9	258.8	96.4	236.5	301.5	116.4	251.8	314.1	213.5	264.3	324.6	213.0	267.7	305.3	222.5	263.4	300.4	224.7	254.7	309.0	212.6	231.0	273.5	208.7	150.7	223.0	101.4	132.5	202.4	93.5
19	226.7	296.2	191.5	216.9	238.7	203.6	212.0	224.4	198.2	218.5	239.9	207.4	224.5	262.2	207.5	232.6	276.1	209.4	245.2	296.2	208.7	246.6	273.9	216.9	240.4	270.9	219.9	235.2	260.0	210.1	220.9	245.6	205.4	211.0	226.3	191.5	214.8	232.8	200.8
20	211.9	255.9	192.0	204.1	215.6	192.8	204.3	215.9	193.7	210.3	228.5	195.3	208.6	236.0	198.6	212.5	242.7	198.5	222.2	255.9	197.8	223.7	242.3	205.5	220.0	240.7	204.1	218.9	237.8	201.4	209.4	227.5	195.1	206.0	217.8	197.8	201.9	210.7	192.0
21	197.3	225.5	179.1	194.2	207.2	179.3	195.7	205.7	187.4	200.4	216.4	186.3	192.7	211.8	181.8	194.1	216.1	182.9	201.4	225.5	182.7	202.7	215.1	187.0	200.9	216.1	186.6	201.6	217.1	187.8	194.1	210.4	179.1	196.6	208.3	187.9	192.9	204.8	183.3
22	175.7	200.0	155.2	181.8	198.7	170.6	180.6	191.7	171.3	186.8	200.0	174.4	167.4	190.6	157.8	166.6	180.0	158.1	172.5	187.8	160.3	173.6	181.4	162.3	172.7	182.8	162.0	173.8	182.4	165.4	168.3	191.0	155.2	183.2	192.2	175.2	180.6	198.1	170.6
23	139.7	180.5	111.3	160.5	179.1	144.7	158.3	166.1	151.8	161.3	172.9	151.3	124.1	165.2	115.5	122.1	130.2	113.9	125.8	132.5	118.2	127.6	133.2	121.2	126.7	132.4	120.5	128.0	139.2	118.8	123.8	163.9	111.3	159.0	165.0	147.7	160.5	180.5	150.8
24	96.7	154.1	58.4	124.4	154.1	103.7	116.3	126.4	105.5	118.2	128.0	111.8	79.6	118.4	67.6	77.2	90.7	58.4	78.9	96.7	68.8	81.9	95.5	71.9	79.9	96.3	71.1	82.0	97.1	70.4	79.6	125.8	59.6	117.8	130.0	107.1	124.9	146.1	109.5
(kWh/day)	2,390	3,775	1,621	2,376	3,109	1,908	2,293	2,864	1,917	2,284	2,989	1,888	2,357	3,271	1,748	2,427	3,097	1,939	2,471	3,177	1,994	2,520	3,143	2,098	2,479	3,076	2,039	2,467	3,115	2,010	2,370	3,221	1,881	2,272	2,903	1,887	2,352	2,993	1,951
(kW)		324.6			238.7			234.2			258.8			301.5			314.1			324.6			305.3			300.4			309.0			293.9			226.3			232.8	
(kW)			18.0			18.0			18.0			18.0			18.0			18.0			18.0			18.0			18.0			18.0			18.0			18.0			18.0

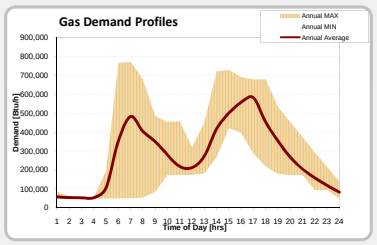
Gas Demand Profiles - MR Res

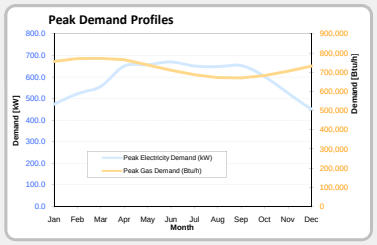
Hour	Annual Average MR Res Demand (Btu/h)	Annual MAX MR Res Demand (Btu/h)	Annual MIN MR Res Demand (Btu/h)	Jan Average MR Res Demand (Btu/h)	Jan MAX MR Res Demand (Btu/h)	Jan MIN MR Res Demand (Btu/h)	Feb Average MR Res Demand (Btu/h)	Feb MAX MR Res Demand (Btu/h)	Feb MIN MR Res Demand (Btu/h)	Mar Average MR Res Demand (Btu/h)	Mar MAX MR Res Demand (Btu/h)	Mar MIN MR Res Demand (Btu/h)	Apr Average MR Res Demand (Btu/h)	Apr MAX MR Res Demand (Btu/h)	Apr MIN MR Res Demand (Btu/h)	May Average MR Res Demand (Btu/h)	May MAX MR Res Demand (Btu/h)	May MIN MR Res Demand (Btu/h)	Jun Average MR Res Demand (Btu/h)	Jun MAX MR Res Demand (Btu/h)	Jun MIN MR Res Demand (Btu/h)	Jul Average MR Res Demand (Btu/h)	Jul MAX MR Res Demand (Btu/h)	Jul MIN MR Res Demand (Btu/h)	Aug Average MR Res Demand (Btu/h)	Aug MAX MR Res Demand (Btu/h)	Aug MIN MR Res Demand (Btu/h)	Sep Average MR Res Demand (Btu/h)	Sep MAX MR Res Demand (Btu/h)	Sep MIN MR Res Demand (Btu/h)	Oct Average MR Res Demand (Btu/h)	Oct MAX MR Res Demand (Btu/h)	Oct MIN MR Res Demand (Btu/h)	Nov Average MR Res Demand (Btu/h)	Nov MAX MR Res Demand (Btu/h)	Nov MIN MR Res Demand (Btu/h)	Dec Average MR Res Demand (Btu/h)	Dec MAX MR Res Demand (Btu/h)	Dec MIN MR Res Demand (Btu/h)
1	31,211	46,379	26,973	36,005	45,549	29,992	35,552	46,318	30,457	34,575	46,379	30,464	31,234	45,873	30,244	29,971	31,174	29,299	28,841	30,165	28,343	28,103	29,274	27,545	27,530	28,734	27,031	27,498	28,673	26,973	28,434	41,409	27,399	33,052	42,728	28,206	34,016	44,219	29,163
2	29,055	32,481	26,978	30,758	31,934	30,015	31,117	32,442	30,489	31,017	32,481	30,496	30,355	32,149	30,261	29,345	29,375	29,316	28,392	28,424	28,355	27,577	27,602	27,556	27,067	27,097	27,040	27,021	27,043	26,978	27,515	29,137	27,416	28,848	30,037	28,237	29,790	31,041	29,190
3	28,809	30,581	26,980	30,051	30,091	30,014	30,523	30,546	30,502	30,543	30,581	30,510	30,303	30,337	30,272	29,352	29,384	29,316	28,400	28,433	28,357	27,585	27,607	27,562	27,075	27,103	27,047	27,029	27,051	26,980	27,470	27,503	27,428	28,285	28,327	28,248	29,222	29,249	29,195
4	28,815	30,591	26,987	30,056	30,095	30,023	30,528	30,552	30,509	30,550	30,591	30,517	30,309	30,341	30,280	29,358	29,387	29,323	28,406	28,436	28,361	27,591	27,611	27,566	27,080	27,106	27,053	27,036	27,057	26,987	27,476	27,506	27,437	28,293	28,330	28,259	29,228	29,255	29,200
5	57,054	107,281	27,034	30,058	30,097	30,023	30,532	30,555	30,512	30,555	30,597	30,520	81,605	107,281	30,292	77,194	103,519	29,342	80,737	99,793	28,371	74,296	96,554	27,581	74,924	94,519	27,060	74,137	94,338	27,034	71,690	96,032	27,455	28,298	28,336	28,264	29,232	29,261	29,200
6	191,700	415,039	27,036	76,668	106,145	30,027	83,134	108,063	30,513	88,158	108,219	30,528	292,280	415,039	30,305	269,108	400,083	29,355	290,510	385,214	28,393	261,646	372,320	27,601	266,712	364,165	27,084	262,966	363,466	27,036	249,071	370,136	27,461	75,552	99,212	28,276	79,075	102,837	29,208
7	261,656	418,764	26,987	263,708	410,344	30,023	294,081	418,137	30,530	319,051	418,764	30,532	282,791	415,019	32,149	242,970	351,867	31,132	260,382	338,807	30,101	235,843	327,482	29,230	239,228	320,322	28,701	236,079	319,712	28,652	224,864	325,570	27,484	265,022	382,728	28,278	278,911	397,149	29,209
8	218,874	368,277	29,127	238,558	360,889	31,842	264,496	367,732	32,390	285,707	368,277	32,393	221,350	364,964	50,533	193,816	251,749	48,859	201,517	242,420	47,150	186,593	234,341	45,702	185,947	229,253	44,835	184,162	228,813	44,762	178,985	233,027	29,127	238,290	336,634	29,974	250,515	349,301	30,973
9	189,907	263,451	45,521	192,108	258,258	50,037	207,930	263,072	50,928	220,390	263,451	50,964	201,124	261,045	105,116	188,737	234,683	101,444	186,824	226,054	97,776	178,836	218,563	94,613	174,075	213,826	92,657	173,376	213,417	92,494	173,286	217,299	45,521	187,385	240,929	46,945	196,208	249,998	48,589
10	151,507	246,490	93,945	190,322	240,712	104,006	198,276	245,239	105,915	203,350	245,605	106,064	137,213	246,490	106,895	131,585	237,581	103,024	121,133	228,901	99,229	121,579	221,282	96,071	115,071	216,491	94,091	115,553	216,104	93,945	120,974	220,046	94,139	179,286	224,601	97,249	186,567	233,053	100,815
11	118,166	248,780	93,851	136,315	243,842	106,125	134,479	248,410	107,881	130,876	248,780	107,967	120,003	246,391	106,832	115,889	165,374	102,946	109,152	159,481	99,151	107,570	154,168	95,982	103,495	150,866	94,020	103,625	150,645	93,851	108,174	153,380	95,660	122,794	227,421	99,025	126,644	236,076	102,818
12	114,987	173,312	93,792	119,627	169,944	106,125	119,859	173,060	107,872	118,337	173,312	107,958	122,115	171,538	106,813	122,245	160,346	102,921	113,242	154,654	99,125	112,342	149,476	95,945	108,310	146,266	93,991	108,599	146,094	93,792	112,324	148,740	95,607	109,647	158,464	99,018	113,462	164,587	102,818
13	147,612	244,679	99,010	127,417	164,839	106,133	126,054	167,855	107,881	122,685	168,081	107,966	172,044	244,679	107,092	177,990	235,779	151,129	165,207	227,215	145,514	163,676	219,570	140,758	157,700	214,793	137,801	158,078	214,527	137,481	163,013	218,429	140,117	116,107	153,675	99,010	119,965	159,656	102,813
14	226,385	391,871	145,051	185,141	242,213	155,558	183,556	246,731	158,267	179,033	247,048	158,432	271,138	391,871	157,094	278,288	377,650	251,212	262,568	363,710	241,852	257,947	351,443	233,835	248,645	343,738	228,792	248,839	343,251	228,261	255,634	349,523	202,307	168,757	225,757	145,051	174,411	234,523	150,617
15	271,164	395,582	228,196	286,898	387,725	258,186	288,133	395,066	262,900	284,914	395,582	263,224	286,253	391,859	260,663	282,567	358,020	251,167	264,984	344,791	241,829	260,769	333,162	233,825	251,971	325,858	228,755	252,258	325,433	228,196	260,394	331,369	232,540	263,295	361,336	240,685	272,597	375,310	249,920
16	302,329	375,040	214,611	292,565	367,599	258,138	292,378	374,552	262,863	287,449	375,040	263,193	341,295	371,467	245,162	328,006	351,865	236,184	322,631	338,612	227,447	308,631	327,160	219,753	302,113	320,048	215,089	300,939	319,490	214,611	306,125	325,627	218,573	268,141	342,531	240,627	277,472	355,834	249,900
17	315,469	368,437	155,370	333,003	361,217	242,530	345,034	367,936	247,012	351,536	368,437	247,369	335,811	365,014	177,417	310,899	351,859	170,880	310,687	338,603	164,628	294,680	327,138	159,057	289,281	320,077	155,746	287,705	319,475	155,370	289,668	325,638	158,240	313,493	336,682	226,194	326,241	349,559	234,872
18	245,472	368,462	118,111	313,258	361,232	175,508	328,699	367,972	178,752	338,965	368,462	178,995	222,657	364,904	134,608	201,098	277,135	129,782	195,913	266,918	125,075	189,404	258,007	120,878	183,161	252,376	118,393	182,743	251,966	118,111	187,486	256,552	120,293	297,510	336,707	163,831	310,141	349,588	170,003
19	191,629	290,122	97,098	204,004	284,296	133,190	210,017	289,671	135,629	213,038	290,122	135,809	203,447	287,446	110,488	189,825	235,160	106,575	187,584	226,510	102,735	179,681	218,968	99,352	174,205	213,850	97,098	174,876	214,193	97,298	176,512	217,737	98,848	190,239	265,198	124,409	197,548	275,226	129,039
20	145,447	246,156	93,952	191,558	241,223	109,361	199,304	245,767	111,349	204,134	246,156	111,492	127,883	243,903	106,860	117,786	193,113	103,104	111,097	186,030	99,377	109,805	179,859	96,133	104,847	175,958	94,134	105,009	175,662	93,952	109,328	178,847	95,630	180,342	225,069	102,188	187,572	233,536	105,967
21	110,416	202,105	93,966	120,826	198,074	105,768	121,322	201,780	107,695	120,187	202,105	107,830	115,202	200,264	106,867	111,105	151,602	103,121	105,788	146,071	99,392	103,599	141,251	96,158	99,994	138,216	94,148	99,998	137,975	93,966	103,036	140,466	95,635	110,484	184,855	98,832	114,182	191,782	102,484
22	86,045	158,617	50,446	113,946	155,479	105,761	115,113	158,361	107,698	114,573	158,617	107,832	75,713	157,178	57,073	72,786	112,220	55,144	66,149	108,166	53,212	66,663	104,633	51,584	63,617	102,413	50,539	63,936	102,229	50,446	67,750	104,059	51,320	105,185	145,161	98,828	108,855	150,572	102,477
23	63,888	117,365	50,470	76,070	115,076	56,579	74,185	117,180	57,541	71,194	117,365	57,594	63,212	116,305	57,100	61,232	72,992	55,174	57,657	70,410	53,245	56,734	68,154	51,611	55,058	66,749	50,563	55,107	66,623	50,470	57,739	91,421	51,343	68,574	107,502	52,990	70,532	111,488	54,884
24	44,815	76,278	26,949	63,314	74,833	56,585	63,278	76,164	57,558	62,244	76,278	57,608	37,202	75,597	30,207	34,167	44,445	29,262	32,216	42,936	28,307	32,508	41,610	27,515	30,561	40,797	27,000	31,082	40,716	26,949	33,622	66,408	27,388	58,404	69,994	53,010	60,314	72,555	54,893
(Btu/day)	3,572,408	5,616,140	1,918,440	3,682,233	4,911,705	2,371,544	3,807,577	5,003,160	2,413,642	3,873,059	5,010,331	2,416,257	3,832,541	5,576,954	2,240,622	3,625,316	4,786,361	2,309,004	3,560,019	4,610,753	2,225,324	3,413,657	4,457,234	2,153,413	3,338,338	4,360,964	2,108,866	3,326,981	4,353,609	2,104,393	3,360,570	4,495,859	2,044,369	3,465,286	4,582,213	2,215,633	3,602,702	4,755,656	2,298,247
(Btu/h)		418,764			410,344			418,137			418,764			415,039			400,083			385,214			372,320			364,165			363,466			370,136			382,728			397,149	
(Btu/h)			26,949			29,992			30,457			30,464			30,207			29,262			28,307			27,515			27,000			26,949			27,388			28,206			29,163

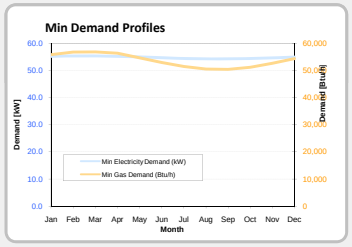
High-Rise Residential eQUEST Simulation Results

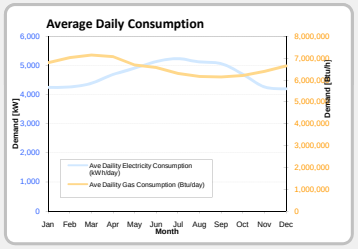
ITERATION: Title 24 - 2008 baseline











Electricity Demand Profiles - HR Res

Hour	Annual Average HR Res Demand (kW)	Annual MAX HR Res Demand (kW)	Annual MIN HR Res Demand (kW)	Jan Average HR Res Demand (kW)	Jan MAX HR Res Demand (kW)	Jan MIN HR Res Demand (kW)	Feb Average HR Res Demand (kW)	Feb MAX HR Res Demand (kW)	Feb MIN HR Res Demand (kW)	Mar Average HR Res Demand (kW)	Mar MAX HR Res Demand (kW)	Mar MIN HR Res Demand (kW)	Apr Average HR Res Demand (kW)	Apr MAX HR Res Demand (kW)	Apr MIN HR Res Demand (kW)
1	110.7	165.0	70.4	120.4	165.0	78.3	100.5	136.0	70.4	101.8	147.3	79.7	94.7	117.0	75.3
2	103.6	173.1	70.8	117.2	173.1	91.0	97.8	114.9	79.8	91.6	114.3	71.8	88.9	106.8	75.5
3	101.3	176.6	72.7	119.5	176.6	88.4	99.4	118.4	84.4	92.7	126.0	76.8	86.4	107.1	72.7
4	100.3	182.7	73.7	121.9	182.7	87.5	103.1	121.0	91.0	95.3	132.7	78.3	87.5	110.3	73.7
5	118.9	183.4	74.0	123.9	183.4	86.2	106.0	131.1	93.5	97.7	135.3	74.0	119.7	156.9	76.8
6	203.7	350.3	79.8	151.2	228.7	92.8	139.0	162.8	96.7	132.8	176.6	79.8	232.2	299.8	101.3
7	227.1	355.8	73.7	241.0	355.8	109.4	241.8	307.1	115.6	245.1	306.9	101.1	221.0	293.9	115.9
8	168.6	342.2	76.2	208.2	245.8	141.8	213.2	246.0	142.9	220.4	246.0	141.9	131.8	261.8	76.9
9	121.6	277.9	75.5	133.7	233.6	76.8	125.5	235.4	76.9	119.4	277.9	76.9	114.2	267.3	76.1
10	98.0	215.6	73.3	129.1	215.5	76.0	119.8	214.5	76.1	111.4	215.6	76.1	84.3	214.5	73.6
11	77.3	101.7	73.2	83.5	101.5	73.6	81.7	100.6	73.6	80.2	101.7	73.6	75.0	100.6	73.5
12	74.2	76.5	73.2	74.3	76.5	73.5	74.1	75.5	73.5	74.1	75.5	73.5	74.5	75.5	74.0
13	75.6	79.1	74.0	74.7	76.5	74.2	74.6	75.6	74.2	74.5	75.6	74.2	76.3	79.1	74.2
14	78.6	85.2	75.6	77.0	80.1	75.8	76.7	79.1	75.9	76.6	79.1	75.9	79.9	85.2	75.8
15	85.1	93.4	77.8	80.8	85.1	79.1	80.6	85.3	79.2	80.4	85.3	79.2	88.9	93.4	78.7
16	132.3	508.0	54.2	88.0	94.4	78.6	89.0	93.5	78.8	89.9	93.5	78.8	131.0	413.9	55.2
17	305.5	604.9	54.6	118.6	298.0	55.1	127.8	363.4	55.3	123.6	417.2	55.3	385.0	527.9	55.2
18	453.5	670.0	161.6	259.2	410.9	161.7	280.7	456.2	161.6	316.9	507.8	161.8	548.3	651.2	209.3
19	485.1	624.9	370.3	424.6	473.4	386.8	459.7	522.4	380.3	491.3	556.2	389.2	490.1	563.6	433.0
20	428.1	534.0	345.1	381.1	422.5	355.9	408.5	458.2	365.3	433.3	490.2	355.1	426.4	486.1	372.1
21	387.0	470.5	316.2	344.5	387.8	323.8	366.2	408.4	333.5	388.8	439.8	324.7	385.8	437.9	337.2
22	340.0	404.7	280.6	317.7	355.7	294.0	334.3	372.8	305.1	356.1	404.7	294.7	328.5	374.7	280.6
23	255.3	347.7	168.1	272.7	303.8	249.1	280.7	312.5	254.1	301.0	347.7	247.9	222.5	318.4	168.1
24	156.2	237.9	75.5	189.3	221.0	161.8	182.6	208.9	162.0	195.1	237.9	167.2	119.8	203.3	82.0
day)	4,687	7,261	2,940	4,252	5,547	3,371	4,263	5,400	3,400	4,390	5,791	3,308	4,693	6,346	3,187
kW)		670.0			473.4			522.4			556.2			651.2	
kW)			54.2			55.1			55.3			55.3			55.2

Hour	May Average HR Res Demand (kW)	May MAX HR Res Demand (kW)	May MIN HR Res Demand (kW)	Jun Average HR Res Demand (kW)	Jun MAX HR Res Demand (kW)	Jun MIN HR Res Demand (kW)	Jul Average HR Res Demand (kW)	Jul MAX HR Res Demand (kW)	Jul MIN HR Res Demand (kW)	Aug Average HR Res Demand (kW)	Aug MAX HR Res Demand (kW)	Aug MIN HR Res Demand (kW)
1	103.3	129.0	76.9	119.2	149.1	87.9	123.8	144.1	109.8	120.9	142.6	101.7
2	95.5	122.0	79.0	109.8	142.2	78.2	114.0	136.2	98.5	111.4	134.1	94.5
3	90.5	112.6	77.3	103.4	135.3	82.3	107.2	128.6	92.7	104.6	124.9	86.9
4	86.4	103.7	74.7	96.8	130.8	76.0	101.3	121.6	87.3	98.5	116.3	80.3
5	115.9	146.8	83.6	128.9	171.3	88.4	130.1	161.7	88.4	128.4	159.2	79.9
6	231.4	327.3	100.5	267.6	350.3	104.2	256.8	336.5	109.4	255.9	329.7	101.6
7	211.5	245.6	141.8	222.6	244.3	141.8	215.8	244.0	142.2	216.5	243.9	143.3
8	143.1	299.5	76.7	132.3	321.7	76.5	141.8	342.2	76.3	133.6	304.5	76.2
9	124.1	214.3	75.9	112.1	214.1	75.8	119.5	213.9	75.6	115.0	213.8	75.5
10	82.4	100.4	73.5	80.1	100.2	73.5	81.4	100.0	73.4	80.5	99.9	73.3
11	74.0	75.3	73.4	73.9	75.2	73.3	73.9	75.1	73.2	73.8	75.0	73.2
12	74.5	75.4	74.1	74.3	75.3	74.0	74.3	75.1	74.0	74.2	75.1	73.9
13	76.6	78.9	75.7	76.3	78.7	75.6	76.3	78.5	75.5	76.1	78.4	75.4
14	80.4	84.9	79.0	79.9	84.6	78.8	79.9	84.3	78.6	79.6	84.2	78.5
15	88.2	93.2	78.4	89.2	93.0	78.2	88.2	92.8	77.9	88.6	92.7	77.8
16	180.9	487.3	54.9	153.4	461.5	54.6	181.7	508.0	54.4	165.8	470.0	54.2
17	440.5	572.3	202.9	455.6	562.3	304.7	472.8	604.9	363.9	460.9	567.8	294.2
18	585.4	656.7	479.7	607.4	670.0	504.5	613.6	651.1	532.1	605.6	648.2	527.6
19	506.5	595.4	419.8	536.0	624.9	445.3	537.5	595.3	470.0	521.0	581.6	471.9
20	438.0	499.4	374.9	463.9	534.0	400.2	467.2	502.9	430.8	455.8	496.3	427.0
21	394.7	447.6	345.9	416.5	470.5	360.8	420.7	449.0	389.1	414.1	447.5	382.8
22	333.9	375.7	292.3	354.2	396.5	306.8	359.2	379.5	331.3	354.4	381.4	327.1
23	225.1	258.0	177.9	241.9	270.6	211.0	248.7	273.1	228.9	244.1	266.8	221.9
24	123.0	166.5	75.5	138.5	190.1	100.0	146.8	178.5	117.7	139.9	183.8	111.8
day)	4,906	6,268	3,664	5,134	6,546	3,952	5,233	6,477	4,251	5,119	6,318	4,111
kW)		656.7			670.0			651.1			648.2	
kW)			54.9			54.6			54.4			54.2

Hour	Sep Average HR Res Demand (kW)	Sep MAX HR Res Demand (kW)	Sep MIN HR Res Demand (kW)	Oct Average HR Res Demand (kW)	Oct MAX HR Res Demand (kW)	Oct MIN HR Res Demand (kW)	Nov Average HR Res Demand (kW)	Nov MAX HR Res Demand (kW)	Nov MIN HR Res Demand (kW)	Dec Average HR Res Demand (kW)	Dec MAX HR Res Demand (kW)	Dec MIN HR Res Demand (kW)
1	121.5	153.1	91.1	101.7	147.1	72.2	102.2	142.4	74.1	117.2	152.0	90.1
2	111.7	150.2	85.3	94.0	121.3	70.8	94.4	122.9	75.3	115.8	156.2	92.7
3	104.2	140.1	80.7	90.8	112.1	77.7	96.0	124.9	77.9	120.5	164.6	93.0
4	97.4	131.5	75.5	88.6	101.7	77.5	99.0	138.5	75.8	127.0	175.0	96.1
5	126.3	173.9	79.9	117.4	145.1	79.3	101.9	136.3	83.4	129.4	171.8	96.1
6	252.7	342.5	101.4	227.1	319.8	86.8	133.1	182.7	92.8	160.1	211.9	102.8
7	214.4	243.9	141.8	207.4	245.0	113.9	233.5	312.0	106.3	255.6	340.8	121.7
8	134.6	300.8	76.2	131.5	270.7	76.3	210.9	245.3	141.8	216.5	245.6	143.2
9	116.3	213.8	75.5	126.0	276.6	75.6	129.0	269.3	76.4	123.9	231.1	78.6
10	80.7	99.9	73.3	85.8	209.6	73.4	121.0	214.1	75.7	120.2	215.3	75.9
11	73.8	75.0	73.2	74.6	96.6	73.2	81.7	100.1	73.4	81.7	101.4	73.5
12	74.2	75.1	73.9	74.2	75.1	73.2	73.9	75.2	73.3	74.1	76.4	73.4
13	76.1	78.4	75.4	76.3	78.5	74.6	74.3	75.2	74.0	74.5	76.4	74.1
14	79.6	84.2	78.5	79.9	84.3	77.6	76.4	78.6	75.6	76.6	78.8	75.7
15	88.4	92.7	77.8	87.8	92.8	77.9	80.0	84.6	78.7	80.2	84.9	78.9
16	165.4	485.2	54.2	161.5	468.9	54.3	88.2	93.0	78.1	88.6	93.2	78.4
17	449.8	580.2	285.5	388.1	553.0	163.6	127.4	341.9	54.6	103.0	240.4	54.9
18	582.1	653.2	488.1	528.6	602.5	456.2	271.5	434.8	162.1	232.5	371.7	161.7
19	504.8	549.6	439.7	468.9	537.2	416.3	464.0	524.1	412.3	416.1	451.0	370.3
20	450.1	487.5	405.9	421.8	481.7	376.6	413.5	461.3	364.3	376.8	405.4	345.1
21	412.7	446.9	372.8	386.7	438.6	338.7	371.7	415.0	332.2	341.1	361.2	316.2
22	354.7	379.0	321.0	330.9	394.1	284.3	341.1	374.9	310.3	314.9	329.9	286.4
23	246.1	281.3	205.1	224.0	331.1	183.7	288.6	321.3	267.1	270.5	282.5	250.1
24	143.6	185.2	99.2	123.9	237.3	76.6	188.0	236.7	168.0	185.5	212.3	162.5
day)	5,061	6,403	3,931	4,697	6,421	3,531	4,261	5,505	3,404	4,202	5,229	3,390
kW)		653.2			602.5			524.1			451.0	
kW)			54.2			54.3			54.6			54.9

Gas Demand Profiles - HR Res

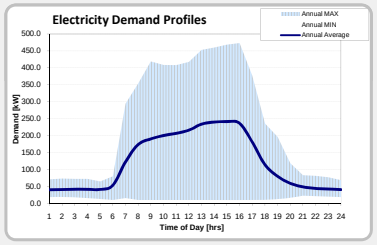
Hour	Annual Average HR Res Demand (Btu/h)	Annual MAX HR Res Demand (Btu/h)	Annual MIN HR Res Demand (Btu/h)	Jan Average HR Res Demand (Btu/h)	Jan MAX HR Res Demand (Btu/h)	Jan MIN HR Res Demand (Btu/h)	Feb Average HR Res Demand (Btu/h)	Feb MAX HR Res Demand (Btu/h)	Feb MIN HR Res Demand (Btu/h)	Mar Average HR Res Demand (Btu/h)	Mar MAX HR Res Demand (Btu/h)	Mar MIN HR Res Demand (Btu/h)	Apr Average HR Res Demand (Btu/h)	Apr MAX HR Res Demand (Btu/h)	Apr MIN HR Res Demand (Btu/h)
1	58,075	85,948	50,374	66,832	84,382	55,781	66,033	85,832	56,686	64,266	85,948	56,752	58,105	85,060	56,332
2	54,076	60,314	50,381	57,137	59,272	55,799	57,831	60,237	56,704	57,676	60,314	56,770	56,462	59,750	56,341
3	53,615	56,798	50,385	55,820	55,842	55,805	56,718	56,730	56,707	56,784	56,798	56,773	56,352	56,365	56,344
4	53,615	56,799	50,388	55,822	55,842	55,807	56,721	56,731	56,711	56,787	56,799	56,777	56,355	56,366	56,347
5	105,628	198,095	50,397	55,824	55,842	55,808	56,722	56,732	56,713	56,788	56,800	56,779	150,842	198,095	56,352
6	353,667	765,031	50,398	141,686	195,932	55,813	153,620	199,526	56,715	162,896	199,813	56,781	538,938	765,031	56,353
7	482,550	771,884	50,388	486,245	756,314	55,813	542,216	770,731	56,715	588,234	771,884	56,782	521,477	765,031	59,751
8	403,709	678,905	54,198	439,931	665,234	59,172	487,730	677,893	60,139	526,838	678,905	60,210	408,298	672,883	93,341
9	350,298	485,814	84,052	354,243	476,141	92,390	383,472	485,113	94,003	406,499	485,814	94,109	371,049	481,507	193,761
10	279,630	454,341	173,462	350,880	443,546	191,705	365,645	451,917	195,244	375,080	452,574	195,454	253,440	454,341	197,898
11	218,293	458,558	173,871	251,440	449,432	195,969	248,186	457,893	199,452	241,643	458,558	199,696	221,811	454,360	197,826
12	212,453	319,588	173,773	220,704	313,316	199,969	221,264	319,126	199,410	218,558	319,588	199,655	225,700	316,548	197,762
13	272,541	451,241	182,990	235,054	303,930	195,951	232,669	309,554	199,377	226,553	309,993	199,621	317,643	451,241	197,986
14	417,644	722,414	267,803	341,390	446,474	286,984	338,592	454,856	292,165	330,345	455,490	292,552	500,164	722,414	290,079
15	500,130	729,116	421,388	528,845	714,539	476,066	531,239	728,109	484,897	525,391	729,116	485,580	527,996	722,369	481,080
16	557,548	691,252	396,096	539,288	677,450	476,005	539,063	690,320	484,849	530,065	691,252	485,528	629,401	684,813	452,223
17	581,698	679,065	286,888	613,781	665,659	447,162	636,065	678,093	455,540	648,133	679,065	456,256	619,185	672,855	326,942
18	452,517	679,064	217,883	577,305	665,640	323,289	605,835	678,105	329,327	624,852	679,064	329,829	410,374	672,719	247,969
19	353,426	534,482	179,572	375,897	523,823	245,216	386,963	533,682	249,772	392,523	534,482	250,138	375,336	529,462	204,115
20	268,543	453,846	173,828	353,297	444,771	201,877	367,611	453,168	205,590	376,552	453,846	205,889	236,246	449,798	197,531
21	204,053	372,811	173,844	223,100	365,383	195,368	224,060	372,260	198,961	222,008	372,811	199,248	212,886	369,513	197,543
22	159,156	292,723	93,702	210,446	286,931	195,375	212,639	292,294	198,970	211,678	292,723	199,257	140,130	290,150	105,888
23	118,326	216,738	93,715	140,673	212,499	104,799	137,240	216,424	106,638	131,765	216,738	106,783	117,082	214,851	105,902
24	83,168	141,044	50,354	117,164	138,352	104,808	117,135	140,845	106,648	115,265	141,044	106,793	69,137	139,838	56,315
day)	6,594,358	########	3,550,131	6,792,805	9,056,546	4,378,720	7,025,268	9,226,171	4,457,933	7,147,179	9,239,420	4,464,014	7,074,407	10,285,359	4,141,981
u/h)		771,884			756,314			770,731			771,884			765,031	
u/h)			50,354			55,781			56,686			56,752			56,315

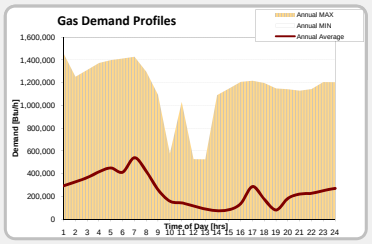
Hour	May Average HR Res Demand (Btu/h)	May MAX HR Res Demand (Btu/h)	May MIN HR Res Demand (Btu/h)	Jun Average HR Res Demand (Btu/h)	Jun MAX HR Res Demand (Btu/h)	Jun MIN HR Res Demand (Btu/h)	Jul Average HR Res Demand (Btu/h)	Jul MAX HR Res Demand (Btu/h)	Jul MIN HR Res Demand (Btu/h)	Aug Average HR Res Demand (Btu/h)	Aug MAX HR Res Demand (Btu/h)	Aug MIN HR Res Demand (Btu/h)
1	55,796	57,983	54,606	53,748	56,139	52,886	52,403	54,537	51,400	51,343	53,528	50,374
2	54,622	54,639	54,611	52,902	52,912	52,893	51,413	51,419	51,406	50,471	50,478	50,465
3	54,625	54,641	54,616	52,905	52,915	52,896	51,417	51,422	51,410	50,475	50,481	50,470
4	54,628	54,642	54,618	52,908	52,917	52,899	51,420	51,424	51,413	50,478	50,483	50,472
5	142,742	191,217	54,622	149,303	184,363	52,903	137,452	178,423	51,421	138,608	174,665	50,475
6	496,279	737,534	54,626	535,741	710,160	52,906	482,583	686,430	51,422	491,911	671,401	50,478
7	448,158	648,739	57,901	480,280	624,703	56,058	435,076	603,864	54,467	441,301	590,667	53,455
8	357,556	464,306	90,236	371,822	447,149	87,141	344,267	432,284	84,482	343,059	422,887	82,794
9	348,180	432,449	187,006	344,751	416,450	180,236	329,950	402,658	174,413	321,155	393,914	170,735
10	243,070	438,121	190,908	223,905	421,924	183,983	224,665	407,936	178,056	212,634	399,072	174,329
11	214,257	305,306	190,818	201,931	294,159	183,894	198,986	284,442	177,959	191,422	278,332	174,248
12	225,982	296,077	190,738	209,484	285,334	183,817	207,814	275,881	177,874	200,324	269,961	174,181
13	328,646	435,004	279,465	305,186	419,058	269,205	302,358	405,057	260,362	291,294	396,257	254,841
14	513,390	696,321	463,824	484,513	670,546	446,622	475,998	648,023	431,772	458,816	633,817	422,434
15	521,263	660,141	463,747	488,946	635,717	446,574	481,181	614,364	431,725	464,933	600,886	422,358
16	604,979	648,707	435,857	595,150	624,423	419,768	569,360	603,455	405,697	557,312	590,259	396,962
17	573,317	648,677	315,312	573,057	624,385	303,786	543,572	603,396	293,763	533,597	590,215	287,458
18	370,713	510,516	239,243	361,312	491,667	230,574	349,355	475,310	223,051	337,826	464,951	218,301
19	350,335	433,757	196,996	346,271	417,801	189,925	331,724	403,952	183,789	322,854	395,182	179,913
20	217,693	356,392	190,658	205,419	343,340	183,825	203,050	332,014	177,896	193,898	324,842	174,154
21	205,367	279,917	190,674	195,616	269,737	183,838	191,592	260,904	177,911	184,937	255,312	174,169
22	134,759	207,358	102,356	122,573	199,903	98,835	123,529	193,433	95,796	117,908	189,340	93,871
23	113,453	135,074	102,369	106,905	130,334	98,853	105,216	126,219	95,811	102,121	123,618	93,885
24	63,562	82,461	54,587	60,004	79,697	52,866	60,554	77,297	51,380	56,963	75,781	50,440
day)	6,693,372	8,829,978	4,270,393	6,574,631	8,505,734	4,117,182	6,304,934	8,224,144	3,984,670	6,165,640	8,046,328	3,901,348
u/h)		737,534			710,160			686,430			671,401	
u/h)			54,587			52,866			51,380			50,440

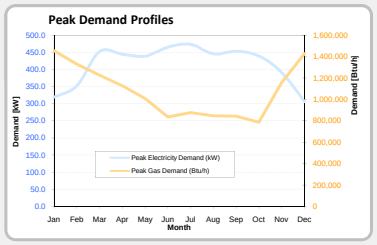
Hour	Sep Average HR Res Demand (Btu/h)	Sep MAX HR Res Demand (Btu/h)	Sep MIN HR Res Demand (Btu/h)	Oct Average HR Res Demand (Btu/h)	Oct MAX HR Res Demand (Btu/h)	Oct MIN HR Res Demand (Btu/h)	Nov Average HR Res Demand (Btu/h)	Nov MAX HR Res Demand (Btu/h)	Nov MIN HR Res Demand (Btu/h)	Dec Average HR Res Demand (Btu/h)	Dec MAX HR Res Demand (Btu/h)	Dec MIN HR Res Demand (Btu/h)
1	51,290	53,444	50,374	52,978	76,899	51,143	61,454	79,245	52,577	63,173	81,939	54,264
2	50,391	50,400	50,381	51,264	54,267	51,151	53,677	55,842	52,599	55,360	57,644	54,282
3	50,395	50,405	50,385	51,167	51,182	51,155	52,622	52,630	52,606	54,298	54,307	54,286
4	50,397	50,407	50,388	51,170	51,184	51,158	52,625	52,633	52,609	54,300	54,309	54,290
5	137,158	174,347	50,397	132,612	177,413	51,166	52,627	52,635	52,612	54,302	54,310	54,291
6	485,008	670,126	50,398	459,374	682,357	51,168	139,672	183,201	52,619	146,119	189,848	54,293
7	435,499	589,547	53,370	414,800	600,289	51,171	488,707	705,481	52,620	514,248	732,021	54,294
8	339,759	422,094	82,653	330,155	429,776	54,198	439,485	620,594	55,750	461,954	643,901	57,543
9	319,859	393,180	170,432	319,587	400,383	84,052	345,605	444,258	86,647	361,794	460,911	89,674
10	213,509	398,325	173,979	223,338	405,612	173,462	330,621	413,849	179,168	343,973	429,383	185,796
11	191,630	277,847	173,871	199,839	282,879	177,053	226,626	419,257	183,062	233,634	435,072	189,901
12	200,812	269,518	173,773	207,500	274,395	176,952	202,425	292,306	183,027	209,352	303,385	189,864
13	291,949	395,612	254,248	300,879	402,811	258,930	214,331	283,513	182,990	221,329	294,313	189,861
14	459,139	632,758	421,488	471,510	644,330	373,195	311,325	416,303	267,803	321,629	432,235	277,922
15	465,440	599,938	421,388	480,290	610,892	429,189	485,487	666,083	443,999	502,507	691,595	460,851
16	555,130	589,197	396,096	564,547	600,283	403,343	494,419	631,459	443,919	511,490	655,720	460,808
17	530,679	589,156	286,888	534,126	600,269	292,069	577,960	620,586	417,154	601,329	644,150	433,034
18	337,054	464,094	217,883	345,569	472,520	221,767	548,351	620,554	301,859	571,559	644,152	313,185
19	321,605	394,455	179,572	325,738	401,592	182,749	350,464	488,441	229,113	364,003	507,064	237,598
20	194,185	324,246	173,829	202,074	330,084	176,893	332,690	415,074	188,739	345,956	430,607	195,622
21	184,937	255,312	174,169	190,491	259,399	176,896	204,112	341,112	182,677	210,865	353,798	189,319
22	118,497	188,998	93,702	125,482	192,334	95,280	194,366	268,000	182,685	201,070	277,895	189,323
23	102,214	123,401	93,715	107,025	169,090	95,292	126,923	198,632	98,264	130,474	205,882	101,690
24	57,929	75,656	50,354	62,568	122,985	51,127	108,177	129,527	98,275	111,641	134,145	101,698
day)	6,144,468	8,031,995	3,893,408	6,204,085	8,293,225	3,780,557	6,394,749	8,451,215	4,093,373	6,646,360	8,768,586	4,243,708
u/h)		670,126			682,357			705,481			732,021	
u/h)			50,354			51,127			52,577			54,264

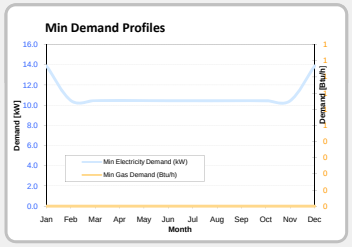
Commercial eQUEST Simulation Results

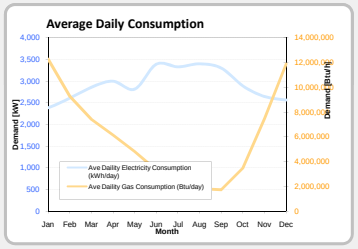
ITERATION: Title 24 - 2008 baseline











Electricity Demand Profiles - Commercial

Hour	Annual Average (kW)	Annual MAX (kW)	Annual MIN (kW)	Jan Average (kW)	Jan MAX (kW)	Jan MIN (kW)	Feb Average (kW)	Feb MAX (kW)	Feb MIN (kW)	Mar Average (kW)	Mar MAX (kW)	Mar MIN (kW)	Apr Average (kW)	Apr MAX (kW)	Apr MIN (kW)
1	40.5	71.1	19.0	43.4	58.6	22.5	41.8	58.4	22.5	43.3	66.1	22.5	41.0	61.7	22.5
2	41.1	73.7	19.0	44.8	73.7	22.5	43.8	71.2	22.5	43.7	65.6	22.5	40.8	46.9	22.5
3	41.7	72.5	19.0	44.9	64.8	25.3	42.9	49.9	25.4	44.2	65.7	22.5	41.8	49.8	22.5
4	41.7	72.5	16.2	46.2	60.9	25.4	45.2	72.5	25.4	44.7	65.7	22.5	43.2	49.8	25.3
5	41.3	65.1	13.3	47.5	60.5	33.9	47.2	63.2	34.0	45.2	65.1	22.5	41.4	49.7	23.2
6	53.1	80.3	10.4	47.0	63.8	25.3	44.6	56.4	23.2	44.0	62.2	23.2	61.7	80.3	18.9
7	122.0	294.6	16.2	64.0	94.7	22.5	62.7	80.5	27.5	64.7	93.9	18.9	152.8	214.0	13.9
8	173.6	354.2	10.4	141.9	215.5	18.2	152.4	214.0	16.8	165.1	256.6	13.9	180.9	275.4	13.9
9	189.5	419.1	10.4	155.0	268.5	13.9	169.6	272.2	13.9	184.6	290.6	13.9	194.1	302.9	13.9
10	200.4	408.9	10.4	156.9	271.2	13.9	173.9	278.8	13.9	195.8	296.2	13.9	208.6	325.8	10.5
11	206.8	408.4	10.4	158.1	271.0	13.9	180.2	287.5	13.9	198.3	299.0	10.5	214.1	345.6	10.5
12	215.9	417.6	10.4	159.5	284.2	13.9	189.4	292.0	13.9	203.8	323.4	10.5	224.2	387.4	10.5
13	233.8	452.9	10.4	165.4	302.3	13.9	191.5	312.6	10.5	214.4	371.5	10.5	240.6	444.5	10.5
14	239.9	460.1	10.4	170.2	316.6	13.9	197.1	310.4	10.5	220.2	361.0	10.5	241.7	413.0	10.5
15	241.2	468.4	10.4	174.0	319.3	13.9	199.8	337.7	10.5	226.0	402.4	10.5	243.0	433.4	10.5
16	236.8	473.6	10.4	175.2	315.6	13.9	199.2	352.1	10.5	227.3	452.2	10.5	241.3	439.1	10.5
17	181.8	377.6	10.4	161.9	282.5	18.2	181.8	307.4	26.9	209.3	377.6	10.5	162.9	299.5	10.5
18	114.7	236.2	10.4	105.2	191.6	25.3	112.5	189.9	17.5	133.3	212.5	14.0	104.7	211.9	20.5
19	80.3	196.2	12.6	65.5	89.2	26.8	66.6	86.4	23.9	71.1	107.2	20.5	83.7	171.4	23.3
20	59.6	119.1	17.6	68.1	89.2	26.8	71.0	108.4	26.8	74.3	89.3	26.8	53.0	89.2	26.8
21	48.3	83.6	23.3	48.9	58.0	26.8	51.8	82.2	26.8	58.0	83.6	26.8	52.0	77.4	26.8
22	44.8	81.9	21.9	49.3	81.1	26.8	48.6	72.1	26.8	53.8	81.9	26.8	47.1	73.7	25.3
23	42.4	77.3	20.5	44.7	63.3	25.4	44.7	64.5	25.4	48.3	77.3	25.4	43.0	61.7	23.9
24	40.7	69.0	19.0	44.0	62.4	26.9	43.2	62.7	23.9	45.4	69.0	23.9	41.5	63.7	22.5
day)	2,932	5,834	343	2,382	3,959	510	2,601	4,083	493	2,859	4,636	434	2,999	4,968	429
kW)		473.6			319.3			352.1			452.2			444.5	
kW)			10.4			13.9			10.5			10.5			10.5

Hour	May Average (kW)	May MAX (kW)	May MIN (kW)	Jun Average (kW)	Jun MAX (kW)	Jun MIN (kW)	Jul Average (kW)	Jul MAX (kW)	Jul MIN (kW)	Aug Average (kW)	Aug MAX (kW)	Aug MIN (kW)	Sep Average (kW)	Sep MAX (kW)	Sep MIN (kW)
1	39.0	71.1	22.5	38.8	46.8	19.0	37.0	46.9	19.0	37.6	47.4	19.0	39.0	49.0	19.0
2	38.5	46.9	22.5	40.9	69.3	19.0	36.6	46.8	19.0	38.3	47.8	19.0	38.1	43.4	19.0
3	38.6	46.9	22.5	41.5	59.9	19.0	36.8	46.8	19.0	37.4	46.8	19.0	40.4	72.5	19.0
4	36.5	46.9	19.6	38.9	67.7	16.2	34.3	44.0	16.2	38.2	46.8	19.0	39.2	62.7	19.0
5	34.5	44.0	19.6	35.7	59.4	13.3	32.0	41.1	13.3	38.2	46.8	19.0	38.7	46.8	19.0
6	53.4	75.2	16.7	58.2	75.2	10.4	53.3	71.7	10.4	60.5	76.0	14.7	61.2	76.0	14.7
7	145.4	239.5	13.9	174.7	294.6	10.4	165.3	266.8	10.4	170.9	263.2	11.9	172.8	277.8	11.9
8	168.2	300.2	10.5	205.3	354.2	10.4	192.9	317.9	10.4	197.1	298.3	10.4	200.6	323.6	10.4
9	181.3	334.7	10.5	223.0	419.1	10.4	210.5	357.4	10.4	212.6	326.4	10.4	218.5	363.3	10.4
10	191.8	383.4	10.5	234.8	408.9	10.4	227.3	401.0	10.4	228.5	376.3	10.4	231.7	396.8	10.4
11	199.2	377.3	10.5	246.4	404.5	10.4	237.0	392.5	10.4	244.4	397.0	10.4	239.5	408.4	10.4
12	207.4	384.6	10.5	257.1	403.4	10.4	253.0	417.6	10.4	258.2	396.9	10.4	251.0	414.3	10.4
13	227.6	438.6	10.5	281.9	436.7	10.4	283.6	452.9	10.4	291.2	443.0	10.4	286.1	444.6	10.4
14	232.0	436.2	10.5	288.9	449.9	10.4	291.8	460.1	47.0	301.0	431.6	10.4	293.4	453.2	10.4
15	238.1	437.7	10.5	287.0	461.6	10.4	291.2	468.4	40.6	300.5	445.7	47.1	287.5	444.2	10.4
16	236.3	428.3	10.5	282.8	465.1	10.4	289.2	473.6	10.4	289.3	437.1	12.6	266.8	424.9	12.6
17	159.1	286.2	10.5	190.0	324.4	10.4	200.1	312.8	10.4	208.4	317.3	78.9	201.2	304.8	19.0
18	100.4	196.2	38.8	125.8	236.2	10.4	134.7	192.5	10.4	135.8	199.3	73.3	113.1	179.2	23.3
19	77.2	144.7	12.6	106.9	196.2	12.6	106.1	149.3	12.6	104.5	167.1	23.3	77.5	155.0	23.3
20	43.2	96.6	17.6	66.5	119.1	17.6	62.6	112.2	17.6	48.5	81.4	23.3	45.0	54.3	23.3
21	45.4	56.3	23.3	47.6	78.7	23.3	43.3	52.8	23.3	44.2	52.8	23.3	45.0	55.0	23.3
22	41.1	49.7	25.3	40.1	46.3	21.9	38.6	46.2	21.9	39.4	46.2	21.9	39.6	46.2	21.9
23	39.5	48.3	23.9	40.9	48.7	23.9	37.2	44.8	20.5	38.1	44.8	20.5	41.3	57.3	20.5
24	39.6	46.9	22.5	38.3	46.8	19.0	36.1	46.8	19.0	37.3	46.8	19.0	36.1	43.4	19.0
day)	2,813	5,016	406	3,392	5,573	341	3,330	5,263	404	3,400	5,083	538	3,303	5,197	391
kW)		438.6			465.1			473.6			445.7			453.2	
kW)			10.5			10.4			10.4			10.4			10.4

Hour	Oct Average (kW)	Oct MAX (kW)	Oct MIN (kW)	Nov Average (kW)	Nov MAX (kW)	Nov MIN (kW)	Dec Average (kW)	Dec MAX (kW)	Dec MIN (kW)
1	38.6	46.8	19.0	43.2	66.1	22.5	43.6	58.7	22.5
2	39.4	49.7	19.0	42.8	62.4	22.5	46.0	58.8	25.3
3	41.9	71.4	19.0	43.6	62.2	22.5	47.0	58.8	25.3
4	41.4	72.2	19.0	44.9	67.3	22.5	47.7	71.0	25.3
5	43.2	64.4	22.5	44.6	63.9	22.5	48.1	60.0	25.3
6	59.5	79.5	18.2	45.1	63.5	22.5	48.5	60.0	25.4
7	156.0	265.7	11.9	63.8	98.6	22.5	67.1	94.1	22.5
8	170.0	287.8	10.4	153.9	249.7	18.1	154.4	230.0	18.2
9	184.0	331.9	10.4	177.1	275.1	10.4	168.5	256.2	16.7
10	197.4	366.1	10.4	183.7	299.4	10.4	173.2	270.0	13.9
11	204.6	373.2	10.4	184.2	317.7	10.4	174.4	275.8	13.9
12	217.9	393.4	10.4	190.3	323.5	10.4	178.0	290.3	13.9
13	240.3	439.2	10.4	195.3	341.9	10.4	186.3	305.6	13.9
14	251.5	436.8	10.4	202.5	376.0	10.4	186.5	305.9	13.9
15	252.7	432.6	10.4	203.3	391.6	10.4	189.5	304.2	13.9
16	245.7	420.8	12.6	195.7	376.1	10.4	188.6	292.7	13.9
17	153.9	290.4	12.6	181.0	341.7	14.7	172.3	266.9	18.2
18	73.2	169.0	19.0	124.3	211.1	25.3	112.9	179.6	25.3
19	67.2	116.8	23.3	68.6	85.7	26.8	67.9	89.2	26.8
20	45.6	54.3	23.3	68.5	89.1	26.8	69.6	89.2	26.8
21	45.1	56.5	23.3	48.4	57.8	26.8	50.3	57.9	26.8
22	41.3	53.0	21.9	48.8	81.2	26.8	49.6	56.4	26.8
23	40.2	49.7	20.5	45.7	74.1	25.3	45.8	52.7	28.2
24	38.8	50.3	19.0	42.9	62.7	23.9	45.7	59.9	35.3
day)	2,890	4,971	388	2,642	4,438	455	2,562	3,844	518
kW)		439.2			391.6			305.9	
kW)			10.4			10.4			13.9

Gas Demand Profiles - Commercial

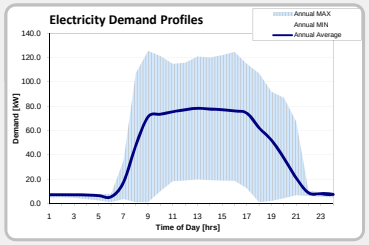
Hour	Annual Average (Btu/h)	Annual MAX (Btu/h)	Annual MIN (Btu/h)	Jan Average (Btu/h)	Jan MAX (Btu/h)	Jan MIN (Btu/h)	Feb Average (Btu/h)	Feb MAX (Btu/h)	Feb MIN (Btu/h)	Mar Average (Btu/h)	Mar MAX (Btu/h)	Mar MIN (Btu/h)	Apr Average (Btu/h)	Apr MAX (Btu/h)	Apr MIN (Btu/h)
1	293,397	1,456,140	0	682,421	1,456,140	288,076	448,393	1,091,820	282,994	342,481	1,099,180	270,204	299,643	473,190	265,745
2	327,842	1,252,930	0	726,442	1,252,240	291,779	517,338	1,152,180	287,888	374,061	1,118,270	274,395	323,504	555,134	269,071
3	365,231	1,313,910	0	759,732	1,264,890	307,760	527,077	1,158,620	293,263	406,978	1,154,850	279,888	392,640	1,087,620	271,731
4	416,590	1,373,620	0	845,177	1,316,830	310,304	620,100	1,179,070	298,032	451,596	1,212,290	282,245	480,210	1,124,260	275,570
5	449,829	1,399,090	0	925,700	1,264,250	304,200	766,641	1,228,570	301,173	537,889	1,216,050	280,211	496,004	1,127,720	277,604
6	412,628	1,413,250	0	878,828	1,258,770	458,478	779,277	1,280,760	321,616	604,872	1,227,470	284,570	463,775	1,122,620	263,514
7	540,016	1,429,150	0	703,752	1,275,790	287,585	606,110	1,329,430	288,620	437,937	1,157,020	267,612	530,591	930,695	265,993
8	420,926	1,296,210	0	835,759	1,190,330	482,790	685,915	989,388	476,142	539,835	894,523	279,317	325,493	507,085	254,574
9	258,238	1,093,830	0	547,062	948,550	281,408	411,235	623,929	267,532	336,025	515,516	225,117	234,900	344,547	179,569
10	157,555	577,926	0	366,670	577,926	254,193	290,612	399,861	219,735	244,551	328,515	124,494	164,406	269,858	0
11	142,656	1,031,340	0	324,289	1,031,340	206,909	244,433	322,969	181,253	187,632	291,536	0	143,611	358,428	0
12	116,685	527,853	0	275,256	527,853	179,396	233,906	311,609	165,815	190,844	374,782	0	123,548	207,851	0
13	87,991	526,000	0	248,316	526,000	143,156	200,841	305,065	0	164,627	286,531	0	75,494	179,279	0
14	75,969	1,090,300	0	240,013	1,090,300	123,645	171,634	427,593	0	140,594	428,085	0	48,182	165,907	0
15	81,686	1,148,860	0	242,733	1,148,860	142,162	170,128	307,887	0	143,700	291,206	0	44,635	291,118	0
16	136,280	1,208,390	0	245,206	1,208,390	150,338	195,180	541,279	0	179,505	612,080	0	234,473	503,374	0
17	286,464	1,218,190	0	273,532	1,218,190	149,301	239,280	554,246	161,376	195,657	346,129	0	146,847	235,563	0
18	174,103	1,197,700	0	388,175	1,197,700	206,162	287,777	498,373	200,098	244,289	504,260	0	31,122	461,349	0
19	80,503	1,150,530	0	201,428	1,150,530	0	97,723	351,705	0	85,212	639,237	0	106,693	687,580	0
20	182,709	1,142,660	0	507,619	1,142,660	0	327,022	511,531	0	209,682	1,058,410	0	196,313	696,347	0
21	220,501	1,129,830	0	465,670	1,129,830	261,364	349,498	552,542	262,310	403,326	1,066,520	0	372,761	647,766	0
22	226,618	1,144,240	0	498,057	1,121,100	270,724	309,561	520,757	259,391	316,357	1,049,430	0	319,880	652,675	0
23	251,003	1,206,410	0	528,122	1,119,600	278,673	368,944	996,416	271,843	334,179	1,058,160	267,996	296,661	632,475	259,561
24	270,167	1,204,550	0	577,846	1,180,720	284,002	429,658	1,026,800	271,031	341,422	1,068,860	261,808	289,406	334,450	264,499
day)	5,975,577	########	0	12,287,804	26,598,789	5,662,405	9,278,283	########	4,810,112	7,413,251	########	3,097,855	6,140,794	########	2,847,437
u/h)		1,456,140			1,456,140			1,329,430			1,227,470			1,127,720	
u/h)			0			0			0			0			0

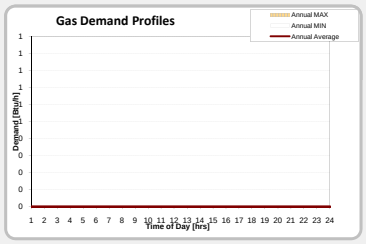
Hour	May Average (Btu/h)	May MAX (Btu/h)	May MIN (Btu/h)	Jun Average (Btu/h)	Jun MAX (Btu/h)	Jun MIN (Btu/h)	Jul Average (Btu/h)	Jul MAX (Btu/h)	Jul MIN (Btu/h)	Aug Average (Btu/h)	Aug MAX (Btu/h)	Aug MIN (Btu/h)	Sep Average (Btu/h)	Sep MAX (Btu/h)	Sep MIN (Btu/h)
1	302,776	636,473	255,612	154,442	686,424	0	67,767	619,254	0	58,848	656,313	0	57,291	642,573	0
2	296,874	477,141	255,835	227,941	690,762	0	57,130	426,595	0	71,037	636,441	0	25,939	269,470	0
3	306,653	500,725	259,154	220,414	682,139	0	87,050	665,940	0	63,941	672,160	0	88,461	640,259	0
4	358,367	988,199	261,062	228,875	655,493	0	81,061	628,869	0	93,470	632,248	0	146,596	630,066	0
5	410,848	1,007,880	263,554	197,479	478,355	0	113,819	675,248	0	83,470	451,533	0	82,395	409,418	0
6	252,226	958,723	0	71,293	472,577	0	84,575	633,188	0	45,448	443,819	0	66,381	405,921	0
7	489,373	736,097	256,593	497,536	835,960	0	515,879	876,435	0	515,356	847,333	0	512,543	843,661	0
8	264,893	421,805	0	207,917	372,728	0	176,896	316,765	0	179,858	323,588	0	157,658	307,594	0
9	138,234	264,725	0	117,499	246,072	0	99,390	227,270	0	99,561	226,454	0	90,716	201,447	0
10	70,607	195,972	0	42,965	193,773	0	18,897	161,597	0	17,512	166,884	0	23,980	198,657	0
11	121,284	370,339	0	69,293	308,604	0	26,530	388,041	0	27,533	315,105	0	20,687	218,792	0
12	82,766	286,790	0	58,801	387,202	0	7,958	128,013	0	8,019	125,903	0	8,112	125,999	0
13	22,030	160,712	0	12,019	121,581	0	7,774	120,826	0	7,702	119,966	0	0	0	0
14	26,467	288,386	0	13,666	284,871	0	0	0	0	0	0	0	0	0	0
15	16,721	142,374	0	49,240	452,195	0	0	0	0	0	0	0	0	0	0
16	119,380	479,805	0	124,668	456,002	0	14,577	451,880	0	14,745	457,096	0	15,174	455,232	0
17	289,542	632,730	0	365,399	608,396	0	400,568	610,785	0	354,194	607,864	0	325,641	615,014	0
18	91,328	524,186	0	69,675	503,893	0	149,032	627,028	0	47,600	549,071	0	0	0	0
19	51,863	367,781	0	112,196	411,807	0	36,594	277,779	0	30,559	494,192	0	0	0	0
20	100,485	680,001	0	206,754	611,438	0	137,713	408,233	0	0	0	0	0	0	0
21	143,354	669,077	0	19,019	289,922	0	0	0	0	0	0	0	21,664	649,919	0
22	283,790	673,446	0	39,431	604,775	0	39,954	628,721	0	41,251	678,237	0	8,887	266,616	0
23	223,552	650,873	0	124,841	638,996	0	17,476	271,330	0	38,140	660,352	0	71,752	634,958	0
24	345,859	657,628	0	99,063	658,332	0	91,138	673,987	0	16,591	259,030	0	0	0	0
day)	4,809,273	########	1,551,810	3,330,428	########	0	2,231,778	9,817,784	0	1,814,836	9,323,589	0	1,723,877	7,515,596	0
u/h)		1,007,880			835,960			876,435			847,333			843,661	
u/h)			0			0			0			0			0

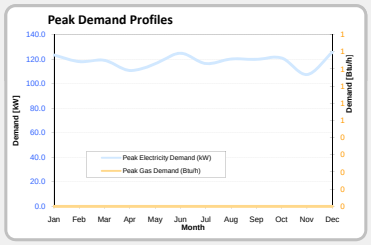
Hour	Oct Average (Btu/h)	Oct MAX (Btu/h)	Oct MIN (Btu/h)	Nov Average (Btu/h)	Nov MAX (Btu/h)	Nov MIN (Btu/h)	Dec Average (Btu/h)	Dec MAX (Btu/h)	Dec MIN (Btu/h)
1	171,123	554,836	0	358,353	605,465	250,618	582,425	1,209,490	266,366
2	202,693	606,984	0	391,801	1,096,490	254,466	726,642	1,252,930	268,079
3	256,642	631,958	0	463,961	1,107,800	251,875	815,353	1,313,910	273,406
4	259,924	620,931	0	579,838	1,160,030	251,720	866,120	1,373,620	279,417
5	289,443	623,070	0	599,855	1,118,820	255,658	911,399	1,399,090	278,467
6	161,366	474,477	0	626,594	1,152,960	259,955	938,759	1,413,250	280,008
7	529,976	786,881	0	443,834	1,024,330	0	698,041	1,429,150	265,849
8	236,789	529,616	0	578,760	988,435	295,567	873,637	1,296,210	477,435
9	143,576	284,599	0	344,844	554,331	0	542,716	1,093,830	350,152
10	92,508	228,676	0	232,340	442,205	0	333,121	533,597	255,337
11	91,828	360,231	0	170,453	285,040	0	288,709	499,041	210,676
12	35,124	215,672	0	132,906	292,948	0	249,702	480,159	178,536
13	5,138	159,278	0	104,097	444,771	0	213,598	308,598	127,621
14	23,045	290,402	0	85,029	611,761	0	167,189	459,776	0
15	26,079	388,072	0	89,548	391,621	0	201,385	483,150	0
16	51,665	455,042	0	210,558	518,833	0	237,209	494,575	139,617
17	330,570	633,747	0	231,814	537,712	0	277,498	1,005,480	156,734
18	56,968	611,540	0	347,813	631,890	223,563	378,462	1,017,020	257,890
19	25,453	275,007	0	97,474	462,295	0	122,321	511,227	0
20	47,193	653,636	0	119,026	473,712	0	347,869	1,035,060	0
21	68,103	654,652	0	295,109	915,734	0	514,398	1,102,730	262,109
22	102,809	649,033	0	297,637	965,549	0	462,068	1,144,240	252,395
23	111,541	650,778	0	357,401	932,677	0	545,892	1,206,410	260,050
24	146,526	645,770	0	317,551	972,550	0	590,290	1,204,550	263,624
day)	3,466,082	########	0	7,476,595	########	2,043,422	########	23,267,093	5,103,773
u/h)		786,881			1,160,030			1,429,150	
u/h)			0			0			0

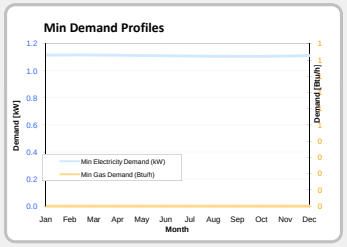
Retail eQUEST Simulation Results

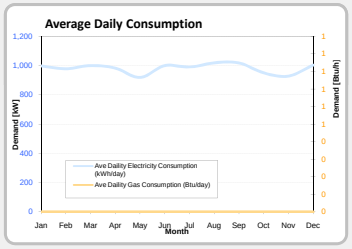
ITERATION: Title 24 - 2008 baseline











Electricity Demand Profiles - Retail

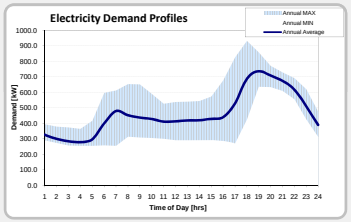
Hour	Annual Average Retail Demand (kW)	Annual MAX Retail Demand (kW)	Annual MIN Retail Demand (kW)	Jan Average Retail Demand (kW)	Jan MAX Retail Demand (kW)	Jan MIN Retail Demand (kW)	Feb Average Retail Demand (kW)	Feb MAX Retail Demand (kW)	Feb MIN Retail Demand (kW)	Mar Average Retail Demand (kW)	Mar MAX Retail Demand (kW)	Mar MIN Retail Demand (kW)	Apr Average Retail Demand (kW)	Apr MAX Retail Demand (kW)	Apr MIN Retail Demand (kW)	May Average Retail Demand (kW)	May MAX Retail Demand (kW)	May MIN Retail Demand (kW)	Jun Average Retail Demand (kW)	Jun MAX Retail Demand (kW)	Jun MIN Retail Demand (kW)	Jul Average Retail Demand (kW)	Jul MAX Retail Demand (kW)	Jul MIN Retail Demand (kW)	Aug Average Retail Demand (kW)	Aug MAX Retail Demand (kW)	Aug MIN Retail Demand (kW)	Sep Average Retail Demand (kW)	Sep MAX Retail Demand (kW)	Sep MIN Retail Demand (kW)	Oct Average Retail Demand (kW)	Oct MAX Retail Demand (kW)	Oct MIN Retail Demand (kW)	Nov Average Retail Demand (kW)	Nov MAX Retail Demand (kW)	Nov MIN Retail Demand (kW)	Dec Average Retail Demand (kW)	Dec MAX Retail Demand (kW)	Dec MIN Retail Demand (kW)
1	7.2	8.0	4.9	7.3	8.0	5.0	7.3	8.0	5.0	7.4	8.0	5.0	7.4	8.0	5.0	7.1	7.9	4.9	7.2	7.9	4.9	7.1	7.5	4.9	7.1	7.5	4.9	7.1	7.5	4.9	7.0	7.9	4.9	7.2	7.9	4.9	7.3	7.9	4.9
2	7.2	8.0	4.9	7.3	8.0	5.0	7.3	8.0	5.0	7.4	8.0	5.0	7.4	8.0	5.0	7.2	7.9	4.9	7.2	7.9	4.9	7.1	7.5	4.9	7.1	7.5	4.9	7.1	7.5	4.9	7.1	7.9	4.9	7.2	7.9	4.9	7.3	7.9	4.9
3	7.2	8.0	4.9	7.3	8.0	5.0	7.4	8.0	5.0	7.4	8.0	5.0	7.5	8.0	5.0	7.2	7.9	4.9	7.2	7.9	4.9	7.1	7.5	4.9	7.1	7.5	4.9	7.1	7.5	4.9	7.1	7.9	4.9	7.3	7.9	4.9	7.4	7.9	4.9
4	6.9	8.0	3.7	7.3	8.0	5.0	7.4	8.0	5.0	7.5	8.0	5.0	7.5	8.0	5.0	5.9	6.7	3.7	6.0	6.7	3.7	5.8	6.2	3.7	7.1	7.5	4.9	7.1	7.5	4.9	7.2	7.9	4.9	7.3	7.9	4.9	7.4	7.9	4.9
5	6.5	8.0	2.4	7.3	8.0	5.0	7.4	8.0	5.0	7.5	8.0	5.0	6.6	8.0	4.0	4.6	5.4	2.4	4.6	5.4	2.4	4.6	5.0	2.4	7.1	7.5	4.9	7.1	7.5	4.9	7.1	7.9	4.9	7.3	7.9	4.9	7.4	7.9	4.9
6	5.5	8.0	1.1	7.3	8.0	5.0	6.4	7.0	4.0	6.5	7.0	4.0	4.8	7.0	2.1	3.4	4.7	1.1	3.4	4.3	1.1	3.4	4.3	1.1	5.3	6.2	3.0	5.3	6.2	3.0	5.4	6.2	3.0	7.3	7.9	4.9	7.4	7.9	4.9
7	17.2	35.2	3.7	6.1	7.3	3.7	4.6	5.7	2.1	4.7	5.7	2.1	24.7	34.6	1.1	24.1	34.6	1.1	26.7	34.2	1.1	25.1	34.2	1.1	26.5	34.8	1.7	26.2	34.8	1.7	24.8	35.2	1.7	6.0	7.2	3.7	6.2	7.2	3.7
8	47.5	107.2	1.1	24.0	35.3	1.8	25.3	34.6	1.1	27.2	34.6	1.1	71.0	107.2	1.1	64.2	98.3	1.1	65.5	93.9	1.1	59.1	85.1	1.1	60.6	84.4	1.1	59.6	85.6	1.1	61.6	97.4	1.1	25.3	35.2	1.7	25.8	35.2	1.6
9	71.2	125.5	1.1	75.8	123.4	1.1	77.9	118.0	1.1	79.9	119.0	1.1	73.3	97.1	10.3	66.5	88.3	10.3	69.4	90.3	10.3	66.2	86.4	10.2	65.6	82.1	10.2	67.0	89.4	10.2	64.6	84.8	1.1	68.7	107.4	1.1	80.1	125.5	1.1
10	73.4	121.1	10.3	80.4	121.1	10.3	77.3	101.2	10.3	77.9	106.3	10.3	71.7	94.1	18.5	67.1	88.6	18.5	73.1	102.5	18.5	71.7	95.8	18.5	72.0	90.8	18.5	73.6	97.4	18.5	67.7	91.6	10.3	68.3	95.3	10.3	79.4	119.1	10.3
11	75.3	114.9	18.5	76.5	111.8	18.5	74.0	96.0	18.5	74.1	95.9	18.5	73.6	94.0	19.0	71.4	95.4	18.9	79.1	107.2	18.9	78.9	105.5	18.9	79.5	102.2	18.9	80.9	114.9	18.9	73.2	100.7	18.5	67.4	90.0	18.5	75.4	108.8	18.5
12	77.0	115.8	18.9	74.4	104.1	19.0	72.6	94.9	19.0	74.0	94.0	19.0	74.3	93.1	19.9	73.7	105.0	19.8	82.2	111.4	19.8	83.1	110.7	19.7	84.6	112.5	19.7	84.5	115.8	19.7	76.7	107.6	18.9	69.3	86.9	18.9	74.0	103.3	18.9
13	78.2	120.9	19.7	72.6	101.5	19.8	71.7	92.2	19.9	74.6	92.5	19.9	75.8	98.2	19.9	75.7	116.2	19.8	84.8	117.2	19.8	86.3	116.4	19.7	88.6	120.1	19.7	87.2	117.6	19.7	78.8	120.9	19.7	69.5	88.2	19.8	72.4	100.0	19.8
14	77.6	120.2	19.3	71.9	99.3	19.8	71.4	91.3	19.9	74.4	91.7	19.9	75.5	101.4	19.4	75.2	112.6	19.4	84.3	120.2	19.3	85.5	112.4	19.3	86.5	115.1	19.3	86.7	117.9	19.3	78.2	117.6	19.3	69.4	90.5	19.8	71.6	95.9	19.8
15	77.1	122.0	18.9	71.6	99.1	19.4	71.5	91.0	19.4	74.3	90.4	19.4	75.2	104.7	19.0	75.1	112.7	18.9	83.9	122.0	18.9	85.4	111.5	18.9	85.3	110.1	18.9	84.9	119.8	18.9	77.2	113.5	18.9	68.7	91.0	19.3	71.3	93.5	19.4
16	76.6	124.8	18.7	69.8	98.5	19.0	69.9	88.9	19.0	73.5	90.0	19.0	74.2	110.7	18.7	74.3	112.4	18.7	83.1	124.8	18.7	84.5	111.5	18.7	84.8	107.2	19.6	83.7	118.1	19.6	76.6	111.4	18.9	67.4	92.2	18.9	69.8	90.4	18.9
17	74.3	114.8	12.5	71.9	102.2	20.6	69.9	88.0	18.7	72.3	90.7	18.7	72.6	101.8	14.1	69.3	102.0	12.5	78.1	114.8	12.5	78.9	102.2	12.5	82.2	105.5	16.3	81.6	109.0	16.3	73.7	105.9	16.3	68.2	88.2	20.6	72.5	91.4	20.6
18	62.2	107.2	1.1	74.6	107.2	17.6	70.6	90.4	14.1	72.1	90.8	14.1	55.9	84.4	5.6	48.4	71.5	1.1	53.9	81.8	1.1	54.1	73.8	1.1	59.2	78.1	6.9	58.0	81.3	6.9	53.9	75.3	6.9	70.1	90.7	17.6	75.5	95.7	17.6
19	52.0	91.9	2.1	61.4	91.9	6.9	59.2	76.8	5.6	59.6	83.3	5.6	52.5	75.0	6.9	41.6	57.0	2.1	45.6	64.3	2.1	44.3	58.6	2.1	48.8	65.2	6.9	48.5	63.6	6.9	45.5	61.6	6.9	55.6	77.8	6.9	62.0	83.8	6.9
20	37.4	86.9	4.3	57.5	86.9	6.9	56.4	75.2	6.9	56.6	74.2	6.9	34.5	71.3	6.9	24.6	38.5	4.3	22.5	36.0	4.3	19.4	30.0	4.3	21.6	30.2	6.9	22.5	35.1	6.9	24.9	36.7	6.9	51.8	71.4	6.9	58.0	80.4	6.9
21	21.0	67.4	6.9	39.8	66.1	6.9	37.1	51.2	6.9	35.8	56.1	6.9	12.6	46.3	6.9	9.1	10.1	6.9	9.2	10.1	6.9	9.1	10.0	6.9	9.1	10.0	6.9	9.1	10.0	6.9	9.0	10.0	6.9	33.3	46.8	6.9	39.5	67.4	6.9
22	8.8	10.5	6.2	9.2	10.5	6.9	9.2	10.5	6.9	9.3	10.5	6.9	8.6	10.1	6.2	8.3	9.2	6.2	8.5	8.8	6.2	8.4	8.8	6.2	8.4	8.8	6.2	8.4	8.8	6.2	8.3	8.8	6.2	9.1	10.1	6.9	9.3	10.5	7.3
23	8.1	9.2	5.6	8.5	9.2	6.2	8.6	9.2	6.2	8.6	9.2	6.2	8.0	9.2	5.6	7.8	8.6	5.6	7.8	8.2	5.6	7.7	8.2	5.6	7.7	8.2	5.6	7.7	8.2	5.6	7.7	8.2	5.6	8.4	9.2	6.2	8.6	9.2	6.6
24	7.5	8.6	4.9	7.9	8.6	5.6	7.9	8.6	5.6	8.0	8.6	5.6	7.5	8.6	5.0	7.1	7.9	4.9	7.2	7.5	4.9	7.0	7.5	4.9	7.2	7.5	4.9	7.1	7.5	4.9	7.0	7.5	4.9	7.8	8.6	5.6	8.0	8.6	6.0
day)	982	1,652	196	998	1,432	240	978	1,270	230	1,001	1,290	230	983	1,389	230	919	1,310	212	1,001	1,395	212	990	1,307	212	1,019	1,317	236	1,018	1,379	236	950	1,341	217	928	1,234	239	1,004	1,374	241
kW)		125.5			123.4			118.0			119.0			110.7			116.2			124.8			116.4			120.1			119.8			120.9			107.4			125.5	
kW)			1.1			1.1			1.1			1.1			1.1			1.1			1.1			1.1			1.1			1.1			1.1			1.1			1.1

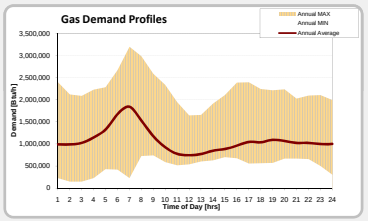
Gas Demand Profiles - Retail

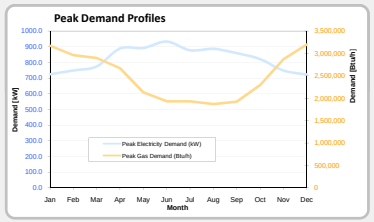
Hour	Annual Average Retail Demand (Btu/h)	Annual MAX Retail Demand (Btu/h)	Annual MIN Retail Demand (Btu/h)	Jan Average Retail Demand (Btu/h)	Jan MAX Retail Demand (Btu/h)	Jan MIN Retail Demand (Btu/h)	Feb Average Retail Demand (Btu/h)	Feb MAX Retail Demand (Btu/h)	Feb MIN Retail Demand (Btu/h)	Mar Average Retail Demand (Btu/h)	Mar MAX Retail Demand (Btu/h)	Mar MIN Retail Demand (Btu/h)	Apr Average Retail Demand (Btu/h)	Apr MAX Retail Demand (Btu/h)	Apr MIN Retail Demand (Btu/h)	May Average Retail Demand (Btu/h)	May MAX Retail Demand (Btu/h)	May MIN Retail Demand (Btu/h)	Jun Average Retail Demand (Btu/h)	Jun MAX Retail Demand (Btu/h)	Jun MIN Retail Demand (Btu/h)	Jul Average Retail Demand (Btu/h)	Jul MAX Retail Demand (Btu/h)	Jul MIN Retail Demand (Btu/h)	Aug Average Retail Demand (Btu/h)	Aug MAX Retail Demand (Btu/h)	Aug MIN Retail Demand (Btu/h)	Sep Average Retail Demand (Btu/h)	Sep MAX Retail Demand (Btu/h)	Sep MIN Retail Demand (Btu/h)	Oct Average Retail Demand (Btu/h)	Oct MAX Retail Demand (Btu/h)	Oct MIN Retail Demand (Btu/h)	Nov Average Retail Demand (Btu/h)	Nov MAX Retail Demand (Btu/h)	Nov MIN Retail Demand (Btu/h)	Dec Average Retail Demand (Btu/h)	Dec MAX Retail Demand (Btu/h)	Dec MIN Retail Demand (Btu/h)
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
day)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
u/h)		0			0			0			0			0			0			0			0			0			0			0			0			0	
u/h)			0			0			0			0			0			0			0			0			0			0			0			0			0	

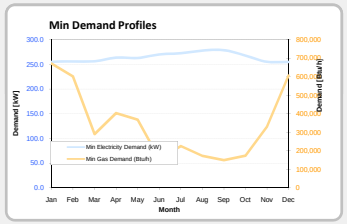
Condotel eQUEST Simulation Results

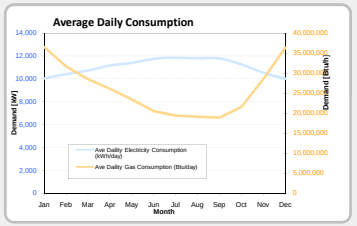
ITERATION: Title 24 - 2008 baseline











Electricity Demand Profiles - Condotel

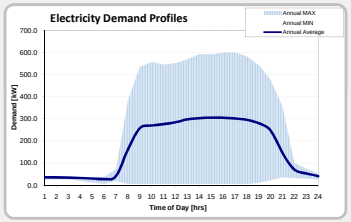
Hour	Annual Average (Condotel Demand (kW))	Annual MAX (Condotel Demand (kW))	Annual MIN (Condotel Demand (kW))	Jan Average (Condotel Demand (kW))	Jan MAX (Condotel Demand (kW))	Jan MIN (Condotel Demand (kW))	Feb Average (Condotel Demand (kW))	Feb MAX (Condotel Demand (kW))	Feb MIN (Condotel Demand (kW))	Mar Average (Condotel Demand (kW))	Mar MAX (Condotel Demand (kW))	Mar MIN (Condotel Demand (kW))	Apr Average (Condotel Demand (kW))	Apr MAX (Condotel Demand (kW))	Apr MIN (Condotel Demand (kW))	May Average (Condotel Demand (kW))	May MAX (Condotel Demand (kW))	May MIN (Condotel Demand (kW))	Jun Average (Condotel Demand (kW))	Jun MAX (Condotel Demand (kW))	Jun MIN (Condotel Demand (kW))	Jul Average (Condotel Demand (kW))	Jul MAX (Condotel Demand (kW))	Jul MIN (Condotel Demand (kW))	Aug Average (Condotel Demand (kW))	Aug MAX (Condotel Demand (kW))	Aug MIN (Condotel Demand (kW))	Sep Average (Condotel Demand (kW))	Sep MAX (Condotel Demand (kW))	Sep MIN (Condotel Demand (kW))	Oct Average (Condotel Demand (kW))	Oct MAX (Condotel Demand (kW))	Oct MIN (Condotel Demand (kW))	Nov Average (Condotel Demand (kW))	Nov MAX (Condotel Demand (kW))	Nov MIN (Condotel Demand (kW))	Dec Average (Condotel Demand (kW))	Dec MAX (Condotel Demand (kW))	Dec MIN (Condotel Demand (kW))
1	326.2	394.3	289.7	319.0	374.7	289.7	323.3	363.6	301.8	330.7	387.1	302.7	312.1	340.5	295.5	317.0	349.0	304.7	331.0	364.4	309.3	335.8	361.4	316.2	335.4	370.1	312.7	339.3	394.3	312.1	325.6	387.5	299.6	330.0	382.0	293.2	315.8	361.2	290.0
2	298.9	379.0	273.6	293.2	321.1	275.4	299.0	318.3	288.2	305.2	335.6	287.9	286.8	305.8	273.6	290.9	312.8	278.0	302.2	339.4	285.8	304.8	323.0	291.4	304.2	333.1	289.5	307.6	379.0	289.4	296.1	344.2	279.2	303.7	329.8	280.5	292.7	320.5	275.4
3	284.1	373.2	257.0	271.3	292.8	257.0	276.8	291.5	268.8	281.7	307.4	266.5	278.1	290.8	267.3	283.6	301.6	272.1	293.0	330.7	278.9	294.9	308.9	284.2	294.4	320.2	282.1	297.2	373.2	283.5	286.9	332.3	272.0	280.2	302.0	261.1	270.7	294.3	257.1
4	278.0	364.4	254.9	266.9	287.5	254.9	271.5	285.2	259.9	275.4	300.4	259.7	274.1	289.0	263.6	275.6	291.5	265.7	283.5	310.5	270.1	285.9	297.0	275.7	289.4	313.4	278.0	291.5	364.4	279.9	282.6	326.4	267.8	274.1	295.2	255.9	265.7	287.6	254.9
5	296.5	417.3	254.9	264.9	286.6	254.9	268.7	282.4	256.1	272.1	295.3	256.2	305.6	330.3	265.8	304.2	325.1	262.9	316.8	353.6	275.2	316.4	341.0	272.5	326.0	346.3	284.7	326.9	417.3	279.0	315.3	344.3	273.7	271.2	291.3	255.1	263.9	285.1	254.9
6	399.1	596.8	257.9	297.4	330.2	257.9	301.0	323.2	263.2	307.2	339.2	263.5	444.7	526.6	263.6	449.5	539.7	311.0	488.4	587.2	317.0	474.9	563.7	322.3	481.3	556.6	323.5	478.8	596.8	322.8	454.9	554.8	290.2	306.2	335.4	266.0	298.9	328.6	258.0
7	479.1	612.8	254.9	431.2	530.2	301.6	441.1	514.7	296.0	462.7	545.0	303.1	490.7	544.8	327.5	498.8	588.9	398.1	531.6	612.8	410.1	511.4	595.0	409.0	508.9	581.4	407.7	504.2	592.2	421.3	474.6	529.0	323.2	450.6	546.1	311.8	441.9	526.6	301.4
8	451.7	654.2	314.0	454.9	509.3	375.2	469.1	517.0	387.2	492.0	552.4	386.4	433.2	595.9	314.8	448.3	602.9	315.8	447.5	628.8	324.8	452.4	654.2	334.2	434.4	614.3	325.7	440.5	614.9	320.4	415.4	602.2	314.0	474.7	526.2	389.9	458.8	507.7	375.0
9	436.7	651.9	309.1	395.1	576.1	309.1	404.5	577.2	310.9	410.8	594.7	310.7	448.7	590.2	313.7	466.5	599.1	318.6	467.7	615.0	341.4	480.3	651.9	384.8	463.3	609.5	346.2	468.8	625.5	328.9	444.3	603.0	320.0	411.0	584.5	310.1	377.9	531.2	309.3
10	427.7	590.7	305.9	395.0	557.7	310.4	416.2	567.6	312.0	428.1	590.0	314.7	429.1	581.2	305.9	432.9	488.7	313.1	445.7	523.9	350.2	455.4	562.3	398.9	444.9	503.7	376.6	450.4	531.5	349.1	423.4	590.7	314.5	424.2	573.8	312.6	387.1	533.7	310.6
11	410.5	527.1	300.5	348.5	448.5	300.5	381.4	465.0	304.2	398.8	465.4	307.7	418.2	452.0	300.6	427.2	478.4	308.9	441.3	503.7	361.3	448.8	527.1	406.0	445.5	487.9	395.4	450.7	515.1	373.1	418.5	507.3	309.6	393.2	464.9	304.5	353.3	428.6	301.2
12	412.3	537.8	290.7	342.2	431.8	290.7	375.5	458.1	296.2	390.2	436.8	299.8	420.2	459.7	309.4	431.9	487.2	314.9	446.2	499.0	391.1	453.8	519.3	414.6	454.9	498.2	413.3	461.0	537.8	391.9	430.7	510.4	316.1	390.3	452.6	308.9	349.5	421.8	292.0
13	418.3	540.3	292.0	350.2	435.7	292.0	384.6	476.5	300.7	397.9	448.7	301.5	422.7	470.8	319.2	434.7	516.6	319.9	449.5	511.7	410.8	457.7	528.3	424.7	461.4	522.6	420.9	466.3	540.3	403.3	439.9	538.7	322.9	394.8	453.2	310.4	358.8	421.4	293.5
14	419.3	544.7	291.0	348.7	417.9	291.0	382.8	441.9	303.0	397.2	450.1	302.2	427.0	486.2	337.2	439.5	520.1	334.6	453.4	528.7	418.4	460.2	522.2	432.4	460.9	512.9	423.8	470.2	544.7	408.2	442.8	535.1	332.5	391.8	450.4	311.0	355.0	405.5	294.1
15	428.6	572.8	292.1	350.0	418.0	292.1	384.5	429.5	310.3	401.9	454.3	309.1	442.7	524.2	376.3	458.6	554.9	360.5	475.3	572.8	419.2	479.9	524.9	442.3	476.0	525.4	432.0	479.1	551.0	402.5	450.4	522.3	350.5	391.2	455.9	318.0	351.2	401.4	296.8
16	439.1	676.1	287.2	354.3	425.4	287.2	388.6	456.2	318.8	416.7	480.1	324.9	449.7	590.9	354.6	484.8	654.0	331.4	488.3	631.1	384.2	502.8	676.1	397.7	492.3	638.7	374.2	488.1	675.5	383.1	462.2	657.3	299.8	387.2	470.5	312.4	351.0	396.7	290.0
17	527.3	826.5	270.1	370.8	522.4	271.7	383.1	547.0	270.1	405.9	581.9	271.0	590.1	751.5	309.8	637.2	792.2	489.0	642.9	788.6	524.8	658.7	826.5	539.7	656.9	793.4	526.5	643.9	812.7	528.3	602.9	771.8	487.3	379.1	528.0	283.4	346.3	491.5	272.0
18	687.0	932.9	424.9	527.3	663.8	424.9	531.1	675.8	430.4	544.9	717.5	430.5	768.4	888.7	472.7	795.0	891.9	709.4	821.0	932.9	713.8	822.9	877.2	733.2	829.9	886.6	761.7	794.9	859.0	734.7	752.6	820.9	687.3	537.2	659.6	446.0	509.2	641.6	428.8
19	736.4	858.8	635.8	695.3	724.2	635.8	708.8	748.8	672.3	724.4	774.1	674.6	747.2	804.6	710.5	742.4	813.3	690.6	774.2	858.8	674.0	772.1	811.6	710.5	771.4	834.5	726.8	755.9	793.2	718.0	734.7	780.3	678.4	710.8	747.8	666.0	698.0	722.9	660.3
20	707.9	771.2	634.3	685.6	706.7	634.3	698.9	730.6	667.8	710.6	755.9	669.1	705.1	753.1	667.3	701.7	744.2	658.0	723.9	771.2	655.4	724.8	746.3	685.5	728.1	759.5	691.4	723.0	749.9	692.4	706.8	741.8	659.4	698.3	730.1	660.6	688.3	709.6	646.2
21	674.0	728.9	609.2	662.1	682.6	618.8	674.9	696.4	649.3	685.1	728.9	638.2	662.8	701.2	614.8	662.1	703.3	615.3	683.0	714.8	615.0	686.0	705.2	623.1	683.0	710.7	621.2	682.0	704.5	646.4	667.8	702.7	609.2	675.0	705.4	639.1	664.3	685.6	623.8
22	618.0	692.1	555.5	623.3	652.1	570.3	638.5	661.5	595.4	649.2	692.1	602.6	596.8	656.8	560.3	592.6	623.0	560.6	607.6	637.0	561.1	616.0	633.4	565.5	613.0	635.8	565.3	614.1	635.7	570.2	602.8	640.2	555.5	638.4	659.6	586.6	625.0	650.7	570.7
23	510.0	620.5	425.8	555.6	587.5	516.0	573.0	593.5	528.7	583.9	620.5	541.2	465.0	590.9	425.8	459.2	480.4	431.2	467.0	492.0	457.3	471.5	505.5	458.8	472.0	495.8	458.2	476.3	510.7	454.5	468.1	567.0	438.7	575.1	596.2	529.2	557.4	586.1	512.8
24	389.1	474.5	311.4	418.4	472.9	397.7	429.3	452.7	412.2	440.4	474.5	412.3	348.6	444.8	311.4	349.2	404.6	324.0	361.9	408.3	329.8	371.4	412.4	340.0	366.3	419.6	336.1	373.4	431.8	332.3	360.8	468.1	315.2	435.4	473.6	404.6	417.2	441.1	397.4
day)	11,055	14,339	8,392	10,021	11,656	8,709	10,406	11,874	9,004	10,713	12,328	9,036	11,168	12,971	8,961	11,383	13,063	9,488	11,743	13,517	10,079	11,839	13,474	10,463	11,794	13,270	10,373	11,784	13,751	10,225	11,260	13,378	9,317	10,524	12,014	9,017	9,998	11,381	8,766
kW)		932.9			724.2			748.8			774.1			888.7			891.9			932.9			877.2			886.6			859.0			820.9			747.8			722.9	
kW)			254.9			254.9			256.1			256.2			263.6			262.9			270.1			272.5			278.0			279.0			267.8			255.1			254.9

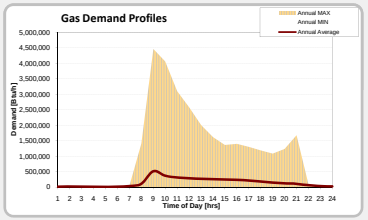
Gas Demand Profiles - Condotel

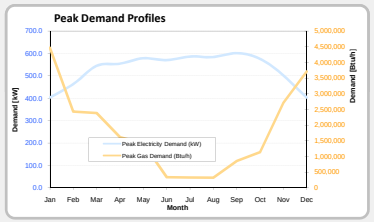
Hour	Annual Average (Condotel Demand (Btu/h))	Annual MAX (Condotel Demand (Btu/h))	Annual MIN (Condotel Demand (Btu/h))	Jan Average (Condotel Demand (Btu/h))	Jan MAX (Condotel Demand (Btu/h))	Jan MIN (Condotel Demand (Btu/h))	Feb Average (Condotel Demand (Btu/h))	Feb MAX (Condotel Demand (Btu/h))	Feb MIN (Condotel Demand (Btu/h))	Mar Average (Condotel Demand (Btu/h))	Mar MAX (Condotel Demand (Btu/h))	Mar MIN (Condotel Demand (Btu/h))	Apr Average (Condotel Demand (Btu/h))	Apr MAX (Condotel Demand (Btu/h))	Apr MIN (Condotel Demand (Btu/h))	May Average (Condotel Demand (Btu/h))	May MAX (Condotel Demand (Btu/h))	May MIN (Condotel Demand (Btu/h))	Jun Average (Condotel Demand (Btu/h))	Jun MAX (Condotel Demand (Btu/h))	Jun MIN (Condotel Demand (Btu/h))	Jul Average (Condotel Demand (Btu/h))	Jul MAX (Condotel Demand (Btu/h))	Jul MIN (Condotel Demand (Btu/h))	Aug Average (Condotel Demand (Btu/h))	Aug MAX (Condotel Demand (Btu/h))	Aug MIN (Condotel Demand (Btu/h))	Sep Average (Condotel Demand (Btu/h))	Sep MAX (Condotel Demand (Btu/h))	Sep MIN (Condotel Demand (Btu/h))	Oct Average (Condotel Demand (Btu/h))	Oct MAX (Condotel Demand (Btu/h))	Oct MIN (Condotel Demand (Btu/h))	Nov Average (Condotel Demand (Btu/h))	Nov MAX (Condotel Demand (Btu/h))	Nov MIN (Condotel Demand (Btu/h))	Dec Average (Condotel Demand (Btu/h))	Dec MAX (Condotel Demand (Btu/h))	Dec MIN (Condotel Demand (Btu/h))
1	987,719	2,398,110	229,228	1,542,973	2,398,110	902,047	1,253,071	1,694,130	893,705	1,039,280	1,577,150	416,146	1,159,301	1,580,730	403,229	975,567	1,601,950	368,633	779,138	1,486,450	239,588	615,395	1,388,430	267,689	588,871	1,471,890	242,040	501,572	1,386,210	229,228	818,111	1,514,800	236,507	1,128,149	1,926,160	384,723	1,464,520	2,034,740	962,330
2	989,427	2,121,510	150,205	1,496,372	1,992,660	870,719	1,273,037	1,743,300	829,852	1,156,659	1,591,790	363,377	1,066,328	1,441,860	729,883	963,610	1,337,160	643,675	675,525	1,334,260	156,403	638,897	1,415,410	226,058	555,600	1,304,420	172,728	610,341	1,383,740	150,205	828,743	1,399,410	174,305	1,136,224	1,859,660	330,081	1,484,091	2,121,510	901,079
3	1,019,963	2,086,600	150,120	1,484,918	1,997,480	837,576	1,270,000	1,725,310	826,668	1,113,977	1,636,980	290,830	1,124,530	1,568,010	773,364	942,896	1,277,100	710,075	797,606	1,388,450	156,393	769,035	1,374,180	232,753	698,467	1,335,710	173,263	568,937	1,291,170	150,120	804,329	1,249,410	176,439	1,174,810	1,813,830	735,356	1,500,897	2,086,600	883,440
4	1,147,259	2,227,640	230,088	1,524,702	2,155,580	834,616	1,326,356	1,797,300	838,286	1,208,758	1,747,260	645,271	1,279,187	1,723,340	933,445	1,093,873	1,412,170	855,346	890,364	1,381,320	250,826	861,167	1,383,190	319,456	937,539	1,357,830	319,175	817,671	1,423,130	230,088	1,017,641	1,439,170	258,761	1,229,645	1,970,640	657,962	1,585,898	2,227,640	893,784
5	1,321,048	2,281,760	433,090	1,631,272	2,230,330	946,294	1,463,705	1,941,760	954,021	1,332,559	1,890,680	665,920	1,547,477	1,990,330	1,050,250	1,352,634	1,666,700	1,090,590	1,146,287	1,534,750	540,762	1,023,004	1,571,170	797,542	990,593	1,282,510	476,556	1,114,299	1,582,850	461,582	1,208,893	1,735,430	433,090	1,349,676	1,988,890	777,489	1,701,907	2,281,760	984,562
6	1,671,002	2,671,280	418,964	1,887,838	2,550,790	1,163,180	1,770,038	2,210,320	1,104,260	1,655,334	2,236,820	1,002,630	2,005,897	2,671,280	1,187,240	1,696,520	2,131,170	1,038,680	1,489,539	1,915,400	670,303	1,423,813	1,864,690	651,619	1,455,947	1,837,550	468,359	1,482,282	1,923,990	761,580	1,607,756	2,293,130	418,964	1,611,116	2,321,390	1,059,340	1,972,460	2,594,000	1,264,280
7	1,841,883	3,198,860	230,088	2,280,296	3,173,060	1,072,400	2,262,254	2,964,340	1,163,080	2,100,197	2,897,600	1,037,930	1,882,766	2,382,180	1,008,690	1,652,487	2,129,260	946,675	1,453,729	1,932,240	563,331	1,445,643	1,930,190	550,829	1,496,061	1,868,420	553,455	1,503,292	1,902,900	818,841	1,672,207	2,221,600	557,004	1,980,377	2,870,120	1,056,020	2,396,305	3,198,860	1,271,070
8	1,530,363	2,983,860	726,483	2,206,391	2,970,450	1,140,440	2,059,990	2,545,170	1,418,480	1,952,148	2,556,360	1,028,780	1,436,047	1,996,170	1,111,220	1,211,775	1,658,550	794,456	1,055,365	1,466,780	757,726	980,631	1,349,850	746,725	1,049,700	1,399,990	727,383	1,026,873	1,472,030	726,483	1,261,464	1,609,230	751,269	1,833,221	2,504,900	1,034,380	2,317,148	2,983,860	1,355,020
9	1,171,895	2,587,910	742,375	1,779,356	2,587,910	1,238,310	1,576,753	1,892,540	1,219,000	1,462,404	1,926,970	1,104,340	1,062,822	1,511,800	837,379	887,487	1,348,050	795,528	845,553	1,185,540	773,571	791,611	844,040	754,831	778,059	829,450	743,335	790,646	1,130,330	742,375	925,055	1,241,630	751,673	1,398,581	1,910,950	851,395	1,784,567	2,315,170	1,424,090
10	925,582	2,337,070	591,371	1,483,190	2,337,070	1,121,620	1,295,744	1,574,940	1,123,550	1,132,752	1,601,830	834,823	773,649	1,259,060	652,758	720,929	1,110,450	635,035	664,184	942,418	617,041	652,626	849,544	602,199	634,314	834,896	592,896	635,662	833,506	591,371	692,120	1,027,460	599,705	1,030,996	1,552,160	770,397	1,407,356	1,994,050	1,158,350
11	773,139	1,946,060	517,191	1,235,441	1,946,060	760,110	1,014,006	1,396,840	700,496	897,264	1,441,620	656,953	659,192	1,136,360	571,522	624,631	996,133	555,785	580,742	749,026	539,854	573,964	716,449	526,789	558,799	704,505	518,675	559,259	703,365	517,191	595,047	915,229	524,513	820,123	1,376,010	615,642	1,167,209	1,717,860	943,418
12	744,851	1,647,120	538,414	1,080,404	1,647,120	677,699	825,045	1,251,400	601,219	777,649	1,190,570	575,410	695,782	1,138,930	571,826	685,796	1,039,000	634,293	644,576	725,944	616,377	634,148	707,032	601,583	620,705	695,361	592,368	620,659	694,313	590,764	646,022	951,230	598,891	680,677	1,156,340	538,414	1,023,612	1,530,740	606,837
13	768,083	1,655,790	603,473	1,078,339	1,655,790	671,109	824,811	1,247,700	665,232	783,012	1,267,980	656,640	730,841	1,090,780	652,581	727,984	1,022,810	650,311	680,605	869,494	631,097	672,801	846,030	615,140	654,194	831,430	605,136	654,713	830,281	603,473	674,637	842,214	612,160	719,974	1,049,270	614,577	1,011,340	1,463,950	640,615
14	845,394	1,912,210	628,937	1,130,838	1,887,480	672,532	861,441	1,381,550	674,013	825,436	1,912,210	674,355	838,302	1,129,600	669,969	831,130	1,094,670	762,084	790,438	1,060,860	738,354	778,991	1,030,700	718,201	755,135	1,011,780	705,458	755,455	1,010,460	703,647	778,262	1,025,790	714,456	754,732	1,089,380	628,937	1,038,298	1,521,690	673,721
15	885,071	2,105,670	703,409	1,196,693	2,105,670	779,472	973,905	1,543,350	791,540	924,843	1,596,190	792,087	850,337	1,136,400	785,652	844,524	1,387,270	761,673	784,613	945,001	738,145	772,074	917,802	718,020	751,842	900,675	705,046	752,087	899,723	703,409	773,876	913,459	714,262	865,416	1,161,690	735,174	1,129,960	1,762,930	791,267
16	957,584	2,387,880	676,442	1,256,159	2,387,880	779,185	979,787	1,344,580	791,298	925,652	1,607,760	791,920	954,435	1,267,670	755,250	914,131	967,124	731,877	898,544	930,205	709,713	866,876	903,686	689,640	851,339	886,999	677,935	848,718	885,884	676,442	865,422	1,001,540	686,516	932,711	1,797,680	734,938	1,193,061	1,699,580	803,259
17	1,045,824	2,395,070	558,283	1,513,359	2,395,070	876,489	1,165,145	2,165,330	759,762	1,098,760	2,143,730	760,710	949,221	1,287,450	621,323	880,698	977,838	602,440	874,763	930,184	584,965	839,024	903,613	568,757	825,682	887,034	559,491	822,266	885,893	558,283	836,444	1,027,510	566,274	1,123,814	2,003,350	706,442	1,618,932	2,216,440	1,090,210
18	1,034,529	2,244,860	563,855	1,632,269	2,216,700	900,077	1,263,723	2,244,860	650,223	1,091,580	1,767,830	625,694	873,819	1,271,980	624,390	814,454	975,940	606,213	796,785	947,114	589,485	773,534	921,116	573,822	756,146	904,559	564,908	754,425	904,169	563,855	780,628	940,521	567,002	1,319,191	2,151,130	633,916	1,567,269	2,189,500	1,132,920
19	1,091,634	2,215,870	572,229	1,494,406	1,976,530	1,062,260	1,362,304	2,215,870	803,967	1,039,453	1,811,200	628,829	1,051,356	2,193,250	745,728	963,607	1,106,120	725,089	942,569	1,030,040	705,676	911,098	1,002,850	687,768	894,160	985,520	677,419	893,226	985,033	676,312	913,889	1,078,350	572,229	1,201,406	1,961,940	673,452	1,449,360	1,769,580	997,475
20	1,065,921	2,235,010	670,463	1,614,708	2,229,600	1,132,110	1,463,929	2,235,010	960,867	1,228,832	2,137,230	780,534	938,019	1,646,500	738,880	840,557	1,075,250	718,652	798,307	1,025,410	699,309	773,490	925,463	681,694	755,747	909,780	671,511	756,087	909,254	670,463	788,633	949,768	679,069	1,290,255	2,121,040	793,864	1,565,487	1,895,500	1,139,620
21	1,021,424	2,027,170	670,749	1,465,047	1,835,540	1,029,580	1,286,211	2,027,170	860,594	1,114,167	1,945,730	825,795	955,916	1,438,060	739,094	902,292	1,857,610	719,095	796,169	975,989	699,520	766,426	849,071	682,017	749,943	835,113	671,824	747,866	834,425	670,749	786,725	880,261	679,269	1,232,267	1,986,520	779,258	1,468,277	1,903,480	1,228,740
22	1,023,538	2,094,240	658,038	1,503,768	1,859,450	929,539	1,425,811	2,028,140	880,779	1,179,542	2,094,240	825,886	957,689	1,905,210	721,558	862,625	1,091,520	703,407	743,586	941,600	684,636	703,195	842,078	669,329	692,930	848,707	659,131	680,652	763,400	658,038	770,669	1,865,920	666,436	1,289,173	2,018,800	785,107	1,498,095	1,940,990	1,240,440
23	995,284	2,106,480	504,480	1,505,570	1,885,700	864,557	1,329,648	1,937,120	826,380	1,154,307	1,976,780	726,743	1,107,502	2,106,480	632,771	954,773	2,001,470	539,888	711,767	1,741,390	525,068	594,355	762,460	513,201	582,961	768,412	505,225	553,603	641,363	504,480	709,596	1,744,450	511,196	1,263,650	1,979,650	719,515	1,496,923	1,992,540	1,165,350
24	998,777	1,993,310	304,014	1,516,932	1,951,300	748,742	1,375,886	1,910,260	1,020,180	1,289,964	1,904,380	579,270	1,175,719	1,751,990	435,068	1,073,945	1,785,940	416,658	658,802	1,511,520	315,875	528,406	1,471,940	318,844	480,035	1,503,230	304,440	418,391	1,447,580	304,014	803,887	1,686,130	307,457	1,169,296	1,781,860	641,334	1,512,028	1,993,310	1,081,310
day)	########	########	12,071,989	36,541,241	52,373,330	22,010,663	31,702,601	45,018,290	21,357,452	28,484,530	44,460,890	17,290,873	26,076,133	38,625,420	17,953,070	23,418,926	33,051,255	17,006,158	20,499,554	28,951,385	13,504,018	19,390,203	26,770,984	13,714,506	19,114,763	26,195,771	12,887,757	18,868,983	26,724,999	13,262,993	21,560,054	31,553,642	12,757,447	28,535,479	44,353,360	17,257,711	36,355,000	49,436,280	24,633,193
u/h)		3,198,860			3,173,060			2,964,340			2,897,600			2,671,280			2,131,170			1,932,240			1,930,190			1,868,420			1,923,990			2,293,130			2,870,120			3,198,860	
u/h)			150,120			671,109			601,219			290,830			403,229			368,633			156,393			226,058			172,728			150,120			174,305			330,081			606,837

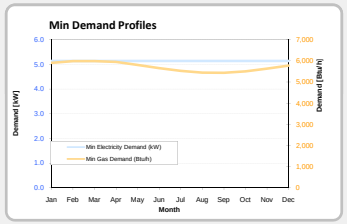
AR eQUEST Simulation Results

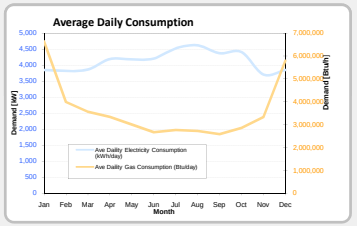
ITERATION: Title 24 - 2008 baseline











Electricity Demand Profiles - AR

Hour	Annual Annual Average (kW)	Annual Annual MAX (kW)	Annual Annual MIN (kW)	Jan Jan Average (kW)	Jan Jan MAX (kW)	Jan Jan MIN (kW)	Feb Feb Average (kW)	Feb Feb MAX (kW)	Feb Feb MIN (kW)	Mar Mar Average (kW)	Mar Mar MAX (kW)	Mar Mar MIN (kW)	Apr Apr Average (kW)	Apr Apr MAX (kW)	Apr Apr MIN (kW)
1	35.3	41.1	26.2	36.3	41.1	26.2	36.3	41.1	26.2	36.3	41.1	26.2	35.7	41.1	26.2
2	34.8	38.5	26.2	34.6	38.5	26.2	34.6	38.5	26.2	34.6	38.5	26.2	35.1	38.5	26.2
3	34.5	38.2	26.2	34.4	38.2	26.2	34.4	38.2	26.2	34.4	38.2	26.2	35.0	38.2	26.2
4	32.7	38.2	19.2	34.4	38.2	26.2	34.4	38.2	26.2	34.4	38.2	26.2	35.0	38.2	26.2
5	30.6	38.2	12.2	34.4	38.2	26.2	34.4	38.2	26.2	34.4	38.2	26.2	30.8	38.2	21.0
6	27.0	38.2	5.1	34.4	38.2	26.2	29.1	33.0	21.0	29.1	33.0	21.0	24.7	33.0	10.4
7	41.2	73.7	19.2	31.4	37.2	19.2	22.6	28.4	10.4	22.6	28.4	10.4	46.1	70.2	5.1
8	161.4	388.3	5.1	52.7	73.7	8.7	49.3	70.2	5.1	49.2	70.2	5.1	214.5	355.5	5.1
9	257.6	535.5	5.1	242.6	361.7	5.1	242.8	355.4	5.1	242.4	355.4	5.1	272.1	373.1	5.1
10	269.4	557.8	5.1	254.4	373.1	5.1	254.9	373.1	5.1	254.4	373.1	5.1	278.1	406.5	5.1
11	276.1	545.6	5.1	256.6	376.4	5.1	257.1	376.4	5.1	256.6	376.4	5.1	280.0	422.0	5.1
12	283.9	552.5	5.1	256.6	376.4	5.1	257.6	392.3	5.1	257.8	402.0	5.1	284.3	476.4	5.1
13	298.3	569.6	5.1	256.6	376.4	5.1	260.2	463.0	5.1	262.1	452.9	5.1	294.0	539.3	5.1
14	302.9	593.7	5.1	256.6	376.4	5.1	259.6	432.3	5.1	263.1	430.2	5.1	296.2	545.0	5.1
15	304.6	592.2	5.1	256.6	376.4	5.1	260.9	422.7	5.1	267.8	486.8	5.1	297.1	553.0	5.1
16	306.0	600.0	5.1	256.7	378.7	5.1	262.3	417.4	5.1	274.6	545.0	5.1	302.6	554.1	5.1
17	301.0	601.4	5.1	267.2	387.0	15.7	259.5	409.3	5.1	270.0	532.5	5.1	299.4	553.7	5.1
18	295.5	582.6	5.1	284.0	403.3	33.3	265.5	393.4	13.9	271.1	440.1	13.9	301.7	459.0	13.9
19	280.6	542.9	10.4	282.5	399.5	36.8	276.0	395.1	29.7	278.8	432.8	29.7	292.8	420.3	29.7
20	247.5	476.5	22.7	269.0	379.6	36.8	269.4	379.6	36.8	269.6	389.6	36.8	253.1	386.4	36.8
21	146.2	354.7	36.8	226.5	316.9	36.8	226.9	316.9	36.8	226.5	317.1	36.8	119.9	317.0	36.8
22	70.7	101.1	33.3	80.4	101.1	36.8	80.4	101.1	36.8	80.4	101.1	36.8	68.8	101.1	33.3
23	53.2	75.8	29.7	62.1	75.8	33.3	62.1	75.8	33.3	62.1	75.8	33.3	50.8	75.8	29.7
24	40.6	53.2	26.2	45.6	53.2	29.7	45.7	53.2	29.7	45.6	53.2	29.7	39.8	53.2	26.2
day)	4,131	8,030	350	3,847	5,455	485	3,816	5,683	431	3,858	6,090	431	4,188	6,889	399
kW)		601.4			403.3			463.0			545.0			554.1	
kW)			5.1			5.1			5.1			5.1			5.1

Hour	May May Average (kW)	May May MAX (kW)	May May MIN (kW)	Jun Jun Average (kW)	Jun Jun MAX (kW)	Jun Jun MIN (kW)	Jul Jul Average (kW)	Jul Jul MAX (kW)	Jul Jul MIN (kW)	Aug Aug Average (kW)	Aug Aug MAX (kW)	Aug Aug MIN (kW)	Sep Sep Average (kW)	Sep Sep MAX (kW)	Sep Sep MIN (kW)
1	35.0	38.5	26.2	34.4	38.5	26.2	35.0	38.5	26.2	35.0	38.5	26.2	34.4	38.5	26.2
2	34.7	38.2	26.2	34.2	38.2	26.2	34.7	38.2	26.2	34.7	38.2	26.2	34.7	38.2	26.2
3	34.7	38.2	26.2	34.2	38.2	26.2	34.7	38.2	26.2	34.7	38.2	26.2	34.2	38.2	26.2
4	27.7	31.2	19.2	27.2	31.2	19.2	27.7	31.2	19.2	34.7	38.2	26.2	34.2	38.2	26.2
5	20.7	24.2	12.2	20.2	24.2	12.2	20.7	24.2	12.2	34.7	38.2	26.2	34.2	38.2	26.2
6	17.9	23.1	5.1	17.1	23.1	5.1	17.9	23.1	5.1	28.4	33.7	15.7	27.7	33.7	15.7
7	51.3	70.2	5.1	48.5	70.2	5.1	51.3	70.2	5.1	54.8	73.7	8.7	52.0	73.7	8.7
8	253.7	355.5	5.1	240.1	387.9	5.1	255.8	388.3	5.1	253.9	357.2	5.1	239.5	374.3	5.1
9	267.7	415.7	5.1	266.6	535.5	5.1	278.5	533.6	5.1	273.3	410.6	5.1	263.5	490.1	5.1
10	277.1	491.9	5.1	281.1	556.4	5.1	296.9	557.8	5.1	286.2	431.8	5.1	275.2	539.4	5.1
11	283.3	481.3	5.1	290.2	543.2	5.1	309.4	545.6	5.1	303.4	488.1	5.1	289.0	540.4	5.1
12	291.2	497.6	5.1	302.4	538.1	5.1	328.2	542.7	5.1	325.3	536.7	5.1	300.4	552.5	5.1
13	311.5	568.0	5.1	331.2	553.3	5.1	358.9	569.6	5.1	354.8	561.4	5.1	320.9	567.0	5.1
14	318.6	575.1	5.1	335.5	562.0	5.1	362.1	578.8	5.1	364.2	570.6	5.1	336.4	593.7	5.1
15	322.9	578.5	5.1	331.0	562.0	5.1	358.3	578.3	5.1	365.4	569.0	5.1	341.6	592.2	5.1
16	324.4	578.8	5.1	331.2	570.2	5.1	360.3	586.4	5.1	368.7	574.8	10.4	336.1	600.0	10.4
17	306.7	558.2	5.1	304.7	561.6	5.1	342.5	570.2	5.1	355.2	583.8	26.2	338.4	601.4	26.2
18	282.1	531.2	5.1	281.0	539.8	5.1	312.5	542.9	5.1	338.2	570.4	36.8	326.9	582.6	36.8
19	261.3	402.4	10.4	253.0	430.6	10.4	276.3	476.7	10.4	298.3	450.0	36.8	291.8	542.9	36.8
20	222.1	309.7	22.7	212.9	343.0	22.7	227.6	347.8	22.7	240.7	364.8	36.8	232.9	382.9	36.8
21	82.5	101.1	36.8	79.7	101.1	36.8	82.5	101.1	36.8	82.5	101.1	36.8	79.7	101.1	36.8
22	63.5	75.8	33.3	61.6	75.8	33.3	63.5	75.8	33.3	63.5	75.8	33.3	61.6	75.8	33.3
23	46.4	53.2	29.7	45.4	53.2	29.7	46.4	53.2	29.7	46.4	53.2	29.7	45.4	53.2	29.7
24	36.3	41.1	26.2	36.7	41.1	26.2	36.8	41.1	26.2	36.3	41.1	26.2	36.7	41.1	26.2
day)	4,174	6,879	336	4,200	7,219	336	4,519	7,354	336	4,613	7,039	470	4,367	7,529	470
kW)		578.8			570.2			586.4			583.8			601.4	
kW)			5.1			5.1			5.1			5.1			5.1

Hour	Oct Oct Average (kW)	Oct Oct MAX (kW)	Oct Oct MIN (kW)	Nov Nov Average (kW)	Nov Nov MAX (kW)	Nov Nov MIN (kW)	Dec Dec Average (kW)	Dec Dec MAX (kW)	Dec Dec MIN (kW)
1	35.3	41.1	26.2	35.7	41.1	26.2	36.3	41.1	26.2
2	34.8	38.5	26.2	34.0	38.5	26.2	34.6	38.5	26.2
3	34.7	38.2	26.2	33.8	38.2	26.2	34.4	38.2	26.2
4	34.7	38.2	26.2	33.8	38.2	26.2	34.4	38.2	26.2
5	34.7	38.2	26.2	33.8	38.2	26.2	34.4	38.2	26.2
6	29.4	38.2	15.7	33.8	38.2	26.2	34.4	38.2	26.2
7	49.9	73.7	8.7	30.6	37.2	19.2	31.4	37.2	19.2
8	218.2	368.1	5.1	49.9	73.7	8.7	52.7	73.7	8.7
9	270.4	451.4	5.1	227.0	356.2	5.1	242.4	355.4	5.1
10	279.9	475.1	5.1	238.2	373.1	5.1	254.4	373.1	5.1
11	287.8	475.0	5.1	241.4	393.8	5.1	256.6	376.4	5.1
12	296.8	483.8	5.1	246.6	432.2	5.1	256.6	376.4	5.1
13	319.1	543.7	5.1	249.5	440.3	5.1	256.6	376.4	5.1
14	326.7	557.5	5.1	255.2	469.5	5.1	256.6	376.4	5.1
15	334.0	572.0	5.1	258.7	488.8	5.1	256.6	376.4	5.1
16	338.8	576.4	5.1	255.3	497.8	5.1	256.6	376.4	5.1
17	337.5	563.6	10.4	259.3	501.4	15.7	267.2	386.9	15.7
18	325.6	557.6	26.2	270.4	452.2	33.3	284.0	403.3	33.3
19	298.2	505.5	36.8	267.2	406.9	36.8	282.5	399.5	36.8
20	251.5	476.5	36.8	253.9	379.7	36.8	269.0	379.6	36.8
21	111.9	354.7	36.8	214.2	316.9	36.8	226.5	316.9	36.8
22	66.8	101.1	33.3	77.5	101.1	36.8	80.4	101.1	36.8
23	49.4	75.8	29.7	60.2	75.8	33.3	62.1	75.8	33.3
24	38.0	53.2	26.2	44.6	53.2	29.7	45.6	53.2	29.7
day)	4,404	7,497	438	3,705	6,083	485	3,846	5,447	485
kW)		576.4			501.4			403.3	
kW)			5.1			5.1			5.1

Gas Demand Profiles - AR

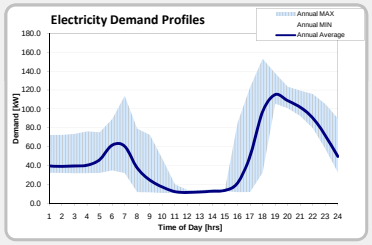
Hour	Annual Annual Average (Btu/h)	Annual Annual MAX (Btu/h)	Annual Annual MIN (Btu/h)	Jan Jan Average (Btu/h)	Jan Jan MAX (Btu/h)	Jan Jan MIN (Btu/h)	Feb Feb Average (Btu/h)	Feb Feb MAX (Btu/h)	Feb Feb MIN (Btu/h)	Mar Mar Average (Btu/h)	Mar Mar MAX (Btu/h)	Mar Mar MIN (Btu/h)	Apr Apr Average (Btu/h)	Apr Apr MAX (Btu/h)	Apr Apr MIN (Btu/h)
1	15,859	23,297	5,439	17,465	22,970	5,907	17,716	23,273	5,986	17,714	23,297	5,992	16,679	23,153	5,954
2	14,874	19,948	5,439	15,228	19,668	5,907	15,446	19,927	5,986	15,445	19,948	5,992	16,125	19,824	5,954
3	14,874	19,948	5,439	15,228	19,668	5,907	15,446	19,927	5,986	15,445	19,948	5,992	16,125	19,824	5,954
4	14,874	19,948	5,439	15,228	19,668	5,907	15,446	19,927	5,986	15,446	19,948	5,992	16,125	19,824	5,954
5	14,874	19,948	5,439	15,228	19,668	5,907	15,446	19,927	5,986	15,446	19,948	5,992	16,125	19,824	5,955
6	15,768	22,280	5,439	15,228	19,668	5,907	15,446	19,927	5,986	15,446	19,948	5,992	17,517	22,280	5,955
7	29,336	57,546	5,439	16,879	22,105	5,907	17,122	22,397	5,986	17,120	22,420	5,992	37,910	57,546	5,955
8	107,098	1,410,640	5,439	40,578	57,089	5,908	41,176	57,846	5,986	41,159	57,906	5,992	234,592	1,338,460	5,955
9	513,263	4,466,520	5,439	1,373,121	4,466,520	5,908	840,496	2,431,670	5,986	621,460	2,386,950	5,992	291,168	1,617,750	5,955
10	368,111	4,059,950	5,439	913,097	4,059,950	5,908	419,187	1,561,830	5,986	318,987	1,457,510	5,992	261,408	855,687	5,955
11	309,753	3,099,160	5,439	639,997	3,099,160	5,908	319,080	1,036,740	5,986	275,742	809,110	5,992	266,860	536,612	5,954
12	288,786	2,580,840	5,439	548,254	2,580,840	5,908	290,639	916,785	5,986	259,308	603,294	5,992	263,122	356,639	5,954
13	268,975	2,009,270	5,439	457,790	2,009,270	5,908	266,230	746,638	5,986	245,038	358,870	5,992	263,122	356,638	5,954
14	255,829	1,616,590	5,439	376,789	1,616,590	5,908	253,318	586,148	5,986	245,038	358,870	5,992	263,122	356,638	5,954
15	244,629	1,366,650	5,439	332,047	1,366,650	5,908	245,187	358,493	5,986	245,038	358,869	5,992	261,259	356,638	5,954
16	233,511	1,399,420	5,439	313,695	1,399,420	5,908	242,943	355,187	5,986	242,796	355,560	5,992	247,619	353,349	5,954
17	210,951	1,301,960	5,439	296,207	1,301,960	5,908	227,185	331,964	5,986	227,048	332,313	5,992	219,584	330,247	5,954
18	182,277	1,189,250	5,439	270,144	1,189,250	5,908	198,075	289,064	5,986	197,956	289,368	5,992	187,030	287,569	5,954
19	151,980	1,086,530	5,439	250,182	1,086,530	5,908	167,451	243,935	5,986	167,352	244,191	5,992	151,008	242,672	5,954
20	116,679	1,237,850	5,439	236,332	1,237,850	5,908	133,097	193,309	5,986	133,021	193,511	5,992	101,455	192,308	5,954
21	113,925	1,679,980	5,439	333,355	1,679,980	5,908	83,555	120,298	5,986	83,511	120,424	5,992	69,658	119,676	5,954
22	54,279	85,457	5,439	58,977	84,248	5,908	59,851	85,367	5,986	59,823	85,457	5,992	58,298	84,925	5,954
23	40,462	75,568	5,439	52,373	74,500	5,908	53,149	75,489	5,986	53,124	75,568	5,992	39,685	75,098	5,954
24	23,585	45,425	5,439	32,243	44,784	5,908	32,716	45,378	5,986	32,705	45,425	5,992	22,804	45,143	5,954
day)	3,604,550	########	130,524	6,635,665	27,498,005	141,783	3,985,401	9,581,447	143,659	3,561,167	8,278,654	143,802	3,338,400	7,688,324	142,902
uh)		4,466,520			4,466,520			2,431,670			2,386,950			1,617,750	
uh)			5,438			5,907			5,986			5,992			5,954

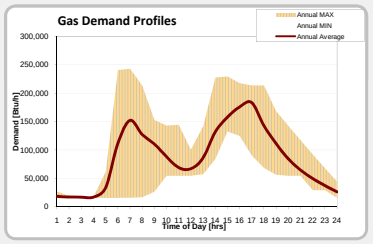
Hour	May May Average (Btu/h)	May May MAX (Btu/h)	May May MIN (Btu/h)	Jun Jun Average (Btu/h)	Jun Jun MAX (Btu/h)	Jun Jun MIN (Btu/h)	Jul Jul Average (Btu/h)	Jul Jul MAX (Btu/h)	Jul Jul MIN (Btu/h)	Aug Aug Average (Btu/h)	Aug Aug MAX (Btu/h)	Aug Aug MIN (Btu/h)	Sep Sep Average (Btu/h)	Sep Sep MAX (Btu/h)	Sep Sep MIN (Btu/h)
1	15,400	19,326	5,805	14,439	18,830	5,656	14,663	18,401	5,527	14,446	18,129	5,446	13,883	18,106	5,439
2	15,400	19,326	5,805	14,439	18,831	5,656	14,663	18,401	5,528	14,447	18,129	5,446	13,883	18,106	5,439
3	15,400	19,326	5,805	14,439	18,831	5,656	14,663	18,401	5,528	14,447	18,129	5,446	13,883	18,106	5,439
4	15,400	19,326	5,805	14,439	18,831	5,656	14,663	18,401	5,529	14,447	18,129	5,446	13,883	18,106	5,439
5	15,400	19,326	5,805	14,439	18,831	5,657	14,663	18,401	5,529	14,447	18,129	5,446	13,883	18,106	5,439
6	17,100	21,721	5,805	15,995	21,164	5,657	16,282	20,681	5,529	16,041	20,376	5,446	15,379	20,350	5,439
7	41,498	56,101	5,805	38,327	54,662	5,657	39,512	53,415	5,529	38,928	52,625	5,446	36,852	52,559	5,439
8	196,003	1,410,640	5,805	116,465	171,870	5,657	120,794	167,949	5,528	119,008	165,465	5,446	134,999	855,743	5,439
9	197,709	806,086	5,805	159,701	236,723	5,656	165,769	231,322	5,529	163,317	227,902	5,446	153,553	227,611	5,439
10	244,044	559,018	5,805	216,990	322,656	5,656	225,363	315,295	5,529	222,030	310,632	5,446	208,637	310,237	5,439
11	248,427	347,682	5,805	227,730	338,767	5,656	236,535	331,038	5,529	233,037	326,142	5,446	218,964	325,727	5,439
12	248,427	347,682	5,805	227,730	338,766	5,656	236,535	331,038	5,529	233,037	326,142	5,446	218,964	325,726	5,439
13	248,427	347,682	5,805	227,730	338,766	5,656	236,535	331,038	5,527	233,037	326,142	5,446	218,964	325,726	5,438
14	248,427	347,682	5,805	227,729	338,766	5,656	236,535	331,038	5,527	233,037	326,142	5,446	218,964	325,726	5,438
15	246,152	344,475	5,805	225,647	335,642	5,656	234,368	327,985	5,527	230,902	323,134	5,445	216,961	322,722	5,438
16	230,168	321,953	5,805	211,017	313,697	5,656	219,150	306,541	5,527	215,909	302,007	5,445	202,894	301,622	5,438
17	200,641	280,347	5,804	183,991	273,158	5,656	191,036	266,927	5,527	188,211	262,979	5,445	176,908	262,644	5,438
18	169,579	236,578	5,804	155,560	230,512	5,656	161,462	225,253	5,527	159,074	221,922	5,445	149,572	221,639	5,438
19	134,734	187,479	5,804	123,666	182,672	5,656	128,285	178,504	5,527	126,388	175,864	5,445	118,906	175,640	5,438
20	84,483	116,670	5,804	77,671	113,679	5,656	80,439	111,085	5,527	79,250	109,443	5,445	74,682	109,303	5,438
21	60,441	82,793	5,804	55,665	80,670	5,656	57,548	78,829	5,527	56,697	77,664	5,445	53,523	77,565	5,438
22	53,642	73,213	5,805	49,442	71,335	5,656	51,075	69,708	5,527	50,320	68,677	5,446	47,539	68,590	5,438
23	32,917	44,009	5,805	30,472	42,881	5,656	31,342	41,902	5,527	30,879	41,283	5,446	29,300	41,231	5,438
24	17,162	22,571	5,805	17,091	21,992	5,656	16,856	21,490	5,527	16,099	21,173	5,446	16,433	21,146	5,439
day)	2,996,984	6,051,012	139,318	2,660,812	3,922,531	135,746	2,758,737	3,833,044	132,660	2,717,433	3,776,358	130,697	2,581,410	4,462,036	130,524
uh)		1,410,640			338,767			331,038			326,142			855,743	
uh)			5,804			5,656			5,527			5,445			5,438

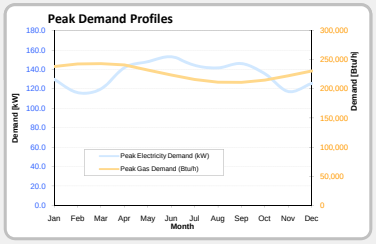
Hour	Oct Oct Average (Btu/h)	Oct Oct MAX (Btu/h)	Oct Oct MIN (Btu/h)	Nov Nov Average (Btu/h)	Nov Nov MAX (Btu/h)	Nov Nov MIN (Btu/h)	Dec Dec Average (Btu/h)	Dec Dec MAX (Btu/h)	Dec Dec MIN (Btu/h)
1	15,002	21,405	5,505	15,930	21,894	5,631	17,074	22,455	5,776
2	14,605	18,328	5,505	13,937	18,747	5,631	14,888	19,228	5,776
3	14,605	18,328	5,506	13,937	18,747	5,631	14,888	19,228	5,776
4	14,605	18,328	5,506	13,937	18,747	5,631	14,888	19,228	5,776
5	14,605	18,328	5,506	13,937	18,747	5,631	14,888	19,228	5,776
6	15,923	20,599	5,506	13,937	18,747	5,631	14,888	19,228	5,776
7	35,147	53,201	5,506	15,409	21,070	5,631	16,502	21,610	5,776
8	160,857	1,137,970	5,506	36,529	54,417	5,631	39,671	55,812	5,776
9	201,730	1,076,170	5,506	597,894	2,713,620	5,632	1,397,463	3,713,610	5,776
10	219,600	414,345	5,506	326,420	1,828,600	5,632	831,706	2,757,250	5,776
11	233,562	329,709	5,506	267,297	1,225,240	5,631	542,380	1,831,650	5,776
12	235,585	329,709	5,506	250,293	1,018,380	5,631	447,423	1,576,060	5,776
13	235,585	329,709	5,505	228,320	717,346	5,631	362,217	1,292,270	5,776
14	235,585	329,708	5,505	222,139	531,895	5,631	306,062	937,428	5,776
15	233,819	329,708	5,505	215,650	337,241	5,631	246,655	670,909	5,776
16	221,025	326,667	5,505	213,680	334,130	5,631	240,246	536,046	5,776
17	195,360	305,310	5,505	199,845	312,284	5,631	224,919	509,010	5,776
18	166,169	265,854	5,505	174,286	271,928	5,631	197,929	500,116	5,776
19	133,778	224,348	5,505	147,398	229,474	5,631	173,947	627,523	5,776
20	88,781	177,787	5,505	117,236	181,849	5,631	192,201	920,582	5,776
21	61,463	110,640	5,505	103,448	1,004,500	5,631	339,709	1,147,110	5,776
22	52,042	78,513	5,505	52,926	80,307	5,632	57,659	82,365	5,776
23	34,790	69,428	5,505	47,041	71,015	5,632	51,203	72,834	5,776
24	18,899	41,735	5,505	29,101	42,688	5,632	31,522	43,782	5,776
day)	2,853,118	6,045,825	132,131	3,330,528	11,091,613	135,154	5,790,926	17,414,561	138,621
uh)		1,137,970			2,713,620			3,713,610	
uh)			5,505			5,631			5,776

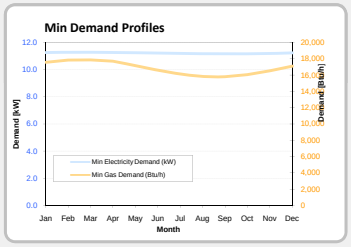
Low-Rise Residential eQUEST Simulation Results

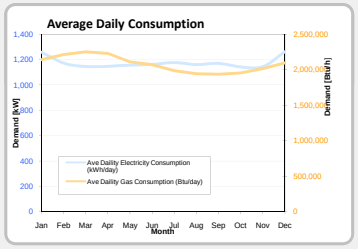
ITERATION: City of SF Green Building Code (LEED Gold)











Electricity Demand Profiles - LR Res

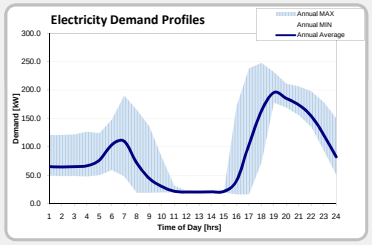
Hour	Annual Average	Annual MAX	Annual MIN	Jan Average	Jan MAX	Jan MIN	Feb Average	Feb MAX	Feb MIN	Mar Average	Mar MAX	Mar MIN	Apr Average	Apr MAX	Apr MIN	May Average	May MAX	May MIN	Jun Average	Jun MAX	Jun MIN	Jul Average	Jul MAX	Jul MIN	Aug Average	Aug MAX	Aug MIN	Sep Average	Sep MAX	Sep MIN	Oct Average	Oct MAX	Oct MIN	Nov Average	Nov MAX	Nov MIN	Dec Average	Dec MAX	Dec MIN
	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)
1	39.6	72.4	32.5	51.4	72.4	37.9	44.4	57.0	37.1	40.2	55.4	32.5	37.7	50.0	32.7	35.7	43.0	32.6	34.7	36.0	33.0	34.6	36.4	32.8	34.5	37.1	33.2	35.2	39.2	33.3	35.2	41.8	33.1	41.2	59.0	32.7	51.0	66.5	40.3
2	39.5	72.6	32.3	50.4	72.6	37.6	43.6	56.2	38.4	39.8	50.3	33.0	38.6	46.2	33.2	36.0	43.5	32.8	34.6	36.8	32.7	33.9	35.6	32.9	34.0	35.5	32.8	34.2	39.1	32.3	34.7	38.8	32.7	40.1	58.1	33.5	50.2	68.9	40.3
3	39.6	73.6	32.0	50.7	73.6	37.4	43.8	52.0	38.4	40.5	51.6	32.1	39.6	47.4	33.4	36.4	43.6	32.7	34.5	38.2	32.1	33.9	35.2	32.9	34.0	35.1	32.9	34.1	38.2	33.0	35.2	40.7	32.0	40.9	58.1	33.3	51.6	71.0	39.7
4	40.3	76.4	32.2	51.1	76.4	37.2	44.7	57.8	38.7	41.9	58.0	32.9	40.8	48.6	35.3	37.2	43.6	33.1	34.9	39.8	32.2	33.9	35.2	33.0	34.0	35.7	32.7	34.1	37.7	32.6	35.8	42.2	32.7	42.2	61.4	32.6	53.7	74.4	40.2
5	46.1	75.3	32.3	51.0	75.3	37.5	45.5	57.3	38.7	42.7	58.9	32.3	49.9	61.8	37.2	46.1	54.3	35.0	44.9	51.8	34.5	43.4	48.9	33.2	44.1	48.7	34.8	44.0	51.4	33.6	44.8	55.8	32.5	42.7	58.8	33.0	53.8	71.9	40.1
6	61.6	89.3	35.0	59.3	89.3	38.0	55.2	66.2	39.2	53.5	72.7	35.5	68.7	87.6	40.6	63.5	79.8	37.9	66.3	80.4	37.8	63.6	78.1	37.5	64.8	77.9	38.3	65.0	79.5	38.4	63.3	80.7	35.0	52.0	73.4	36.4	63.1	83.6	42.5
7	60.5	113.9	32.2	76.1	113.9	40.8	74.7	100.1	42.0	72.9	97.6	38.4	53.5	78.0	41.2	49.8	56.0	40.2	50.6	53.7	40.2	50.1	53.6	40.2	49.9	53.6	40.2	49.6	53.6	40.2	49.4	55.9	39.6	69.4	97.9	38.3	80.7	109.1	45.8
8	37.6	79.2	12.0	53.8	59.8	41.3	53.2	56.2	43.1	52.9	56.2	40.2	26.7	58.9	12.3	28.3	62.6	12.2	25.2	67.8	12.1	27.5	79.2	12.1	25.4	62.8	12.0	26.1	69.2	12.0	26.7	56.9	12.1	50.9	55.9	40.4	55.3	65.8	46.5
9	24.7	72.5	11.9	32.5	70.1	12.2	27.6	61.9	12.3	24.6	64.8	12.3	21.2	57.3	12.1	23.5	45.1	12.0	20.6	45.0	12.0	22.4	45.0	11.9	21.3	44.9	11.9	21.6	44.9	11.9	23.9	61.4	11.9	26.8	65.2	12.1	30.0	72.5	12.2
10	17.4	47.4	11.2	25.7	47.4	12.0	22.6	45.2	12.1	20.7	47.4	12.1	14.0	45.1	11.3	13.5	18.0	11.3	12.9	17.9	11.3	13.2	17.9	11.3	13.0	17.8	11.2	13.0	17.8	11.2	14.3	43.6	11.3	22.8	45.9	11.9	23.5	47.3	12.0
11	12.3	20.3	11.2	14.2	20.3	11.3	13.4	18.1	11.3	13.0	20.3	11.3	11.8	18.0	11.3	11.5	11.9	11.2	11.4	11.8	11.2	11.4	11.8	11.2	11.4	11.8	11.2	11.4	11.8	11.2	11.6	16.8	11.2	13.3	19.0	11.3	13.7	20.2	11.3
12	11.6	14.2	11.2	11.9	14.2	11.3	11.5	11.9	11.3	11.5	11.9	11.3	11.6	11.9	11.5	11.6	11.9	11.5	11.6	11.9	11.5	11.6	11.8	11.5	11.5	11.8	11.5	11.5	11.8	11.5	11.5	11.8	11.2	11.4	11.8	11.2	11.7	14.1	11.2
13	12.0	14.2	11.5	11.9	14.2	11.6	11.7	11.9	11.6	11.6	11.9	11.6	12.2	12.8	11.6	12.2	12.8	12.0	12.1	12.7	12.0	12.1	12.7	12.0	12.1	12.6	11.9	12.1	12.6	11.9	12.1	12.7	11.6	11.6	11.8	11.5	11.8	14.1	11.5
14	12.8	15.1	12.0	12.6	15.1	12.1	12.3	12.8	12.1	12.2	12.9	12.1	13.2	14.5	12.1	13.3	14.4	13.1	13.2	14.3	13.0	13.2	14.2	12.9	13.1	14.1	12.9	13.1	14.1	12.9	13.1	14.2	12.3	12.2	12.7	12.0	12.3	14.3	12.0
15	13.8	15.6	13.0	13.6	15.6	13.1	13.4	14.5	13.1	13.4	14.5	13.1	14.2	14.6	13.1	14.1	14.5	13.2	14.1	14.4	13.2	14.0	14.4	13.1	14.0	14.3	13.0	14.0	14.3	13.0	14.0	14.4	13.1	13.2	14.3	13.0	13.3	14.4	13.1
16	21.5	85.8	12.1	14.3	16.8	13.3	14.2	14.6	13.3	14.4	16.1	13.4	20.7	58.2	12.4	28.4	76.2	12.3	25.1	68.8	12.2	30.0	85.8	12.1	27.0	72.5	12.1	27.6	81.2	12.1	26.9	78.4	12.1	14.1	14.4	13.1	14.1	14.5	13.2
17	49.9	123.2	12.2	26.0	73.4	12.4	22.2	47.4	12.4	21.4	58.8	12.4	56.4	104.6	12.4	70.3	113.3	34.5	70.3	112.7	36.6	74.9	123.2	46.7	71.2	112.7	37.2	73.0	120.6	32.2	65.1	112.7	32.2	22.6	48.8	12.2	23.3	56.1	12.3
18	97.0	153.1	32.7	64.0	103.7	39.3	55.2	91.9	34.4	52.4	102.3	32.7	113.7	141.8	37.5	124.4	148.0	109.7	129.3	153.1	114.7	131.3	144.2	120.6	129.1	141.6	117.5	128.0	146.1	114.7	118.9	135.6	102.3	54.5	94.5	33.2	60.3	91.0	38.7
19	115.1	137.7	105.6	115.0	129.8	107.3	111.0	116.1	106.6	112.7	119.9	108.4	111.4	126.2	107.8	114.5	130.6	105.8	119.4	137.7	107.7	120.8	130.8	113.7	118.3	129.6	112.9	118.4	128.1	109.3	113.3	124.1	105.6	111.0	117.3	107.1	114.6	125.6	108.3
20	108.7	123.5	100.7	109.9	121.5	104.2	106.7	109.9	103.4	108.1	113.9	103.9	105.1	116.5	100.9	106.5	117.8	101.0	110.3	123.5	100.7	111.6	118.8	104.7	110.2	118.2	104.5	111.3	121.1	104.9	107.4	117.9	101.3	107.1	111.3	103.4	109.4	118.4	104.7
21	101.7	119.5	92.5	105.6	116.0	99.4	102.1	105.3	98.2	103.4	108.8	99.4	97.5	105.1	92.9	97.7	106.0	92.5	100.9	109.9	92.6	101.9	106.8	95.6	101.3	107.6	95.1	102.7	110.8	97.6	99.2	110.3	93.2	102.6	106.3	98.8	105.5	119.5	100.1
22	90.4	115.8	79.5	99.4	111.2	91.2	95.4	99.8	91.6	96.4	100.9	92.2	84.1	97.6	80.6	83.4	88.0	80.2	85.6	90.8	80.4	86.7	89.7	81.5	86.3	90.9	81.7	87.7	92.5	83.4	85.1	99.4	79.5	95.7	101.0	92.1	99.8	115.8	92.7
23	71.9	105.2	57.8	87.8	99.9	80.2	83.3	88.7	78.8	82.9	87.5	79.5	63.0	83.9	58.6	61.0	65.3	57.8	61.8	67.0	58.0	63.1	67.8	59.6	62.6	67.0	58.9	64.0	71.2	58.1	62.3	84.3	58.5	82.6	93.6	79.5	88.8	105.2	81.9
24	49.7	89.9	32.5	70.1	89.9	60.7	64.3	72.3	58.7	62.0	71.8	58.0	40.5	65.4	33.3	37.3	47.9	32.5	37.0	45.8	33.0	37.9	45.3	32.5	37.2	45.7	32.7	38.5	47.6	33.0	38.6	64.1	32.6	62.6	76.1	58.8	70.8	86.2	62.7
day)	1,175	1,906	848	1,258	1,692	999	1,172	1,425	997	1,145	1,464	960	1,146	1,552	885	1,156	1,448	967	1,162	1,442	975	1,177	1,442	1,005	1,160	1,400	993	1,170	1,454	984	1,142	1,514	950	1,144	1,467	961	1,262	1,641	1,034
kW)		153.1			129.8			116.1			119.9			141.8			148.0			153.1			144.2			141.6			146.1			135.6			117.3			125.6	
kW)			11.2			11.3			11.3			11.3			11.3			11.2			11.2			11.2			11.2			11.2			11.2			11.2			11.2

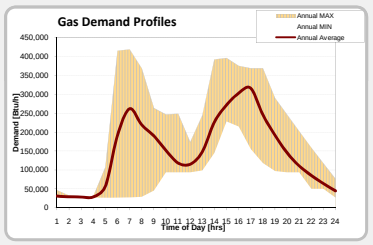
Gas Demand Profiles - LR Res

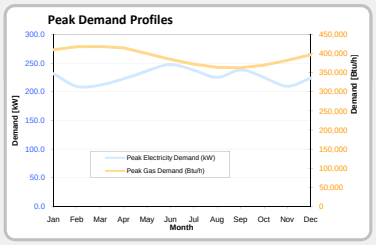
Hour	Annual Average	Annual MAX	Annual MIN	Jan Average	Jan MAX	Jan MIN	Feb Average	Feb MAX	Feb MIN	Mar Average	Mar MAX	Mar MIN	Apr Average	Apr MAX	Apr MIN	May Average	May MAX	May MIN	Jun Average	Jun MAX	Jun MIN	Jul Average	Jul MAX	Jul MIN	Aug Average	Aug MAX	Aug MIN	Sep Average	Sep MAX	Sep MIN	Oct Average	Oct MAX	Oct MIN	Nov Average	Nov MAX	Nov MIN	Dec Average	Dec MAX	Dec MIN
	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)
1	18,278	27,091	15,809	21,067	26,613	17,560	20,800	27,055	17,840	20,228	27,091	17,844	18,291	26,797	17,714	17,554	18,250	17,183	16,896	17,659	16,619	16,468	17,144	16,141	16,135	16,829	15,848	16,115	16,795	15,809	16,658	24,190	16,055	19,342	24,975	16,514	19,916	25,845	17,094
2	17,025	19,020	15,814	18,020	18,705	17,576	18,227	18,997	17,863	18,165	19,020	17,861	17,782	18,831	17,725	17,192	17,218	17,170	16,636	16,659	16,619	16,164	16,173	16,149	15,868	15,882	15,855	15,839	15,857	15,814	16,126	17,064	16,065	16,904	17,609	16,535	17,462	18,191	17,113
3	16,883	17,916	15,816	17,609	17,635	17,581	17,882	17,895	17,869	17,891	17,916	17,864	17,753	17,776	17,732	17,198	17,224	17,175	16,642	16,665	16,622	16,169	16,179	16,154	15,873	15,887	15,860	15,845	15,863	15,816	16,101	16,124	16,072	16,579	16,610	16,542	17,132	17,150	17,111
4	16,889	17,921	15,820	17,612	17,637	17,584	17,886	17,899	17,875	17,896	17,921	17,870	17,758	17,779	17,738	17,202	17,226	17,179	16,646	16,669	16,624	16,174	16,185	16,158	15,877	15,892	15,864	15,849	15,868	15,820	16,106	16,131	16,078	16,585	16,611	16,550	17,135	17,153	17,115
5	33,286	62,453	15,844	17,614	17,639	17,586	17,888	17,901	17,877	17,900	17,925	17,874	47,542	62,453	17,748	44,978	60,267	17,191	47,032	58,104	16,630	43,292	56,214	16,172	43,657	55,035	15,868	43,198	54,933	15,844	41,779	55,922	16,087	16,589	16,614	16,554	17,137	17,155	17,119
6	111,462	241,140	15,846	44,677	61,794	17,592	48,430	62,906	17,878	51,346	62,997	17,877	169,863	241,140	17,749	156,406	232,456	17,195	168,829	223,821	16,632	152,071	216,328	16,173	155,011	211,596	15,873	152,835	211,192	15,846	144,769	215,071	16,090	44,026	57,766	16,568	46,077	59,875	17,121
7	152,081	243,304	15,820	153,276	238,416	17,590	170,910	242,942	17,884	185,406	243,304	17,881	164,354	241,135	18,819	141,233	204,462	18,227	151,342	196,875	17,624	137,092	190,297	17,127	139,055	186,141	16,811	137,225	185,786	16,784	130,714	189,195	16,110	154,036	222,381	16,572	162,105	230,757	17,122
8	127,226	213,995	17,066	138,674	209,704	18,643	153,734	213,678	18,963	166,051	213,995	18,960	128,663	212,087	29,406	112,665	146,306	28,426	117,150	140,898	27,423	108,469	136,207	26,586	108,092	133,252	26,075	107,049	133,002	26,024	104,032	135,431	17,066	138,516	195,622	17,554	145,620	202,977	18,145
9	110,389	153,095	26,484	111,648	150,065	29,108	120,850	152,875	29,639	128,097	153,095	29,643	116,926	151,736	61,071	109,719	136,316	58,945	108,627	131,264	56,777	103,968	126,921	54,935	101,199	124,169	53,804	100,786	123,931	53,696	100,710	126,199	26,484	108,916	140,017	27,298	114,035	145,268	28,280
10	88,116	143,196	54,673	110,595	139,842	60,424	115,238	142,459	61,560	118,202	142,674	61,604	79,855	143,196	62,335	76,584	138,083	60,124	70,536	132,970	57,947	70,779	128,559	56,072	66,991	125,773	54,915	67,262	125,533	54,790	70,369	127,831	54,673	104,199	130,467	56,464	108,424	135,393	58,591
11	68,786	144,534	54,772	79,245	141,665	61,731	78,213	144,316	62,846	76,143	144,534	62,915	69,893	143,211	62,322	67,508	96,227	60,106	63,618	92,703	57,930	62,694	89,639	56,053	60,315	87,713	54,897	60,375	87,558	54,772	62,970	89,152	55,781	71,417	132,149	57,662	73,641	137,149	59,842
12	66,953	100,727	54,755	69,560	98,760	61,741	69,733	100,574	62,843	68,873	100,727	62,913	71,127	99,785	62,312	71,212	93,326	60,093	66,009	89,924	57,917	65,486	86,942	56,039	63,131	85,078	54,886	63,282	84,936	54,755	65,393	86,477	55,764	63,795	92,141	57,664	65,992	95,639	59,847
13	85,901	142,218	57,663	74,086	95,800	61,746	73,333	97,554	62,843	71,400	97,702	62,911	100,115	142,218	62,404	103,580	137,124	88,070	96,183	132,075	84,841	95,296	127,663	82,051	91,816	124,893	80,323	92,019	124,684	80,133	94,835	126,955	81,616	67,555	89,379	57,663	69,772	92,777	59,849
14	131,644	227,693	84,412	107,606	140,729	90,458	106,724	143,351	92,095	104,121	143,565	92,210	157,652	227,693	91,437	161,817	219,495	146,184	152,713	211,346	140,769	150,035	204,250	136,087	144,627	199,781	133,160	144,727	199,433	132,857	148,626	203,085	117,644	98,135	131,242	84,412	101,392	136,249	87,615
15	157,651	229,816	132,837	166,695	225,222	150,058	167,452	229,477	152,852	165,606	229,816	153,060	166,434	227,718	151,641	164,307	208,100	146,167	154,118	200,375	140,762	151,677	193,648	136,080	146,567	189,417	133,149	146,726	189,092	132,837	151,405	192,549	135,305	153,037	209,978	139,970	158,408	217,997	145,281
16	175,756	217,886	124,883	169,990	213,533	150,046	169,923	217,567	152,843	167,086	217,886	153,051	198,403	215,887	142,564	190,702	204,465	137,410	187,602	196,837	132,323	179,480	190,217	127,893	175,695	186,068	125,156	175,005	185,742	124,883	177,970	189,189	127,179	155,856	199,069	139,951	161,243	206,691	145,272
17	183,365	214,026	90,368	193,471	209,806	140,981	200,500	213,714	143,622	204,304	214,026	143,817	195,188	212,071	103,071	180,720	204,462	99,352	180,638	196,825	95,714	171,343	190,209	92,532	168,210	186,052	90,571	167,285	185,727	90,368	168,370	189,187	92,013	182,189	195,635	131,515	189,560	203,044	136,528
18	142,631	214,027	68,607	181,984	209,802	101,958	190,978	213,718	103,834	196,971	214,027	103,959	129,364	212,054	78,141	116,838	160,904	75,359	113,863	154,960	72,621	110,086	149,779	70,235	106,458	146,513	68,755	106,207	146,267	68,607	108,909	148,932	69,842	172,853	195,642	95,140	180,186	203,046	98,778
19	111,364	168,524	56,472	118,519	165,140	77,333	122,001	168,236	78,729	123,752	168,524	78,821	118,248	166,904	64,258	110,346	136,645	61,995	109,052	131,610	59,759	104,463	127,231	57,811	101,672	124,467	56,605	101,272	124,247	56,472	102,595	126,508	57,497	110,492	153,960	72,193	114,785	159,863	74,954
20	84,591	143,072	54,685	111,363	140,207	63,595	115,852	142,828	64,738	118,651	143,072	64,814	74,402	141,716	62,187	68,542	112,267	60,006	64,663	108,146	57,846	63,913	104,565	55,967	61,031	102,303	54,797	61,119	102,124	54,685	63,619	103,972	55,660	104,829	130,768	59,408	109,060	135,737	61,647
21	64,281	117,506	54,697	70,310	115,169	61,543	70,593	117,307	62,656	69,932	117,506	62,730	67,041	116,416	62,195	64,660	88,168	60,017	61,576	84,951	57,854	60,304	82,157	55,977	58,209	80,394	54,806	58,208	80,252	54,697	59,970	81,696	55,667	64,292	107,461	57,504	66,460	111,513	59,646
22	50,111	92,255	29,435	66,317	90,438	61,546	66,990	92,098	62,665	66,673	92,255	62,738	44,112	91,406	33,294	42,409	65,304	32,174	38,557	62,944	31,056	38,856	60,896	30,100	37,087	59,606	29,499	37,269	59,500	29,435	39,483	60,560	29,946	61,218	84,422	57,510	63,366	87,587	59,646
23	37,246	68,303	29,447	44,326	66,981	33,008	43,227	68,190	33,562	41,487	68,303	33,596	36,854	67,677	33,307	35,701	42,528	32,188	33,626	41,023	31,070	33,091	39,717	30,113	32,117	38,899	29,447	32,143	38,829	29,447	33,671	53,217	29,958	39,963	62,560	30,915	41,116	64,895	32,028
24	26,175	44,449	15,793	36,922	43,616	33,015	36,896	44,378	33,574	36,293	44,449	33,604	21,753	44,043	17,692	19,988	25,954	17,142	18,855	25,073	16,589	19,025	24,306	16,121	17,894	23,832	15,828	18,195	23,788	15,793	19,669	38,694	16,042	34,060	40,784	30,922	35,185	42,292	32,035
day)	2,078,065	3,264,165	1,117,816	2,141,185	2,854,916	1,379,994	2,214,256	2,907,915	1,404,949	2,252,476	2,912,329	1,406,416	2,229,374	3,241,728	1,304,861	2,109,060	2,782,777	1,345,057	2,071,407	2,680,375	1,296,560	1,986,395	2,591,425	1,254,724	1,942,587	2,535,470	1,228,718	1,935,835	2,530,939	1,225,983	1,954,850	2,613,331	1,190,693	2,015,383	2,663,863	1,289,578	2,095,209	2,764,243	1,337,776
u/h)		243,304			238,416			242,942			243,304			241,140			232,456			223,821			216,328			211,596			211,192			215,071			222,381			230,757	
u/h)			15,793			17,560			17,840			17,844			17,692			17,142			16,589			16,121			15,828			15,793			16,042			16,514			17,094

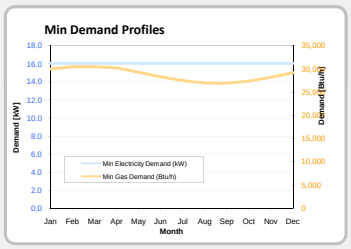
Mid-Rise Residential eQUEST Simulation Results

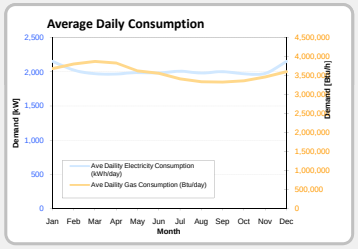
ITERATION: City of SF Green Building Code (LEED Gold)











Electricity Demand Profiles - MR Res

Hour	Annual Average MR Res Demand (kW)	Annual MAX MR Res Demand (kW)	Annual MIN MR Res Demand (kW)	Jan Average MR Res Demand (kW)	Jan MAX MR Res Demand (kW)	Jan MIN MR Res Demand (kW)	Feb Average MR Res Demand (kW)	Feb MAX MR Res Demand (kW)	Feb MIN MR Res Demand (kW)	Mar Average MR Res Demand (kW)	Mar MAX MR Res Demand (kW)	Mar MIN MR Res Demand (kW)	Apr Average MR Res Demand (kW)	Apr MAX MR Res Demand (kW)	Apr MIN MR Res Demand (kW)
1	65.2	121.1	49.2	86.0	121.1	64.7	74.5	96.0	61.9	67.2	93.2	56.0	62.9	83.6	51.4
2	64.3	120.6	48.1	84.1	120.6	64.5	73.0	93.8	64.6	66.4	83.8	51.3	64.3	76.4	55.5
3	65.0	121.9	48.5	84.5	121.9	64.0	73.2	86.2	64.9	67.6	85.6	54.8	66.0	79.2	55.9
4	66.3	126.7	47.7	84.9	126.7	63.4	74.6	94.5	65.2	70.1	95.6	55.6	67.8	80.6	57.7
5	76.1	124.1	50.1	84.8	124.1	63.9	75.8	94.4	65.3	71.4	97.0	55.1	83.3	102.6	62.6
6	103.1	147.7	58.9	98.8	147.5	65.2	92.2	110.0	66.1	89.4	120.1	61.5	116.5	147.7	70.9
7	109.6	190.5	47.7	129.3	190.5	72.3	126.8	167.7	73.7	123.6	163.7	69.6	97.3	131.5	78.7
8	71.6	165.1	18.9	94.9	101.1	92.2	94.6	99.8	90.5	95.4	106.2	92.6	52.0	130.8	18.9
9	44.4	136.5	18.9	58.6	122.9	18.9	52.0	124.8	18.9	46.5	131.6	18.9	37.1	124.6	18.9
10	30.2	82.1	19.4	43.9	82.1	19.4	39.0	80.0	19.4	35.3	82.1	19.4	24.3	80.0	19.4
11	21.6	31.9	19.7	24.3	31.9	20.1	23.2	29.8	20.1	22.6	31.9	20.1	20.6	29.8	19.7
12	20.3	22.4	19.7	20.4	22.4	19.7	20.1	20.3	19.7	20.2	20.3	19.7	20.3	20.5	19.8
13	20.4	22.6	19.8	20.5	22.6	19.8	20.3	20.5	19.8	20.3	20.5	19.8	20.4	20.5	20.0
14	20.5	22.6	20.0	20.6	22.6	20.0	20.4	20.5	20.0	20.4	20.5	20.0	20.5	20.5	20.3
15	21.5	23.4	19.4	20.7	22.6	20.3	20.5	20.5	20.3	20.5	20.5	20.3	22.2	23.4	19.4
16	39.5	172.0	16.1	22.0	25.5	19.4	22.1	23.4	19.4	22.4	23.4	19.4	38.7	130.6	16.1
17	103.2	238.3	16.1	45.4	120.6	16.1	41.9	116.1	16.1	39.4	131.2	16.1	121.5	203.9	16.1
18	162.9	247.8	72.1	116.3	175.4	72.6	110.8	186.0	73.0	110.9	198.7	74.0	185.8	222.8	72.7
19	195.5	231.9	177.6	205.0	231.9	179.8	195.2	209.5	184.2	191.5	211.7	179.7	187.3	207.8	180.1
20	185.0	211.2	168.9	190.0	211.2	174.6	183.2	191.4	177.4	184.1	193.5	178.0	178.7	195.6	169.6
21	173.6	206.3	155.4	182.0	201.4	165.8	176.3	183.1	168.6	176.9	185.2	169.0	166.3	178.5	157.7
22	154.1	197.8	134.5	170.7	191.6	156.3	164.7	172.1	155.2	164.5	172.6	156.1	142.9	166.6	134.5
23	120.9	178.4	93.1	150.7	171.1	136.5	143.1	151.9	135.2	141.8	150.8	135.7	104.8	145.1	94.4
24	82.1	150.1	50.2	117.9	150.1	102.0	108.3	122.2	95.0	103.7	121.0	94.7	67.1	110.4	52.3
day)	2,017	3,293	1,390	2,156	2,859	1,711	2,026	2,515	1,714	1,972	2,561	1,657	1,968	2,713	1,482
kW)		247.8			231.9			209.5			211.7			222.8	
kW)			16.1			16.1			16.1			16.1			16.1

Hour	May Average MR Res Demand (kW)	May MAX MR Res Demand (kW)	May MIN MR Res Demand (kW)	Jun Average MR Res Demand (kW)	Jun MAX MR Res Demand (kW)	Jun MIN MR Res Demand (kW)	Jul Average MR Res Demand (kW)	Jul MAX MR Res Demand (kW)	Jul MIN MR Res Demand (kW)	Aug Average MR Res Demand (kW)	Aug MAX MR Res Demand (kW)	Aug MIN MR Res Demand (kW)	Sep Average MR Res Demand (kW)	Sep MAX MR Res Demand (kW)	Sep MIN MR Res Demand (kW)
1	59.0	71.2	50.0	55.8	61.9	49.2	55.1	58.4	50.3	55.1	59.1	49.5	56.4	62.3	51.7
2	59.1	72.0	50.9	55.9	61.9	48.1	54.0	57.4	49.8	53.7	57.8	48.4	55.0	62.0	49.4
3	60.4	72.2	54.6	56.1	62.9	48.6	53.9	56.8	48.8	53.7	58.0	48.5	54.1	60.8	48.7
4	61.7	71.9	54.0	57.1	64.9	49.7	54.1	56.9	49.4	53.9	59.7	47.7	54.6	60.1	49.3
5	76.8	90.7	58.7	74.0	85.4	56.4	70.8	80.7	50.8	70.7	80.5	50.3	71.4	83.7	50.1
6	107.9	135.4	66.0	110.9	133.9	60.8	106.7	131.0	60.7	108.6	129.8	59.0	108.3	133.2	60.1
7	97.2	114.3	92.6	98.0	126.2	92.6	98.7	130.7	92.6	97.4	113.5	92.6	97.9	113.6	92.6
8	58.9	141.6	18.9	50.9	153.3	18.9	57.5	165.1	18.9	53.0	142.5	18.9	55.1	155.4	18.9
9	40.9	80.0	19.4	35.6	80.0	19.4	38.9	80.0	19.4	37.0	80.0	19.4	37.6	80.0	19.4
10	23.5	29.8	20.1	22.6	29.8	20.1	23.2	29.8	20.1	22.9	29.8	20.1	23.0	29.8	20.1
11	20.1	20.3	19.7	20.2	20.3	19.7	20.1	20.3	19.7	20.2	20.3	19.7	20.2	20.3	19.7
12	20.3	20.5	19.8	20.3	20.5	19.8	20.3	20.5	19.8	20.3	20.5	19.8	20.3	20.5	19.8
13	20.4	20.5	20.0	20.4	20.5	20.0	20.4	20.5	20.0	20.4	20.5	20.0	20.4	20.5	20.0
14	20.5	20.5	20.3	20.5	20.5	20.3	20.5	20.5	20.3	20.5	20.5	20.3	20.5	20.5	20.3
15	22.0	23.4	19.4	22.3	23.4	19.4	22.1	23.4	19.4	22.2	23.4	19.4	22.2	23.4	19.4
16	56.0	162.4	16.1	47.7	149.2	16.1	58.1	172.0	16.1	52.8	157.6	16.1	54.4	170.9	16.1
17	146.6	222.7	76.4	147.9	219.8	94.6	157.9	237.8	108.9	153.2	222.7	97.2	155.4	238.3	93.1
18	198.3	236.4	186.2	204.3	247.8	183.6	206.2	230.6	190.2	203.8	225.1	192.0	203.0	235.6	184.1
19	190.5	216.3	180.0	197.3	227.8	177.8	199.1	216.3	187.5	196.2	215.3	187.8	196.9	214.8	185.8
20	180.0	199.7	168.9	186.3	208.1	170.6	187.9	200.8	176.5	186.3	200.2	176.5	188.0	204.1	178.0
21	165.8	181.0	155.4	171.1	187.0	156.8	172.4	181.3	162.3	171.8	182.2	161.8	173.7	187.4	164.4
22	141.3	150.6	135.3	145.2	155.5	137.1	146.7	151.9	134.9	146.3	153.5	137.9	148.0	156.4	137.4
23	101.3	108.2	95.2	102.6	108.6	98.2	103.9	111.1	98.5	103.1	110.0	95.3	105.6	115.6	96.5
24	61.8	79.9	50.2	60.2	74.5	52.8	61.2	74.0	52.0	59.6	74.8	51.5	61.2	76.6	50.2
day)	1,990	2,542	1,648	1,983	2,544	1,651	2,010	2,528	1,687	1,983	2,457	1,670	2,003	2,546	1,665
kW)		236.4			247.8			237.8			225.1			238.3	
kW)			16.1			16.1			16.1			16.1			16.1

Hour	Oct Average MR Res Demand (kW)	Oct MAX MR Res Demand (kW)	Oct MIN MR Res Demand (kW)	Nov Average MR Res Demand (kW)	Nov MAX MR Res Demand (kW)	Nov MIN MR Res Demand (kW)	Dec Average MR Res Demand (kW)	Dec MAX MR Res Demand (kW)	Dec MIN MR Res Demand (kW)
1	57.2	69.6	50.8	68.3	96.3	53.6	84.9	109.8	67.3
2	56.8	64.0	49.5	66.4	95.2	55.0	83.2	113.6	68.6
3	57.5	67.0	49.5	67.7	95.0	54.6	85.4	116.8	67.9
4	58.7	69.6	50.5	69.8	100.1	53.8	88.7	122.1	67.9
5	74.4	92.1	54.2	70.5	96.2	54.6	88.8	118.1	67.8
6	106.3	136.2	58.9	86.4	120.7	61.5	104.6	137.8	71.6
7	95.8	107.9	68.1	117.5	164.1	68.6	136.5	182.0	80.0
8	57.6	137.9	18.9	95.2	106.6	92.6	94.9	97.6	92.3
9	42.7	135.3	19.4	54.7	136.5	18.9	51.9	120.8	18.9
10	25.1	79.8	20.1	39.7	81.9	19.4	40.0	82.1	19.4
11	20.4	29.6	19.7	23.3	31.7	20.1	23.6	31.9	20.1
12	20.3	20.5	19.7	20.1	20.3	19.7	20.3	22.4	19.7
13	20.4	20.5	19.8	20.3	20.5	19.8	20.5	22.6	19.8
14	20.5	20.5	20.0	20.4	20.5	20.0	20.4	22.6	20.0
15	22.0	23.4	19.4	20.5	20.5	20.3	20.5	20.5	20.3
16	53.9	170.7	16.1	22.1	23.4	19.4	22.1	23.4	19.4
17	142.6	225.1	79.3	44.1	116.4	16.1	38.9	92.0	16.1
18	192.8	212.8	177.1	112.6	184.8	74.0	106.6	169.3	72.1
19	189.1	204.9	177.6	191.0	209.7	177.9	206.3	224.3	189.0
20	181.7	194.8	169.3	183.0	191.7	177.1	190.8	205.4	181.5
21	168.2	183.3	157.6	175.6	182.9	167.6	183.0	206.3	172.9
22	144.0	166.0	135.8	162.8	172.1	156.1	172.4	197.8	160.8
23	102.8	141.2	93.1	140.4	159.2	132.4	152.3	178.4	138.0
24	62.6	105.3	50.5	103.9	126.7	92.9	118.7	142.7	105.0
day)	1,973	2,678	1,595	1,976	2,573	1,646	2,155	2,760	1,776
kW)		225.1			209.7			224.3	
kW)			16.1			16.1			16.1

Gas Demand Profiles - MR Res

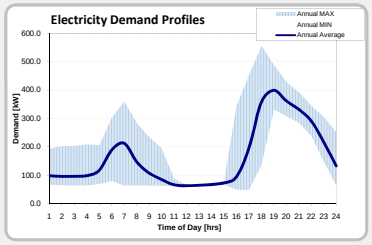
Hour	Annual Average MR Res Demand (Btu/h)	Annual MAX MR Res Demand (Btu/h)	Annual MIN MR Res Demand (Btu/h)	Jan Average MR Res Demand (Btu/h)	Jan MAX MR Res Demand (Btu/h)	Jan MIN MR Res Demand (Btu/h)	Feb Average MR Res Demand (Btu/h)	Feb MAX MR Res Demand (Btu/h)	Feb MIN MR Res Demand (Btu/h)	Mar Average MR Res Demand (Btu/h)	Mar MAX MR Res Demand (Btu/h)	Mar MIN MR Res Demand (Btu/h)	Apr Average MR Res Demand (Btu/h)	Apr MAX MR Res Demand (Btu/h)	Apr MIN MR Res Demand (Btu/h)
1	31,244	46,418	26,985	36,042	45,586	30,018	35,589	46,355	30,495	34,614	46,418	30,499	31,277	45,918	30,285
2	29,089	32,520	26,990	30,796	31,971	30,043	31,156	32,479	30,528	31,057	32,520	30,533	30,397	32,194	30,302
3	28,845	30,621	26,992	30,089	30,132	30,058	30,561	30,583	30,541	30,583	30,621	30,547	30,345	30,376	30,311
4	28,845	30,630	26,999	30,094	30,135	30,052	30,567	30,589	30,548	30,590	30,630	30,553	30,350	30,380	30,319
5	57,087	107,319	27,056	30,095	30,136	30,051	30,569	30,592	30,550	30,594	30,636	30,557	81,645	107,319	30,335
6	191,733	415,076	27,056	76,705	106,184	30,057	83,172	108,102	30,551	88,196	108,261	30,562	292,319	415,076	30,338
7	261,688	418,805	26,999	263,745	410,382	30,053	294,117	418,178	30,564	319,087	418,805	30,565	282,829	415,064	32,182
8	218,917	368,319	29,148	238,594	360,928	31,871	264,532	367,774	32,423	285,744	368,319	32,426	221,411	365,008	50,542
9	189,975	263,507	45,521	192,152	258,319	50,048	207,980	263,134	50,942	220,452	263,507	50,979	201,228	261,132	105,143
10	151,618	246,567	94,093	190,376	240,739	104,029	198,350	245,258	105,936	203,449	245,633	106,084	137,381	246,567	107,126
11	118,330	248,847	94,073	136,395	243,897	106,236	134,593	248,461	108,046	131,023	248,847	108,175	120,237	246,536	107,131
12	115,199	173,422	94,050	119,732	170,027	106,266	120,008	173,143	108,078	118,525	173,422	108,204	122,389	171,766	107,153
13	147,831	244,879	99,183	127,537	164,941	106,282	126,220	167,955	108,098	122,891	168,219	108,223	172,329	244,879	107,368
14	226,614	392,094	145,243	185,274	242,332	155,721	183,734	246,843	158,491	179,250	247,212	158,692	271,426	392,094	157,380
15	271,410	395,770	228,517	287,048	387,857	258,383	288,330	395,185	263,142	285,151	395,770	263,502	286,556	392,125	261,019
16	302,597	375,241	214,924	292,730	367,732	258,367	292,594	374,677	263,137	287,706	375,241	263,494	341,622	371,756	245,492
17	315,738	368,616	155,638	333,180	361,343	242,768	345,266	368,067	247,301	351,814	368,616	247,641	336,118	365,236	177,562
18	245,660	368,637	118,252	313,404	361,357	175,613	328,893	368,092	178,869	339,216	368,637	179,110	222,832	365,181	134,676
19	191,714	290,177	97,161	204,076	284,344	133,235	210,105	289,707	135,681	213,147	290,177	135,858	203,544	287,514	110,560
20	145,469	246,206	93,984	191,612	241,271	109,405	199,366	245,810	111,401	204,206	246,206	111,542	127,952	243,966	106,914
21	110,459	202,149	93,987	120,871	198,118	105,800	121,371	201,822	107,739	120,242	202,149	107,871	115,256	200,318	106,911
22	86,082	158,658	50,460	113,987	155,519	105,788	115,156	158,402	107,737	114,618	158,658	107,866	75,760	157,224	57,115
23	63,921	117,405	50,482	76,108	115,114	56,615	74,224	117,219	57,581	71,236	117,405	57,631	63,256	116,348	57,140
24	44,848	76,317	26,960	63,350	74,870	56,620	63,316	76,201	57,597	62,284	76,317	57,643	37,245	75,637	30,247
day)	3,574,937	5,618,201	1,920,753	3,683,993	4,913,234	2,373,371	3,809,767	5,004,628	2,415,976	3,875,675	5,012,227	2,418,759	3,835,703	5,579,614	2,243,550
u/h)		418,805			410,382			418,178			418,805			415,076	
u/h)			26,960			30,018			30,495			30,499			30,247

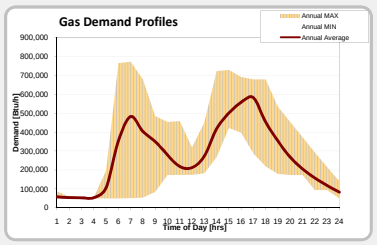
Hour	May Average MR Res Demand (Btu/h)	May MAX MR Res Demand (Btu/h)	May MIN MR Res Demand (Btu/h)	Jun Average MR Res Demand (Btu/h)	Jun MAX MR Res Demand (Btu/h)	Jun MIN MR Res Demand (Btu/h)	Jul Average MR Res Demand (Btu/h)	Jul MAX MR Res Demand (Btu/h)	Jul MIN MR Res Demand (Btu/h)	Aug Average MR Res Demand (Btu/h)	Aug MAX MR Res Demand (Btu/h)	Aug MIN MR Res Demand (Btu/h)	Sep Average MR Res Demand (Btu/h)	Sep MAX MR Res Demand (Btu/h)	Sep MIN MR Res Demand (Btu/h)
1	30,011	31,210	29,336	28,876	30,197	28,378	28,136	29,306	27,577	27,559	28,761	27,058	27,522	28,693	26,985
2	29,384	29,420	29,347	28,427	28,462	28,392	27,610	27,632	27,586	27,097	27,121	27,066	27,046	27,073	26,990
3	29,391	29,428	29,352	28,435	28,470	28,395	27,618	27,637	27,595	27,105	27,127	27,073	27,054	27,081	26,992
4	29,396	29,431	29,358	28,440	28,472	28,398	27,623	27,641	27,599	27,110	27,133	27,079	27,060	27,087	26,999
5	77,231	103,557	29,378	80,771	99,827	28,403	74,327	96,583	27,613	74,953	94,545	27,086	74,162	94,366	27,056
6	269,144	400,119	29,387	290,543	385,247	28,421	261,677	372,347	27,626	266,739	364,192	27,108	262,989	363,494	27,056
7	243,006	351,904	31,164	260,415	338,839	30,129	235,873	327,513	29,253	239,255	320,350	28,724	236,102	319,737	28,675
8	193,875	251,814	48,873	201,578	242,484	47,148	186,643	234,402	45,693	185,992	229,302	44,842	184,197	228,869	44,764
9	188,835	234,711	101,466	186,934	226,075	97,786	178,923	218,578	94,614	174,152	213,837	92,666	173,434	213,422	92,484
10	131,751	237,700	103,287	121,312	228,976	99,482	121,732	221,346	96,304	115,207	216,542	94,277	115,662	216,147	94,093
11	116,125	165,599	103,282	109,401	159,807	99,486	107,800	154,290	96,294	103,702	150,966	94,273	103,799	150,725	94,073
12	122,525	160,625	103,295	113,538	154,809	99,505	112,628	149,638	96,306	108,567	146,409	94,290	108,816	146,199	94,050
13	178,281	236,069	151,500	165,515	227,396	145,899	163,979	219,762	141,121	157,975	214,975	138,114	158,313	214,651	137,757
14	278,581	377,939	251,561	262,875	363,917	242,235	258,250	351,661	234,186	248,927	343,954	229,109	249,088	343,389	228,554
15	282,873	358,319	251,531	265,298	345,023	242,215	261,079	333,403	234,175	252,268	326,101	229,094	252,533	325,583	228,517
16	328,336	352,073	236,531	322,970	338,900	227,795	308,967	327,463	220,104	302,439	320,319	215,427	301,242	319,759	214,924
17	311,202	352,084	171,164	311,027	338,893	164,907	295,013	327,461	159,360	289,608	320,325	156,025	288,007	319,749	155,638
18	201,273	277,202	129,884	196,140	266,964	125,176	189,639	258,052	121,046	183,385	252,425	118,504	182,941	251,988	118,252
19	189,918	235,230	106,652	187,685	226,564	102,812	179,777	219,015	99,436	174,966	214,248	97,369	174,280	213,881	97,161
20	117,852	193,170	103,155	111,163	186,075	99,429	109,866	179,899	96,181	104,902	175,996	94,180	105,052	175,689	93,984
21	111,154	151,648	103,160	105,836	146,108	99,432	103,641	141,290	96,191	100,032	138,247	94,181	100,027	137,996	93,987
22	72,828	112,261	55,183	66,188	108,199	53,253	66,697	104,666	51,616	63,648	102,441	50,568	63,959	102,247	50,460
23	61,272	73,030	55,209	57,692	70,442	53,280	56,765	68,184	51,640	55,086	66,775	50,589	55,128	66,642	50,482
24	34,205	44,482	29,297	32,251	42,968	28,341	32,539	41,640	27,543	30,589	40,823	27,025	31,104	40,734	26,960
day)	3,628,449	4,789,025	2,312,351	3,563,310	4,612,913	2,228,694	3,416,802	4,459,408	2,156,660	3,341,263	4,362,915	2,111,727	3,329,516	4,355,201	2,106,893
u/h)		400,119			385,247			372,347			364,192			363,494	
u/h)			29,297			28,341			27,543			27,025			26,960

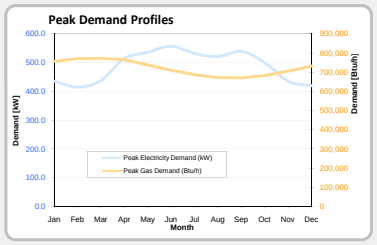
Hour	Oct Average MR Res Demand (Btu/h)	Oct MAX MR Res Demand (Btu/h)	Oct MIN MR Res Demand (Btu/h)	Nov Average MR Res Demand (Btu/h)	Nov MAX MR Res Demand (Btu/h)	Nov MIN MR Res Demand (Btu/h)	Dec Average MR Res Demand (Btu/h)	Dec MAX MR Res Demand (Btu/h)	Dec MIN MR Res Demand (Btu/h)
1	28,458	41,429	27,414	33,079	42,763	28,224	34,052	44,254	29,199
2	27,540	29,157	27,433	28,876	30,073	28,260	29,827	31,080	29,227
3	27,495	27,524	27,445	28,314	28,363	28,273	29,260	29,288	29,229
4	27,501	27,531	27,456	28,321	28,365	28,284	29,265	29,294	29,235
5	71,715	96,061	27,476	28,326	28,371	28,289	29,268	29,299	29,238
6	249,095	370,165	27,481	75,580	99,248	28,301	79,112	102,874	29,242
7	224,887	325,599	27,504	265,050	382,763	28,303	278,946	397,185	29,242
8	179,017	233,065	29,148	238,317	336,669	29,998	250,550	349,339	31,005
9	174,152	213,837	92,666	187,419	240,989	46,949	196,252	250,055	48,601
10	121,300	220,085	94,149	179,335	224,608	97,252	186,624	233,075	100,830
11	108,307	153,455	95,869	122,877	227,486	99,161	126,727	236,124	102,932
12	112,487	148,841	95,850	109,759	158,579	99,180	113,569	164,658	102,954
13	163,194	218,552	140,375	116,237	153,814	99,183	120,087	159,742	102,963
14	255,836	349,666	202,490	168,908	225,925	145,243	174,550	234,622	150,788
15	260,623	331,527	232,844	263,468	361,531	240,902	272,755	375,421	250,114
16	306,379	325,742	218,900	268,332	342,749	240,871	277,646	355,952	250,115
17	289,905	325,752	158,523	313,695	336,895	226,434	326,425	349,686	235,098
18	187,609	256,574	120,389	297,666	336,929	163,917	310,294	349,709	170,106
19	176,570	217,767	98,902	190,301	265,230	124,440	197,621	275,257	129,085
20	109,365	178,875	95,662	180,388	225,106	102,223	187,626	233,577	106,013
21	103,063	140,488	95,658	110,520	184,888	98,862	114,227	191,826	102,522
22	67,773	104,079	51,343	105,215	145,190	98,851	108,894	150,611	102,510
23	57,760	91,437	51,362	68,602	107,527	53,015	70,569	111,523	54,921
24	33,644	66,424	27,405	58,431	70,018	53,033	60,350	72,589	54,929
day)	3,362,615	4,497,095	2,046,599	3,467,016	4,584,078	2,217,445	3,604,496	4,757,040	2,300,096
u/h)		370,165			382,763			397,185	
u/h)			27,405			28,224			29,199

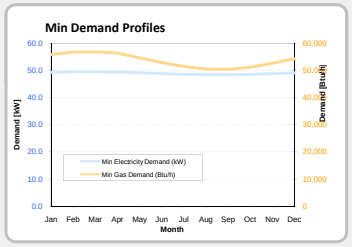
High-Rise Residential eQUEST Simulation Results

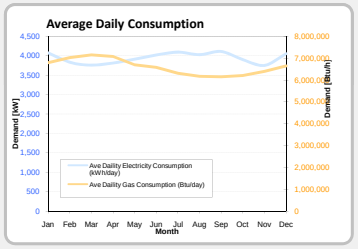
ITERATION: LEED Gold











Electricity Demand Profiles - HR Res

Hour	Annual Average HR Res Demand (kW)	Annual MAX HR Res Demand (kW)	Annual MIN HR Res Demand (kW)	Jan Average HR Res Demand (kW)	Jan MAX HR Res Demand (kW)	Jan MIN HR Res Demand (kW)	Feb Average HR Res Demand (kW)	Feb MAX HR Res Demand (kW)	Feb MIN HR Res Demand (kW)	Mar Average HR Res Demand (kW)	Mar MAX HR Res Demand (kW)	Mar MIN HR Res Demand (kW)	Apr Average HR Res Demand (kW)	Apr MAX HR Res Demand (kW)	Apr MIN HR Res Demand (kW)
1	97.7	193.4	66.3	136.0	193.4	92.6	111.9	151.1	83.2	97.7	154.2	71.6	90.2	127.6	75.5
2	94.9	201.7	65.0	132.5	201.7	94.7	110.9	140.0	85.9	97.1	135.2	78.3	91.7	115.7	70.1
3	95.8	203.0	63.4	133.6	203.0	94.5	112.9	132.1	94.8	100.1	137.8	75.9	94.9	118.7	76.7
4	97.6	208.8	63.4	135.1	208.8	93.9	115.5	137.4	96.1	103.9	143.5	74.5	98.1	122.2	79.8
5	116.6	206.0	70.1	135.6	206.0	94.4	117.9	143.9	99.2	107.0	146.2	77.9	128.3	167.5	88.0
6	188.0	302.2	79.6	161.9	246.2	96.8	149.0	180.1	105.4	141.1	190.2	87.2	218.7	285.8	106.5
7	211.8	360.3	63.4	241.3	360.3	113.3	237.4	311.8	121.2	232.5	305.9	101.0	200.4	265.2	122.2
8	146.7	284.2	64.5	194.1	222.5	130.1	195.8	222.7	132.0	200.5	222.7	129.1	110.7	221.6	65.2
9	106.6	233.8	63.8	121.6	233.0	65.1	109.5	209.5	65.2	101.7	223.7	65.2	98.5	205.1	64.4
10	84.6	193.9	61.6	113.5	193.8	64.3	104.9	192.9	64.4	97.1	193.9	64.4	71.9	192.8	61.9
11	65.3	88.3	61.5	71.1	88.2	61.9	69.4	87.2	61.9	68.0	88.3	61.9	63.2	87.2	61.8
12	62.5	64.8	61.5	62.6	64.8	61.8	62.4	63.8	61.8	62.4	63.8	61.8	62.8	63.8	62.3
13	63.8	67.2	62.3	63.0	64.8	62.5	62.9	63.8	62.5	62.8	63.9	62.5	64.6	67.2	62.5
14	66.7	73.0	63.9	65.2	68.1	64.1	65.0	67.2	64.2	64.8	67.2	64.2	68.1	73.0	64.1
15	72.3	78.9	66.4	68.9	73.0	67.4	68.7	73.1	67.5	68.5	73.1	67.5	75.4	78.9	67.4
16	93.5	344.9	48.4	74.7	79.9	67.3	75.4	78.9	67.4	76.2	78.9	67.4	81.1	219.5	49.4
17	194.5	452.2	48.8	101.0	268.1	49.3	87.2	191.1	49.5	82.9	225.7	49.5	208.9	379.7	49.4
18	357.5	556.9	134.8	234.9	337.9	154.5	207.4	330.5	142.2	197.0	372.2	135.5	413.1	514.3	142.7
19	398.8	487.9	330.2	383.9	436.2	350.9	377.5	415.0	352.5	388.9	437.8	358.5	383.4	445.7	346.0
20	361.1	428.4	307.2	351.2	383.6	328.7	345.4	374.2	320.8	355.6	395.0	325.8	341.8	398.6	311.5
21	331.0	391.7	284.1	326.3	356.8	306.0	318.1	339.2	297.8	326.4	360.6	304.9	311.8	361.1	288.6
22	290.3	345.1	237.7	304.8	341.3	279.6	295.5	310.4	284.1	300.9	332.0	277.8	262.6	299.4	240.2
23	216.0	304.5	146.7	265.9	304.5	244.1	254.2	263.5	245.0	254.6	278.9	240.0	174.2	257.4	151.7
24	132.1	251.6	63.4	197.0	251.6	170.3	177.2	196.5	160.5	169.9	203.4	151.2	96.9	177.2	70.5
day)	3,946	6,323	2,578	4,076	5,387	3,208	3,832	4,676	3,185	3,758	4,894	3,054	3,811	5,245	2,778
kW)		556.9			436.2			415.0			437.8			514.3	
kW)			48.4			49.3			49.5			49.5			49.4

Hour	May Average HR Res Demand (kW)	May MAX HR Res Demand (kW)	May MIN HR Res Demand (kW)	Jun Average HR Res Demand (kW)	Jun MAX HR Res Demand (kW)	Jun MIN HR Res Demand (kW)	Jul Average HR Res Demand (kW)	Jul MAX HR Res Demand (kW)	Jul MIN HR Res Demand (kW)	Aug Average HR Res Demand (kW)	Aug MAX HR Res Demand (kW)	Aug MIN HR Res Demand (kW)	Sep Average HR Res Demand (kW)	Sep MAX HR Res Demand (kW)	Sep MIN HR Res Demand (kW)
1	83.9	105.0	67.3	83.5	101.6	68.1	81.6	103.3	66.3	81.4	103.0	69.0	88.2	124.5	69.2
2	83.6	109.2	66.6	80.6	96.5	65.4	76.1	98.0	65.0	76.9	95.5	67.1	82.6	122.2	67.2
3	85.3	110.3	65.3	79.5	92.0	65.2	74.4	91.6	63.4	75.1	89.5	65.6	79.1	114.7	67.7
4	87.6	110.7	71.4	79.4	90.8	65.1	73.8	85.7	64.4	74.0	83.8	63.4	79.1	108.7	69.0
5	117.2	148.3	85.5	113.0	132.5	72.7	106.1	132.4	70.8	106.7	128.9	70.1	110.0	153.3	76.0
6	205.7	276.2	98.5	222.6	295.8	92.6	213.9	291.2	92.1	214.3	280.6	91.5	217.1	302.2	96.4
7	189.8	222.3	129.1	198.4	221.0	129.2	193.7	220.7	129.1	194.4	220.6	129.1	193.3	220.6	129.1
8	116.9	234.9	65.0	107.0	256.5	64.8	115.0	284.2	64.6	108.4	236.1	64.5	111.2	261.2	64.5
9	108.9	192.6	64.2	97.7	192.4	64.1	104.6	192.3	63.8	100.4	192.2	63.8	101.6	192.2	63.8
10	70.1	87.0	61.8	68.0	86.8	61.7	69.2	86.6	61.7	68.3	86.5	61.6	68.5	86.5	61.6
11	62.3	63.6	61.7	62.2	63.5	61.6	62.2	63.4	61.5	62.1	63.3	61.5	62.1	63.3	61.5
12	62.8	63.7	62.4	62.6	63.6	62.3	62.6	63.4	62.3	62.5	63.4	62.2	62.5	63.4	62.2
13	64.9	67.0	64.0	64.5	66.8	63.9	64.5	66.6	63.8	64.4	66.5	63.7	64.4	66.5	63.7
14	68.6	72.7	67.3	68.1	72.4	67.1	68.1	72.1	66.9	67.8	72.0	66.8	67.8	72.0	66.8
15	74.8	78.7	67.1	75.6	78.5	66.8	74.7	78.3	66.6	74.9	78.2	66.5	74.8	78.2	66.4
16	109.5	297.3	49.1	101.3	277.3	48.8	120.5	344.9	48.6	109.8	292.5	48.4	113.9	330.2	48.4
17	264.7	415.6	136.0	274.5	416.2	141.4	296.4	452.6	181.5	284.1	418.1	153.9	293.2	445.8	140.5
18	452.9	535.6	358.4	475.6	556.9	415.1	483.8	532.1	446.7	477.8	521.0	440.5	474.8	539.1	421.2
19	398.2	464.3	330.2	422.1	487.9	364.9	429.4	470.1	400.3	421.0	464.1	399.5	421.7	467.9	377.9
20	353.9	410.0	307.2	376.3	428.4	330.9	384.3	417.2	358.6	378.3	412.4	358.2	383.8	424.9	345.3
21	320.8	371.2	284.1	341.4	386.2	299.9	349.2	377.3	322.6	345.9	375.5	322.9	353.0	391.7	318.8
22	267.5	308.7	237.7	286.2	323.0	250.9	294.5	316.6	270.9	291.9	317.4	272.9	299.7	330.9	264.8
23	173.2	202.7	151.6	184.9	213.8	155.0	193.9	225.9	174.9	191.3	216.6	167.8	200.3	240.7	158.4
24	88.6	122.3	65.8	92.2	138.7	63.4	99.7	130.0	76.9	94.9	139.6	69.8	104.9	147.5	65.2
day)	3,912	5,070	3,017	4,017	5,139	3,141	4,092	5,197	3,343	4,027	5,017	3,300	4,108	5,348	3,226
kW)		535.6			556.9			532.1			521.0			539.1	
kW)			49.1			48.8			48.6			48.4			48.4

Hour	Oct Average HR Res Demand (kW)	Oct MAX HR Res Demand (kW)	Oct MIN HR Res Demand (kW)	Nov Average HR Res Demand (kW)	Nov MAX HR Res Demand (kW)	Nov MIN HR Res Demand (kW)	Dec Average HR Res Demand (kW)	Dec MAX HR Res Demand (kW)	Dec MIN HR Res Demand (kW)
1	84.3	116.7	74.2	100.3	142.1	75.7	134.3	173.1	101.6
2	80.5	94.8	73.5	95.8	139.6	78.6	131.4	176.5	105.4
3	81.5	94.4	72.3	98.4	140.1	79.9	134.9	182.7	104.1
4	82.1	98.0	69.9	103.0	150.3	78.3	140.2	191.9	109.5
5	111.9	141.3	75.3	104.7	146.0	76.8	140.9	186.0	109.6
6	203.9	278.6	79.6	134.4	192.0	79.8	170.9	224.9	116.2
7	187.6	221.8	99.4	219.8	306.6	98.9	254.7	341.5	132.4
8	111.0	220.4	64.6	191.8	222.0	129.1	201.1	222.3	136.3
9	109.8	225.5	63.9	111.2	232.3	64.7	113.1	233.8	64.9
10	73.2	187.9	61.7	106.0	192.4	64.0	105.3	193.7	64.2
11	62.8	83.2	61.5	69.4	86.8	61.7	69.4	88.0	61.8
12	62.5	63.4	61.5	62.2	63.5	61.6	62.4	64.7	61.7
13	64.5	66.6	62.9	62.6	63.5	62.3	62.8	64.7	62.4
14	68.0	72.1	65.7	64.6	66.7	63.9	64.8	66.9	64.0
15	74.4	78.2	66.6	68.1	72.4	67.0	68.3	72.7	67.2
16	107.7	309.5	48.5	74.7	78.4	66.8	75.1	78.6	67.1
17	253.7	416.0	134.5	90.0	199.3	48.8	90.1	203.0	49.0
18	434.0	499.7	353.3	205.4	338.3	134.8	223.3	310.9	155.9
19	395.0	460.5	346.7	384.5	435.0	347.1	377.8	419.5	355.2
20	360.7	418.9	321.1	353.8	390.6	326.7	346.6	371.3	333.5
21	330.9	384.8	294.1	324.6	357.4	301.9	322.4	352.4	311.7
22	278.9	345.1	245.3	298.9	324.6	273.1	302.6	336.6	286.1
23	182.8	286.7	146.7	254.3	275.0	234.4	264.8	303.9	246.9
24	98.5	200.4	67.0	172.4	194.5	151.2	195.6	233.8	170.8
day)	3,900	5,365	3,010	3,751	4,809	3,027	4,053	5,094	3,337
kW)		499.7			435.0			419.5	
kW)			48.5			48.8			49.0

Gas Demand Profiles - HR Res

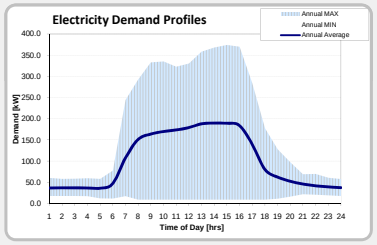
Hour	Annual Average HR Res Demand (Btu/h)	Annual MAX HR Res Demand (Btu/h)	Annual MIN HR Res Demand (Btu/h)	Jan Average HR Res Demand (Btu/h)	Jan MAX HR Res Demand (Btu/h)	Jan MIN HR Res Demand (Btu/h)	Feb Average HR Res Demand (Btu/h)	Feb MAX HR Res Demand (Btu/h)	Feb MIN HR Res Demand (Btu/h)	Mar Average HR Res Demand (Btu/h)	Mar MAX HR Res Demand (Btu/h)	Mar MIN HR Res Demand (Btu/h)	Apr Average HR Res Demand (Btu/h)	Apr MAX HR Res Demand (Btu/h)	Apr MIN HR Res Demand (Btu/h)
1	58,091	85,965	50,387	66,848	84,397	55,798	66,050	85,846	56,705	64,285	85,965	56,767	58,124	85,081	56,353
2	54,093	60,330	50,393	57,152	59,286	55,815	57,848	60,250	56,722	57,694	60,330	56,785	56,481	59,770	56,359
3	53,627	56,814	50,396	55,834	55,854	55,829	56,734	56,742	56,722	56,801	56,814	56,789	56,370	56,384	56,361
4	53,628	56,815	50,398	55,836	55,854	55,821	56,735	56,744	56,725	56,803	56,815	56,792	56,371	56,384	56,362
5	105,641	198,108	50,405	55,836	55,853	55,822	56,736	56,744	56,726	56,804	56,815	56,793	150,857	198,108	56,366
6	353,679	765,043	50,407	141,698	195,942	55,825	153,633	199,537	56,727	162,910	199,827	56,795	538,953	765,043	56,366
7	482,561	771,898	50,398	486,257	756,323	55,825	542,229	770,742	56,727	588,248	771,898	56,795	521,489	765,047	59,763
8	403,741	678,919	54,205	439,943	665,243	59,182	487,743	677,904	60,150	526,853	678,919	60,223	408,351	672,903	93,390
9	350,379	485,869	84,083	354,290	476,181	92,435	383,523	485,156	94,051	406,554	485,869	94,159	371,157	481,573	193,845
10	279,740	454,496	173,514	350,968	443,612	191,795	365,743	451,981	195,325	375,191	452,650	195,560	253,590	454,496	198,066
11	218,447	458,670	174,023	251,557	449,516	196,076	248,319	457,989	199,589	241,795	458,670	199,865	222,017	454,499	198,052
12	212,654	319,748	173,983	220,857	313,448	196,128	221,442	319,262	199,593	218,759	319,748	199,874	225,960	316,785	198,043
13	272,781	451,494	183,168	235,236	304,092	196,152	232,883	309,714	199,603	226,795	310,187	199,885	317,944	451,494	198,278
14	417,914	722,696	268,036	341,601	446,664	287,214	338,836	455,036	292,419	330,617	455,720	292,843	500,493	722,696	290,403
15	500,434	729,386	421,716	529,084	714,753	476,320	531,518	728,304	485,191	525,701	729,386	485,909	528,362	722,730	481,469
16	557,888	691,551	396,457	539,555	677,684	476,298	539,375	690,529	485,180	530,410	691,551	485,895	629,805	685,212	452,617
17	582,030	679,358	286,984	614,070	665,904	447,524	636,404	678,337	455,926	648,509	679,358	456,616	619,612	673,168	327,276
18	452,757	679,367	217,920	577,605	665,902	323,650	606,188	678,353	329,646	625,246	679,367	330,127	410,725	673,117	248,120
19	353,589	534,721	179,600	376,140	523,995	245,442	387,274	533,902	249,937	392,877	534,721	250,275	375,422	529,707	204,153
20	268,586	453,902	173,848	353,345	444,816	201,920	367,667	453,221	205,629	376,611	453,902	205,922	236,283	449,841	197,561
21	204,077	372,834	173,860	223,123	365,403	195,394	224,088	372,275	198,986	222,038	372,834	199,272	212,914	369,543	197,567
22	159,176	292,743	93,719	210,465	286,949	195,396	212,660	292,308	198,991	211,702	292,743	199,277	140,154	290,176	105,913
23	118,344	216,757	93,730	140,690	212,516	104,817	137,260	216,439	106,661	131,787	216,757	106,806	117,104	214,874	105,924
24	83,185	141,062	50,367	117,180	138,367	104,826	117,154	140,859	106,669	115,286	141,062	106,814	69,157	139,860	56,336
day)	6,597,007	########	3,551,996	6,795,170	9,058,553	4,381,295	7,028,042	9,228,174	4,460,601	7,150,274	9,241,908	4,466,837	7,077,694	10,288,491	4,144,943
u/h)		771,898			756,323			770,742			771,898			765,047	
u/h)			50,367			55,798			56,705			56,767			56,336

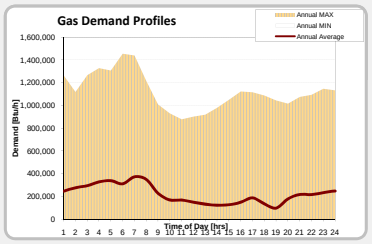
Hour	May Average HR Res Demand (Btu/h)	May MAX HR Res Demand (Btu/h)	May MIN HR Res Demand (Btu/h)	Jun Average HR Res Demand (Btu/h)	Jun MAX HR Res Demand (Btu/h)	Jun MIN HR Res Demand (Btu/h)	Jul Average HR Res Demand (Btu/h)	Jul MAX HR Res Demand (Btu/h)	Jul MIN HR Res Demand (Btu/h)	Aug Average HR Res Demand (Btu/h)	Aug MAX HR Res Demand (Btu/h)	Aug MIN HR Res Demand (Btu/h)	Sep Average HR Res Demand (Btu/h)	Sep MAX HR Res Demand (Btu/h)	Sep MIN HR Res Demand (Btu/h)
1	55,813	58,000	54,623	53,764	56,154	52,903	52,418	54,551	51,412	51,358	53,540	50,473	51,303	53,456	50,387
2	54,639	54,654	54,627	52,917	52,929	52,907	51,428	51,436	51,418	50,485	50,492	50,478	50,404	50,415	50,393
3	54,641	54,655	54,630	52,920	52,931	52,911	51,431	51,438	51,421	50,488	50,494	50,482	50,407	50,418	50,396
4	54,642	54,656	54,632	52,922	52,931	52,913	51,432	51,439	51,423	50,490	50,496	50,484	50,409	50,420	50,398
5	142,756	191,230	54,635	149,316	184,377	52,915	137,464	178,437	51,430	138,619	174,677	50,486	137,169	174,359	50,405
6	496,291	737,548	54,636	535,752	710,172	52,916	482,594	686,443	51,431	491,922	671,412	50,487	485,018	670,137	50,407
7	448,168	648,753	57,910	480,291	624,712	56,067	435,086	603,876	54,475	441,312	590,677	53,464	435,508	589,557	53,378
8	357,608	464,359	90,278	371,870	447,200	87,181	344,313	432,338	84,516	343,103	422,932	82,832	339,798	422,138	82,686
9	348,289	432,569	187,094	344,857	416,573	180,296	330,046	402,755	174,457	321,245	394,012	170,812	319,935	393,269	170,491
10	243,215	438,258	191,074	224,043	422,061	184,156	224,787	408,033	178,187	212,748	399,172	174,475	213,601	398,417	174,085
11	214,458	305,519	191,045	202,128	294,341	184,128	199,166	284,597	178,151	191,591	278,465	174,436	191,770	277,982	174,023
12	226,236	296,354	191,023	209,734	285,545	184,109	208,051	276,068	178,127	200,546	270,125	174,416	201,006	269,679	173,983
13	328,942	435,328	279,793	305,479	419,294	269,542	302,643	405,278	260,663	291,564	396,463	255,123	292,184	395,795	254,499
14	513,711	696,670	464,160	484,830	670,809	446,986	476,308	648,274	432,092	459,116	634,074	422,748	459,408	632,960	421,776
15	521,615	660,522	464,110	489,289	636,010	446,956	481,517	614,647	432,067	465,269	601,192	422,718	465,752	600,157	421,716
16	605,366	649,007	436,259	595,527	624,795	420,139	569,729	603,790	406,062	557,688	590,593	397,352	555,485	589,540	396,457
17	573,686	649,001	315,443	573,412	624,766	303,884	543,895	603,765	293,858	533,927	590,554	287,557	530,989	589,505	286,984
18	370,942	510,677	239,282	361,492	491,795	230,611	349,483	475,341	223,087	337,953	464,984	218,338	337,166	464,186	217,920
19	350,382	433,795	197,030	346,315	417,831	189,954	331,766	403,978	183,815	322,895	395,210	179,943	321,641	394,483	179,600
20	217,724	356,421	190,684	205,451	343,364	183,849	203,080	332,034	177,919	193,926	324,863	174,177	194,210	324,267	173,848
21	205,392	279,942	190,694	195,641	269,758	183,859	191,616	260,922	177,931	184,960	255,331	174,188	184,962	254,862	173,860
22	134,781	207,380	102,378	122,594	199,921	98,861	123,549	193,450	95,816	117,928	189,356	93,892	118,514	189,013	93,719
23	113,473	135,094	102,389	106,924	130,351	98,874	105,233	126,235	95,828	102,138	123,633	93,904	102,230	123,415	93,730
24	63,580	82,480	54,605	60,022	79,713	52,884	60,570	77,312	51,393	56,979	75,795	50,454	57,943	75,669	50,367
day)	6,696,349	8,832,872	4,273,035	6,577,489	8,508,334	4,119,802	6,307,608	8,226,436	3,986,980	6,168,251	8,048,542	3,903,719	6,146,810	8,034,098	3,895,508
u/h)		737,548			710,172			686,443			671,412			670,137	
u/h)			54,605			52,884			51,393			50,454			50,367

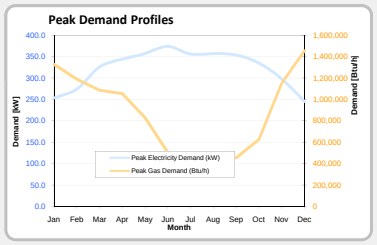
Hour	Oct Average HR Res Demand (Btu/h)	Oct MAX HR Res Demand (Btu/h)	Oct MIN HR Res Demand (Btu/h)	Nov Average HR Res Demand (Btu/h)	Nov MAX HR Res Demand (Btu/h)	Nov MIN HR Res Demand (Btu/h)	Dec Average HR Res Demand (Btu/h)	Dec MAX HR Res Demand (Btu/h)	Dec MIN HR Res Demand (Btu/h)
1	52,991	76,911	51,155	61,468	79,260	52,587	63,189	81,955	54,279
2	51,276	54,278	51,162	53,690	55,857	52,609	55,375	57,659	54,296
3	51,178	51,192	51,165	52,634	52,643	52,615	54,313	54,321	54,300
4	51,180	51,193	51,168	52,636	52,646	52,618	54,314	54,323	54,302
5	132,622	177,423	51,174	52,637	52,647	52,621	54,314	54,323	54,303
6	459,383	682,365	51,175	139,682	183,210	52,628	146,131	189,860	54,304
7	414,809	600,296	51,179	488,716	705,491	52,629	514,260	732,032	54,304
8	330,192	429,814	54,205	439,491	620,602	55,758	461,968	643,912	57,553
9	319,659	400,448	84,083	345,643	444,300	86,681	361,842	460,956	89,718
10	223,428	405,699	173,514	330,695	413,916	179,235	344,060	429,453	185,864
11	199,969	283,010	177,212	226,724	419,329	183,149	233,752	435,153	190,019
12	207,671	274,549	177,165	202,561	292,439	183,164	209,506	303,507	190,051
13	301,084	402,988	259,186	214,498	283,690	183,168	221,514	294,461	190,062
14	471,751	644,531	373,411	311,527	416,530	268,036	321,847	432,407	278,163
15	480,573	611,114	429,534	485,724	666,356	444,265	502,756	691,788	461,130
16	564,868	600,468	403,737	494,685	631,766	444,224	511,768	655,931	461,122
17	534,411	600,464	292,156	578,246	620,874	417,475	601,628	644,408	433,348
18	345,717	472,634	221,802	548,615	620,899	302,009	571,870	644,416	313,510
19	325,774	401,617	182,773	350,689	488,571	229,148	364,270	507,234	237,841
20	202,097	330,102	176,912	332,733	415,103	188,764	346,008	430,649	195,666
21	190,509	259,415	176,913	204,133	341,132	182,694	210,887	353,814	189,342
22	125,498	192,348	95,297	194,383	268,016	182,700	201,089	277,909	189,342
23	107,039	169,103	95,308	126,939	198,646	98,281	130,492	205,898	101,708
24	62,582	122,997	51,139	108,192	129,541	98,291	111,658	134,159	101,716
day)	6,206,261	8,294,958	3,782,526	6,396,939	8,453,463	4,095,348	6,648,810	8,770,528	4,246,243
u/h)		682,365			705,491			732,032	
u/h)			51,139			52,587			54,279

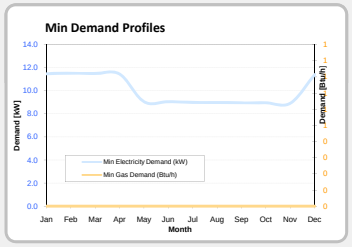
Commercial eQUEST Simulation Results

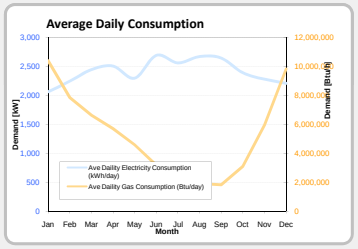
ITERATION: City of SF Green Building Code (LEED Gold)











Electricity Demand Profiles - Commercial

Hour	Annual Average Commercial Demand (kW)	Annual MAX Commercial Demand (kW)	Annual MIN Commercial Demand (kW)	Jan Average Commercial Demand (kW)	Jan MAX Commercial Demand (kW)	Jan MIN Commercial Demand (kW)	Feb Average Commercial Demand (kW)	Feb MAX Commercial Demand (kW)	Feb MIN Commercial Demand (kW)	Mar Average Commercial Demand (kW)	Mar MAX Commercial Demand (kW)	Mar MIN Commercial Demand (kW)
1	36.5	60.3	17.8	36.6	49.8	20.4	37.0	49.9	20.4	38.3	55.4	20.3
2	36.8	58.2	17.8	37.5	58.2	20.4	37.5	58.2	20.4	39.0	55.1	20.3
3	36.9	58.5	17.8	38.1	53.6	22.3	37.5	49.7	20.6	39.0	55.2	20.4
4	36.5	59.6	17.4	38.5	51.5	22.3	38.5	59.6	22.4	39.0	55.3	20.4
5	35.8	58.3	12.1	38.8	51.5	22.3	38.3	51.0	22.4	38.7	54.7	20.4
6	46.7	77.8	11.7	39.1	53.6	20.3	36.2	48.0	20.2	37.2	52.0	18.3
7	106.9	244.2	17.4	55.4	83.3	17.5	54.8	72.7	16.0	57.6	81.8	13.9
8	151.6	292.6	9.0	126.4	193.9	15.1	135.1	192.4	13.6	144.2	219.8	11.6
9	163.5	333.2	9.0	136.6	234.2	13.5	147.1	236.6	11.7	158.1	247.9	11.5
10	170.0	335.1	9.0	137.2	236.4	11.6	149.7	240.9	11.5	169.4	253.7	11.6
11	173.3	322.7	9.1	137.3	236.0	11.5	156.1	245.4	11.6	171.5	249.6	11.6
12	179.0	330.3	9.1	138.6	236.4	11.6	161.4	246.8	11.6	174.3	256.1	11.6
13	188.0	358.2	9.1	142.8	248.0	11.6	163.7	255.5	11.7	180.8	286.7	11.6
14	189.6	368.0	9.0	145.0	253.4	11.6	167.7	257.7	11.8	185.0	284.1	11.6
15	189.2	374.1	8.9	145.0	247.6	11.5	169.5	268.2	20.9	188.3	305.1	11.7
16	183.8	369.9	9.0	146.3	246.3	11.5	166.5	273.9	21.2	187.6	326.0	11.7
17	139.8	284.3	9.0	141.7	240.0	15.9	154.3	248.9	20.5	171.8	279.2	13.5
18	80.4	177.4	9.0	94.8	161.9	23.3	97.7	157.9	15.4	111.5	168.2	15.4
19	62.2	127.9	11.3	60.8	82.4	24.8	61.3	79.3	21.9	65.4	79.3	24.0
20	52.5	97.3	16.4	62.1	82.2	24.9	65.9	95.4	24.9	70.7	97.3	24.8
21	45.5	69.0	22.1	44.6	53.7	26.7	47.6	69.0	24.7	51.1	68.8	24.8
22	41.8	69.9	20.6	44.4	68.0	26.7	45.0	62.0	24.8	48.5	69.9	24.8
23	38.9	60.9	19.2	39.4	53.9	25.2	40.6	54.8	23.4	42.7	59.3	23.5
24	37.3	57.8	17.8	38.6	52.9	23.9	38.7	53.1	23.9	40.3	57.8	22.1
day)	2,422	4,646	318	2,065	3,329	446	2,248	3,427	447	2,450	3,718	411
kW)		374.1			253.4			273.9			326.0	
kW)			8.9			11.5			11.5			11.5

Hour	Apr Average Commercial Demand (kW)	Apr MAX Commercial Demand (kW)	Apr MIN Commercial Demand (kW)	May Average Commercial Demand (kW)	May MAX Commercial Demand (kW)	May MIN Commercial Demand (kW)	Jun Average Commercial Demand (kW)	Jun MAX Commercial Demand (kW)	Jun MIN Commercial Demand (kW)	Jul Average Commercial Demand (kW)	Jul MAX Commercial Demand (kW)	Jul MIN Commercial Demand (kW)
1	37.0	52.5	20.3	34.5	51.0	20.3	38.0	60.3	20.3	34.1	51.4	17.8
2	36.9	43.9	20.3	34.4	43.8	20.3	37.7	57.8	17.8	34.4	51.5	17.8
3	37.1	44.0	20.3	34.4	43.9	20.3	38.8	58.5	20.3	34.1	51.1	17.8
4	37.5	44.3	20.4	31.7	40.9	17.4	36.1	56.0	17.4	32.2	47.6	17.4
5	35.5	42.0	18.2	29.0	38.2	14.6	33.3	48.4	14.5	29.4	50.2	12.1
6	54.3	70.5	14.0	47.8	68.1	11.7	53.4	77.8	11.7	49.3	68.0	11.7
7	133.8	192.1	11.6	126.5	208.2	11.5	150.0	239.6	9.1	145.7	222.7	9.0
8	153.9	226.4	11.4	145.4	245.3	11.4	176.8	292.6	9.1	165.8	257.8	9.0
9	167.9	252.7	11.6	159.3	276.1	11.6	190.8	333.2	9.1	178.5	291.9	9.1
10	177.7	265.8	11.6	167.0	304.4	21.1	196.0	335.1	9.1	187.1	314.9	9.1
11	181.4	276.4	11.6	169.7	297.6	9.1	202.1	322.7	9.1	190.2	305.7	9.1
12	189.0	304.0	21.3	175.9	315.5	9.1	209.5	330.3	9.1	199.4	323.3	9.1
13	199.6	338.7	21.2	185.0	357.5	9.1	222.7	358.2	9.1	212.8	348.0	9.1
14	200.5	329.8	21.3	187.9	353.1	9.1	223.1	368.0	9.1	212.8	351.5	9.1
15	200.3	340.3	21.7	185.3	352.2	9.1	220.9	374.1	9.1	213.1	355.8	9.1
16	193.2	344.1	21.8	178.3	336.6	9.1	210.5	369.9	9.1	203.6	351.6	9.1
17	124.8	226.3	21.3	109.6	212.8	9.0	132.0	246.3	9.1	130.9	223.5	9.1
18	68.0	134.1	21.7	54.0	120.7	9.1	65.0	136.9	9.1	65.6	117.7	9.0
19	66.7	82.1	21.8	53.6	86.0	11.3	61.1	127.9	11.3	54.8	85.4	11.3
20	50.5	82.1	24.7	38.6	62.0	18.9	41.3	61.5	18.8	38.0	44.5	16.4
21	48.5	67.6	24.7	42.3	51.2	24.6	44.1	48.7	24.6	44.0	48.7	22.1
22	42.0	59.8	23.3	38.6	61.1	23.2	39.2	61.3	23.1	39.1	42.1	23.1
23	38.5	52.3	21.8	37.1	60.7	21.8	38.3	59.3	21.7	36.7	40.7	21.7
24	37.4	54.4	20.3	36.0	51.5	20.3	36.7	51.6	17.8	34.2	51.5	17.8
day)	2,512	3,926	458	2,302	4,038	353	2,697	4,476	328	2,566	4,097	316
kW)		344.1			357.5			374.1			355.8	
kW)			11.4			9.0			9.1			9.0

Hour	Aug Average Commercial Demand (kW)	Aug MAX Commercial Demand (kW)	Aug MIN Commercial Demand (kW)	Sep Average Commercial Demand (kW)	Sep MAX Commercial Demand (kW)	Sep MIN Commercial Demand (kW)	Oct Average Commercial Demand (kW)	Oct MAX Commercial Demand (kW)	Oct MIN Commercial Demand (kW)	Nov Average Commercial Demand (kW)	Nov MAX Commercial Demand (kW)	Nov MIN Commercial Demand (kW)	Dec Average Commercial Demand (kW)	Dec MAX Commercial Demand (kW)	Dec MIN Commercial Demand (kW)
1	35.8	52.3	17.8	37.3	56.9	17.8	34.7	52.5	17.8	37.4	54.7	20.3	37.4	50.5	20.3
2	35.5	52.2	17.8	37.0	53.3	17.8	36.7	57.8	17.8	37.1	53.0	20.3	37.9	50.2	20.3
3	35.2	52.0	17.8	36.7	53.3	17.8	35.5	51.5	17.8	37.2	52.5	20.3	38.8	51.7	20.3
4	35.4	51.5	17.8	36.2	52.8	17.8	36.1	53.5	17.8	37.6	52.4	20.3	39.5	58.0	22.1
5	35.3	51.8	17.8	36.0	52.7	17.8	37.7	58.3	20.3	37.4	57.7	20.3	40.1	51.6	22.2
6	56.1	69.9	13.5	55.3	69.9	13.5	53.0	72.4	13.5	37.5	53.6	20.3	40.3	55.5	22.2
7	150.4	220.9	10.5	152.2	244.2	10.6	137.5	228.7	13.1	56.5	86.2	17.4	59.1	82.8	19.3
8	169.9	249.6	9.0	171.9	270.9	9.0	148.6	251.9	9.0	136.2	216.5	13.0	137.6	204.0	13.1
9	180.7	271.9	9.1	184.1	298.4	9.0	158.3	263.2	9.0	152.4	236.6	11.7	147.9	226.4	13.5
10	189.7	299.9	9.1	191.7	312.9	9.1	167.4	292.6	9.0	157.2	245.5	13.5	148.8	230.5	11.6
11	197.1	308.7	9.1	194.7	320.8	9.1	170.5	294.6	9.1	159.4	258.0	9.1	149.1	235.5	11.5
12	206.7	321.7	9.1	199.7	329.7	9.1	178.0	307.9	9.1	163.5	264.0	9.1	151.8	234.2	11.5
13	222.7	357.2	9.1	211.8	350.1	9.1	188.2	335.0	9.1	167.9	271.7	9.1	156.9	244.9	11.5
14	221.4	346.2	9.1	214.9	353.6	9.1	190.1	331.9	9.1	170.3	297.0	9.0	155.9	242.3	11.4
15	219.1	339.1	9.1	212.6	350.6	9.1	189.9	330.4	9.0	168.7	298.0	8.9	157.6	237.8	11.4
16	209.7	328.1	11.2	201.1	327.9	11.1	180.6	322.9	9.0	167.4	297.0	11.5	160.4	240.5	11.5
17	139.1	227.4	17.6	137.3	225.8	17.6	124.7	219.4	11.3	160.1	284.3	16.0	153.0	232.2	16.0
18	68.2	129.6	21.9	68.7	135.3	22.0	63.7	101.4	17.8	107.2	177.4	23.1	101.3	154.1	23.2
19	65.6	98.5	22.0	66.1	97.7	22.1	63.9	79.5	22.1	63.2	79.5	24.6	63.7	82.1	24.6
20	45.6	50.2	22.1	45.5	50.2	22.1	44.8	50.2	22.1	63.3	82.0	24.6	64.4	82.1	26.4
21	44.9	48.6	24.6	44.8	48.6	22.1	44.0	48.7	24.6	44.0	52.7	24.6	45.9	53.4	26.5
22	38.8	42.1	23.1	39.4	42.1	20.6	38.9	44.6	23.1	43.7	67.8	24.6	44.6	51.4	26.5
23	37.2	40.7	21.7	38.6	40.7	19.2	37.2	43.2	21.7	40.4	60.9	23.1	40.2	47.9	25.1
24	36.4	52.9	17.8	37.0	53.0	17.8	34.4	53.2	17.8	38.3	53.1	23.5	39.6	45.5	29.2
day)	2,676	4,063	367	2,651	4,191	360	2,394	3,945	360	2,284	3,652	418	2,212	3,245	451
kW)		357.2			353.6			335.0			298.0			244.9	
kW)			9.0			9.0			9.0			8.9			11.4

Gas Demand Profiles - Commercial

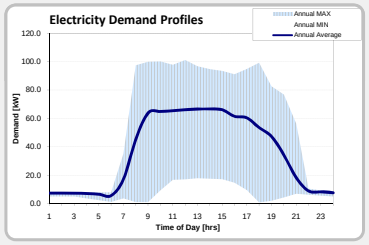
Hour	Annual Average Commercial Demand (Btu/h)	Annual MAX Commercial Demand (Btu/h)	Annual MIN Commercial Demand (Btu/h)	Jan Average Commercial Demand (Btu/h)	Jan MAX Commercial Demand (Btu/h)	Jan MIN Commercial Demand (Btu/h)	Feb Average Commercial Demand (Btu/h)	Feb MAX Commercial Demand (Btu/h)	Feb MIN Commercial Demand (Btu/h)	Mar Average Commercial Demand (Btu/h)	Mar MAX Commercial Demand (Btu/h)	Mar MIN Commercial Demand (Btu/h)
1	245,517	1,265,550	0	499,747	1,265,550	232,599	393,615	1,051,600	228,906	292,881	923,963	216,476
2	275,974	1,119,570	0	536,770	1,119,570	231,983	391,652	1,079,110	232,517	357,549	952,384	219,558
3	293,465	1,266,520	0	599,258	1,157,520	231,513	444,153	1,072,330	232,293	355,827	1,013,170	223,075
4	327,050	1,328,570	0	634,051	1,328,570	232,211	472,273	1,078,080	235,094	371,988	1,068,650	224,885
5	337,823	1,307,080	0	687,490	1,185,000	233,469	490,179	1,115,350	241,846	404,115	1,078,980	224,004
6	310,017	1,455,300	0	673,003	1,237,710	233,314	523,122	1,151,630	240,854	453,844	1,085,530	227,243
7	371,463	1,439,320	0	498,285	1,180,070	214,855	447,416	1,189,630	216,407	354,071	1,054,590	207,988
8	348,693	1,214,140	0	728,302	1,113,860	382,743	602,836	997,987	253,704	496,123	889,772	208,363
9	226,999	1,008,970	0	494,807	934,194	297,057	391,055	782,397	242,103	294,495	527,083	169,197
10	168,488	930,835	0	352,961	829,336	195,592	250,525	407,648	163,061	219,518	423,591	143,904
11	168,038	878,421	0	304,008	878,421	168,685	217,275	379,356	149,416	195,109	382,585	141,547
12	150,173	902,094	0	278,029	902,094	151,794	208,177	367,997	155,600	190,284	279,101	148,836
13	129,029	919,101	0	256,729	919,101	141,390	197,647	281,520	150,892	193,514	397,207	147,475
14	123,071	979,816	0	223,451	979,816	128,839	185,048	280,392	128,808	177,481	265,599	133,531
15	126,190	1,050,120	0	229,212	1,050,120	127,780	179,851	286,050	121,188	177,011	404,804	125,970
16	147,883	1,123,750	0	239,734	1,123,750	127,372	181,703	293,455	119,144	175,882	422,512	125,379
17	186,970	1,116,480	0	282,523	1,116,480	128,624	192,767	442,979	132,496	186,052	435,542	133,722
18	134,492	1,088,160	0	386,521	1,088,160	188,090	237,207	412,389	180,840	239,988	921,572	173,273
19	96,948	1,044,220	0	256,387	1,044,220	0	100,950	420,643	0	101,703	940,398	0
20	177,415	1,016,700	0	416,522	1,016,700	0	280,678	445,791	0	237,982	899,192	0
21	216,539	1,075,000	0	438,311	990,280	209,800	346,743	888,000	206,190	300,818	891,232	0
22	215,419	1,093,760	0	450,681	1,001,630	214,460	329,542	927,187	208,844	272,649	853,839	210,987
23	233,024	1,146,620	0	447,379	1,023,410	220,049	386,644	949,233	220,778	290,522	912,722	212,873
24	246,775	1,132,870	0	502,535	1,067,080	224,211	404,579	1,010,360	220,140	298,234	900,863	210,705
day)	5,257,432	########	0	10,416,694	25,552,642	4,516,430	7,855,637	########	4,281,121	6,637,638	########	3,828,991
u/h)		1,455,300			1,328,570			1,189,630			1,085,530	
u/h)			0			0			0			0

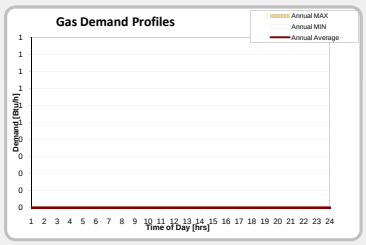
Hour	Apr Average Commercial Demand (Btu/h)	Apr MAX Commercial Demand (Btu/h)	Apr MIN Commercial Demand (Btu/h)	May Average Commercial Demand (Btu/h)	May MAX Commercial Demand (Btu/h)	May MIN Commercial Demand (Btu/h)	Jun Average Commercial Demand (Btu/h)	Jun MAX Commercial Demand (Btu/h)	Jun MIN Commercial Demand (Btu/h)	Jul Average Commercial Demand (Btu/h)	Jul MAX Commercial Demand (Btu/h)	Jul MIN Commercial Demand (Btu/h)
1	286,719	937,433	213,683	235,027	385,461	203,170	191,955	449,201	0	82,500	431,664	0
2	313,391	964,721	217,399	246,462	411,905	200,439	186,000	434,049	0	134,629	442,392	0
3	332,031	1,027,780	218,756	249,706	417,592	202,365	194,264	398,886	0	104,372	301,733	0
4	368,848	1,037,570	222,030	263,771	444,354	206,798	232,641	436,126	0	133,256	441,141	0
5	362,570	1,054,310	222,946	280,939	828,866	209,272	204,633	375,094	0	112,289	304,039	0
6	319,885	1,040,160	206,538	206,865	391,425	0	97,980	374,397	0	77,518	307,931	0
7	418,959	910,880	210,008	312,844	605,443	201,355	288,370	501,711	0	314,415	428,826	0
8	270,254	425,948	171,756	208,969	367,559	150,943	167,002	302,880	0	117,244	216,368	0
9	200,799	336,241	138,942	176,398	239,065	130,056	128,091	212,219	0	70,138	208,631	0
10	178,557	248,388	128,963	168,483	242,984	106,668	94,846	208,808	0	57,913	214,543	0
11	182,174	261,387	139,343	165,457	239,845	0	120,102	258,936	0	100,382	270,977	0
12	183,111	255,635	137,704	160,489	310,468	0	103,876	221,561	0	71,047	127,618	0
13	173,819	257,061	122,502	137,219	310,547	0	52,921	211,808	0	42,791	101,408	0
14	165,264	270,800	114,659	145,156	311,687	0	85,570	419,286	0	45,960	192,644	0
15	161,002	258,425	106,637	117,090	229,490	0	84,151	417,340	0	66,254	255,616	0
16	163,010	244,673	107,103	164,704	367,978	0	161,978	413,032	0	73,636	301,776	0
17	186,647	248,660	137,970	144,168	231,447	0	152,196	387,779	0	145,207	415,772	0
18	75,472	260,179	0	42,736	234,718	0	14,253	214,124	0	0	0	0
19	78,011	326,617	0	98,272	437,186	0	40,072	376,803	0	42,147	443,663	0
20	276,015	387,979	0	138,517	437,114	0	90,002	464,287	0	64,039	464,372	0
21	248,503	441,611	0	192,716	417,236	0	60,302	240,383	0	86,533	465,785	0
22	242,980	447,005	204,477	265,612	436,558	0	101,227	408,623	0	77,062	444,721	0
23	244,968	429,437	208,962	240,785	438,632	196,018	151,225	435,438	0	69,753	230,889	0
24	275,374	902,452	212,521	227,926	282,995	202,116	183,201	437,954	0	83,078	434,790	0
day)	5,708,365	########	3,442,898	4,590,310	9,020,555	2,009,200	3,186,860	8,600,725	0	2,172,165	7,447,299	0
u/h)		1,054,310	0		828,866	0		501,711	0		465,785	0

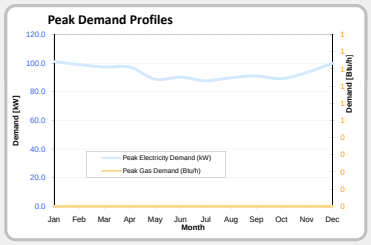
Hour	Aug Average Commercial Demand (Btu/h)	Aug MAX Commercial Demand (Btu/h)	Aug MIN Commercial Demand (Btu/h)	Sep Average Commercial Demand (Btu/h)	Sep MAX Commercial Demand (Btu/h)	Sep MIN Commercial Demand (Btu/h)	Oct Average Commercial Demand (Btu/h)	Oct MAX Commercial Demand (Btu/h)	Oct MIN Commercial Demand (Btu/h)	Nov Average Commercial Demand (Btu/h)	Nov MAX Commercial Demand (Btu/h)	Nov MIN Commercial Demand (Btu/h)	Dec Average Commercial Demand (Btu/h)	Dec MAX Commercial Demand (Btu/h)	Dec MIN Commercial Demand (Btu/h)
1	67,030	214,074	0	65,443	300,460	0	118,025	388,059	0	279,131	598,708	198,898	443,345	1,070,980	208,097
2	67,091	214,770	0	61,643	213,390	0	222,515	411,684	0	305,958	916,416	197,047	491,548	1,078,490	209,859
3	80,047	383,034	0	99,456	383,209	0	153,068	353,186	0	343,469	1,042,770	199,669	573,854	1,266,520	213,695
4	108,071	433,628	0	81,145	380,926	0	209,406	438,481	0	414,873	1,038,640	199,980	641,536	1,304,790	217,519
5	97,934	431,010	0	95,598	302,080	0	211,733	400,882	0	413,129	1,153,610	202,515	699,132	1,307,080	217,237
6	65,017	430,034	0	49,097	223,721	0	105,959	357,256	0	432,143	1,018,810	204,980	725,394	1,455,300	218,657
7	299,515	437,397	0	294,705	442,869	0	364,178	624,875	202,379	322,701	924,601	0	544,253	1,439,320	203,589
8	113,818	211,973	0	101,399	212,938	0	173,118	362,179	0	464,505	896,120	202,987	752,710	1,214,140	238,622
9	51,339	191,825	0	44,389	216,171	0	132,155	313,593	0	261,102	444,151	174,956	486,268	1,008,970	231,528
10	60,323	203,939	0	34,314	265,537	0	94,417	217,257	0	195,647	377,144	141,333	316,554	930,835	171,503
11	93,477	298,950	0	109,673	302,120	0	98,486	257,658	0	169,856	371,149	0	262,303	663,041	152,725
12	73,758	298,013	0	55,858	117,793	0	88,277	310,887	0	148,132	358,094	0	243,098	877,200	148,269
13	38,896	91,989	0	32,086	92,601	0	52,427	213,208	0	164,422	324,949	0	209,521	429,558	135,648
14	38,723	193,922	0	28,907	102,217	0	57,543	254,649	0	139,153	400,827	0	188,223	397,198	118,740
15	47,349	256,664	0	32,028	191,614	0	102,519	428,691	0	127,524	260,674	0	192,252	774,104	110,070
16	68,144	303,421	0	81,630	409,252	0	114,447	302,128	0	172,624	373,405	101,857	179,980	393,340	110,547
17	179,563	413,450	0	192,212	419,775	0	183,437	423,551	0	167,705	252,475	120,601	230,141	789,724	138,930
18	0	0	0	24,976	432,417	0	61,275	435,841	0	205,627	257,463	164,196	328,765	855,458	189,710
19	27,498	432,891	0	42,968	437,249	0	75,939	433,778	0	91,935	405,024	0	203,532	973,529	0
20	69,656	441,203	0	57,230	437,984	0	76,283	436,544	0	122,756	836,487	0	304,059	1,007,690	0
21	81,200	429,071	0	57,377	453,779	0	82,952	424,091	0	225,489	861,108	0	481,242	1,075,000	205,910
22	60,899	218,772	0	49,152	218,477	0	105,678	389,517	0	225,816	420,693	0	406,955	1,093,760	197,023
23	61,317	222,671	0	63,761	433,351	0	99,572	380,774	0	297,499	808,052	0	452,100	1,146,620	203,101
24	60,383	216,005	0	64,085	452,764	0	110,898	384,518	0	268,709	807,847	0	491,304	1,132,870	205,973
day)	1,911,048	6,968,706	0	1,819,131	7,442,694	0	3,094,307	8,943,287	202,379	5,959,904	########	2,109,019	9,848,068	23,685,517	4,046,950
u/h)		441,203	0		453,779	0		624,875	0		1,153,610	0		1,455,300	0

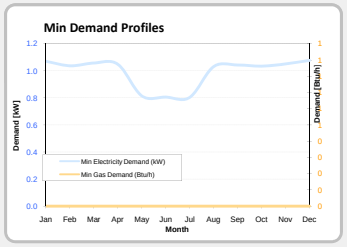
Retail eQUEST Simulation Results

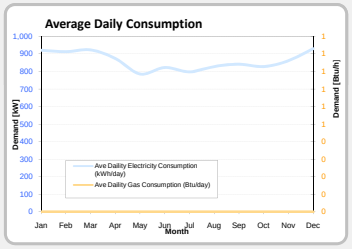
ITERATION: City of SF Green Building Code (LEED Gold)











Electricity Demand Profiles - Retail

Hour	Annual Average Retail Demand (kW)	Annual MAX Retail Demand (kW)	Annual MIN Retail Demand (kW)	Jan Average Retail Demand (kW)	Jan MAX Retail Demand (kW)	Jan MIN Retail Demand (kW)	Feb Average Retail Demand (kW)	Feb MAX Retail Demand (kW)	Feb MIN Retail Demand (kW)	Mar Average Retail Demand (kW)	Mar MAX Retail Demand (kW)	Mar MIN Retail Demand (kW)	Apr Average Retail Demand (kW)	Apr MAX Retail Demand (kW)	Apr MIN Retail Demand (kW)	May Average Retail Demand (kW)	May MAX Retail Demand (kW)	May MIN Retail Demand (kW)	Jun Average Retail Demand (kW)	Jun MAX Retail Demand (kW)	Jun MIN Retail Demand (kW)	Jul Average Retail Demand (kW)	Jul MAX Retail Demand (kW)	Jul MIN Retail Demand (kW)	Aug Average Retail Demand (kW)	Aug MAX Retail Demand (kW)	Aug MIN Retail Demand (kW)	Sep Average Retail Demand (kW)	Sep MAX Retail Demand (kW)	Sep MIN Retail Demand (kW)	Oct Average Retail Demand (kW)	Oct MAX Retail Demand (kW)	Oct MIN Retail Demand (kW)	Nov Average Retail Demand (kW)	Nov MAX Retail Demand (kW)	Nov MIN Retail Demand (kW)	Dec Average Retail Demand (kW)	Dec MAX Retail Demand (kW)	Dec MIN Retail Demand (kW)
1	7.2	8.0	4.9	7.3	8.0	5.0	7.3	8.0	5.0	7.4	8.0	5.0	7.4	8.0	5.0	7.1	7.9	4.9	7.2	7.9	4.9	7.1	7.5	4.9	7.1	7.5	4.9	7.1	7.5	4.9	7.0	7.9	4.9	7.2	7.9	4.9	7.3	7.9	4.9
2	7.2	8.0	4.9	7.3	8.0	5.0	7.3	8.0	5.0	7.4	8.0	5.0	7.4	8.0	5.0	7.2	7.9	4.9	7.2	7.9	4.9	7.1	7.5	4.9	7.1	7.5	4.9	7.1	7.5	4.9	7.1	7.9	4.9	7.2	7.9	4.9	7.3	7.9	4.9
3	7.2	8.0	4.9	7.3	8.0	5.0	7.4	8.0	5.0	7.4	8.0	5.0	7.5	8.0	5.0	7.2	7.9	4.9	7.2	7.9	4.9	7.1	7.5	4.9	7.1	7.5	4.9	7.1	7.5	4.9	7.1	7.9	4.9	7.3	7.9	4.9	7.4	7.9	4.9
4	6.9	8.0	3.7	7.3	8.0	5.0	7.4	8.0	5.0	7.5	8.0	5.0	7.5	8.0	5.0	5.9	6.7	3.7	6.0	6.7	3.7	5.8	6.2	3.7	7.1	7.5	4.9	7.1	7.5	4.9	7.2	7.9	4.9	7.3	7.9	4.9	7.4	7.9	4.9
5	6.9	8.0	2.4	7.3	8.0	5.0	7.4	8.0	5.0	7.5	8.0	5.0	6.6	8.0	4.0	4.6	5.4	2.4	4.6	5.4	2.4	4.6	5.0	2.4	7.1	7.5	4.9	7.1	7.5	4.9	7.1	7.9	4.9	7.3	7.9	4.9	7.4	7.9	4.9
6	5.5	8.0	1.1	7.3	8.0	5.0	6.4	7.0	4.0	6.5	7.0	4.0	4.8	7.0	2.1	3.4	4.7	1.1	3.4	4.3	1.1	3.4	4.3	1.1	5.3	6.2	3.0	5.3	6.2	3.0	5.4	6.2	3.0	7.3	7.9	4.9	7.4	7.9	4.9
7	16.9	35.2	3.7	6.1	7.3	3.7	4.6	5.7	2.1	4.7	5.7	2.1	24.2	34.0	1.1	23.4	33.8	1.1	25.8	33.7	1.1	24.5	33.6	1.1	26.0	34.5	1.7	25.9	34.7	1.7	24.7	35.2	1.7	6.0	7.2	3.7	6.2	7.2	3.7
8	45.6	97.4	1.0	23.9	35.2	1.8	25.1	34.5	1.1	26.4	34.1	1.1	65.1	97.4	1.0	59.4	88.7	1.1	61.7	87.2	1.0	56.2	79.2	1.0	57.3	78.5	1.0	56.1	78.9	1.0	57.4	87.1	1.0	24.9	35.1	1.7	25.7	35.2	1.8
9	63.7	100.0	1.0	65.3	99.5	1.1	68.7	99.1	1.0	71.5	97.3	1.1	68.6	88.5	9.5	62.1	80.9	9.3	62.8	77.9	9.3	58.7	70.5	9.2	59.0	72.2	9.4	59.0	73.4	9.4	59.3	76.4	1.0	61.6	93.6	1.1	68.7	100.0	1.1
10	64.7	100.1	9.4	70.9	100.1	9.6	70.4	90.0	9.5	71.8	91.9	9.5	67.5	85.7	16.8	61.2	79.0	16.8	62.7	75.6	16.6	59.4	72.3	16.9	59.7	70.3	17.0	60.4	73.6	16.8	59.3	74.6	9.5	62.7	84.5	9.4	71.1	99.3	9.6
11	65.3	97.8	16.7	69.4	97.8	17.2	68.6	85.6	17.1	69.6	84.7	16.7	67.1	85.6	16.9	61.6	79.5	16.8	65.1	79.6	17.1	63.0	78.2	17.4	63.0	77.8	16.8	63.6	82.6	16.8	61.4	75.8	17.2	62.3	79.8	17.2	69.1	96.3	17.2
12	66.0	101.2	17.0	69.0	101.2	17.7	68.4	85.3	17.7	69.5	85.6	17.0	66.3	82.8	17.7	61.8	79.4	17.5	66.4	83.0	18.3	65.2	81.5	18.4	65.7	84.4	17.5	66.2	85.2	17.8	62.2	80.6	17.7	62.6	79.8	17.6	68.8	91.5	17.7
13	66.5	96.8	17.9	67.8	96.8	18.8	67.4	83.3	18.4	68.3	84.5	17.9	66.1	80.9	18.0	62.7	86.4	17.9	67.8	87.3	18.6	67.2	87.7	18.4	68.4	89.9	18.0	68.1	87.6	17.9	63.9	89.2	18.3	62.7	78.1	18.4	67.7	89.4	18.7
14	66.5	94.7	17.5	67.4	94.7	18.7	67.2	83.1	18.8	68.5	84.1	18.0	66.1	78.8	17.6	62.9	85.2	17.5	67.8	89.8	18.2	67.4	86.0	18.0	68.3	87.7	18.1	68.7	88.5	18.1	64.2	88.8	17.8	62.8	77.9	18.7	67.5	87.1	18.8
15	66.0	93.5	17.2	67.1	93.5	18.3	67.2	83.7	18.5	68.6	83.5	17.6	64.3	76.3	17.2	61.6	83.9	17.3	66.9	90.2	17.6	66.6	84.2	17.6	67.0	84.3	17.5	68.0	91.0	17.8	63.9	87.3	17.5	63.6	79.1	18.4	67.6	86.1	18.5
16	61.4	91.1	14.7	66.0	91.1	18.1	66.2	82.5	18.2	65.7	83.0	16.4	56.7	74.1	14.8	54.1	73.9	14.7	58.1	81.7	14.7	58.0	73.0	14.7	58.9	72.4	15.7	61.0	81.8	15.8	62.7	87.0	17.2	62.8	78.6	18.2	66.3	84.2	18.0
17	60.5	94.9	9.5	68.2	94.9	20.2	65.1	81.8	16.8	62.4	83.1	14.7	55.0	76.0	11.0	50.4	72.4	9.5	54.9	74.0	9.8	54.2	69.4	9.8	56.9	75.3	13.3	59.8	79.3	13.2	62.6	80.4	14.9	65.2	82.8	20.4	69.4	85.7	20.5
18	53.4	99.2	0.8	70.8	99.2	17.6	67.6	84.1	13.8	67.5	83.4	13.0	48.4	80.5	5.4	36.1	56.6	0.8	36.4	54.4	0.8	35.8	53.2	0.8	42.2	57.0	6.6	48.4	65.0	6.7	48.8	62.2	6.9	67.7	86.5	17.6	71.7	90.0	17.6
19	47.2	82.7	1.9	56.2	82.7	6.9	55.2	71.2	5.6	56.6	74.2	5.6	50.6	68.5	6.9	38.5	53.2	2.0	37.6	50.2	1.9	35.5	46.3	1.9	42.1	51.7	6.8	42.8	53.3	6.9	42.7	56.1	6.9	52.4	70.9	6.9	56.7	75.3	6.9
20	34.2	76.8	4.3	51.5	76.8	6.9	51.5	67.9	6.9	52.6	64.7	6.9	31.0	64.0	6.9	22.3	34.1	4.3	20.6	31.9	4.3	18.8	28.8	4.3	20.9	29.4	6.9	20.4	30.0	6.9	22.1	32.4	6.9	47.7	64.3	6.9	52.0	70.7	6.9
21	18.2	56.3	6.9	32.2	56.3	6.9	30.6	42.4	6.9	30.1	45.5	6.9	11.9	40.0	6.9	9.1	10.1	6.9	9.2	10.1	6.9	9.1	10.0	6.9	9.1	10.0	6.9	9.1	10.0	6.9	9.0	10.0	6.9	27.6	38.3	6.9	31.8	49.2	6.9
22	8.8	10.5	6.2	9.2	10.5	6.9	9.2	10.5	6.9	9.3	10.5	6.9	8.6	10.1	6.2	8.3	9.2	6.2	8.5	8.8	6.2	8.4	8.8	6.2	8.4	8.8	6.2	8.4	8.8	6.2	8.3	8.8	6.2	9.1	10.1	6.9	9.3	10.5	7.3
23	8.1	9.2	5.6	8.5	9.2	6.2	8.6	9.2	6.2	8.6	9.2	6.2	8.0	9.2	5.6	7.8	8.6	5.6	7.8	8.2	5.6	7.7	8.2	5.6	7.7	8.2	5.6	7.7	8.2	5.6	7.7	8.2	5.6	8.4	9.2	6.2	8.6	9.2	6.6
24	7.5	8.6	4.9	7.9	8.6	5.6	7.9	8.6	5.6	8.0	8.6	5.6	7.5	8.6	5.0	7.1	7.9	4.9	7.2	7.5	4.9	7.0	7.5	4.9	7.2	7.5	4.9	7.1	7.5	4.9	7.0	7.5	4.9	7.8	8.6	5.6	8.0	8.6	6.0
ay)	860	1,394	178	921	1,303	232	913	1,155	220	923	1,160	212	874	1,188	210	786	1,064	192	823	1,071	195	798	1,017	195	829	1,044	218	841	1,083	218	828	1,093	206	861	1,112	231	930	1,223	233
kW)		101.2			101.2			99.1			97.3			97.4			88.7			90.2			87.7			89.9			91.0			89.2			93.6			100.0	
kW)			0.8			1.1			1.0			1.1			1.0			0.8			0.8			0.8			1.0			1.0			1.0			1.1			1.1

Gas Demand Profiles - Retail

Hour	Annual Average Retail Demand (Btu/h)	Annual MAX Retail Demand (Btu/h)	Annual MIN Retail Demand (Btu/h)	Jan Average Retail Demand (Btu/h)	Jan MAX Retail Demand (Btu/h)	Jan MIN Retail Demand (Btu/h)	Feb Average Retail Demand (Btu/h)	Feb MAX Retail Demand (Btu/h)	Feb MIN Retail Demand (Btu/h)	Mar Average Retail Demand (Btu/h)	Mar MAX Retail Demand (Btu/h)	Mar MIN Retail Demand (Btu/h)	Apr Average Retail Demand (Btu/h)	Apr MAX Retail Demand (Btu/h)	Apr MIN Retail Demand (Btu/h)	May Average Retail Demand (Btu/h)	May MAX Retail Demand (Btu/h)	May MIN Retail Demand (Btu/h)	Jun Average Retail Demand (Btu/h)	Jun MAX Retail Demand (Btu/h)	Jun MIN Retail Demand (Btu/h)	Jul Average Retail Demand (Btu/h)	Jul MAX Retail Demand (Btu/h)	Jul MIN Retail Demand (Btu/h)	Aug Average Retail Demand (Btu/h)	Aug MAX Retail Demand (Btu/h)	Aug MIN Retail Demand (Btu/h)	Sep Average Retail Demand (Btu/h)	Sep MAX Retail Demand (Btu/h)	Sep MIN Retail Demand (Btu/h)	Oct Average Retail Demand (Btu/h)	Oct MAX Retail Demand (Btu/h)	Oct MIN Retail Demand (Btu/h)	Nov Average Retail Demand (Btu/h)	Nov MAX Retail Demand (Btu/h)	Nov MIN Retail Demand (Btu/h)	Dec Average Retail Demand (Btu/h)	Dec MAX Retail Demand (Btu/h)	Dec MIN Retail Demand (Btu/h)
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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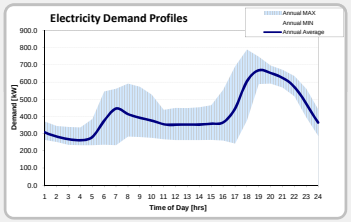
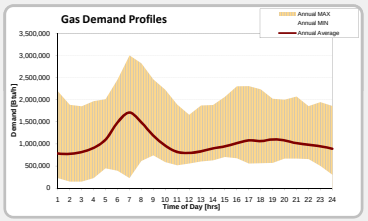
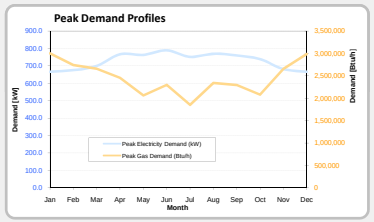
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
day)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
u/h)		0			0			0			0			0			0			0			0			0			0			0			0			0	
u/h)			0			0			0			0			0			0			0			0			0			0			0			0			0	0

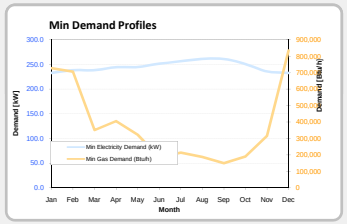
Condotel eQUEST Simulation Results

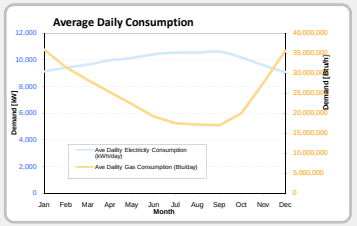
ITERATION: City of SF Green Building Code (LEED Gold)











Electricity Demand Profiles - Condotel

Hour	Annual Average (Condotel Demand (kW))	Annual MAX (Condotel Demand (kW))	Annual MIN (Condotel Demand (kW))	Jan Average	Jan MAX	Jan MIN	Feb Average	Feb MAX	Feb MIN	Mar Average	Mar MAX	Mar MIN	Apr Average	Apr MAX	Apr MIN
1	307.4	370.8	263.4	294.6	350.1	263.4	300.2	338.6	280.4	309.0	367.2	282.3	291.7	317.4	272.5
2	282.4	344.4	251.7	270.7	299.2	251.7	277.5	295.0	267.9	285.1	320.8	268.3	267.4	284.1	253.1
3	268.0	338.8	234.7	250.1	272.5	234.7	256.5	269.7	249.5	262.7	293.4	247.8	259.0	272.8	247.6
4	261.9	336.0	232.7	245.9	267.5	232.7	251.5	263.7	241.0	256.5	285.0	241.7	255.3	271.5	244.4
5	279.6	386.1	232.7	244.1	266.6	232.7	249.0	260.7	238.4	253.2	278.3	238.3	286.6	310.7	246.4
6	374.8	546.0	235.8	276.1	308.6	235.8	280.7	301.6	242.9	287.8	321.5	245.1	414.3	491.2	244.4
7	445.8	561.0	232.7	397.8	488.7	280.3	407.9	477.7	274.5	432.4	505.8	281.3	462.1	516.2	320.7
8	413.6	591.4	283.6	419.8	466.0	347.8	437.7	495.7	358.7	457.5	523.8	357.5	394.9	535.0	285.0
9	391.9	572.7	280.3	363.5	522.4	280.3	371.6	524.9	281.5	374.0	536.3	282.7	395.7	526.5	284.4
10	375.9	526.9	275.9	360.8	501.7	281.6	374.5	508.5	282.8	379.9	525.9	283.4	370.8	512.1	275.9
11	354.2	438.3	267.8	315.2	399.2	272.2	336.1	403.9	274.4	346.1	402.9	274.3	355.4	388.8	267.8
12	351.6	450.2	262.9	302.6	379.3	262.9	324.2	388.0	265.6	333.3	370.3	264.9	355.1	384.2	272.4
13	353.3	448.9	263.1	304.1	374.8	263.1	326.6	399.8	266.6	334.8	378.5	265.2	353.7	390.2	277.3
14	352.2	453.6	263.0	298.1	357.6	263.0	319.6	366.6	267.8	329.0	379.0	265.2	356.4	403.2	289.5
15	358.2	465.5	264.0	297.1	346.8	264.0	318.4	364.8	273.2	332.3	384.6	271.3	368.2	428.8	311.4
16	364.7	555.0	259.9	303.6	348.2	259.9	324.4	386.0	274.6	343.0	397.1	278.1	369.5	493.1	275.2
17	444.1	691.7	242.8	324.7	460.6	248.2	325.7	461.5	242.8	336.4	488.3	242.9	492.2	636.5	263.3
18	603.5	789.3	375.9	471.0	598.2	375.9	467.6	595.2	380.2	474.4	627.8	381.8	674.0	766.6	407.3
19	668.1	747.4	588.8	641.2	666.4	588.8	651.8	675.1	619.5	662.2	699.4	620.9	673.4	721.5	637.9
20	652.3	696.7	591.1	636.3	655.7	591.1	648.8	668.4	620.6	657.2	690.9	621.6	649.0	688.3	619.2
21	624.3	671.4	568.4	617.5	637.4	578.3	630.2	649.3	605.6	637.7	671.4	596.9	612.1	645.8	570.6
22	572.5	634.8	517.0	581.2	607.1	531.9	595.9	614.9	558.6	603.5	634.8	561.5	553.0	612.4	519.5
23	473.3	561.3	393.6	517.1	545.2	479.4	533.8	550.6	496.0	541.8	561.3	506.2	433.5	549.1	393.6
24	364.1	440.1	286.5	388.8	437.1	366.7	401.0	424.9	384.7	411.7	440.1	387.2	326.0	414.3	286.5
day)	9,938	12,618	7,668	9,122	10,557	7,986	9,411	10,685	8,248	9,641	11,084	8,266	9,969	11,560	8,066
kW)		789.3			666.4			675.1			699.4			766.6	
kW)			232.7			232.7			238.4			238.3			244.4

Hour	May Average (Condotel Demand (kW))	May MAX (Condotel Demand (kW))	May MIN (Condotel Demand (kW))	Jun Average (Condotel Demand (kW))	Jun MAX (Condotel Demand (kW))	Jun MIN (Condotel Demand (kW))	Jul Average (Condotel Demand (kW))	Jul MAX (Condotel Demand (kW))	Jul MIN (Condotel Demand (kW))	Aug Average (Condotel Demand (kW))	Aug MAX (Condotel Demand (kW))	Aug MIN (Condotel Demand (kW))	Sep Average (Condotel Demand (kW))	Sep MAX (Condotel Demand (kW))	Sep MIN (Condotel Demand (kW))
1	298.7	335.6	282.5	315.2	346.7	287.6	322.4	345.5	300.8	322.0	347.2	295.7	326.6	360.0	295.8
2	273.5	301.9	258.0	288.9	321.4	266.0	294.4	315.8	275.9	294.8	319.5	271.8	299.4	344.4	272.5
3	266.0	289.2	253.1	279.4	313.1	259.8	284.6	303.7	267.4	284.9	309.3	264.4	288.5	338.8	265.9
4	257.7	276.4	247.2	269.3	303.7	251.6	274.8	293.4	259.0	278.9	304.1	261.1	281.5	336.0	261.9
5	286.0	312.8	244.6	302.8	345.5	259.5	305.4	338.3	256.3	315.0	346.7	268.6	315.7	386.1	261.1
6	422.9	513.3	291.6	458.1	536.4	296.3	447.9	521.2	304.5	456.4	521.9	305.8	455.1	546.0	303.4
7	464.4	530.1	377.9	486.9	561.0	389.6	475.2	542.2	388.4	475.7	537.4	385.5	474.1	541.9	407.2
8	404.1	547.6	285.2	400.3	570.6	291.5	405.6	591.4	305.3	392.2	556.0	295.6	404.9	568.0	290.5
9	410.8	533.0	286.1	409.9	541.3	300.0	422.8	572.7	334.3	409.2	538.5	312.8	416.9	555.4	295.3
10	372.2	422.7	278.8	381.3	437.4	303.5	390.3	476.4	337.0	382.8	428.5	327.1	389.6	457.7	298.3
11	366.0	409.0	277.1	374.8	414.3	323.1	382.3	433.2	357.0	383.4	413.8	358.3	389.0	450.2	325.6
12	367.2	429.4	280.2	378.2	425.5	339.2	385.0	437.4	364.7	386.0	428.4	360.0	390.0	448.9	332.9
13	371.8	431.9	290.7	382.9	439.3	347.1	388.5	424.5	365.3	388.3	424.5	365.3	393.8	453.6	335.5
14	382.0	452.4	310.8	394.5	465.5	350.7	399.0	433.9	373.7	397.9	431.2	365.7	402.5	462.7	328.5
15	396.4	522.2	268.3	396.7	511.1	321.1	410.7	541.2	341.1	404.6	516.8	307.6	407.7	555.0	318.4
16	527.4	656.2	425.0	526.0	655.0	448.6	540.1	690.1	464.5	543.7	664.2	450.4	544.4	691.7	449.6
17	686.5	763.0	635.1	703.4	789.3	625.4	705.4	751.4	656.5	719.4	769.7	670.9	709.9	759.5	654.3
18	663.5	712.5	621.2	681.7	747.4	617.1	682.6	709.4	641.1	694.2	734.4	656.9	690.5	723.8	653.5
19	640.7	678.0	611.1	657.9	696.7	608.4	659.7	678.8	617.5	667.4	694.1	626.0	666.8	694.7	639.5
20	611.6	646.5	572.6	626.0	654.3	570.7	628.9	646.8	577.2	628.1	652.9	576.8	629.3	653.8	587.0
21	547.8	566.1	520.3	558.4	582.3	520.1	564.2	580.4	523.9	563.6	583.2	524.6	566.8	587.2	527.8
22	426.5	444.9	398.5	431.6	447.6	422.8	435.0	461.4	425.2	434.9	449.2	424.6	438.3	467.1	423.4
23	327.4	376.7	300.7	338.9	377.9	307.8	347.7	379.3	319.5	342.9	379.2	318.3	349.5	392.4	316.0
24	10,132	11,556	8,590	10,414	11,899	9,011	10,532	11,914	9,397	10,544	11,760	9,332	10,614	12,213	9,167
day)		763.0			789.3			751.4			769.7			759.5	
kW)			244.6			251.6			256.3			261.1			261.1

Hour	Oct Average (Condotel Demand (kW))	Oct MAX (Condotel Demand (kW))	Oct MIN (Condotel Demand (kW))	Nov Average (Condotel Demand (kW))	Nov MAX (Condotel Demand (kW))	Nov MIN (Condotel Demand (kW))	Dec Average (Condotel Demand (kW))	Dec MAX (Condotel Demand (kW))	Dec MIN (Condotel Demand (kW))
1	310.6	370.8	280.4	309.8	364.1	271.3	291.9	333.4	266.9
2	282.7	322.8	260.9	284.4	313.8	260.3	270.5	294.9	254.9
3	272.7	313.2	254.9	261.5	284.2	242.2	249.8	271.0	236.9
4	267.5	308.4	250.6	255.6	276.1	236.7	244.9	265.0	233.2
5	299.9	338.8	257.3	252.9	271.9	235.7	243.1	262.8	232.8
6	427.8	520.8	275.5	287.4	318.2	247.8	277.7	306.3	238.5
7	443.7	492.8	308.1	419.6	505.0	291.1	407.7	483.2	277.5
8	382.0	545.3	283.6	444.5	504.6	370.1	422.2	461.4	346.9
9	401.5	547.4	288.6	377.5	536.9	281.6	348.3	493.7	280.5
10	370.1	526.9	281.3	385.1	518.0	284.0	353.8	484.2	281.9
11	359.6	426.7	275.1	347.9	407.9	275.7	318.3	384.6	272.7
12	364.8	424.5	279.0	336.5	388.6	275.2	306.6	362.3	263.5
13	368.4	446.2	283.5	336.3	385.2	275.7	307.7	366.8	264.9
14	371.0	441.7	291.7	328.2	382.0	276.0	297.5	346.1	264.2
15	379.6	435.8	307.0	329.5	386.3	283.4	295.5	332.4	264.9
16	390.4	546.6	266.3	328.4	400.8	274.6	299.1	322.4	260.9
17	524.3	668.9	436.7	330.8	462.6	254.8	306.0	434.0	248.3
18	684.6	738.8	630.8	482.0	601.6	396.1	455.5	589.3	380.9
19	673.7	713.9	631.3	657.7	681.1	617.2	644.0	666.0	607.9
20	654.0	685.6	616.0	650.3	670.2	615.2	639.5	659.0	600.4
21	618.5	648.9	568.4	631.7	652.1	596.7	620.6	640.4	583.0
22	556.5	590.0	517.0	597.2	615.8	549.4	583.6	607.0	533.1
23	434.9	526.4	416.7	537.4	552.8	496.2	519.4	544.6	477.8
24	340.7	434.4	296.5	409.8	439.6	378.7	388.1	410.3	369.0
day)	10,179	12,016	8,557	9,582	10,919	8,286	9,091	10,321	8,039
kW)		738.8			681.1			666.0	
kW)			250.6			235.7			232.8

Gas Demand Profiles - Condotel

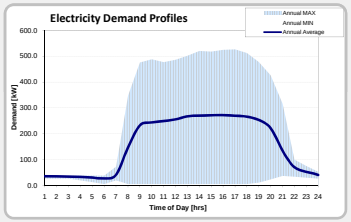
Hour	Annual Average (Condotel Demand (Btu/h))	Annual MAX (Condotel Demand (Btu/h))	Annual MIN (Condotel Demand (Btu/h))	Jan Average (Condotel Demand (Btu/h))	Jan MAX (Condotel Demand (Btu/h))	Jan MIN (Condotel Demand (Btu/h))	Feb Average (Condotel Demand (Btu/h))	Feb MAX (Condotel Demand (Btu/h))	Feb MIN (Condotel Demand (Btu/h))	Mar Average (Condotel Demand (Btu/h))	Mar MAX (Condotel Demand (Btu/h))	Mar MIN (Condotel Demand (Btu/h))	Apr Average (Condotel Demand (Btu/h))	Apr MAX (Condotel Demand (Btu/h))	Apr MIN (Condotel Demand (Btu/h))
1	784,889	2,191,770	230,089	1,394,017	2,191,770	866,740	1,126,342	1,503,140	856,420	956,916	1,454,330	451,826	928,616	1,403,330	422,154
2	776,444	1,885,180	150,077	1,351,287	1,842,690	823,477	1,118,118	1,514,650	770,515	928,966	1,393,320	389,246	933,403	1,359,330	405,651
3	816,762	1,851,090	150,068	1,325,870	1,831,160	766,323	1,096,054	1,470,290	751,484	1,007,974	1,415,990	351,499	937,320	1,304,150	648,237
4	915,075	1,966,720	230,081	1,359,650	1,933,690	763,277	1,141,046	1,513,080	775,792	995,777	1,527,690	355,094	1,057,024	1,441,900	788,318
5	1,095,019	2,011,270	450,643	1,461,745	2,011,270	867,938	1,270,205	1,655,870	871,114	1,156,670	1,653,960	648,887	1,324,661	1,734,420	906,342
6	1,486,004	2,456,880	395,626	1,722,475	2,340,330	1,047,970	1,575,544	1,926,210	1,025,250	1,456,043	1,952,280	948,604	1,818,702	2,456,880	986,478
7	1,710,756	3,003,770	230,081	2,142,789	3,003,770	975,643	2,090,788	2,741,890	1,091,510	1,957,845	2,659,450	926,643	1,839,999	2,337,460	979,212
8	1,489,460	2,824,150	614,902	2,110,866	2,824,150	1,079,830	1,997,999	2,460,980	1,332,710	1,924,109	2,419,100	1,025,010	1,443,315	1,997,490	991,867
9	1,189,228	2,459,200	742,060	1,769,135	2,459,200	1,262,730	1,599,705	1,847,640	1,276,170	1,512,748	1,856,960	1,137,560	1,119,395	1,521,870	851,724
10	964,218	2,227,020	591,463	1,515,958	2,227,020	1,121,050	1,337,712	1,518,710	1,128,710	1,207,790	1,632,310	916,725	855,933	1,317,200	661,035
11	818,872	1,893,480	517,542	1,302,378	1,893,480	1,005,520	1,119,471	1,455,880	773,160	985,293	1,530,080	688,163	734,485	1,247,640	571,969
12	800,329	1,661,680	557,762	1,174,253	1,661,680	726,909	990,331	1,319,720	705,464	902,049	1,386,650	584,089	758,531	1,211,620	637,988
13	831,459	1,870,520	604,329	1,200,363	1,672,320	786,200	987,563	1,313,800	709,790	933,158	1,870,520	657,910	769,984	1,195,600	670,293
14	902,527	1,880,440	629,962	1,245,570	1,880,440	855,490	1,021,675	1,448,560	717,735	933,787	1,405,720	680,544	879,527	1,268,310	728,652
15	946,213	2,065,700	704,664	1,355,751	2,065,700	939,492	1,132,896	1,612,050	815,626	1,033,751	1,700,320	797,838	886,450	1,241,880	786,973
16	1,016,791	2,302,890	677,815	1,356,172	2,302,890	845,796	1,194,516	1,867,740	792,632	1,030,362	1,665,030	793,273	977,914	1,364,650	756,495
17	1,083,504	2,306,730	559,678	1,597,998	2,306,730	1,274,230	1,327,106	1,907,690	823,993	1,190,178	2,038,570	762,350	971,546	1,352,480	622,677
18	1,064,664	2,236,560	565,127	1,609,677	2,236,560	1,140,150	1,440,327	2,042,340	753,848	1,186,750	1,775,670	655,299	925,935	2,153,870	625,788
19	1,103,892	2,023,130	573,283	1,490,962	1,981,680	1,156,080	1,285,680	1,499,980	863,520	1,172,654	2,023,130	703,353	1,074,191	1,497,430	747,104
20	1,081,081	2,002,320	671,289	1,575,205	2,002,320	1,190,240	1,472,408	1,864,060	1,134,950	1,266,165	1,780,970	855,911	1,002,660	1,834,690	740,139
21	1,014,071	2,071,870	671,311	1,435,714	1,801,170	1,087,870	1,271,123	1,539,650	930,267	1,100,233	1,678,200	826,876	1,009,000	2,071,870	772,001
22	989,583	1,857,770	658,238	1,464,234	1,829,550	973,180	1,288,473	1,496,390	941,893	1,108,371	1,572,480	826,859	970,443	1,786,100	735,069
23	943,809	1,948,270	504,598	1,449,990	1,835,430	918,806	1,304,498	1,948,270	866,567	1,131,734	1,872,090	740,967	1,045,959	1,756,990	671,107
24	891,967	1,861,310	303,940	1,455,314	1,861,310	986,858	1,258,516	1,683,980	984,479	1,168,385	1,715,710	639,633	985,731	1,545,950	468,430
day)	########	########	11,984,624	35,867,374	49,996,310	23,461,799	31,448,097	41,152,570	21,693,597	28,247,707	41,980,530	17,364,159	25,250,725	38,403,110	17,175,695
u/h)		3,003,770			3,003,770			2,741,890			2,659,450			2,456,880	
u/h)			150,068			726,909			705,464			351,499			405,651

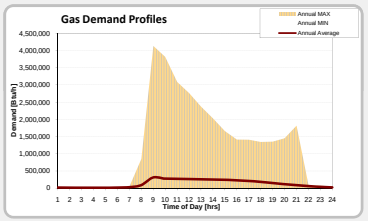
Hour	May Average (Condotel Demand (Btu/h))	May MAX (Condotel Demand (Btu/h))	May MIN (Condotel Demand (Btu/h))	Jun Average (Condotel Demand (Btu/h))	Jun MAX (Condotel Demand (Btu/h))	Jun MIN (Condotel Demand (Btu/h))	Jul Average (Condotel Demand (Btu/h))	Jul MAX (Condotel Demand (Btu/h))	Jul MIN (Condotel Demand (Btu/h))	Aug Average (Condotel Demand (Btu/h))	Aug MAX (Condotel Demand (Btu/h))	Aug MIN (Condotel Demand (Btu/h))	Sep Average (Condotel Demand (Btu/h))	Sep MAX (Condotel Demand (Btu/h))	Sep MIN (Condotel Demand (Btu/h))
1	695,983	1,340,820	372,230	469,389	1,310,000	269,857	354,656	417,640	279,597	335,732	432,935	242,107	316,904	392,590	230,085
2	781,738	1,325,690	322,682	429,264	1,356,020	185,719	293,006	374,918	214,422	332,305	1,214,370	187,484	291,562	1,172,960	150,077
3	757,555	1,207,280	351,267	553,181	1,280,900	188,218	438,728	1,237,490	221,209	388,004	1,246,490	209,250	315,033	1,185,220	150,068
4	930,727	1,371,520	466,127	791,603	1,342,150	273,892	569,310	1,333,790	307,029	505,857	1,280,420	306,656	449,619	1,262,170	230,081
5	1,160,141	1,495,710	948,588	873,272	1,233,380	457,530	769,465	1,575,200	505,065	720,936	1,383,200	480,073	781,016	1,579,830	465,149
6	1,556,616	1,989,970	870,681	1,399,603	2,298,820	458,643	1,195,643	1,728,540	395,626	1,226,082	2,198,750	471,637	1,274,076	2,295,200	484,900
7	1,601,378	2,061,850	952,225	1,401,206	1,895,470	563,118	1,299,961	1,851,490	550,601	1,335,475	2,341,990	572,921	1,308,961	1,813,550	576,127
8	1,217,958	1,642,180	798,101	1,064,853	1,488,360	757,564	987,483	1,149,720	751,688	1,001,080	1,395,070	732,146	1,003,758	1,446,560	733,055
9	933,681	1,355,860	809,016	868,416	1,235,740	773,489	801,906	884,095	754,954	796,119	885,904	743,147	805,434	1,174,940	742,060
10	756,169	1,135,700	634,983	691,832	1,026,330	617,264	655,765	857,654	602,233	641,481	846,693	592,713	645,687	847,595	591,463
11	651,643	1,043,390	556,079	595,057	852,321	540,403	574,546	716,421	527,117	559,602	704,523	518,723	564,081	735,627	517,542
12	707,366	1,101,020	634,894	651,187	783,449	617,206	634,467	707,201	602,164	621,161	695,465	592,674	622,829	700,750	591,380
13	738,578	1,096,670	651,079	683,587	883,687	632,080	673,293	846,303	615,901	654,649	831,725	605,708	656,176	836,238	604,329
14	851,080	1,172,300	763,122	793,135	1,074,420	739,382	779,650	1,031,090	719,110	755,770	1,012,280	706,336	758,244	1,016,730	704,714
15	845,347	1,162,970	763,105	786,928	958,800	739,351	772,900	918,291	719,077	752,826	901,374	706,323	754,306	929,943	704,664
16	934,249	1,312,130	733,624	901,909	956,705	710,746	867,821	904,159	691,289	852,732	901,300	679,146	851,495	924,040	677,815
17	904,977	1,331,950	604,326	880,101	949,741	586,004	840,024	904,117	570,450	827,863	921,111	560,807	826,808	943,023	559,678
18	835,957	1,191,060	608,095	802,777	982,370	590,464	774,531	921,700	575,469	757,424	905,540	566,199	756,938	904,392	565,127
19	990,454	1,357,280	726,791	950,391	1,100,560	706,565	912,531	1,003,350	689,270	895,540	986,426	678,573	894,979	997,898	677,398
20	909,575	1,780,410	720,058	805,649	1,054,130	700,085	776,765	935,640	682,960	757,814	910,533	672,414	757,172	909,490	671,289
21	907,036	1,165,540	777,330	804,119	985,851	700,131	768,655	859,019	682,973	753,803	854,068	672,462	748,864	834,669	671,311
22	871,031	1,080,920	704,465	751,823	938,354	685,322	709,003	821,284	669,496	694,297	846,595	659,566	682,392	763,652	658,238
23	786,504	1,816,520	583,195	671,064	1,620,840	525,854	597,846	721,284	513,423	580,418	718,229	505,509	550,792	624,182	504,598
24	941,965	1,548,920	429,094	526,519	1,429,170	361,997	426,411	494,354	359,277	407,303	509,989	304,735	378,965	477,892	303,940
day)	22,267,708	33,087,660	15,781,157	19,146,865	29,037,568	13,380,884	17,474,367	23,194,750	13,200,360	17,154,274	24,924,980	12,967,309	16,996,091	24,769,141	12,765,088
u/h)		2,061,850			2,298,820			1,851,490			2,341,990			2,295,200	
u/h)			322,682			185,719			214,422			187,484			150,068

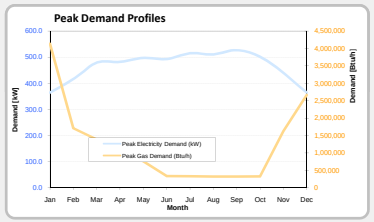
Hour	Oct Average (Condotel Demand (Btu/h))	Oct MAX (Condotel Demand (Btu/h))	Oct MIN (Condotel Demand (Btu/h))	Nov Average (Condotel Demand (Btu/h))	Nov MAX (Condotel Demand (Btu/h))	Nov MIN (Condotel Demand (Btu/h))	Dec Average (Condotel Demand (Btu/h))	Dec MAX (Condotel Demand (Btu/h))	Dec MIN (Condotel Demand (Btu/h))
1	557,551	1,433,380	232,847	961,372	1,666,460	395,694	1,339,215	1,813,080	924,528
2	580,926	1,350,160	190,653	957,776	1,602,690	336,535	1,336,116	1,885,180	858,392
3	687,864	1,229,100	193,804	969,302	1,524,090	315,080	1,335,409	1,851,090	834,272
4	773,406	1,457,520	276,892	1,010,746	1,642,500	319,051	1,406,668	1,966,720	846,166
5	966,110	1,442,050	450,643	1,151,186	1,693,850	699,589	1,513,717	2,009,060	934,808
6	1,429,219	2,041,620	443,822	1,396,603	2,042,790	944,000	1,788,328	2,339,390	1,217,070
7	1,530,807	2,080,660	566,038	1,802,106	2,653,900	926,206	2,238,703	2,988,430	1,203,390
8	1,198,030	1,540,410	614,902	1,754,674	2,360,160	983,706	2,196,305	2,791,610	1,301,600
9	938,119	1,218,100	751,720	1,372,620	1,837,190	784,889	1,774,114	2,216,130	1,397,680
10	714,858	1,027,250	599,582	1,105,719	1,514,250	790,766	1,459,872	1,920,100	1,204,030
11	620,110	936,925	524,739	897,919	1,268,610	639,775	1,235,360	1,723,010	980,850
12	664,805	989,206	599,470	766,134	1,215,160	557,762	1,116,230	1,564,920	873,730
13	691,614	857,717	613,010	854,998	1,544,300	616,017	1,137,003	1,524,020	917,623
14	795,077	1,051,640	715,510	835,601	1,191,890	629,962	1,181,654	1,595,160	946,795
15	790,773	967,398	715,467	948,827	1,235,370	736,429	1,298,695	1,747,620	1,080,870
16	879,604	1,048,290	687,891	1,040,980	1,978,390	736,381	1,321,430	1,663,100	1,129,030
17	853,701	1,053,320	567,730	1,261,318	1,974,000	759,889	1,531,283	1,821,150	1,312,550
18	798,547	994,135	568,116	1,316,443	2,025,880	705,460	1,592,285	1,997,050	1,216,040
19	922,918	1,082,200	573,283	1,200,204	1,853,630	705,837	1,464,250	1,807,430	1,226,420
20	795,170	998,453	680,085	1,320,823	2,002,270	813,386	1,557,312	1,891,850	1,311,570
21	790,838	911,569	680,071	1,177,061	2,027,680	792,817	1,417,047	1,750,200	1,193,780
22	736,966

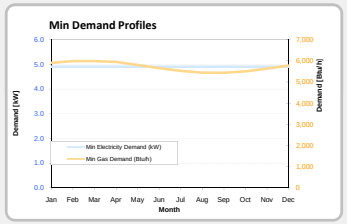
AR eQUEST Simulation Results

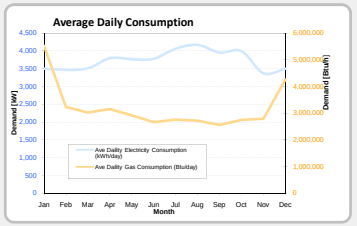
ITERATION: City of SF Green Building Code (LEED Gold)











Electricity Demand Profiles - AR

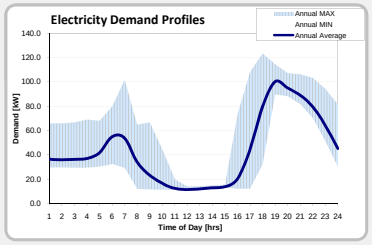
Hour	Annual Average (AR Demand (kW))	Annual MAX (AR Demand (kW))	Annual MIN (AR Demand (kW))	Jan Average (AR Demand (kW))	Jan MAX (AR Demand (kW))	Jan MIN (AR Demand (kW))	Feb Average (AR Demand (kW))	Feb MAX (AR Demand (kW))	Feb MIN (AR Demand (kW))	Mar Average (AR Demand (kW))	Mar MAX (AR Demand (kW))	Mar MIN (AR Demand (kW))	Apr Average (AR Demand (kW))	Apr MAX (AR Demand (kW))	Apr MIN (AR Demand (kW))	May Average (AR Demand (kW))	May MAX (AR Demand (kW))	May MIN (AR Demand (kW))	Jun Average (AR Demand (kW))	Jun MAX (AR Demand (kW))	Jun MIN (AR Demand (kW))	Jul Average (AR Demand (kW))	Jul MAX (AR Demand (kW))	Jul MIN (AR Demand (kW))	Aug Average (AR Demand (kW))	Aug MAX (AR Demand (kW))	Aug MIN (AR Demand (kW))	Sep Average (AR Demand (kW))	Sep MAX (AR Demand (kW))	Sep MIN (AR Demand (kW))	Oct Average (AR Demand (kW))	Oct MAX (AR Demand (kW))	Oct MIN (AR Demand (kW))	Nov Average (AR Demand (kW))	Nov MAX (AR Demand (kW))	Nov MIN (AR Demand (kW))	Dec Average (AR Demand (kW))	Dec MAX (AR Demand (kW))	Dec MIN (AR Demand (kW))
1	34.9	40.3	26.0	35.7	40.3	26.0	35.7	40.3	26.0	35.7	40.3	26.0	35.0	40.3	26.0	34.3	37.8	26.0	33.8	37.8	26.0	34.3	37.8	26.0	34.3	37.8	26.0	33.8	37.8	26.0	34.7	40.3	26.0	35.1	40.3	26.0	35.7	40.3	26.0
2	34.0	37.8	26.0	34.0	37.8	26.0	34.0	37.8	26.0	34.0	37.8	26.0	34.4	37.8	26.0	34.1	37.4	26.0	33.6	37.4	26.0	34.1	37.4	26.0	34.1	37.4	26.0	33.6	37.4	26.0	34.2	37.8	26.0	33.4	37.8	26.0	34.0	37.8	26.0
3	33.9	37.4	26.0	33.7	37.4	26.0	33.8	37.4	26.0	33.7	37.4	26.0	34.4	37.4	26.0	34.1	37.4	26.0	33.6	37.4	26.0	34.1	37.4	26.0	34.1	37.4	26.0	33.6	37.4	26.0	34.1	37.4	26.0	33.2	37.4	26.0	33.7	37.4	26.0
4	32.3	37.4	19.0	33.7	37.4	26.0	33.8	37.4	26.0	33.7	37.4	26.0	34.4	37.4	26.0	27.1	30.4	19.0	26.6	30.4	19.0	27.1	30.4	19.0	34.1	37.4	26.0	33.6	37.4	26.0	34.1	37.4	26.0	33.2	37.4	26.0	33.7	37.4	26.0
5	30.0	37.4	11.9	33.7	37.4	26.0	33.8	37.4	26.0	33.7	37.4	26.0	30.2	37.4	20.7	20.1	23.4	11.9	19.6	23.4	11.9	20.1	23.4	11.9	34.1	37.4	26.0	33.6	37.4	26.0	34.1	37.4	26.0	33.2	37.4	26.0	33.7	37.4	26.0
6	26.3	37.4	4.9	33.7	37.4	26.0	28.5	32.2	20.7	28.5	32.2	20.7	24.0	32.2	10.2	17.2	22.3	4.9	16.5	22.3	4.9	17.2	22.3	4.9	27.8	32.8	15.4	27.0	32.8	15.4	28.7	37.4	15.4	33.2	37.4	26.0	33.7	37.4	26.0
7	40.3	72.3	19.0	30.7	36.3	19.0	22.0	27.6	10.2	21.9	27.6	10.2	45.1	68.8	4.9	50.3	68.8	4.9	47.5	68.8	4.9	50.3	68.8	4.9	53.8	72.3	8.4	51.0	72.3	8.4	48.9	72.3	8.4	30.0	36.3	19.0	30.7	36.3	19.0
8	145.4	347.9	4.9	51.7	72.3	8.4	48.3	68.8	4.9	48.2	68.8	4.9	191.0	314.6	4.9	224.7	314.7	4.9	213.7	346.8	4.9	227.2	347.9	4.9	225.1	318.0	4.9	213.2	338.1	4.9	194.9	333.0	4.9	48.9	72.3	8.4	51.7	72.3	8.4
9	231.7	475.8	4.9	214.8	320.1	4.9	215.0	314.6	4.9	214.7	314.6	4.9	243.4	335.4	4.9	240.6	376.4	4.9	241.8	473.0	4.9	254.4	471.1	4.9	249.8	373.3	4.9	243.8	475.8	4.9	244.4	410.7	4.9	201.1	315.7	4.9	214.7	314.6	4.9
10	243.1	488.2	4.9	228.3	334.7	4.9	228.7	334.7	4.9	228.3	334.7	4.9	249.8	368.8	4.9	250.1	465.8	4.9	252.0	487.7	4.9	268.6	488.2	4.9	261.1	391.7	4.9	251.2	479.5	4.9	254.5	428.2	4.9	214.1	344.5	4.9	228.3	334.7	4.9
11	248.7	477.5	4.9	230.5	337.9	4.9	230.9	337.9	4.9	230.6	340.4	4.9	251.4	379.6	4.9	254.3	425.6	4.9	259.4	473.4	4.9	279.5	473.7	4.9	275.3	432.7	4.9	261.7	477.5	4.9	260.2	422.9	4.9	218.3	365.7	4.9	230.5	337.9	4.9
12	254.9	486.4	4.9	230.5	337.9	4.9	231.7	361.4	4.9	232.3	368.4	4.9	255.2	423.1	4.9	261.5	432.5	4.9	269.6	468.2	4.9	293.5	477.2	4.9	292.3	471.2	4.9	270.2	486.4	4.9	266.2	430.8	4.9	222.5	387.0	4.9	230.5	337.9	4.9
13	266.8	501.8	4.9	230.5	337.9	4.9	233.7	415.9	4.9	235.9	405.7	4.9	263.2	473.2	4.9	280.3	492.4	4.9	295.9	483.4	4.9	320.0	501.8	4.9	315.6	492.0	4.9	284.9	496.2	4.9	284.4	478.7	4.9	223.7	389.4	4.9	230.5	337.9	4.9
14	269.6	520.4	4.9	230.5	337.9	4.9	233.3	384.5	4.9	236.6	382.2	4.9	264.9	476.5	4.9	285.3	496.3	4.9	296.2	490.5	4.9	319.5	506.8	4.9	320.8	497.9	4.9	295.2	520.4	4.9	291.0	487.6	4.9	228.1	412.7	4.9	230.5	337.9	4.9
15	270.7	518.3	4.9	230.5	337.9	4.9	234.8	375.9	4.9	240.9	435.3	4.9	266.2	481.8	4.9	287.2	497.2	4.9	291.9	489.3	4.9	315.8	506.5	4.9	321.1	497.4	4.9	299.3	518.3	4.9	296.0	498.5	4.9	230.7	427.9	4.9	230.5	337.9	4.9
16	271.8	524.8	4.9	230.5	339.9	4.9	235.7	369.4	4.9	246.3	479.1	4.9	269.9	480.8	4.9	287.5	496.1	4.9	291.9	492.8	4.9	316.8	515.0	4.9	324.1	501.8	10.2	296.1	524.8	10.2	300.5	501.6	4.9	228.3	434.8	4.9	230.5	337.9	4.9
17	268.8	527.1	4.9	241.0	348.5	15.4	232.9	363.9	4.9	242.1	465.3	4.9	268.7	479.9	4.9	272.5	476.5	4.9	269.0	483.3	4.9	301.4	497.7	4.9	315.5	510.4	26.0	301.4	527.1	26.0	302.7	492.5	10.2	233.7	439.7	15.4	241.0	348.4	15.4
18	265.8	512.5	4.9	257.8	364.9	33.0	239.6	354.8	13.7	244.9	391.0	13.7	272.0	406.1	13.7	250.6	428.8	4.9	249.0	463.0	4.9	276.3	470.5	4.9	303.1	499.2	36.5	294.6	512.5	36.5	295.1	489.5	26.0	246.2	405.4	33.0	257.8	364.9	33.0
19	252.8	477.7	10.2	256.4	361.0	36.5	249.9	357.2	29.5	252.6	388.1	29.5	264.8	383.0	29.5	232.9	354.1	10.2	225.4	375.2	10.2	246.5	412.1	10.2	269.9	400.0	36.5	264.3	477.7	36.5	270.5	451.8	36.5	243.0	369.4	36.5	256.4	361.0	36.5
20	221.7	426.6	22.5	243.0	341.3	36.5	243.3	341.4	36.5	243.9	354.0	36.5	225.8	351.9	36.5	195.9	273.8	22.5	187.9	296.0	22.5	200.9	303.5	22.5	214.9	321.9	36.5	208.7	338.3	36.5	224.9	426.6	36.5	229.6	342.6	36.5	243.0	341.3	36.5
21	134.5	316.1	36.5	201.4	280.0	36.5	201.7	280.0	36.5	201.5	280.7	36.5	113.1	282.5	36.5	81.5	99.9	36.5	78.8	99.9	36.5	81.5	99.9	36.5	81.5	99.9	36.5	78.8	99.9	36.5	106.4	316.1	36.5	190.7	280.0	36.5	201.4	280.0	36.5
22	69.9	99.9	33.0	79.4	99.9	36.5	79.5	99.9	36.5	79.4	99.9	36.5	68.0	99.9	33.0	62.7	74.8	33.0	60.9	74.8	33.0	62.7	74.8	33.0	62.7	74.8	33.0	60.9	74.8	33.0	66.0	99.9	33.0	76.7	99.9	36.5	79.4	99.9	36.5
23	52.5	74.8	29.5	61.3	74.8	33.0	61.4	74.8	33.0	61.3	74.8	33.0	50.1	74.8	29.5	45.7	52.4	29.5	44.8	52.4	29.5	45.7	52.4	29.5	45.7	52.4	29.5	44.8	52.4	29.5	48.8	74.8	29.5	59.5	74.8	33.0	61.3	74.8	33.0
24	40.0	52.4	26.0	45.0	52.4	29.5	45.0	52.4	29.5	45.0	52.4	29.5	39.1	52.4	26.0	35.7	40.3	26.0	36.0	40.3	26.0	36.2	40.3	26.0	35.7	40.3	26.0	36.0	40.3	26.0	37.4	52.4	26.0	44.0	52.4	29.5	45.0	52.4	29.5
day)	3,740	7,128	344	3,499	4,943	480	3,467	5,137	425	3,506	5,486	425	3,794	6,156	394	3,766	6,055	330	3,775	6,348	330	4,064	6,497	330	4,167	6,268	464	3,951	6,733	464	3,993	6,696	432	3,370	5,478	480	3,498	4,936	480
kW)		527.1			364.9			415.9			479.1			481.8			497.2			492.8			515.0			510.4			527.1			501.6			439.7			364.9	
kW)			4.9			4.9			4.9			4.9			4.9			4.9			4.9			4.9			4.9			4.9			4.9			4.9			4.9

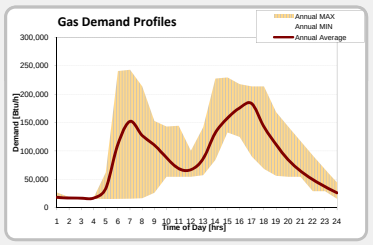
Gas Demand Profiles - AR

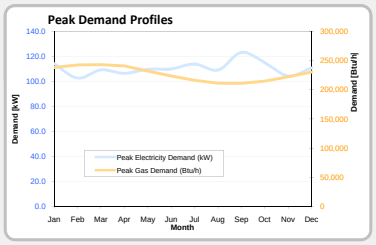
Hour	Annual Average (AR Demand (Btu/h))	Annual MAX (AR Demand (Btu/h))	Annual MIN (AR Demand (Btu/h))	Jan Average (AR Demand (Btu/h))	Jan MAX (AR Demand (Btu/h))	Jan MIN (AR Demand (Btu/h))	Feb Average (AR Demand (Btu/h))	Feb MAX (AR Demand (Btu/h))	Feb MIN (AR Demand (Btu/h))	Mar Average (AR Demand (Btu/h))	Mar MAX (AR Demand (Btu/h))	Mar MIN (AR Demand (Btu/h))	Apr Average (AR Demand (Btu/h))	Apr MAX (AR Demand (Btu/h))	Apr MIN (AR Demand (Btu/h))	May Average (AR Demand (Btu/h))	May MAX (AR Demand (Btu/h))	May MIN (AR Demand (Btu/h))	Jun Average (AR Demand (Btu/h))	Jun MAX (AR Demand (Btu/h))	Jun MIN (AR Demand (Btu/h))	Jul Average (AR Demand (Btu/h))	Jul MAX (AR Demand (Btu/h))	Jul MIN (AR Demand (Btu/h))	Aug Average (AR Demand (Btu/h))	Aug MAX (AR Demand (Btu/h))	Aug MIN (AR Demand (Btu/h))	Sep Average (AR Demand (Btu/h))	Sep MAX (AR Demand (Btu/h))	Sep MIN (AR Demand (Btu/h))	Oct Average (AR Demand (Btu/h))	Oct MAX (AR Demand (Btu/h))	Oct MIN (AR Demand (Btu/h))	Nov Average (AR Demand (Btu/h))	Nov MAX (AR Demand (Btu/h))	Nov MIN (AR Demand (Btu/h))	Dec Average (AR Demand (Btu/h))	Dec MAX (AR Demand (Btu/h))	Dec MIN (AR Demand (Btu/h))
1	15,859	23,297	5,439	17,464	22,970	5,907	17,715	23,273	5,985	17,714	23,297	5,991	16,679	23,152	5,954	15,400	19,326	5,805	14,438	18,830	5,656	14,663	18,401	5,527	14,446	18,129	5,446	13,883	18,106	5,439	15,001	21,404	5,505	15,930	21,893	5,631	17,074	22,455	5,775
2	14,873	19,947	5,439	15,227	19,668	5,907	15,445	19,927	5,985	15,445	19,947	5,991	16,124	19,824	5,954	15,400	19,326	5,805	14,439	18,830	5,656	14,663	18,401	5,527	14,446	18,129	5,446	13,883	18,106	5,439	14,604	18,327	5,505	13,937	18,746	5,631	14,887	19,227	5,775
3	14,873	19,947	5,439	15,227	19,668	5,907	15,445	19,927	5,985	15,445	19,947	5,991	16,124	19,824	5,954	15,400	19,326	5,805	14,439	18,830	5,656	14,663	18,401	5,527	14,446	18,129	5,446	13,883	18,106	5,439	14,604	18,327	5,505	13,937	18,746	5,631	14,887	19,227	5,775
4	14,874	19,947	5,439	15,228	19,668	5,907	15,445	19,927	5,985	15,445	19,947	5,991	16,125	19,824	5,954	15,400	19,326	5,805	14,439	18,830	5,656	14,663	18,401	5,527	14,446	18,129	5,446	13,883	18,106	5,439	14,604	18,327	5,505	13,937	18,746	5,631	14,887	19,227	5,775
5	14,874	19,947	5,439	15,228	19,668	5,907	15,445	19,927	5,985	15,445	19,947	5,991	16,125	19,824	5,954	15,400	19,326	5,805	14,439	18,830	5,656	14,663	18,401	5,527	14,446	18,129	5,446	13,883	18,106	5,439	14,604	18,327	5,505	13,937	18,746	5,631	14,887	19,227	5,775
6	15,768	22,280	5,439	15,228	19,668	5,907	15,445	19,927	5,985	15,445	19,947	5,991	17,517	22,280	5,954	17,100	21,721	5,805	15,994	21,164	5,656	16,281	20,681	5,527	16,041	20,375	5,446	15,379	20,350	5,439	15,923	20,598	5,505	13,937	18,746	5,631	14,887	19,227	5,775
7	29,335	57,545	5,439	16,879	22,105	5,907	17,121	22,396	5,985	17,120	22,420	5,991	37,910	57,545	5,954	41,498	56,100	5,805	38,326	54,662	5,656	39,512	53,415	5,527	38,928	52,625	5,446	36,851	52,558	5,439	35,147	53,201	5,505	15,408	21,069	5,631	16,501	21,610	5,775
8	89,975	852,868	5,439	40,577	57,088	5,907	41,175	57,845	5,985	41,159	57,905	5,991	158,435	852,868	5,954	145,648	758,628	5,805	116,465	171,869	5,656	120,794	167,948	5,527	119,007	165,465	5,446	111,982	165,254	5,439	105,589	167,274	5,505	36,528	54,416	5,631	39,670	55,811	5,775
9	313,978	4,136,950	5,439	894,932	4,136,950	5,907	366,796	1,710,640	5,985	255,392	1,391,300	5,992	203,400	1,094,060	5,954	174,103	242,952	5,805	159,700	236,723	5,656	165,769	231,322	5,527	163,317	227,901	5,446	153,553	227,611	5,439	156,958	230,393	5,505	281,120	1,627,930	5,631	782,999	2,667,300	5,775
10	274,184	3,817,640	5,439	616,882	3,817,640	5,907	242,789	985,903	5,985	196,832	733,897	5,992	244,061	502,835	5,954	236,693	331,147	5,805	216,989	322,656	5,656	225,363	315,295	5,527	222,030	310,632	5,446	208,637	310,236	5,439	213,665	314,029	5,505	192,608	971,252	5,631	463,060	1,651,930	5,775
11	272,633	3,087,510	5,439	510,411	3,087,510	5,907	256,383	753,334	5,985	239,601	531,651	5,992	260,296	356,638	5,954	248,427	347,682	5,805	227,729	338,766	5,656	236,535	331,038	5,527	233,037	326,142	5,446	218,964	325,726	5,439	233,562	329,708	5,505	220,504	771,550	5,631	379,316	1,194,330	5,775
12	268,334	2,762,680	5,439	465,785	2,762,680	5,907	263,423	701,631	5,985	245,038	358,869	5,992	263,122	356,638	5,954	248,427	347,682	5,805	227,729	338,766	5,656	236,535	331,038	5,527	233,037	326,142	5,446	218,964	325,726	5,439	235,585	329,708	5,505	227,320	687,330	5,631	350,175	1,095,650	5,775
13	259,718	2,372,030	5,439	422,397	2,372,030	5,907	253,923	603,114	5,985	245,038	358,869	5,992	263,122	356,638	5,954	248,427	347,682	5,805	227,729	338,766	5,656	236,535	331,038	5,527	233,037	326,142	5,446	218,964	325,726	5,439	235,585	329,708	5,505	221,981	527,158	5,631	305,860	947,355	5,775
14	250,063	2,027,540	5,439	369,287	2,027,540	5,907	250,708	513,096	5,985	245,038	358,869	5,992	263,122	356,638	5,954	248,427	347,682	5,805	227,729	338,766	5,656	236,535	331,038	5,527	233,037	326,142	5,446	218,964	325,726	5,439	235,585	329,708	5,505	215,650	337,240	5,631	254,324	756,018	5,775
15	244,675	1,661,120	5,439	335,162	1,661,120	5,907	245,187	358,493	5,985	245,038	358,869	5,992	261,259	356,638	5,954	246,151	344,475	5,805	225,647	335,642	5,656	234,368	327,985	5,527	230,902	323,134	5,446	216,961	322,722	5,439	233,819	329,708	5,505	215,650	337,240	5,631	244,097	591,614	5,775
16	233,764	1,414,890	5,439	318,018	1,414,890	5,907	242,943	355,187	5,985	242,795	355,560	5,992	247,619	353,349	5,954	230,168	321,953	5,805	211,017	313,697	5,656	219,150	306,541	5,527	215,909	302,007	5,446	202,894	301,622	5,439	221,025	326,667	5,505	213,680	334,130	5,631	238,907	494,524	5,775
17	211,165	1,408,020	5,439	299,807	1,408,020	5,907	227,185	331,964	5,985	227,047	332,312	5,992	219,584	330,246	5,954	200,641	280,347	5,805	183,991	273,158	5,656	191,036	266,927	5,527	188,211	262,979	5,446	176,908	262,644	5,439	195,360	305,309	5,505	199,844	312,284	5,631	223,844	475,703	5,775
18	182,086	1,345,330	5,439	269,639	1,345,330	5,907	198,075	289,064	5,985	197,956	289,368	5,992	187,030	287,569	5,954	169,579	236,578	5,805	155,560	230,512	5,656	161,462	225,253	5,527	159,074	221,922	5,446	149,572	221,639	5,439	166,169	265,854	5,505	174,285	271,928	5,631	196,180	445,920	5,775
19	151,196	1,352,910	5,439	245,977	1,352,910	5,907	167,451	243,934	5,985	167,352	244,190	5,992	151,008	242,672	5,954	134,734	187,479	5,805	123,666	182,672	5,656	128,285	178,504	5,527	126,388	175,864	5,446	118,906	175,640	5,439	133,778	224,348	5,505	147,398	229,473	5,631	168,921	471,733	5,775
20	113,255	1,451,640	5,439	228,856	1,451,640	5,907	133,097	193,308	5,986	133,021	193,511	5,992	101,455	192,308	5,954	84,483	116,670	5,805	77,671	113,679	5,656	80,439	111,085	5,527	79,250	109,443	5,446	74,682	109,303	5,439	88,781	177,787	5,505	117,235	181,849	5,631	159,359	801,263	5,775
21	94,488	1,817,320	5,439	251,332	1,817,320	5,907	83,555	120,298	5,986	83,510	120,424	5,992	69,658	119,675	5,954	60,441	82,792	5,805	55,665	80,670	5,656	57,548	78,829	5,527	56,697	77,664	5,446	53,523	77,565	5,439	61,462	110,639	5,505	92,819	685,639	5,631	203,165	1,024,340	5,775
22	54,279	85,456	5,439	58,977	84,248	5,907	59,851	85,367	5,986	59,822	85,456	5,992	58,297	84,925	5,954	53,642	73,212	5,805	49,442	71,335	5,656	51,075	69,708	5,527	50,320	68,677	5,446	47,539	68,590	5,439	52,042	78,513	5,505	52,925	80,307	5,631	57,658	82,364	5,775
23	40,462	75,568	5,439	52,373	74,500	5,907	53,148	75,489	5,986	53,124	75,568	5,992	39,685	75,098	5,954	32,917	44,009	5,805	30,472	42,880	5,656	31,342	41,902	5,527	30,878	41,283	5,446	29,300	41,230	5,439	34,789	69,428	5,505	47,040	71,014	5,631	51,202	72,834	5,775
24	23,586	45,425	5,439	32,242	44,784	5,907	32,716	45,377	5,986	32,704	45,425	5,992	22,804	45,142	5,954	17,162	22,570	5,805	17,091	21,992	5,656	16,855	21,490	5,527	16,099	21,172	5,446	16,433	21,146	5,439	18,898	41,734	5,505	29,100	42,688	5,631	31,522	43,782	5,775
day)	3,198,293	########	130,528	5,523,133	29,059,613	141,771	3,230,468	7,569,347	143,650	3,022,525	6,037,496	143,796	3,150,560	6,146,209	142,900	2,915,667	4,607,990	139,318	2,660,808	3,922,525	135,748	2,758,733	3,833,040	132,656	2,717,429	3,776,354	130,697	2,558,391	3,771,541	130,528	2,747,141	4,129,027	132,126	2,786,712	7,660,121	135,145	4,258,270	13,012,670	138,610
u/h)		4,136,950			4,136,950			1,710,640			1,391,300			1,094,060			758,628			338,766			331,038			326,142			325,726			329,708			1,627,930			2,667,300	
u/h)			5,439			5,907			5,985			5,991			5,954				5,805			5,656			5,527			5,446			5,439			5,505			5,631			5,775

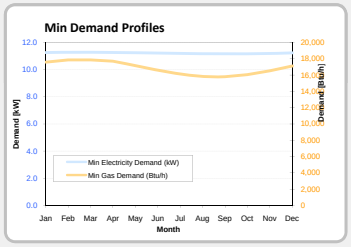
Low-Rise Residential eQUEST Simulation Results

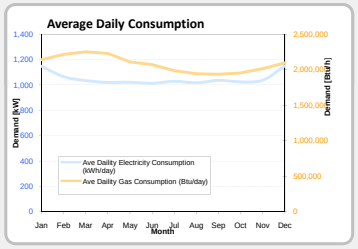
ITERATION: % construction cost premium











Electricity Demand Profiles - LR Res

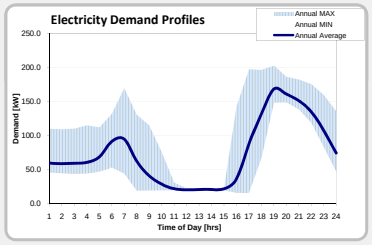
Hour	Annual Average	Annual MAX	Annual MIN	Jan Average	Jan MAX	Jan MIN	Feb Average	Feb MAX	Feb MIN	Mar Average	Mar MAX	Mar MIN	Apr Average	Apr MAX	Apr MIN	May Average	May MAX	May MIN	Jun Average	Jun MAX	Jun MIN	Jul Average	Jul MAX	Jul MIN	Aug Average	Aug MAX	Aug MIN	Sep Average	Sep MAX	Sep MIN	Oct Average	Oct MAX	Oct MIN	Nov Average	Nov MAX	Nov MIN	Dec Average	Dec MAX	Dec MIN
	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)	LR Res Demand (kW)
1	36.4	66.0	29.6	47.1	66.0	35.1	40.9	52.1	34.7	37.3	50.6	29.6	35.0	46.2	30.3	33.2	39.5	30.5	31.8	33.2	30.4	31.4	32.5	30.8	31.4	32.9	30.5	31.9	35.1	30.3	32.4	38.8	30.2	38.1	54.1	30.9	46.8	61.1	37.4
2	35.3	65.9	29.6	46.0	65.9	34.8	40.0	51.5	35.4	36.6	45.7	29.8	35.6	42.2	30.8	33.2	40.1	30.1	31.5	34.2	29.7	30.9	31.9	29.6	30.9	32.0	30.1	31.2	35.0	30.2	32.1	35.8	30.0	37.0	53.1	30.9	45.7	62.7	37.0
3	36.3	66.7	29.6	46.2	66.7	34.4	40.1	47.0	35.3	37.1	46.6	30.0	36.6	43.2	32.1	33.7	40.1	30.5	31.7	35.5	29.6	31.1	32.3	30.1	31.1	32.5	30.3	31.3	34.3	30.0	32.5	37.3	29.9	37.6	53.0	29.9	47.0	64.4	36.7
4	37.0	69.0	29.4	46.4	69.0	34.2	40.9	52.8	35.6	38.5	53.0	29.7	37.5	44.2	33.1	34.5	40.0	31.3	32.1	36.8	29.4	31.0	32.8	29.8	31.3	33.4	30.1	31.2	33.9	29.9	33.0	38.8	29.6	38.7	55.9	30.2	48.8	67.4	37.0
5	41.8	68.1	30.6	46.3	68.1	34.5	41.6	52.3	35.6	39.2	53.7	30.6	45.2	55.2	34.5	41.9	48.5	32.8	40.4	46.8	31.2	39.0	43.1	31.4	39.4	44.2	31.0	39.6	45.1	31.3	40.7	49.8	30.9	39.1	53.6	30.7	48.8	65.1	36.9
6	54.9	80.0	32.5	53.3	80.0	35.2	49.7	58.9	36.0	48.2	65.4	33.4	61.5	78.0	37.3	57.0	71.3	35.2	58.3	69.7	34.1	56.0	67.2	33.8	57.1	67.4	34.6	57.0	69.2	34.3	56.4	72.1	32.5	46.9	65.8	33.7	56.7	74.9	39.0
7	53.7	101.9	29.4	68.2	101.9	37.2	66.9	89.8	38.3	65.2	87.5	35.4	47.2	69.4	37.4	43.1	47.6	36.4	43.1	47.5	36.5	44.1	47.4	37.8	44.4	47.4	36.9	44.6	47.4	37.9	44.6	49.7	36.3	62.0	87.7	35.8	72.2	97.6	41.7
8	34.0	64.8	12.0	48.6	54.9	38.8	48.1	50.0	40.6	46.4	50.0	37.2	24.0	52.4	12.3	25.7	53.2	12.2	23.4	59.7	12.1	25.3	64.8	12.1	23.2	51.6	12.0	23.8	57.1	12.0	24.9	50.8	12.1	45.9	49.7	38.3	49.8	60.3	43.8
9	23.2	66.7	11.9	30.6	64.8	12.2	25.3	57.7	12.3	23.1	60.4	12.3	20.2	50.3	12.1	22.4	42.3	12.0	19.7	42.2	12.0	21.3	42.2	11.9	20.4	42.1	11.9	20.4	42.1	11.9	21.8	49.0	11.9	24.9	60.4	12.1	28.4	66.7	12.2
10	16.7	44.6	11.2	23.8	44.6	12.0	21.0	42.4	12.1	20.0	44.6	12.1	13.8	42.4	11.3	13.3	17.5	11.3	12.8	17.5	11.3	13.1	17.4	11.5	12.9	17.4	11.2	12.9	17.4	11.2	13.9	38.0	11.3	21.0	43.1	11.9	21.8	44.5	12.0
11	12.3	19.8	11.2	14.0	19.3	11.3	13.2	17.6	11.3	12.9	19.8	11.3	11.8	17.6	11.3	11.5	11.9	11.2	11.4	11.8	11.2	11.4	11.8	11.2	11.4	11.8	11.2	11.4	11.8	11.2	11.6	16.3	11.2	13.1	18.6	11.3	13.4	19.8	11.3
12	11.6	14.2	11.2	11.9	14.2	11.3	11.5	11.9	11.3	11.5	11.9	11.3	11.6	11.9	11.5	11.6	11.9	11.5	11.6	11.9	11.5	11.6	11.8	11.5	11.5	11.8	11.5	11.5	11.8	11.5	11.5	11.8	11.2	11.4	11.8	11.2	11.7	14.1	11.2
13	12.0	14.2	11.5	11.9	14.2	11.6	11.7	11.9	11.6	11.6	11.9	11.6	12.2	12.8	11.6	12.2	12.8	12.0	12.1	12.7	12.0	12.1	12.7	12.0	12.1	12.6	11.9	12.1	12.6	11.9	12.1	12.7	11.6	11.6	11.8	11.5	11.8	14.1	11.5
14	12.8	15.1	12.0	12.6	15.1	12.1	12.3	12.8	12.1	12.2	12.9	12.1	13.2	14.5	12.1	13.3	14.4	13.1	13.2	14.3	13.0	13.2	14.2	12.9	13.1	14.1	12.9	13.1	14.1	12.9	13.1	14.2	12.3	12.2	12.7	12.0	12.3	14.3	12.0
15	13.8	15.6	13.0	13.6	15.6	13.1	13.4	14.5	13.1	13.4	14.5	13.1	14.2	14.6	13.1	14.1	14.5	13.2	14.1	14.4	13.2	14.0	14.4	13.1	14.0	14.3	13.0	14.0	14.3	13.0	14.0	14.4	13.1	13.2	14.3	13.0	13.3	14.4	13.1
16	20.2	74.0	12.1	14.3	16.8	13.3	14.2	14.6	13.3	14.4	16.1	13.4	19.8	52.1	12.4	26.2	66.2	12.3	23.3	60.6	12.2	27.4	74.0	12.1	24.9	63.3	12.1	25.3	68.6	12.1	24.4	65.7	12.1	14.1	14.4	13.1	14.1	14.5	13.2
17	44.4	108.4	12.2	24.8	66.3	12.4	20.9	41.2	12.4	20.0	50.9	12.4	49.0	85.7	12.4	61.7	97.7	33.9	62.9	100.3	34.0	67.0	108.4	43.1	61.2	97.8	35.8	61.6	93.6	31.9	58.1	100.2	31.9	21.7	44.4	12.2	22.5	52.2	12.3
18	79.7	123.4	32.2	59.9	95.4	38.2	52.1	83.7	34.0	48.7	87.1	32.2	90.2	106.5	36.5	92.8	108.2	83.9	95.1	106.9	84.9	97.5	109.3	90.4	98.0	107.5	91.3	108.9	123.4	95.8	103.7	115.1	91.8	51.3	85.0	32.8	56.8	84.7	37.8
19	100.2	114.4	89.8	103.1	114.4	98.0	98.6	102.7	94.4	99.1	109.4	94.9	97.0	106.6	92.7	99.4	109.9	92.2	99.0	110.2	89.8	101.7	114.0	92.8	101.9	109.2	96.9	102.3	113.4	93.9	98.7	110.9	92.4	98.4	104.5	94.5	102.9	111.0	96.0
20	94.9	107.2	88.1	98.4	107.2	94.2	94.3	97.9	91.8	95.0	103.1	92.0	91.4	98.1	88.2	92.5	99.0	88.1	95.0	103.3	90.0	96.2	103.3	92.2	95.0	99.5	91.3	95.9	104.7	88.3	93.3	105.4	88.5	94.4	100.1	91.7	98.0	104.7	92.7
21	89.0	106.3	81.7	94.2	102.0	89.9	90.2	93.1	87.6	90.4	98.0	87.3	84.9	91.8	81.7	85.3	89.7	82.6	87.1	92.6	83.1	88.3	92.2	86.2	87.6	91.0	84.6	88.8	95.5	83.7	86.4	98.8	82.8	90.1	94.7	87.3	94.1	106.3	88.1
22	79.6	103.3	70.2	88.9	98.1	83.5	84.7	88.3	82.1	84.4	90.9	81.4	73.9	84.9	71.1	73.2	77.2	70.7	74.6	77.8	71.9	75.7	78.6	73.0	75.2	78.0	72.3	76.3	82.7	71.3	74.5	89.4	70.2	84.3	88.9	82.0	89.5	103.3	84.1
23	64.2	94.4	51.4	79.2	88.6	73.0	74.6	79.1	70.7	73.4	80.8	71.0	56.4	74.8	51.6	54.9	59.2	51.6	54.9	60.4	51.5	56.0	61.3	51.6	55.5	60.7	51.4	56.8	63.9	52.1	55.7	76.2	51.8	73.7	83.6	70.3	80.1	94.4	73.7
24	45.2	81.5	30.0	64.0	81.5	55.3	58.7	66.6	53.3	56.0	66.1	51.4	37.3	61.1	30.4	34.5	44.4	30.2	33.5	41.0	30.0	34.3	41.0	30.6	33.7	41.0	30.7	34.8	42.7	30.4	35.2	57.6	30.7	56.9	69.5	51.8	64.5	78.6	56.9
day)	1,050	1,685	772	1,147	1,530	926	1,065	1,290	915	1,034	1,331	875	1,019	1,357	808	1,021	1,257	869	1,013	1,241	864	1,029	1,259	891	1,017	1,214	886	1,037	1,270	879	1,025	1,349	866	1,038	1,331	879	1,151	1,491	948
kW)		123.4			114.4			102.7			109.4			106.6			109.9			110.2			114.0			109.2			123.4			115.1			104.5			111.0	
kW)			11.2			11.3			11.3			11.3			11.3			11.2			11.2			11.2			11.2			11.2			11.2			11.2			11.2

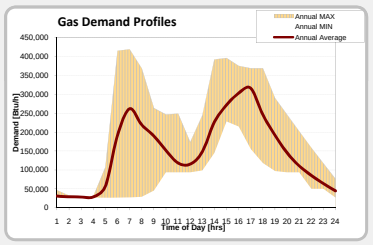
Gas Demand Profiles - LR Res

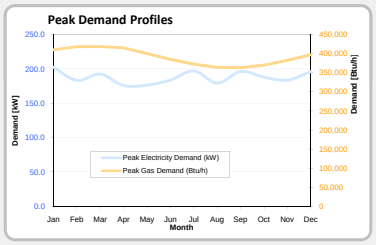
Hour	Annual Average	Annual MAX	Annual MIN	Jan Average	Jan MAX	Jan MIN	Feb Average	Feb MAX	Feb MIN	Mar Average	Mar MAX	Mar MIN	Apr Average	Apr MAX	Apr MIN	May Average	May MAX	May MIN	Jun Average	Jun MAX	Jun MIN	Jul Average	Jul MAX	Jul MIN	Aug Average	Aug MAX	Aug MIN	Sep Average	Sep MAX	Sep MIN	Oct Average	Oct MAX	Oct MIN	Nov Average	Nov MAX	Nov MIN	Dec Average	Dec MAX	Dec MIN
	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)	LR Res Demand (Btu/h)
1	18,292	27,098	15,810	21,076	26,620	17,567	20,811	27,062	17,851	20,238	27,098	17,850	18,298	26,810	17,719	17,560	18,256	17,188	16,900	17,664	16,614	16,472	17,147	16,141	16,138	16,832	15,849	16,118	16,798	15,810	16,663	24,192	16,057	19,351	24,987	16,517	19,926	25,853	17,102
2	17,030	19,026	15,814	18,027	18,711	17,582	18,234	19,004	17,871	18,172	19,026	17,867	17,788	18,839	17,729	17,197	17,225	17,173	16,640	16,664	16,621	16,167	16,176	16,149	15,870	15,886	15,858	15,841	15,863	15,814	16,130	17,067	16,067	16,910	17,616	16,537	17,469	18,198	17,118
3	16,888	17,921	15,816	17,615	17,641	17,587	17,888	17,901	17,875	17,897	17,921	17,869	17,759	17,782	17,737	17,202	17,230	17,179	16,645	16,670	16,624	16,172	16,183	16,154	15,876	15,891	15,862	15,847	15,868	15,816	16,104	16,130	16,074	16,584	16,616	16,544	17,138	17,156	17,117
4	16,892	17,926	15,820	17,618	17,643	17,589	17,891	17,905	17,880	17,901	17,926	17,874	17,763	17,784	17,742	17,207	17,231	17,183	16,649	16,675	16,627	16,176	16,189	16,158	15,880	15,896	15,866	15,851	15,872	15,820	16,109	16,136	16,080	16,590	16,616	16,552	17,141	17,158	17,120
5	33,288	62,458	15,845	17,619	17,644	17,590	17,893	17,907	17,883	17,905	17,931	17,878	47,547	62,458	17,753	44,982	60,272	17,194	47,035	58,110	16,632	43,295	56,217	16,175	43,660	55,039	15,870	43,200	54,937	15,845	41,782	55,926	16,088	16,593	16,618	16,556	17,142	17,160	17,124
6	111,467	241,146	15,847	44,682	61,799	17,596	48,435	62,911	17,883	51,350	63,002	17,881	169,869	241,146	17,753	156,411	232,463	17,198	168,833	223,828	16,634	152,074	216,332	16,174	155,015	211,601	15,874	152,837	211,197	15,847	144,773	215,077	16,091	44,030	57,771	16,571	46,083	59,880	17,125
7	152,086	243,310	15,820	153,281	238,422	17,593	170,915	242,948	17,888	185,411	243,310	17,885	164,361	241,141	18,823	141,240	204,472	18,230	151,348	196,883	17,625	137,097	190,304	17,129	139,060	186,149	16,813	137,230	185,794	16,785	130,720	189,205	16,113	154,041	222,386	16,575	162,111	230,763	17,126
8	127,235	214,002	17,069	138,681	209,712	18,648	153,741	213,686	18,967	166,059	214,002	18,965	128,675	212,095	29,413	112,676	146,321	28,432	117,161	140,911	27,428	108,479	136,220	26,590	108,102	133,265	26,080	107,059	133,015	26,029	104,042	135,446	17,069	138,523	195,629	17,558	145,627	202,985	18,150
9	110,401	153,110	26,490	111,660	150,080	29,116	120,862	152,890	29,647	128,110	153,110	29,650	116,940	151,751	61,081	109,731	136,330	58,955	108,639	131,275	56,784	103,979	126,932	54,940	101,210	124,180	53,813	100,797	123,942	53,704	100,721	126,210	26,490	108,927	140,032	27,305	114,047	145,282	28,288
10	88,128	143,210	54,682	110,607	139,853	60,435	115,251	142,471	61,571	118,216	142,685	61,614	79,868	143,210	62,347	76,596	138,098	60,137	70,547	132,983	57,960	70,789	128,572	56,080	67,002	125,786	54,925	67,271	125,546	54,798	70,380	127,844	54,682	104,212	130,479	56,474	108,437	135,403	58,602
11	68,798	144,546	54,780	79,257	141,677	61,742	78,225	144,330	62,859	76,156	144,546	62,927	69,905	143,226	62,334	67,520	96,240	60,118	63,629	92,715	57,942	62,704	89,651	56,060	60,325	87,725	54,907	60,384	87,569	54,780	62,980	89,165	55,788	71,430	132,164	57,670	73,653	137,160	59,853
12	66,984	100,739	54,762	69,571	98,772	61,751	69,745	100,587	62,855	68,885	100,739	62,925	71,139	99,800	62,323	71,223	93,339	60,104	66,018	89,935	57,928	65,495	86,952	56,046	63,140	85,088	54,895	63,291	84,946	54,762	65,403	86,488	55,770	63,807	92,155	57,671	66,003	95,650	59,859
13	85,911	142,230	57,670	74,097	95,811	61,755	73,344	97,566	62,852	71,411	97,714	62,923	100,126	142,230	62,416	103,591	137,136	88,081	96,192	132,085	84,852	95,305	127,673	82,058	91,825	124,903	80,332	92,028	124,693	80,140	94,844	126,967	81,622	67,566	89,392	57,670	69,783	92,787	59,861
14	131,654	227,704	84,419	107,617	140,740	90,458	106,735	143,363	92,106	104,132	143,576	92,222	157,663	227,704	91,450	161,827	219,507	146,195	152,722	211,356	140,780	150,044	204,259	136,093	144,636	199,791	133,168	144,735	199,442	132,864	148,635	203,096	117,652	98,146	131,255	84,419	101,403	136,258	87,627
15	157,661	229,827	132,843	166,705	225,232	150,067	167,462	229,488	152,863	165,617	229,827	153,072	166,444	227,730	151,652	164,317	208,112	146,178	154,127	200,385	140,772	151,686	193,657	136,087	146,575	189,427	133,158	146,734	189,101	132,843	151,414	192,559	135,311	153,047	209,989	139,977	158,419	218,006	145,292
16	175,769	217,897	124,890	170,000	213,544	150,055	169,934	217,578	152,854	167,096	217,897	153,062	198,414	215,899	142,572	190,711	204,476	137,420	187,611	196,847	132,330	179,488	190,227	127,901	175,703	186,076	125,164	175,013	185,752	124,890	177,978	189,198	127,186	155,866	199,079	139,962	161,254	206,700	145,284
17	183,374	214,037	90,372	193,481	209,817	140,991	200,510	213,723	143,632	204,314	214,037	143,826	195,199	212,080	103,081	180,729	204,472	99,357	180,646	196,835	95,718	171,350	190,218	92,535	168,217	186,060	90,575	167,292	185,736	90,372	168,378	189,197	92,015	182,199	195,646	131,523	189,570	203,053	136,536
18	142,639	214,038	68,611	181,994	209,813	101,968	190,988	213,727	103,844	196,981	214,038	103,965	129,374	212,066	78,149	116,846	160,913	75,364	113,869	154,969	72,626	110,091	149,785	70,238	106,462	146,518	68,759	106,211	146,276	68,611	108,916	148,945	69,844	172,863	195,652	95,146	180,196	203,055	98,788
19	111,379	168,537	56,477	118,530	165,153	77,346	122,012	168,251	78,742	123,762	168,537	78,828	118,257	166,919	64,264	110,353	136,652	61,999	109,058	131,616	59,761	104,469	127,235	57,815	101,677	124,471	56,607	101,278	124,254	56,477	102,602	126,515	57,499	110,502	153,974	72,200	114,796	159,875	74,967
20	84,606	143,081	54,688	111,375	140,217	63,606	115,863	142,841	64,746	118,662	143,081	64,819	74,413	141,727	62,193	68,551	112,275	60,011	64,671	108,152	57,849	63,920	104,570	55,970	61,038	102,308	54,800	61,125	102,129	54,688	63,627	103,979	55,662	104,840	130,777	59,412	109,071	135,746	61,660
21	64,271	117,517	54,700	70,323	115,178	61,553	70,606	117,318	62,664	69,943	117,517	62,735	67,052	116,426	62,200	64,669	88,176	60,021	61,584	84,957	57,858	60,311	82,162	55,980	58,215	80,297	54,800	58,215	80,257	54,700	59,978	81,702	55,669	64,303	107,469	57,509	66,472	111,525	59,657
22	50,123	92,266	29,442	66,330	90,448	61,555	67,003	92,109	62,674	66,686	92,266	62,744	44,123	91,416	33,304	42,419	65,311	32,184	38,566	62,950	31,064	38,863	60,901	30,107	37,094	59,611	29,507	37,276	59,505	29,442	39,491	60,566	29,954	61,230	84,430	57,515	63,380	87,600	59,656
23	37,256	68,314	29,453	44,339	66,990	33,024	43,240	68,201	33,575	41,500	68,314	33,607	36,865	67,686	33,316	35,710	42,535	32,197	33,634	41,029	31,078	33,097	39,721	30,120	32,124	38,903	29,518	32,150	38,834	29,453	33,678	53,220	29,965	39,975	62,568	30,925	41,129	64,905	32,044
24	26,182	44,459	15,796	36,933	43,624	33,029	36,908	44,389	33,586	36,304	44,459	33,615	21,762	44,052	17,699	19,995	25,961	17,150	18,861	25,078	16,595	19,030	24,310	16,123	17,900	23,836	15,830	18,200	23,791	15,796	19,675	38,697	16,043	34,071	40,792	30,932	35,197	42,300	32,049
day)	2,078,266	3,264,400	1,117,915	2,141,419	2,855,140	1,380,204	2,214,497	2,908,155	1,405,168	2,252,707	2,912,559	1,406,601	2,229,603	3,241,975	1,305,049	2,109,265	2,783,002	1,345,226	2,071,585	2,680,572	1,296,701	1,986,554	2,591,593	1,254,823	1,942,745	2,535,641	1,228,839	1,935,982	2,531,116	1,226,086	1,955,023	2,613,529	1,190,788	2,015,606	2,664,093	1,289,719	2,095,447	2,764,457	1,338,004
u/h)		243,310			238,422			242,948			243,310			241,146			232,463			223,828			216,332			211,601			211,197			215,077			222,386			230,763	
u/h)			15,796			17,567			17,851			17,850			17,699			17,150			16,595			16,123			15,830			15,796			16,043			16,517			17,102

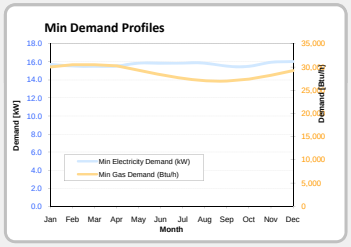
Mid-Rise Residential eQUEST Simulation Results

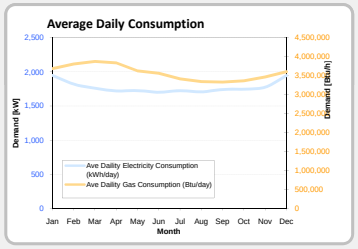
ITERATION: % construction cost premium











Electricity Demand Profiles - MR Res

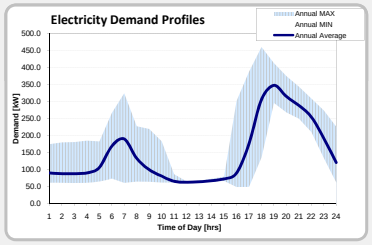
Hour	Annual Average MR Res Demand (kW)	Annual MAX MR Res Demand (kW)	Annual MIN MR Res Demand (kW)	Jan Average MR Res Demand (kW)	Jan MAX MR Res Demand (kW)	Jan MIN MR Res Demand (kW)	Feb Average MR Res Demand (kW)	Feb MAX MR Res Demand (kW)	Feb MIN MR Res Demand (kW)	Mar Average MR Res Demand (kW)	Mar MAX MR Res Demand (kW)	Mar MIN MR Res Demand (kW)	Apr Average MR Res Demand (kW)	Apr MAX MR Res Demand (kW)	Apr MIN MR Res Demand (kW)	May Average MR Res Demand (kW)	May MAX MR Res Demand (kW)	May MIN MR Res Demand (kW)	Jun Average MR Res Demand (kW)	Jun MAX MR Res Demand (kW)	Jun MIN MR Res Demand (kW)	Jul Average MR Res Demand (kW)	Jul MAX MR Res Demand (kW)	Jul MIN MR Res Demand (kW)	Aug Average MR Res Demand (kW)	Aug MAX MR Res Demand (kW)	Aug MIN MR Res Demand (kW)	Sep Average MR Res Demand (kW)	Sep MAX MR Res Demand (kW)	Sep MIN MR Res Demand (kW)	Oct Average MR Res Demand (kW)	Oct MAX MR Res Demand (kW)	Oct MIN MR Res Demand (kW)	Nov Average MR Res Demand (kW)	Nov MAX MR Res Demand (kW)	Nov MIN MR Res Demand (kW)	Dec Average MR Res Demand (kW)	Dec MAX MR Res Demand (kW)	Dec MIN MR Res Demand (kW)
1	59.2	109.9	45.5	78.0	109.9	59.0	68.1	86.8	57.2	61.8	84.3	45.6	58.0	76.6	48.9	54.1	65.1	47.2	50.9	56.8	46.7	49.4	51.8	46.2	49.2	53.3	45.6	50.3	55.0	45.5	52.4	63.6	48.8	62.5	87.6	46.6	77.1	100.4	61.5
2	58.4	109.0	44.2	76.0	109.0	58.7	66.3	85.1	59.3	60.8	75.3	50.1	58.8	69.2	49.0	54.5	65.5	47.6	50.8	56.9	45.8	48.9	51.4	44.6	48.9	51.8	45.0	48.9	54.7	44.2	51.7	58.6	44.9	60.6	86.4	46.9	75.2	102.9	62.4
3	59.1	110.1	43.8	76.2	110.1	58.2	66.2	77.1	59.3	61.5	76.6	49.3	60.3	71.3	52.0	55.3	65.6	47.0	51.4	57.4	46.8	49.2	51.7	44.3	48.9	53.3	45.8	49.0	53.8	43.8	52.7	61.0	45.1	61.6	86.0	48.8	77.1	105.5	61.5
4	60.3	114.9	44.0	76.5	114.9	57.6	67.4	85.6	59.5	63.7	86.7	49.9	61.7	72.4	53.9	56.6	65.3	49.8	52.3	59.5	47.1	49.6	52.9	45.7	49.5	54.8	46.1	49.3	54.8	44.0	53.6	63.2	44.9	63.4	90.4	50.3	79.9	110.1	61.7
5	68.1	111.9	46.9	76.2	111.9	58.0	68.4	85.3	59.5	64.7	87.8	51.7	74.4	90.6	57.3	69.0	80.5	53.9	66.0	76.3	50.7	62.4	70.7	47.6	63.2	72.4	48.7	62.8	72.2	46.9	66.3	81.7	48.1	64.0	86.9	50.9	79.9	106.4	61.6
6	90.9	131.6	53.0	87.8	131.6	59.2	81.9	96.8	60.3	79.6	107.0	56.2	103.2	130.2	64.5	95.2	119.6	58.0	96.0	113.9	55.2	93.1	111.1	55.1	94.6	111.8	55.3	94.3	114.4	53.0	94.5	120.4	53.9	77.0	107.3	56.2	93.0	122.7	64.9
7	94.5	169.4	44.0	114.6	169.4	65.4	112.3	149.1	66.8	109.4	145.4	63.2	81.4	116.1	70.0	79.3	91.2	67.5	78.7	101.0	64.7	82.6	101.9	66.1	82.8	95.4	73.8	84.7	98.2	76.7	84.1	94.5	61.9	104.2	145.6	62.4	120.9	161.6	71.9
8	62.2	130.3	18.9	83.9	89.3	81.1	82.6	88.4	79.6	80.2	89.8	71.4	44.1	107.5	18.9	50.5	111.6	18.9	44.7	122.4	18.9	49.7	130.3	18.9	45.8	116.3	18.9	48.1	125.5	18.9	50.9	114.4	18.9	83.0	91.7	78.0	83.7	90.3	81.1
9	40.5	114.9	18.9	53.6	110.0	18.9	46.5	109.2	18.9	41.7	109.8	18.9	34.3	103.3	18.9	37.5	71.7	19.4	32.9	72.6	19.4	35.6	72.2	19.4	34.2	72.4	19.4	34.6	73.6	19.4	38.8	113.8	19.4	48.8	114.9	18.9	47.5	109.9	18.9
10	28.7	75.6	19.4	40.7	75.6	19.4	36.1	73.1	19.4	33.1	74.0	19.4	23.7	71.3	19.4	22.9	28.4	20.1	22.2	28.6	20.1	22.7	28.4	20.1	22.4	28.4	20.1	22.5	28.7	20.1	24.3	69.4	20.1	36.5	75.2	19.4	37.2	75.6	19.4
11	21.4	30.8	19.7	23.8	30.7	20.1	22.8	28.6	20.1	22.2	30.4	20.1	20.5	28.4	19.7	20.1	20.3	19.7	20.2	20.3	19.7	20.1	20.3	19.7	20.2	20.3	19.7	20.2	20.3	19.7	20.4	28.2	19.7	22.9	30.5	20.1	23.1	30.8	20.1
12	20.3	22.4	19.7	20.4	22.4	19.7	20.1	20.3	19.7	20.2	20.3	19.7	20.3	20.5	19.8	20.3	20.5	19.8	20.3	20.5	19.8	20.3	20.5	19.8	20.3	20.5	19.8	20.3	20.5	19.8	20.3	20.5	19.7	20.1	20.3	19.7	20.3	22.4	19.7
13	20.4	22.6	19.8	20.5	22.6	19.8	20.3	20.5	19.8	20.3	20.5	19.8	20.4	20.5	20.0	20.4	20.5	20.0	20.4	20.5	20.0	20.4	20.5	20.0	20.4	20.5	20.0	20.4	20.5	20.0	20.4	20.5	19.8	20.3	20.5	19.8	20.5	22.6	19.8
14	20.5	22.6	20.0	20.6	22.6	20.0	20.4	20.5	20.0	20.4	20.5	20.0	20.5	20.5	20.3	20.5	20.5	20.3	20.5	20.5	20.3	20.5	20.5	20.3	20.5	20.5	20.3	20.5	20.5	20.3	20.5	20.5	20.0	20.4	20.5	20.0	20.4	22.6	20.0
15	21.5	23.4	19.4	20.7	22.6	20.3	20.5	20.5	20.3	20.5	20.5	20.3	22.2	23.4	19.4	22.0	23.4	19.4	22.3	23.4	19.4	22.1	23.4	19.4	22.2	23.4	19.4	22.2	23.4	19.4	22.0	23.4	19.4	20.5	20.5	20.3	20.5	20.5	20.3
16	35.7	142.7	15.5	22.0	25.5	19.4	22.1	23.4	19.4	22.4	23.4	19.4	34.9	110.6	15.8	49.0	135.6	15.9	42.2	125.7	15.8	50.6	142.7	15.9	46.2	132.0	15.9	47.2	138.3	15.5	46.0	137.7	15.5	22.1	23.4	19.4	22.1	23.4	19.4
17	87.1	197.1	15.5	41.6	108.6	15.7	37.1	95.9	15.5	34.9	107.7	15.5	100.0	153.1	15.5	121.8	176.0	66.9	125.5	183.8	83.5	133.5	197.1	94.5	125.7	179.3	85.8	125.6	177.9	82.2	119.9	188.1	71.7	40.1	100.9	15.9	36.5	83.4	16.0
18	131.4	196.2	67.1	105.9	161.2	68.9	99.1	160.7	67.1	97.0	161.9	67.7	141.0	161.0	68.5	146.8	168.1	135.2	149.8	177.6	137.6	151.3	168.8	142.0	148.8	161.7	141.1	167.5	196.2	148.4	168.3	180.9	161.1	101.6	164.5	67.3	98.0	152.8	67.9
19	168.0	202.6	148.0	182.9	202.6	170.5	173.3	183.2	161.6	169.1	192.5	159.8	161.1	175.8	153.4	159.6	176.3	150.0	158.4	176.4	148.0	161.1	173.8	153.0	165.2	175.6	158.2	168.7	182.2	155.3	163.7	174.5	153.1	169.6	183.6	160.4	183.3	196.3	173.4
20	160.7	186.2	148.5	169.8	186.2	161.0	162.1	167.5	152.7	160.2	177.6	152.2	154.5	163.4	148.7	155.6	166.4	150.0	158.7	172.6	150.6	160.4	170.2	155.5	159.3	166.9	155.0	160.6	170.9	148.5	156.8	173.0	150.3	160.0	169.7	152.0	169.7	181.7	159.9
21	150.8	182.1	138.2	162.1	175.6	153.4	155.0	160.3	147.6	153.8	167.5	148.2	143.7	156.1	138.9	143.5	151.7	138.2	146.4	156.3	140.7	148.1	153.1	145.3	147.4	152.7	143.5	148.9	157.0	139.1	145.5	163.9	140.7	153.3	161.6	145.9	162.4	182.1	152.5
22	134.8	175.3	118.3	152.4	167.8	142.5	145.4	151.2	138.1	143.6	154.9	137.3	124.9	146.2	118.3	123.8	128.3	118.9	125.2	131.4	120.2	127.0	130.4	123.0	126.3	130.1	121.5	127.8	135.3	119.5	125.2	149.0	119.7	143.0	151.9	136.6	153.2	175.3	143.4
23	107.0	159.3	82.5	135.2	150.9	124.1	127.5	134.8	120.1	124.8	137.1	118.9	93.3	127.1	84.0	90.0	96.4	84.0	89.5	98.0	82.5	90.7	99.6	84.2	90.4	98.4	82.8	91.9	103.1	83.7	90.9	126.1	83.4	125.0	142.0	118.7	136.5	159.3	126.5
24	74.1	135.1	46.5	106.4	135.1	92.4	98.0	112.0	88.3	93.1	110.8	83.0	62.1	102.8	48.5	56.7	73.7	46.9	53.9	67.3	46.8	54.4	64.6	46.5	53.1	65.9	46.7	54.6	67.5	47.5	56.8	94.6	46.6	94.0	114.2	85.4	107.2	130.7	94.3
day)	1,776	2,876	1,257	1,948	2,566	1,583	1,819	2,236	1,550	1,759	2,282	1,477	1,719	2,318	1,344	1,725	2,142	1,434	1,699	2,140	1,440	1,724	2,128	1,467	1,705	2,078	1,468	1,741	2,165	1,451	1,746	2,341	1,447	1,774	2,296	1,480	1,945	2,489	1,618
kW)		202.6			202.6			183.2			192.5			175.8			176.3			183.8			197.1			179.3			196.2			188.1			183.6			196.3	
kW)			15.5			15.7			15.5			15.5			15.5			15.9			15.8			15.9			15.9			15.5			15.5			15.9			16.0

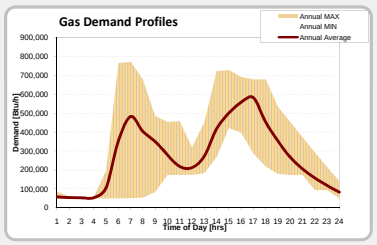
Gas Demand Profiles - MR Res

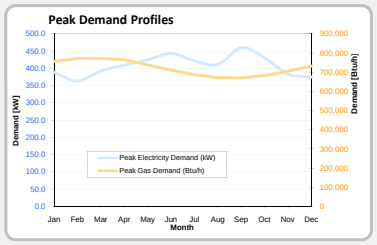
Hour	Annual Average MR Res Demand (Btu/h)	Annual MAX MR Res Demand (Btu/h)	Annual MIN MR Res Demand (Btu/h)	Jan Average MR Res Demand (Btu/h)	Jan MAX MR Res Demand (Btu/h)	Jan MIN MR Res Demand (Btu/h)	Feb Average MR Res Demand (Btu/h)	Feb MAX MR Res Demand (Btu/h)	Feb MIN MR Res Demand (Btu/h)	Mar Average MR Res Demand (Btu/h)	Mar MAX MR Res Demand (Btu/h)	Mar MIN MR Res Demand (Btu/h)	Apr Average MR Res Demand (Btu/h)	Apr MAX MR Res Demand (Btu/h)	Apr MIN MR Res Demand (Btu/h)	May Average MR Res Demand (Btu/h)	May MAX MR Res Demand (Btu/h)	May MIN MR Res Demand (Btu/h)	Jun Average MR Res Demand (Btu/h)	Jun MAX MR Res Demand (Btu/h)	Jun MIN MR Res Demand (Btu/h)	Jul Average MR Res Demand (Btu/h)	Jul MAX MR Res Demand (Btu/h)	Jul MIN MR Res Demand (Btu/h)	Aug Average MR Res Demand (Btu/h)	Aug MAX MR Res Demand (Btu/h)	Aug MIN MR Res Demand (Btu/h)	Sep Average MR Res Demand (Btu/h)	Sep MAX MR Res Demand (Btu/h)	Sep MIN MR Res Demand (Btu/h)	Oct Average MR Res Demand (Btu/h)	Oct MAX MR Res Demand (Btu/h)	Oct MIN MR Res Demand (Btu/h)	Nov Average MR Res Demand (Btu/h)	Nov MAX MR Res Demand (Btu/h)	Nov MIN MR Res Demand (Btu/h)	Dec Average MR Res Demand (Btu/h)	Dec MAX MR Res Demand (Btu/h)	Dec MIN MR Res Demand (Btu/h)
1	31,258	46,431	26,989	36,057	45,599	30,028	35,604	46,367	30,510	34,629	46,431	30,514	31,288	45,934	30,295	30,021	31,219	29,345	28,885	30,206	28,386	28,144	29,313	27,583	27,567	28,769	27,065	27,529	28,700	26,989	28,466	41,435	27,419	33,091	42,779	28,231	34,067	44,271	29,215
2	29,098	32,532	26,993	30,808	31,983	30,052	31,167	32,490	30,540	31,068	32,532	30,544	30,407	32,207	30,310	29,393	29,431	29,355	28,435	28,471	28,399	27,617	27,638	27,594	27,103	27,128	27,072	27,052	27,081	26,993	27,547	29,163	27,437	28,886	30,085	28,266	29,839	31,094	29,239
3	28,855	30,631	26,995	30,100	30,145	30,058	30,572	30,593	30,552	30,593	30,631	30,555	30,354	30,386	30,319	29,399	29,439	29,359	28,442	28,478	28,402	27,624	27,643	27,600	27,111	27,134	27,078	27,060	27,089	26,995	27,501	27,531	27,450	28,322	28,373	28,278	29,278	29,300	29,239
4	28,857	30,640	27,001	30,104	30,147	30,060	30,576	30,599	30,558	30,599	30,640	30,561	30,359	30,389	30,326	29,404	29,441	29,365	28,447	28,480	28,404	27,629	27,647	27,605	27,116	27,139	27,085	27,066	27,094	27,001	27,507	27,539	27,460	28,330	28,375	28,289	29,275	29,305	29,244
5	57,095	107,328	27,060	30,105	30,148	30,059	30,579	30,601	30,560	30,603	30,646	30,564	81,654	107,328	30,344	77,239	103,566	29,385	80,777	99,835	28,408	74,333	96,588	27,619	74,959	94,552	27,091	74,167	94,373	27,060	71,721	96,069	27,482	28,334	28,380	28,294	29,278	29,309	29,248
6	191,741	415,087	27,060	76,715	106,195	30,064	83,181	108,112	30,561	88,205	108,271	30,569	292,329	415,087	30,345	269,153	400,130	29,394	290,551	385,257	28,426	261,684	372,356	27,631	266,746	364,201	27,113	262,996	363,502	27,060	249,102	370,174	27,485	75,588	99,257	28,307	79,121	102,885	29,251
7	261,698	418,816	27,001	263,755	410,395	30,061	294,128	418,189	30,572	319,098	418,816	30,573	282,842	415,077	32,189	243,018	351,918	31,171	260,426	338,851	30,134	235,883	327,524	29,258	239,264	320,362	28,730	236,112	319,748	28,680	224,897	325,612	27,509	265,059	382,774	28,309	278,957	397,198	29,251
8	218,933	368,334	29,154	238,607	360,944	31,879	264,545	367,789	32,432	285,756	368,334	32,433	221,430	365,023	50,544	193,892	251,840	48,875	201,597	242,509	47,149	186,659	234,426	45,694	186,009	229,326	44,844	184,213	228,893	44,765	179,032	233,088	29,154	238,329	336,683	30,004	250,564	349,354	31,014
9	189,994	263,530	45,521	192,170	258,347	50,053	207,999	263,160	50,947	220,472	263,530	50,982	201,249	261,159	105,147	188,854	234,718	101,470	186,955	226,079	97,787	178,940	218,582	94,615	174,169	213,841	92,668	173,449	213,426	92,484	173,348	217,306	45,521	187,437	241,015	46,951	196,272	250,082	48,605
10	151,637	246,583	94,109	190,395	240,749	104,035	198,369	245,266	105,942	203,470	245,643	106,089	137,402	246,583	107,149	131,771	237,718	103,312	121,332	228,991	99,507	121,750	221,359	96,323	115,225	216,555	94,298	115,678	216,160	94,109	121,076	220,099	94,150	179,352	224,613	97,256	186,643	233,085	100,836
11	118,349	248,865	94,087	136,414	243,915	106,253	134,612	248,478	108,068	131,043	248,865	108,199	120,258	246,554	107,153	116,145	165,619	103,304	109,421	159,625	99,506	107,818	154,306	96,312	103,719	150,983	94,290	103,815	150,740	94,087	108,324	153,471	95,882	122,895	227,501	99,182	126,747	236,140	102,954
12	115,208	173,443	94,064	119,751	170,047	106,281	120,027	173,162	108,099	118,544	173,443	108,225	122,409	171,787	107,173	122,544	160,644	103,316	113,556	154,826	99,526	112,645	149,653	96,321	108,583	146,425	94,306	108,831	146,213	94,064	112,503	148,856	95,862	109,776	158,599	99,200	113,588	164,675	102,974
13	147,848	244,895	99,202	127,555	164,960	106,297	126,238	167,973	108,118	122,909	168,237	108,244	172,347	244,895	107,390	178,299	236,087	151,521	165,533	227,412	145,920	163,995	219,777	141,136	157,990	214,989	138,131	158,327	214,664	137,770	163,208	218,567	140,386	116,253	153,831	99,202	120,106	159,758	102,983
14	226,631	392,110	145,262	185,291	242,350	155,739	183,752	246,860	158,509	179,268	247,230	158,712	271,444	392,110	157,402	278,598	377,956	251,581	262,892	363,933	242,255	258,266	351,674	234,201	248,942	343,970	229,126	249,102	343,402	228,566	255,850	349,679	202,501	168,924	225,941	145,262	174,568	234,637	150,807
15	271,426	395,787	228,529	287,064	387,875	258,401	288,347	395,201	263,160	285,168	395,787	263,521	286,573	392,142	261,038	282,889	358,336	251,551	265,314	345,039	242,234	261,094	333,417	234,189	252,283	326,116	229,110	252,546	325,596	228,529	260,636	331,540	232,855	263,483	361,546	240,920	272,772	375,435	250,133
16	302,619	375,257	214,935	292,746	367,749	258,385	292,611	374,693	263,155	287,723	375,257	263,513	341,639	371,773	245,506	328,353	352,090	236,546	322,987	338,917	227,809	308,982	327,479	220,117	302,453	320,334	215,440	301,256	319,775	214,935	306,392	325,758	218,911	268,347	342,764	240,889	277,662	355,966	250,133
17	315,751	368,633	155,637	333,196	361,363	242,781	345,282	368,081	247,314	351,830	368,633	247,653	336,133	365,250	177,566	311,214	352,101	171,166	311,040	338,910	164,907	295,024	327,478	159,360	289,619	320,338	156,025	288,016	319,764	155,637	289,915	325,767	158,517	313,710	336,911	226,445	326,441	349,701	235,111
18	245,667	368,654	118,253	313,418	361,377	175,619	328,906	368,106	178,873	339,230	368,654	179,112	222,839	365,199	134,682	201,277	277,208	129,887	196,143	266,970	125,179	189,641	258,055	121,048	183,386	252,428	118,506	182,941	251,993	118,253	187,611	256,579	120,389	297,677	336,945	163,918	310,308	349,724	170,113
19	191,725	290,188	97,168	204,086	284,355	133,242	210,114	289,718	135,687	213,155	290,188	135,862	203,559	287,522	110,574	189,933	235,245	106,663	187,698	226,576	102,821	179,789	219,026	99,443	174,979	214,259	97,379	174,291	213,892	97,168	176,582	217,779	98,908	190,307	265,236	124,442	197,631	275,269	129,093
20	145,515	246,221	93,991	191,629	241,287	109,418	199,382	245,825	111,413	204,223	246,221	111,553	127,971	243,980	106,928	117,869	193,185	103,166	111,180	186,088	99,440	109,881	179,912	96,190	104,917	176,007	94,190	105,065	175,701	93,991	109,380	178,887	95,668	180,403	225,118	102,233	187,644	233,592	106,027
21	110,476	202,165	93,994	120,890	198,134	105,814	121,390	201,837	107,752	120,260	202,165	107,883	115,274	200,331	106,923	111,171	151,662	103,170	105,852	146,121	99,441	103,656	141,302	96,198	100,046	138,257	94,190	100,040	138,007	93,994	103,078	140,500	95,664	110,537	184,900	98,873	114,246	191,841	102,535
22	86,098	158,673	50,471	114,006	155,534	105,802	115,175	158,417	107,749	114,638	158,673	107,877	75,778	157,238	57,132	72,845	112,274	55,199	66,203	108,211	53,267	66,711	104,676	51,630	63,662	102,450	50,582	63,972	102,258	50,471	67,787	104,090	51,357	105,233	145,202	98,861	108,914	150,626	102,523
23	63,937	117,420	50,493	76,126	115,129	56,637	74,243	117,233	57,601	71,255	117,420	57,651	63,273	116,361	57,156	61,287	73,041	55,224	57,707	70,453	53,293	56,778	68,193	51,653	55,099	66,784	50,602	55,139	66,650	50,493	57,774	91,444	51,375	68,619	107,539	53,035	70,588	111,537	54,943
24	44,862	76,331	26,968	63,368	74,884	56,641	63,333	76,215	57,616	62,302	76,331	57,661	37,259	75,650	30,261	34,218	44,493	29,310	32,262	42,977	28,352	32,549	41,648	27,552	30,600	40,831	27,035	31,113	40,742	26,968	33,655	66,432	27,410	58,446	70,029	53,049	60,368	72,602	54,949
day)	3,575,264	5,618,554	1,920,935	3,684,357	4,913,610	2,373,659	3,810,131	5,004,964	2,416,288	3,876,039	5,012,578	2,419,049	3,836,068	5,579,965	2,243,853	3,628,786	4,789,361	2,312,634	3,563,634	4,613,214	2,228,955	3,417,094	4,459,673	2,156,869	3,341,547	4,363,178	2,111,955	3,329,776	4,355,464	2,107,061	3,362,892	4,497,363	2,046,752	3,467,338	4,584,396	2,217,696	3,604,871	4,757,387	2,300,419
u/h)		418,816			410,395			418,189			418,816			415,087			400,130			385,257			372,356			364,201			363,502			370,174			382,774			397,198	
u/h)			26,968			30,028			30,510			30,514			30,261			29,310			28,352			27,552			27,035			26,968			27,410			28,231			29,215

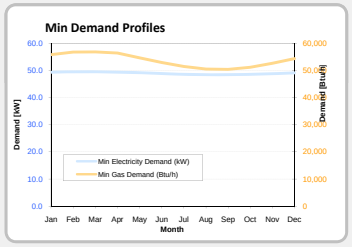
High-Rise Residential eQUEST Simulation Results

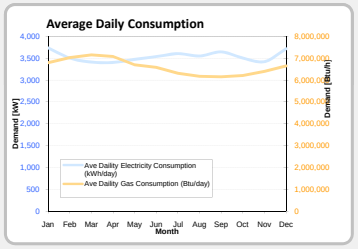
ITERATION: % construction cost premium











Electricity Demand Profiles - HR Res

Hour	Annual Average HR Res Demand (kW)	Annual MAX HR Res Demand (kW)	Annual MIN HR Res Demand (kW)	Jan Average HR Res Demand (kW)	Jan MAX HR Res Demand (kW)	Jan MIN HR Res Demand (kW)	Feb Average HR Res Demand (kW)	Feb MAX HR Res Demand (kW)	Feb MIN HR Res Demand (kW)	Mar Average HR Res Demand (kW)	Mar MAX HR Res Demand (kW)	Mar MIN HR Res Demand (kW)	Apr Average HR Res Demand (kW)	Apr MAX HR Res Demand (kW)	Apr MIN HR Res Demand (kW)
1	89.7	174.4	61.2	124.2	174.4	84.4	104.1	138.1	76.5	91.0	140.0	67.8	83.8	121.2	68.2
2	87.1	179.6	60.4	119.9	179.6	87.4	102.0	127.5	82.7	89.8	121.5	71.8	84.9	105.3	68.2
3	87.8	180.3	60.9	120.5	180.3	88.0	102.7	118.8	87.3	92.1	123.1	70.0	87.7	107.5	70.9
4	89.6	184.8	60.4	121.5	184.8	86.2	104.7	124.7	88.3	95.2	129.3	69.3	90.5	110.5	74.2
5	105.1	182.5	64.9	121.8	182.5	90.0	106.8	130.1	91.1	97.7	131.8	72.2	115.7	148.3	81.2
6	168.0	265.4	73.5	144.0	216.2	92.2	132.9	158.8	96.2	126.4	169.0	80.5	198.8	261.2	97.5
7	189.5	324.0	60.4	217.9	324.0	103.5	215.3	283.1	110.5	210.7	277.9	93.8	175.3	238.8	109.2
8	132.7	226.9	64.5	178.7	203.2	123.1	177.2	203.1	121.2	174.0	202.2	109.4	97.8	199.1	65.2
9	99.2	218.9	63.8	113.9	217.9	65.1	98.8	196.2	65.2	93.8	203.6	65.2	93.4	179.2	64.4
10	80.6	182.7	61.6	104.2	182.7	64.3	96.0	180.5	64.4	92.8	179.3	64.4	70.7	176.6	61.9
11	64.9	86.0	61.5	69.7	85.3	61.9	68.6	85.1	61.9	67.3	85.6	61.9	63.1	84.5	61.8
12	62.5	64.8	61.5	62.6	64.8	61.8	62.4	63.8	61.8	62.4	63.8	61.8	62.8	63.8	62.3
13	63.8	67.2	62.3	63.0	64.8	62.5	62.9	63.8	62.5	62.8	63.9	62.5	64.6	67.2	62.5
14	66.7	73.0	63.9	65.2	68.1	64.1	65.0	67.2	64.2	64.8	67.2	64.2	68.1	73.0	64.1
15	72.3	78.9	66.4	68.9	73.0	67.4	68.7	73.1	67.5	68.5	73.1	67.5	75.4	78.9	67.4
16	88.9	301.5	48.4	74.7	79.9	67.3	75.4	78.9	67.4	76.2	78.9	67.4	77.9	196.9	49.4
17	174.5	387.3	48.8	97.4	249.3	49.3	83.1	167.6	49.5	78.7	197.1	49.5	186.2	296.4	49.4
18	304.9	459.5	154.8	222.8	318.4	151.6	196.9	294.8	141.5	185.2	314.7	135.5	335.3	408.7	144.8
19	347.1	412.3	295.0	347.7	388.7	326.0	338.2	363.1	325.7	344.5	392.3	320.5	330.8	377.5	295.0
20	314.3	374.1	267.2	315.5	344.1	301.5	307.8	324.5	300.3	312.0	348.4	294.2	294.3	335.3	267.2
21	287.9	343.0	249.0	291.1	313.9	275.7	281.9	294.1	274.2	283.7	317.6	268.1	269.7	304.6	252.2
22	254.4	308.3	209.7	273.0	301.2	260.5	263.0	269.3	257.7	263.0	286.2	250.6	229.3	262.3	209.7
23	191.7	272.9	133.0	240.4	270.3	224.8	228.2	235.7	219.9	225.8	240.4	209.5	156.2	228.4	135.4
24	120.3	225.0	61.1	179.2	225.0	151.9	161.5	185.7	142.3	154.2	191.5	134.4	91.0	169.0	65.0
day)	3,544	5,573	2,394	3,738	4,892	3,011	3,504	4,228	2,980	3,413	4,399	2,812	3,403	4,594	2,547
kW)		459.5			388.7			363.1			392.3			408.7	
kW)			48.4			49.3			49.5			49.5			49.4

Hour	May Average HR Res Demand (kW)	May MAX HR Res Demand (kW)	May MIN HR Res Demand (kW)	Jun Average HR Res Demand (kW)	Jun MAX HR Res Demand (kW)	Jun MIN HR Res Demand (kW)	Jul Average HR Res Demand (kW)	Jul MAX HR Res Demand (kW)	Jul MIN HR Res Demand (kW)	Aug Average HR Res Demand (kW)	Aug MAX HR Res Demand (kW)	Aug MIN HR Res Demand (kW)	Sep Average HR Res Demand (kW)	Sep MAX HR Res Demand (kW)	Sep MIN HR Res Demand (kW)
1	78.0	96.5	65.1	76.4	89.7	64.3	73.5	91.6	61.2	73.7	91.2	63.1	79.4	109.3	63.5
2	77.9	99.9	64.6	74.1	85.2	62.6	69.9	87.3	60.4	70.7	84.7	61.8	74.9	107.5	62.1
3	78.8	100.7	60.9	73.0	81.7	62.9	69.3	82.3	62.0	69.6	79.9	62.3	72.9	101.5	64.1
4	81.2	100.9	66.1	74.0	83.4	62.1	69.6	77.4	60.4	69.1	77.3	62.2	72.6	96.6	63.9
5	105.9	132.0	79.0	101.0	117.8	71.0	95.3	114.9	65.3	95.7	113.2	64.9	98.0	132.3	69.8
6	185.1	241.4	88.8	196.7	253.1	87.2	189.4	253.5	83.6	190.6	246.7	83.3	193.1	265.4	88.2
7	163.6	200.9	108.1	169.6	200.4	111.1	171.1	200.1	113.9	173.8	200.5	113.1	175.5	200.9	117.2
8	105.1	187.9	65.0	98.8	207.8	64.8	104.6	226.9	64.6	97.8	186.2	64.5	100.0	201.2	64.5
9	102.8	175.7	64.2	92.8	179.4	64.1	98.6	178.4	63.8	95.3	178.8	63.8	95.0	181.2	63.8
10	69.1	84.3	61.8	67.2	84.6	61.7	68.2	84.1	61.7	67.5	84.0	61.6	67.7	84.5	61.6
11	62.3	63.6	61.7	62.2	63.5	61.6	62.2	63.4	61.5	62.1	63.3	61.5	62.1	63.3	61.5
12	62.8	63.7	62.4	62.6	63.6	62.3	62.6	63.4	62.3	62.5	63.4	62.2	62.5	63.4	62.2
13	64.9	67.0	64.0	64.5	66.8	63.9	64.5	66.6	63.8	64.4	66.5	63.7	64.4	66.5	63.7
14	68.6	72.7	67.3	68.1	72.4	67.1	68.1	72.1	66.9	67.8	72.0	66.8	67.8	72.0	66.8
15	74.8	78.7	67.1	75.6	78.5	66.8	74.7	78.3	66.6	74.9	78.2	66.5	74.8	78.2	66.4
16	101.7	261.5	49.1	94.3	245.5	48.8	110.5	301.5	48.6	101.4	257.3	48.4	104.6	283.7	48.4
17	234.0	342.7	136.0	245.8	359.0	139.3	263.4	387.3	170.1	248.7	349.6	148.1	253.7	353.2	138.5
18	365.4	424.4	319.8	382.5	442.8	345.0	389.3	421.2	370.1	382.6	411.2	362.9	402.5	459.5	355.2
19	339.4	388.9	295.1	351.8	399.8	318.8	359.6	391.5	340.8	359.1	389.1	338.9	364.5	399.3	322.3
20	305.2	344.9	268.9	321.2	359.8	288.5	329.0	362.2	306.8	323.8	347.0	302.6	328.9	360.9	290.3
21	277.8	313.4	249.0	292.5	325.7	263.7	300.0	324.7	284.8	296.8	317.0	278.2	303.2	331.0	268.9
22	234.0	262.6	217.0	247.0	274.5	222.0	254.6	276.1	241.1	252.2	270.0	234.5	259.0	286.9	225.6
23	153.3	181.6	133.0	160.8	191.0	134.6	168.6	201.3	150.1	166.2	193.3	144.6	174.1	213.5	137.5
24	83.6	112.4	64.3	84.1	122.0	61.1	88.9	115.7	69.6	84.8	123.1	63.6	93.5	130.2	65.5
day)	3,475	4,398	2,778	3,537	4,448	2,855	3,606	4,522	3,000	3,551	4,344	2,943	3,645	4,642	2,892
kW)		424.4			442.8			421.2			411.2			459.5	
kW)			49.1			48.8			48.6			48.4			48.4

Hour	Oct Average HR Res Demand (kW)	Oct MAX HR Res Demand (kW)	Oct MIN HR Res Demand (kW)	Nov Average HR Res Demand (kW)	Nov MAX HR Res Demand (kW)	Nov MIN HR Res Demand (kW)	Dec Average HR Res Demand (kW)	Dec MAX HR Res Demand (kW)	Dec MIN HR Res Demand (kW)
1	77.4	105.2	69.1	93.1	129.5	70.2	122.7	158.2	97.3
2	74.4	84.5	67.1	89.0	126.8	73.2	118.7	158.1	96.4
3	75.4	86.8	66.7	91.0	127.0	73.4	121.3	163.0	94.9
4	77.0	90.0	64.9	94.5	135.4	72.2	125.8	170.7	99.5
5	101.1	129.1	69.7	95.7	131.7	71.0	126.4	165.4	99.5
6	184.1	245.2	73.5	121.0	170.4	77.0	151.6	198.3	105.1
7	172.4	202.3	90.8	199.3	278.3	90.6	230.3	307.9	119.6
8	101.7	187.0	64.6	173.9	202.4	118.1	184.7	202.9	129.0
9	98.2	180.8	63.9	100.6	202.0	64.7	106.0	218.9	64.9
10	71.3	156.8	61.7	96.4	177.3	64.0	96.4	182.5	64.2
11	62.8	80.5	61.5	68.3	84.1	61.7	68.1	86.0	61.8
12	62.5	63.4	61.5	62.2	63.5	61.6	62.4	64.7	61.7
13	64.5	66.6	62.9	62.6	63.5	62.3	62.8	64.7	62.4
14	68.0	72.1	65.7	64.6	66.7	63.9	64.8	66.9	64.0
15	74.4	78.2	66.6	68.1	72.4	67.0	68.3	72.7	67.2
16	98.5	264.6	48.5	74.7	78.4	66.8	75.1	78.6	67.1
17	226.3	359.3	134.5	86.6	182.5	48.8	87.8	195.0	49.0
18	380.6	429.8	321.7	195.8	309.5	134.8	213.0	293.6	156.0
19	343.4	412.3	295.2	342.4	383.2	320.9	343.2	375.1	327.2
20	310.8	374.1	270.0	311.6	347.4	294.0	311.2	330.2	298.9
21	285.8	343.0	252.0	284.0	318.6	265.7	288.1	314.0	273.1
22	242.8	308.3	213.3	263.8	291.3	249.1	271.5	302.2	256.0
23	161.9	257.4	134.4	226.6	247.3	211.9	240.0	272.9	225.1
24	90.3	180.5	66.7	156.7	175.8	139.1	178.3	214.9	152.9
day)	3,506	4,758	2,747	3,423	4,365	2,822	3,718	4,657	3,093
kW)		429.8			383.2			375.1	
kW)			48.5			48.8			49.0

Gas Demand Profiles - HR Res

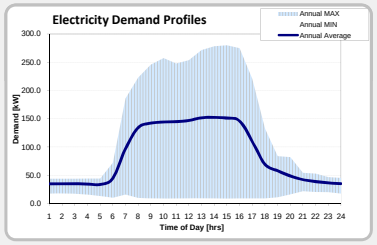
Hour	Annual Average HR Res Demand (Btu/h)	Annual MAX HR Res Demand (Btu/h)	Annual MIN HR Res Demand (Btu/h)	Jan Average HR Res Demand (Btu/h)	Jan MAX HR Res Demand (Btu/h)	Jan MIN HR Res Demand (Btu/h)	Feb Average HR Res Demand (Btu/h)	Feb MAX HR Res Demand (Btu/h)	Feb MIN HR Res Demand (Btu/h)	Mar Average HR Res Demand (Btu/h)	Mar MAX HR Res Demand (Btu/h)	Mar MIN HR Res Demand (Btu/h)	Apr Average HR Res Demand (Btu/h)	Apr MAX HR Res Demand (Btu/h)	Apr MIN HR Res Demand (Btu/h)
1	58,088	85,955	50,383	66,841	84,387	55,788	66,044	85,836	56,695	64,279	85,955	56,757	58,121	85,077	56,350
2	54,096	60,324	50,391	57,149	59,280	55,811	57,844	60,244	56,718	57,691	60,324	56,780	56,478	59,767	56,350
3	53,624	56,813	50,394	55,832	55,852	55,816	56,731	56,740	56,718	56,799	56,813	56,785	56,368	56,382	56,359
4	53,628	56,813	50,396	55,833	55,852	55,818	56,733	56,742	56,722	56,801	56,813	56,788	56,369	56,383	56,361
5	105,639	198,107	50,403	55,834	55,852	55,819	56,734	56,743	56,724	56,802	56,814	56,790	150,856	198,107	56,363
6	353,676	765,041	50,404	141,696	195,941	55,822	153,631	199,536	56,725	162,908	199,826	56,792	538,950	765,041	56,363
7	482,557	771,895	50,396	486,254	756,320	55,822	542,226	770,739	56,725	588,245	771,895	56,792	521,482	765,044	59,759
8	403,722	678,913	54,201	439,937	665,237	59,178	487,737	677,898	60,146	526,846	678,913	60,219	408,325	672,897	93,359
9	350,356	485,842	84,053	354,260	476,155	92,401	383,494	485,129	94,020	406,525	485,842	94,128	371,149	481,547	193,805
10	279,729	454,464	173,475	350,951	443,572	191,750	365,731	451,942	195,284	375,185	452,612	195,519	253,584	454,464	198,077
11	218,441	458,632	174,025	251,541	449,475	196,071	248,309	457,950	199,594	241,788	458,632	199,873	222,017	454,470	198,057
12	212,653	319,738	173,986	220,852	313,435	196,119	221,441	319,250	199,598	218,759	319,738	199,879	225,962	316,781	198,049
13	272,782	451,494	183,165	235,234	304,085	196,145	232,884	309,709	199,607	226,796	310,183	199,892	317,947	451,494	198,283
14	417,915	722,697	268,038	341,599	446,660	287,210	338,837	455,032	292,424	330,619	455,718	292,850	500,496	722,697	290,408
15	500,435	729,384	421,720	529,083	714,750	476,317	531,519	728,301	485,196	525,703	729,384	485,916	528,365	722,733	481,474
16	557,888	691,549	396,454	539,554	677,681	476,295	539,376	690,527	485,186	530,412	691,549	485,903	629,808	685,215	452,614
17	582,031	679,362	286,981	614,069	665,907	447,524	636,406	678,333	455,927	648,512	679,362	456,612	619,614	673,167	327,265
18	452,754	679,371	217,906	577,602	665,906	323,641	606,187	678,348	329,639	625,247	679,371	330,114	410,716	673,124	248,061
19	353,556	534,664	179,583	376,118	523,937	245,388	387,258	533,845	249,882	392,865	534,664	250,215	375,412	529,657	204,137
20	268,566	453,886	173,830	353,334	444,800	201,904	367,657	453,205	205,613	376,601	453,886	205,905	236,273	449,826	197,544
21	204,065	372,819	173,842	223,109	365,383	195,376	224,073	372,265	198,968	222,027	372,819	199,254	212,902	369,526	197,549
22	159,164	292,727	93,710	210,452	286,928	195,379	212,648	292,294	198,973	211,691	292,727	199,259	140,143	290,160	105,905
23	118,334	216,741	93,723	140,678	212,499	104,809	137,249	216,424	106,652	131,777	216,741	106,797	117,095	214,859	105,917
24	83,178	141,048	50,358	117,170	138,354	104,818	117,144	140,846	106,662	115,277	141,048	106,806	69,151	139,847	56,327
day)	6,596,871	########	3,551,816	6,794,982	9,058,248	4,381,019	7,027,893	9,227,878	4,460,397	7,150,154	9,241,629	4,466,625	7,077,582	10,288,265	4,144,734
u/h)		771,895			756,320			770,739			771,895			765,044	
u/h)			50,358			55,788			56,695			56,757			56,327

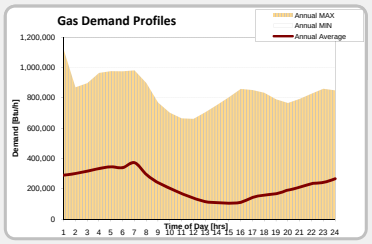
Hour	May Average HR Res Demand (Btu/h)	May MAX HR Res Demand (Btu/h)	May MIN HR Res Demand (Btu/h)	Jun Average HR Res Demand (Btu/h)	Jun MAX HR Res Demand (Btu/h)	Jun MIN HR Res Demand (Btu/h)	Jul Average HR Res Demand (Btu/h)	Jul MAX HR Res Demand (Btu/h)	Jul MIN HR Res Demand (Btu/h)	Aug Average HR Res Demand (Btu/h)	Aug MAX HR Res Demand (Btu/h)	Aug MIN HR Res Demand (Btu/h)	Sep Average HR Res Demand (Btu/h)	Sep MAX HR Res Demand (Btu/h)	Sep MIN HR Res Demand (Btu/h)
1	55,810	57,995	54,619	53,761	56,149	52,899	52,415	54,545	51,408	51,355	53,534	50,383	51,300	53,450	50,383
2	54,636	54,653	54,624	52,915	52,928	52,904	51,425	51,435	51,415	50,483	50,491	50,475	50,401	50,413	50,391
3	54,639	54,654	54,628	52,918	52,929	52,908	51,429	51,437	51,418	50,486	50,493	50,479	50,405	50,417	50,394
4	54,641	54,655	54,630	52,920	52,930	52,911	51,431	51,438	51,420	50,488	50,495	50,481	50,407	50,418	50,396
5	142,754	191,229	54,633	149,314	184,376	52,913	137,463	178,436	51,427	138,618	174,676	50,484	137,167	174,358	50,403
6	496,288	737,545	54,634	535,749	710,166	52,913	482,592	686,440	51,428	491,919	671,409	50,485	485,015	670,134	50,404
7	448,163	648,742	57,905	480,285	624,705	56,063	435,081	603,871	54,471	441,306	590,671	53,460	435,503	589,552	53,374
8	357,580	464,332	90,247	371,842	447,173	87,150	344,285	432,312	84,483	343,075	422,905	82,801	339,769	422,112	82,655
9	348,280	432,536	187,055	344,852	416,539	180,255	330,037	402,720	174,414	321,237	393,977	170,774	319,925	393,235	170,450
10	243,205	438,229	191,084	224,036	422,030	184,166	224,777	408,000	178,187	212,738	399,141	174,480	213,590	398,382	174,086
11	214,457	305,516	191,055	202,129	294,334	184,138	199,166	284,591	178,151	191,590	278,461	174,442	191,768	277,972	174,025
12	226,237	296,356	191,032	209,736	285,544	184,118	208,052	276,066	178,127	200,547	270,123	174,422	201,006	269,675	173,986
13	328,944	435,331	279,802	305,482	419,295	269,551	302,645	405,277	260,662	291,565	396,465	255,129	292,184	395,793	254,502
14	513,713	696,673	464,169	484,833	670,811	446,995	476,310	648,274	432,092	459,117	634,076	422,754	459,408	632,958	421,779
15	521,617	660,525	464,119	489,292	636,012	446,965	481,519	614,649	432,067	465,271	601,195	422,723	465,753	600,156	421,720
16	605,369	649,012	436,257	595,530	624,799	420,134	569,732	603,796	406,059	557,690	590,595	397,350	555,487	589,545	396,454
17	573,686	649,006	315,433	573,415	624,771	303,881	543,896	603,771	293,855	533,928	590,557	287,555	530,990	589,510	286,981
18	370,928	510,625	239,269	361,489	491,744	230,596	349,482	475,329	223,073	337,951	464,971	218,324	337,162	464,132	217,906
19	350,370	433,780	197,013	346,304	417,815	189,937	331,755	403,962	183,798	322,884	395,194	179,926	321,630	394,467	179,583
20	217,713	356,405	190,667	205,441	343,347	183,832	203,069	332,018	177,901	193,916	324,847	174,160	194,198	324,249	173,830
21	205,380	279,926	190,677	195,630	269,741	183,842	191,604	260,906	177,914	184,948	255,314	174,171	184,950	254,845	173,842
22	134,770	207,365	102,370	122,583	199,905	98,852	123,538	193,435	95,807	117,917	189,341	93,884	118,503	188,996	93,710
23	113,463	135,081	102,382	106,915	130,338	98,867	105,224	126,222	95,820	102,129	123,620	93,897	102,220	123,401	93,723
24	63,574	82,470	54,595	60,016	79,704	52,875	60,564	77,302	51,384	56,973	75,786	50,444	57,937	75,659	50,358
day)	6,696,219	8,832,640	4,272,899	6,577,387	8,508,084	4,119,664	6,307,492	8,226,232	3,986,781	6,168,131	8,048,336	3,903,568	6,146,679	8,033,829	3,895,333
u/h)		737,545			710,166			686,440			671,409			670,134	
u/h)			54,595			52,875			51,384			50,444			50,358

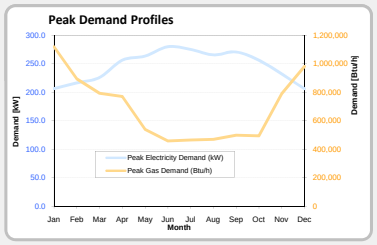
Hour	Oct Average HR Res Demand (Btu/h)	Oct MAX HR Res Demand (Btu/h)	Oct MIN HR Res Demand (Btu/h)	Nov Average HR Res Demand (Btu/h)	Nov MAX HR Res Demand (Btu/h)	Nov MIN HR Res Demand (Btu/h)	Dec Average HR Res Demand (Btu/h)	Dec MAX HR Res Demand (Btu/h)	Dec MIN HR Res Demand (Btu/h)
1	52,988	76,905	51,153	61,461	79,256	52,578	63,183	81,951	54,268
2	51,274	54,273	51,161	53,686	55,853	52,605	55,372	57,655	54,291
3	51,176	51,190	51,164	52,631	52,641	52,612	54,310	54,320	54,296
4	51,178	51,191	51,167	52,634	52,645	52,615	54,312	54,321	54,299
5	132,620	177,422	51,172	52,635	52,646	52,618	54,312	54,322	54,300
6	459,380	682,363	51,173	139,680	183,209	52,625	146,129	189,859	54,302
7	414,803	600,290	51,176	488,713	705,488	52,626	514,257	732,029	54,302
8	330,164	429,787	54,201	439,487	620,598	55,754	461,961	643,906	57,549
9	319,646	400,411	84,053	345,614	444,272	86,649	361,813	460,928	89,686
10	223,415	405,667	173,475	330,682	413,877	179,193	344,047	429,413	185,819
11	199,966	283,009	177,209	226,712	419,300	183,145	233,739	435,118	190,013
12	207,671	274,546	177,161	202,559	292,441	183,160	209,503	303,488	190,047
13	301,084	402,986	259,183	214,498	283,695	183,165	221,513	294,449	190,064
14	471,752	644,529	373,409	311,528	416,534	268,038	321,846	432,397	278,165
15	480,574	611,113	429,531	485,724	666,360	444,270	502,756	691,779	461,133
16	564,869	600,472	403,735	494,686	631,770	444,229	511,768	655,923	461,125
17	534,410	600,469	292,154	578,247	620,877	417,473	601,628	644,411	433,345
18	345,710	472,581	221,789	548,613	620,902	301,998	571,867	644,418	313,498
19	325,763	401,601	182,757	350,674	488,517	229,131	364,252	507,170	237,784
20	202,085	330,085	176,895	332,722	415,088	188,746	345,997	430,631	195,653
21	190,497	259,397	176,895	204,121	341,115	182,676	210,872	353,800	189,324
22	125,486	192,332	95,288	194,371	268,000	182,683	201,076	277,894	189,325
23	107,029	169,087	95,300	126,927	198,631	98,272	130,481	205,881	101,697
24	62,575	122,984	51,129	108,182	129,528	98,284	111,649	134,145	101,708
day)	6,206,116	8,294,691	3,782,329	6,396,790	8,453,243	4,095,144	6,648,643	8,770,208	4,245,990
u/h)		682,363			705,488			732,029	
u/h)			51,129			52,578			54,268

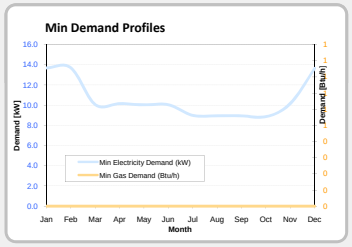
Commercial eQUEST Simulation Results

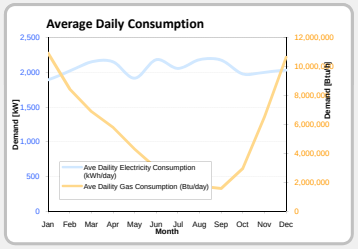
ITERATION: % construction cost premium











Electricity Demand Profiles - Commercial

Hour	Annual Average	Annual MAX	Annual MIN	Jan Average	Jan MAX	Jan MIN	Feb Average	Feb MAX	Feb MIN	Mar Average	Mar MAX	Mar MIN	Apr Average	Apr MAX	Apr MIN
	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)
1	34.6	44.0	17.7	35.6	44.0	19.7	35.9	44.0	18.8	36.1	43.9	18.8	35.8	43.8	18.8
2	34.7	44.0	17.7	35.7	44.0	22.5	36.2	44.0	18.8	36.3	43.9	18.8	36.0	43.8	18.8
3	34.8	44.0	17.7	35.7	44.0	22.5	36.5	43.9	19.7	36.6	43.9	18.8	36.1	43.8	18.8
4	34.2	44.1	15.9	35.7	44.0	22.5	36.8	43.9	22.5	37.2	43.9	18.8	36.3	43.9	18.8
5	33.4	44.1	13.1	35.7	44.0	22.5	37.0	43.9	22.5	37.4	43.9	18.8	34.7	43.8	16.7
6	44.1	72.3	10.2	35.7	44.0	22.5	34.9	41.8	20.4	35.5	41.8	16.7	52.6	70.3	12.4
7	96.4	186.1	15.9	53.0	74.0	19.7	52.9	70.4	16.1	55.3	70.4	12.4	126.3	180.5	11.1
8	134.1	222.8	10.0	117.6	182.3	15.4	126.4	180.7	13.9	134.5	180.4	10.1	143.8	202.1	13.7
9	141.5	245.8	8.9	127.6	202.6	13.8	137.3	202.2	13.7	147.8	201.8	10.0	151.8	205.8	13.8
10	144.4	257.5	9.0	128.8	206.4	13.8	139.9	206.2	13.8	153.6	205.7	10.1	152.1	205.3	13.8
11	144.6	247.8	9.0	128.4	205.8	13.7	141.9	205.6	13.8	153.7	205.0	10.1	150.5	212.3	10.1
12	146.7	253.8	8.9	127.2	201.8	13.8	139.7	201.9	13.8	151.0	201.3	10.2	151.8	220.5	10.2
13	151.6	271.5	9.0	127.5	202.2	13.8	140.1	201.9	13.8	151.7	211.1	10.3	157.3	246.9	10.4
14	152.4	278.4	9.0	128.8	205.8	13.8	142.2	205.4	13.8	154.3	213.5	10.3	158.2	250.8	10.4
15	151.2	280.0	8.9	126.6	206.1	13.7	142.7	213.8	13.8	155.3	217.4	10.2	157.9	256.3	10.4
16	146.3	274.9	9.0	125.7	204.3	13.7	140.4	216.4	13.7	153.9	225.9	10.2	151.3	254.7	10.4
17	110.4	220.8	9.0	126.8	197.6	18.1	133.5	196.1	13.7	143.0	198.1	10.2	94.7	192.8	13.7
18	69.4	132.6	9.0	86.4	125.0	25.4	84.9	117.1	17.5	90.3	117.0	13.8	62.8	116.8	17.4
19	58.0	83.9	11.2	58.6	82.1	26.8	58.9	75.4	23.9	61.9	75.5	20.2	64.0	78.5	23.1
20	48.8	82.1	16.2	59.0	82.1	26.8	61.8	78.3	26.8	64.8	78.3	23.1	46.0	78.3	23.1
21	41.8	54.5	21.9	42.3	54.5	26.8	43.3	54.4	26.8	44.3	51.6	23.1	43.0	50.7	23.1
22	38.8	52.8	20.5	41.7	52.8	26.8	42.3	52.8	26.8	43.2	52.7	23.1	38.7	49.0	21.7
23	36.2	46.7	20.2	37.8	46.7	25.4	38.2	46.7	25.4	38.4	46.6	24.4	37.0	45.2	23.0
24	35.0	45.3	17.7	36.7	45.3	24.0	36.8	45.3	24.0	37.3	45.2	23.0	35.6	43.8	18.8
day)	2,064	3,530	315	1,895	2,841	477	2,021	2,832	448	2,154	2,859	376	2,154	3,180	383
kW)		280.0			206.4			216.4			225.9			256.3	
kW)			8.9			13.7			13.7			10.0			10.1

Hour	May Average	May MAX	May MIN	Jun Average	Jun MAX	Jun MIN	Jul Average	Jul MAX	Jul MIN	Aug Average	Aug MAX	Aug MIN	Sep Average	Sep MAX	Sep MIN	Oct Average	Oct MAX	Oct MIN	Nov Average	Nov MAX	Nov MIN	Dec Average	Dec MAX	Dec MIN
	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)
1	33.2	43.8	18.8	34.7	43.7	18.8	33.0	40.0	17.7	33.3	40.0	17.7	33.1	40.0	17.7	32.6	43.7	17.7	34.8	43.9	18.8	37.0	44.0	22.5
2	33.3	43.8	18.8	34.7	43.7	18.8	33.0	40.0	18.8	33.5	40.0	17.7	33.2	40.0	17.7	32.6	43.7	17.7	35.1	43.9	18.8	37.0	44.0	22.5
3	33.3	43.8	18.8	34.7	43.7	18.8	33.1	40.0	18.8	33.5	40.0	17.7	33.3	40.0	17.7	32.6	43.7	17.7	35.3	43.9	18.8	37.0	44.0	22.5
4	30.7	40.9	16.0	31.9	40.9	15.9	30.3	37.1	15.9	33.5	40.0	17.7	33.4	40.0	17.7	32.6	43.7	17.7	35.4	43.9	18.8	37.0	44.1	22.5
5	27.9	38.1	13.1	29.0	38.0	13.1	27.4	34.3	13.1	33.5	40.0	17.7	33.4	40.0	17.7	32.8	43.7	18.8	35.6	43.9	18.8	37.0	44.1	22.6
6	46.3	67.9	10.2	49.9	67.9	10.2	46.5	64.2	10.2	52.5	68.5	14.5	51.9	68.5	14.5	49.9	72.3	14.5	35.8	43.9	18.8	37.0	44.1	22.6
7	117.9	180.1	10.0	131.5	182.3	10.0	123.6	179.7	10.1	131.0	181.3	11.5	130.2	186.1	11.6	121.6	182.4	11.6	54.8	73.9	15.9	56.4	74.1	19.7
8	130.6	201.5	10.1	148.0	215.7	10.1	137.9	203.3	10.0	142.7	202.6	10.0	141.7	222.8	10.0	131.7	203.4	10.1	125.4	181.8	11.7	128.3	182.2	15.4
9	135.3	218.0	10.1	155.2	245.8	10.1	142.4	222.7	10.1	148.5	215.6	9.0	149.6	232.0	8.9	132.7	215.5	8.9	135.4	201.9	10.2	138.9	202.3	13.9
10	136.5	229.6	10.1	158.5	257.5	10.1	146.5	236.5	10.1	151.4	225.5	9.0	153.7	247.0	9.0	136.3	232.6	9.0	136.8	205.5	10.2	138.9	206.1	13.8
11	135.1	226.3	10.1	158.4	245.9	10.2	146.9	233.9	9.0	152.8	234.7	9.0	154.2	247.8	9.0	136.8	232.6	9.0	138.1	205.2	10.1	138.7	205.7	13.7
12	137.7	237.7	10.1	162.6	251.9	10.2	153.6	245.1	9.0	161.5	245.9	8.9	160.2	253.8	9.0	140.3	237.4	9.0	137.4	211.5	10.2	137.4	202.1	13.8
13	143.7	263.5	10.1	173.1	271.5	10.1	163.4	269.3	9.0	171.3	265.6	9.0	168.2	267.8	9.0	147.0	256.0	9.0	138.2	214.7	10.2	137.6	202.1	13.7
14	144.0	261.2	10.1	171.3	278.4	10.1	162.8	272.1	9.0	170.2	262.0	9.0	169.9	270.9	9.0	147.9	250.7	9.0	140.0	231.2	10.2	138.5	205.7	13.7
15	143.2	258.7	10.1	169.2	280.0	10.2	161.8	275.3	9.0	167.8	253.8	9.0	167.6	268.4	9.0	145.6	254.5	8.9	138.3	228.1	10.2	137.9	206.0	13.6
16	136.5	244.8	10.1	159.4	274.1	10.1	153.6	274.9	9.0	160.2	242.5	11.1	158.0	248.4	11.0	138.3	244.1	11.0	138.6	232.2	10.2	139.4	204.3	13.8
17	79.2	146.5	10.1	92.9	166.3	10.1	89.5	151.1	9.0	98.7	152.4	17.5	100.2	159.7	17.5	99.9	156.0	17.4	138.2	220.8	14.5	139.6	197.6	18.2
18	45.4	77.0	10.1	51.0	84.9	10.1	48.1	73.5	9.0	61.2	87.3	21.8	61.0	85.9	21.9	58.2	84.5	19.1	91.7	132.6	21.7	92.8	124.9	25.4
19	47.9	72.7	12.3	53.0	80.5	12.3	48.8	67.4	11.2	61.5	83.6	21.9	61.3	83.9	21.9	58.2	78.1	23.1	60.9	78.2	23.1	61.7	79.2	26.8
20	35.4	44.9	17.4	37.3	45.5	17.4	35.2	44.8	16.2	41.7	49.3	23.1	41.4	49.3	21.9	40.5	50.5	23.1	61.0	79.1	23.1	62.1	82.0	26.8
21	40.2	49.0	23.1	41.9	49.0	23.1	39.9	49.0	23.1	40.7	48.9	23.1	40.4	48.9	21.9	39.7	49.0	23.1	42.6	51.5	23.1	43.8	54.4	26.9
22	35.9	42.9	21.7	37.3	42.8	21.7	35.5	42.8	21.7	36.0	42.8	21.7	35.7	42.8	20.5	35.4	42.8	21.7	41.7	52.7	23.1	43.2	52.8	26.9
23	34.6	41.4	20.2	35.9	41.4	20.2	34.1	41.4	20.2	34.6	41.4	20.2	34.4	41.4	20.2	34.0	41.4	20.2	37.2	46.7	21.7	38.9	46.7	25.5
24	34.0	43.8	18.8	34.5	43.7	18.8	32.1	40.0	17.7	34.0	40.0	17.7	33.0	40.0	17.7	31.9	43.7	17.7	36.1	45.3	20.2	37.8	45.3	24.0
day)	1,918	3,118	331	2,186	3,335	331	2,059	3,178	317	2,186	3,144	365	2,179	3,265	362	1,979	3,146	365	2,004	2,956	392	2,034	2,838	481
kW)		263.5			280.0			275.3			265.6			270.9			256.0			232.2			206.1	
kW)			10.0			10.0			9.0			8.9			8.9			8.9			10.1			13.6

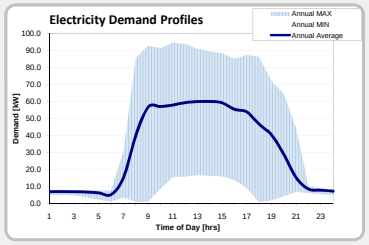
Gas Demand Profiles - Commercial

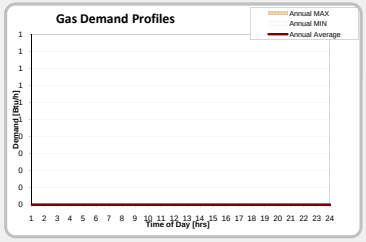
Hour	Annual Average	Annual MAX	Annual MIN	Jan Average	Jan MAX	Jan MIN	Feb Average	Feb MAX	Feb MIN	Mar Average	Mar MAX	Mar MIN	Apr Average	Apr MAX	Apr MIN
	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)
1	289,508	1,120,000	0	595,429	1,120,000	211,777	429,966	770,219	177,917	315,532	641,412	151,165	312,308	677,619	162,120
2	300,475	870,378	0	599,946	841,739	281,753	453,146	805,879	186,436	332,141	672,743	155,944	333,170	717,181	167,379
3	316,298	897,743	0	613,067	869,497	271,566	479,853	796,645	194,085	365,360	722,303	157,669	350,605	749,088	181,349
4	333,264	965,347	0	623,764	898,077	274,120	507,091	801,633	212,670	418,529	775,680	158,115	376,621	761,659	188,477
5	344,761	976,161	0	628,393	883,621	298,398	543,625	830,971	294,522	448,038	788,481	158,470	397,240	770,310	188,515
6	339,096	975,192	0	627,676	849,504	331,571	562,384	862,723	276,830	472,543	793,416	169,188	377,050	756,570	127,158
7	372,067	981,508	0	617,146	892,041	360,992	572,846	894,640	277,558	468,203	788,896	127,748	350,988	727,385	157,463
8	295,103	898,577	0	509,483	851,165	161,153	436,361	765,225	159,517	364,152	679,068	0	332,161	579,750	182,681
9	239,725	770,018	0	422,562	770,018	204,135	364,059	603,259	148,172	345,327	572,360	169,867	290,574	427,435	148,074
10	204,091	702,581	0	435,182	682,722	213,937	359,569	501,351	204,570	320,491	554,579	144,521	216,216	398,555	0
11	167,936	665,645	0	395,463	643,759	203,895	309,322	424,353	162,729	269,051	488,565	121,161	172,508	399,055	0
12	139,162	632,966	0	356,877	662,431	203,684	260,446	383,361	133,075	223,878	420,527	0	140,064	379,705	0
13	114,904	705,448	0	319,165	705,448	0	219,825	384,702	124,781	193,226	421,832	0	104,267	359,310	0
14	108,461	754,144	0	300,454	754,144	0	199,828	366,028	0	171,703	406,382	0	110,891	339,665	0
15	105,133	804,960	0	284,561	804,960	0	186,268	323,016	0	164,452	464,130	0	106,112	319,869	0
16	110,609	859,632	0	279,106	859,632	0	178,397	328,419	0	159,135	506,332	0	128,798	444,183	0
17	142,795	852,452	0	317,229	852,452	127,618	195,219	331,013	0	189,702	546,200	0	154,339	445,131	0
18	158,533	833,543	0	370,429	833,543	182,653	248,512	388,733	0	210,782	584,790	0	154,013	441,204	0
19	167,204	791,244	0	351,467	791,244	155,599	266,455	494,632	158,195	204,167	641,817	0	217,043	454,628	0
20	192,019	766,692	0	380,425	766,692	149,362	265,693	549,721	139,595	218,660	617,400	133,305	187,290	375,228	0
21	209,509	794,321	0	410,665	744,525	162,174	302,985	596,437	149,800	231,027	601,003	118,114	218,914	446,841	143,828
22	234,259	827,965	0	459,169	757,793	188,907	338,242	677,467	161,261	252,516	585,646	129,637	234,662	454,274	145,274
23	241,532	860,251	0	500,107	768,533	172,953	372,334	715,540	183,762	262,326	588,531	136,167	258,799	514,867	152,774
24	266,055	849,375	0	546,331	776,795	180,171	395,030	748,691	179,738	294,264	595,237	145,390	278,231	595,915	156,888
day)	5,392,455	########	0	10,944,096	19,380,335	4,336,418	8,447,455	########	3,525,213	6,895,206	########	2,176,461	5,802,865	########	2,101,980
u/h)		1,120,000			1,120,000			894,640			793,416			770,310	
u/h)			0			0			0			0			0

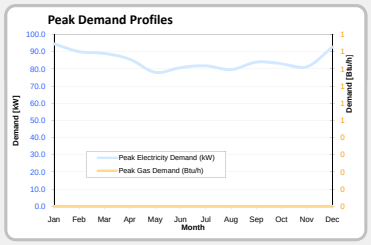
Hour	May Average	May MAX	May MIN	Jun Average	Jun MAX	Jun MIN	Jul Average	Jul MAX	Jul MIN	Aug Average	Aug MAX	Aug MIN	Sep Average	Sep MAX	Sep MIN	Oct Average	Oct MAX	Oct MIN	Nov Average	Nov MAX	Nov MIN	Dec Average	Dec MAX	Dec MIN
	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)
1	227,858	467,935	145,247	173,310	371,353	130,453	191,026	465,496	0	103,438	464,743	0	92,610	458,223	0	152,815	456,075	0	320,754	761,389	143,812	564,292	839,381	314,815
2	230,523	499,254	145,512	176,031	376,703	126,751	146,175	448,492	0	129,044	470,145	0	103,963	467,044	0	164,391	465,366	0	355,217	757,263	150,330	589,190	870,378	314,625
3	244,132	526,412	160,440	180,047	413,038	126,019	151,823	455,120	0	129,414	456,633	0	131,153	467,465	0	160,768	450,184	0	387,633	743,652	155,814	609,533	897,743	317,825
4	271,834	534,476	163,177	185,664	432,141	127,581	157,265	453,275	0	110,337	172,676	0	132,779	460,647	0	166,261	494,487	0	421,180	790,745	158,744	637,668	965,347	301,479
5	269,644	539,330	163,890	180,124	392,610	128,966	160,377	452,384	130,499	110,067	171,848	0	144,309	464,796	0	186,588	487,145	0	435,516	778,586	161,266	645,301	976,161	293,602
6	244,410	495,796	0	168,412	372,674	123,128	124,931	168,499	0	124,430	458,775	0	107,587	442,484	0	173,559	403,700	0	447,090	779,898	163,029	652,420	975,192	302,666
7	284,220	411,027	127,360	188,599	303,252	0	193,628	325,706	123,706	254,152	459,912	131,599	226,752	499,620	0	268,151	461,111	134,918	408,522	762,640	162,305	640,922	981,508	233,600
8	258,244	359,877	133,137	173,250	320,254	0	147,285	289,185	0	148,680	256,829	0	130,408	189,790	0	213,218	383,216	0	331,727	588,912	138,101	503,068	898,577	225,560
9	200,708	340,684	0	125,384	301,498	0	105,933	168,647	0	85,828	161,486	0	65,344	147,969	0	148,299	303,615	0	288,846	566,957	144,979	439,783	758,906	261,754
10	145,482	296,953	0	85,397	286,817	0	56,287	135,970	0	36,922	136,364	0	25,417	142,060	0	104,552	233,567	0	243,559	510,817	126,335	427,134	702,581	260,667
11	113,139	290,183	0	60,502	238,532	0	23,205	128,241	0	15,518	123,809	0	12,515	133,470	0	70,324	201,087	0	197,526	423,934	0	383,105	665,645	219,212
12	80,141	247,569	0	39,178	180,490	0	0	0	0	3,871	119,987	0	11,915	124,012	0	57,478	180,508	0	163,467	409,057	0	337,855	632,966	139,814
13	51,247	172,770	0	28,352	132,653	0	0	0	0	0	0	0	3,840	115,204	0	36,302	160,360	0	140,744	339,655	0	286,150	602,548	0
14	55,563	277,561	0	24,361	130,862	0	0	0	0	0	0	0	3,840	115,203	0	24,335	140,977	0	138,396	302,654	0	275,964	533,678	0
15	61,892	300,431	0	42,646	385,655	0	0	0	0	0	0	0	3,840	115,203	0	33,214	277,215	0	128,907	304,984	0	253,074	473,566	0
16	72,273	444,206	0	43,698	449,065	0	0	0	0	14,339	444,516	0	3,840	115,203	0	42,106	440,808	0	153,052	443,353	0	255,473	476,825	126,593
17	152,807	447,190	0	78,139	442,109	0	14,261	442,098	0	18,194	441,199	0	18,765	447,741	0	75,811	443,291	0	210,014	462,471	0	290,590	488,150	129,423
18	139,436	448,983	0	71,040	445,767	0	43,605	454,130	0	3,999	123,974	0	18,523	440,471	0	55,657	443,693	0	235,908	505,150	0	354,210	610,935	182,682
19	139,700	448,171	0	81,436	440,858	0	42,331	445,347	0	47,265	444,596	0	37,307	443,133	0	97,128	449,332	0	225,886	508,765	0	302,416	714,893	151,161
20	219,748	458,906	0	175,184	450,013	0	79,988	449,046	0	60,745	454,200	0	31,376	444,273	0	112,709	448,003	0	231,723	546,903	136,132	343,157	760,989	141,111
21	190,158	444,040	126,931	156,687	455,977	0	94,487	456,952	0	73,437	453,162	0	65,469	446,233	0	140,195	449,600	0	243,330	600,111	134,323	390,843	794,321	152,742
22	195,221	373,060	129,969	209,451	459,049	0	114,596	457,827	0	88,412	461,550	0	48,696	443,539	0	162,694	459,835	0	261,484	663,546	134,233	450,137	827,965	165,083
23	212,019	402,898	131,627	170,285	454,260	119,287	89,970	376,290	0	74,074	442,141	0	68,751	444,324	0	140,775	453,454	0	269,071	672,358	130,423	486,104	860,251	173,138
24	226,872	444,536	138,776	160,068	373,797	129,454	141,317	465,748	0	94,051	454,925	0	77,862	454,858	0	160,844	455,441	0	293,266	722,747	136,851	528,726	849,375	201,945
day)	4,287,268	9,672,248	1,566,066	2,977,244	8,609,427	1,011,639	2,078,490	7,038,453	254,205	1,726,218	7,173,470	131,599	1,566,862	8,022,965	0	2,948,175	9,142,070	134,918	6,532,820	########	2,176,677	########	18,157,881	4,609,494
u/h)		539,330			459,049			465,748			470,145			499,620			494,487			790,745			981,508	
u/h)			0			0			0			0			0			0			0			0

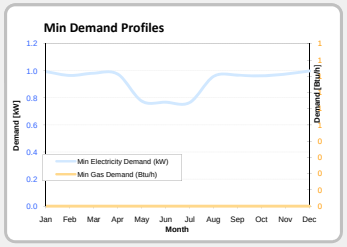
Retail eQUEST Simulation Results

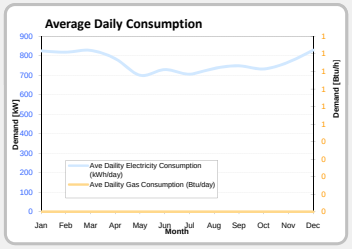
ITERATION: % construction cost premium











Electricity Demand Profiles - Retail

Hour	Annual Average Retail Demand (kW)	Annual MAX Retail Demand (kW)	Annual MIN Retail Demand (kW)	Jan Average Retail Demand (kW)	Jan MAX Retail Demand (kW)	Jan MIN Retail Demand (kW)	Feb Average Retail Demand (kW)	Feb MAX Retail Demand (kW)	Feb MIN Retail Demand (kW)	Mar Average Retail Demand (kW)	Mar MAX Retail Demand (kW)	Mar MIN Retail Demand (kW)	Apr Average Retail Demand (kW)	Apr MAX Retail Demand (kW)	Apr MIN Retail Demand (kW)	May Average Retail Demand (kW)	May MAX Retail Demand (kW)	May MIN Retail Demand (kW)	Jun Average Retail Demand (kW)	Jun MAX Retail Demand (kW)	Jun MIN Retail Demand (kW)	Jul Average Retail Demand (kW)	Jul MAX Retail Demand (kW)	Jul MIN Retail Demand (kW)	Aug Average Retail Demand (kW)	Aug MAX Retail Demand (kW)	Aug MIN Retail Demand (kW)	Sep Average Retail Demand (kW)	Sep MAX Retail Demand (kW)	Sep MIN Retail Demand (kW)	Oct Average Retail Demand (kW)	Oct MAX Retail Demand (kW)	Oct MIN Retail Demand (kW)	Nov Average Retail Demand (kW)	Nov MAX Retail Demand (kW)	Nov MIN Retail Demand (kW)	Dec Average Retail Demand (kW)	Dec MAX Retail Demand (kW)	Dec MIN Retail Demand (kW)
1	7.0	7.7	4.9	7.0	7.7	4.9	7.1	7.7	4.9	7.1	7.7	4.9	7.1	7.7	4.9	6.9	7.7	4.9	7.0	7.7	4.9	6.9	7.3	4.9	6.9	7.2	4.9	6.8	7.2	4.9	6.8	7.6	4.9	7.0	7.7	4.9	7.1	7.7	4.9
2	7.0	7.7	4.9	7.0	7.7	4.9	7.1	7.7	4.9	7.1	7.7	4.9	7.2	7.7	4.9	6.9	7.7	4.9	7.0	7.7	4.9	6.9	7.3	4.9	6.9	7.2	4.9	6.8	7.2	4.9	6.8	7.6	4.9	7.0	7.7	4.9	7.1	7.7	4.9
3	7.0	7.7	4.9	7.0	7.7	4.9	7.1	7.7	4.9	7.2	7.7	4.9	7.2	7.7	4.9	6.9	7.7	4.9	7.0	7.7	4.9	6.9	7.3	4.9	6.9	7.2	4.9	6.8	7.2	4.9	6.9	7.6	4.9	7.0	7.7	4.9	7.1	7.7	4.9
4	6.7	7.7	3.6	7.0	7.7	4.9	7.1	7.7	4.9	7.2	7.7	4.9	7.3	7.7	4.9	5.7	6.4	3.6	5.7	6.4	3.6	5.6	6.0	3.6	6.9	7.2	4.9	6.8	7.2	4.9	6.9	7.6	4.9	7.0	7.7	4.9	7.1	7.7	4.9
5	6.3	7.7	2.3	7.0	7.7	4.9	7.1	7.7	4.9	7.2	7.7	4.9	6.3	7.7	3.9	4.4	5.1	2.3	4.4	5.1	2.3	4.3	4.7	2.3	6.9	7.2	4.9	6.8	7.2	4.9	6.9	7.6	4.9	7.0	7.7	4.9	7.1	7.7	4.9
6	5.2	7.7	1.0	7.0	7.7	4.9	6.2	6.7	3.9	6.3	6.7	3.9	4.6	6.7	2.0	3.1	4.4	1.0	3.2	3.9	1.0	3.1	4.0	1.0	5.0	5.9	2.9	5.0	5.9	2.9	5.1	5.9	2.9	7.0	7.7	4.9	7.2	7.7	4.9
7	15.1	30.8	3.6	5.8	6.9	3.6	4.4	5.3	2.0	4.5	5.3	2.0	21.3	29.8	1.0	20.6	29.5	1.0	22.7	29.5	1.0	21.5	29.4	1.0	22.9	30.2	1.6	22.8	30.4	1.6	21.8	30.8	1.7	5.8	6.9	3.6	5.9	6.9	3.6
8	39.7	85.6	1.0	21.1	30.9	1.7	22.1	30.2	1.0	23.3	29.9	1.0	57.4	85.6	1.0	52.4	78.0	1.0	54.7	77.7	1.0	49.7	69.4	1.0	50.5	68.7	1.0	49.6	68.9	1.0	50.4	76.1	1.0	22.0	30.8	1.7	22.7	30.9	1.7
9	56.6	92.7	1.0	58.4	91.2	1.0	61.1	90.0	1.0	63.2	89.0	1.0	61.1	77.9	8.8	55.7	71.1	8.6	56.2	69.8	8.7	52.4	63.7	8.6	51.9	63.6	8.7	51.5	64.6	8.7	52.9	67.9	1.0	54.3	81.2	1.0	61.1	92.7	1.0
10	57.0	91.2	8.7	63.1	91.2	8.8	62.5	79.8	8.8	63.8	81.2	8.8	60.2	74.9	15.6	54.8	69.0	15.6	55.4	68.7	15.4	51.3	64.8	15.7	50.8	63.4	15.7	51.4	65.6	15.5	51.9	66.1	8.7	56.0	73.6	8.7	62.8	89.9	8.9
11	57.8	94.6	15.5	61.6	94.6	15.9	61.0	75.6	15.8	61.8	75.6	15.5	61.0	77.0	15.7	55.9	71.4	15.6	57.1	71.2	15.9	53.7	70.1	16.1	54.6	70.3	15.6	56.4	73.7	15.6	53.8	68.1	15.9	55.5	69.6	15.9	60.8	85.9	15.9
12	59.3	93.8	15.8	62.6	93.8	16.4	62.2	77.2	16.4	63.2	77.0	15.8	60.5	74.3	16.5	55.6	70.6	16.3	59.2	73.5	17.0	57.5	75.2	17.1	58.2	75.1	16.3	58.7	76.3	16.6	55.4	75.1	16.3	56.4	72.0	16.3	62.2	84.3	16.4
13	59.8	90.9	16.6	61.6	90.9	17.4	61.4	77.7	17.1	62.2	75.8	16.7	59.5	72.7	16.8	56.3	75.8	16.7	60.6	76.9	17.3	60.3	81.8	17.1	61.6	79.5	16.7	61.0	81.5	16.6	56.0	83.0	17.0	56.2	70.1	17.1	61.3	84.1	17.3
14	59.9	89.4	16.3	61.3	89.4	17.4	61.2	76.6	17.4	62.1	75.4	16.8	59.9	72.0	16.4	56.3	75.5	16.3	60.6	79.1	16.9	60.5	80.3	16.7	61.3	78.1	16.8	61.5	80.4	16.8	56.8	82.6	16.5	56.6	70.4	17.3	61.1	81.6	17.4
15	59.2	88.3	15.9	61.0	88.3	17.0	61.1	75.4	17.2	62.2	76.5	16.4	57.9	71.4	15.9	53.8	75.2	16.0	59.2	80.7	16.3	60.2	78.4	16.3	60.2	75.9	16.2	60.5	84.0	16.5	56.2	80.5	16.2	56.7	71.0	17.0	61.2	79.6	17.1
16	55.3	85.0	13.8	60.2	85.0	16.7	60.2	74.7	16.9	59.6	77.0	15.3	51.9	66.9	13.9	47.7	66.4	13.8	51.4	72.8	13.8	53.3	68.0	13.8	53.3	65.8	14.8	55.1	75.4	14.9	54.8	79.5	16.1	56.2	70.7	16.8	60.2	77.1	16.7
17	53.8	87.3	8.9	61.5	87.3	18.8	58.7	73.1	15.6	56.4	75.9	13.8	49.4	67.5	10.5	44.7	63.3	8.9	47.7	65.3	9.2	47.6	61.5	9.2	51.2	63.9	12.7	53.9	70.6	12.7	54.7	73.5	14.1	58.1	73.4	18.9	62.3	77.8	19.0
18	46.5	86.2	0.8	62.7	86.2	16.6	59.7	73.8	12.8	59.6	73.6	12.2	42.8	69.6	5.3	31.2	48.2	0.8	31.1	47.7	0.8	29.6	43.9	0.8	35.8	48.6	6.5	41.6	59.7	6.7	42.0	58.4	6.8	59.6	75.3	16.6	63.3	78.6	16.6
19	40.4	72.1	1.8	48.4	72.1	6.8	47.8	60.8	5.5	49.2	62.9	5.5	44.0	57.2	6.8	32.5	45.2	1.9	31.6	43.2	1.8	28.5	37.0	1.8	35.6	47.6	6.7	36.7	48.4	6.8	36.9	48.2	6.8	45.3	59.4	6.8	48.6	63.0	6.8
20	28.9	64.3	4.2	44.1	64.3	6.8	44.6	57.8	6.8	45.8	54.6	6.8	25.1	53.6	6.8	17.4	27.0	4.2	16.5	25.6	4.2	15.0	23.2	4.2	17.4	22.0	6.8	17.7	26.4	6.8	18.5	27.3	6.8	41.2	54.1	6.8	44.4	59.0	6.8
21	15.2	44.1	6.8	24.8	44.1	6.8	24.2	33.5	6.8	24.2	35.2	6.8	10.8	32.0	6.8	8.8	9.7	6.8	8.9	9.7	6.8	8.9	9.7	6.8	8.8	9.7	6.8	8.8	9.7	6.8	8.8	9.7	6.8	21.4	30.7	6.8	24.1	36.4	6.8
22	8.5	10.2	6.1	9.0	10.1	6.8	9.0	10.2	6.8	9.0	10.2	6.8	8.4	9.8	6.1	8.1	8.9	6.1	8.2	8.5	6.1	8.1	8.5	6.1	8.1	8.5	6.1	8.1	8.5	6.1	8.1	8.5	6.1	8.9	9.7	6.8	9.1	10.1	7.2
23	7.9	9.0	5.5	8.3	9.0	6.1	8.3	9.0	6.1	8.3	9.0	6.1	7.8	9.0	5.5	7.5	8.3	5.5	7.6	7.9	5.5	7.5	7.9	5.5	7.5	7.9	5.5	7.5	7.9	5.5	7.4	7.9	5.5	8.1	8.9	6.1	8.4	8.9	6.5
24	7.2	8.3	4.9	7.7	8.3	5.5	7.7	8.3	5.5	7.7	8.3	5.5	7.2	8.3	4.9	6.9	7.7	4.9	6.9	7.3	4.9	6.8	7.3	4.9	6.9	7.2	4.9	6.8	7.2	4.9	6.7	7.2	4.9	7.6	8.3	5.5	7.7	8.3	5.9
day)	767	1,270	169	825	1,190	219	819	1,034	208	828	1,038	201	786	1,055	200	700	940	182	730	954	184	706	917	184	736	928	207	749	981	207	733	995	195	768	982	219	830	1,101	221
kW)		94.6			94.6			90.0			89.0			85.6			78.0			80.7			81.8			79.5			84.0			83.0			81.2			92.7	
kW)			0.8			1.0			1.0			1.0			1.0			0.8			0.8			0.8			1.0			1.0			1.0			1.0			1.0

Gas Demand Profiles - Retail

Hour	Annual Average Retail Demand (Btu/h)	Annual MAX Retail Demand (Btu/h)	Annual MIN Retail Demand (Btu/h)	Jan Average Retail Demand (Btu/h)	Jan MAX Retail Demand (Btu/h)	Jan MIN Retail Demand (Btu/h)	Feb Average Retail Demand (Btu/h)	Feb MAX Retail Demand (Btu/h)	Feb MIN Retail Demand (Btu/h)	Mar Average Retail Demand (Btu/h)	Mar MAX Retail Demand (Btu/h)	Mar MIN Retail Demand (Btu/h)	Apr Average Retail Demand (Btu/h)	Apr MAX Retail Demand (Btu/h)	Apr MIN Retail Demand (Btu/h)	May Average Retail Demand (Btu/h)	May MAX Retail Demand (Btu/h)	May MIN Retail Demand (Btu/h)	Jun Average Retail Demand (Btu/h)	Jun MAX Retail Demand (Btu/h)	Jun MIN Retail Demand (Btu/h)	Jul Average Retail Demand (Btu/h)	Jul MAX Retail Demand (Btu/h)	Jul MIN Retail Demand (Btu/h)	Aug Average Retail Demand (Btu/h)	Aug MAX Retail Demand (Btu/h)	Aug MIN Retail Demand (Btu/h)	Sep Average Retail Demand (Btu/h)	Sep MAX Retail Demand (Btu/h)	Sep MIN Retail Demand (Btu/h)	Oct Average Retail Demand (Btu/h)	Oct MAX Retail Demand (Btu/h)	Oct MIN Retail Demand (Btu/h)	Nov Average Retail Demand (Btu/h)	Nov MAX Retail Demand (Btu/h)	Nov MIN Retail Demand (Btu/h)	Dec Average Retail Demand (Btu/h)	Dec MAX Retail Demand (Btu/h)	Dec MIN Retail Demand (Btu/h)
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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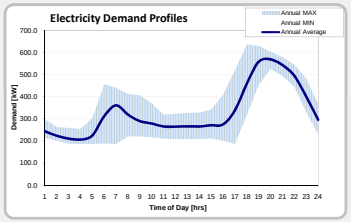
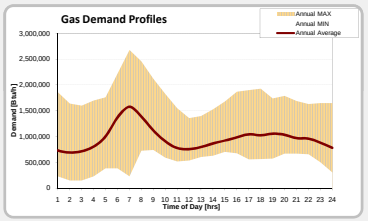
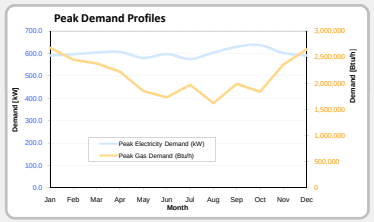
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
day)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
u/h)		0			0			0			0			0			0			0			0			0			0			0			0			0	
u/h)			0			0			0			0			0			0			0			0			0			0			0			0			0	

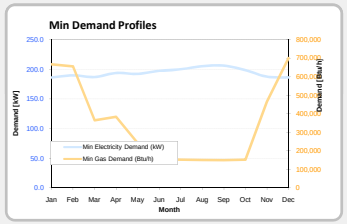
Condotel eQUEST Simulation Results

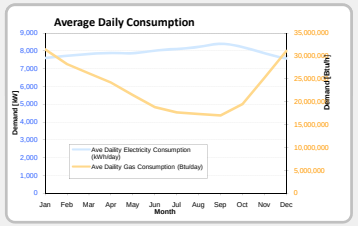
ITERATION: % construction cost premium











Electricity Demand Profiles - Condotel

Hour	Annual Average (Condotel Demand (kW))	Annual MAX (Condotel Demand (kW))	Annual MIN (Condotel Demand (kW))	Jan Average	Jan MAX	Jan MIN	Feb Average	Feb MAX	Feb MIN	Mar Average	Mar MAX	Mar MIN	Apr Average	Apr MAX	Apr MIN
1	245.0	299.4	213.6	239.3	285.3	213.6	242.4	277.2	225.2	247.7	296.9	226.0	232.4	259.5	218.5
2	223.2	264.1	200.5	218.5	241.3	204.4	223.0	238.2	215.3	228.0	255.9	215.7	211.1	226.6	200.5
3	210.9	259.6	188.2	199.4	217.5	188.2	203.7	215.2	198.2	207.8	231.6	197.0	204.5	216.5	196.2
4	206.3	255.0	186.3	196.0	213.4	186.3	199.7	210.6	191.8	203.0	225.3	192.2	201.9	215.6	194.0
5	224.3	304.5	186.3	194.7	212.8	186.3	197.9	208.8	189.9	200.7	220.7	189.9	233.0	253.8	195.6
6	311.9	456.9	189.4	226.4	253.6	189.4	229.4	247.8	193.3	235.0	261.4	195.2	355.4	425.6	194.3
7	361.0	441.3	186.3	344.3	426.1	232.7	352.6	416.3	226.9	365.5	433.7	229.4	351.2	406.1	240.5
8	319.4	413.6	221.1	364.1	409.8	293.7	354.7	402.4	277.0	345.3	393.7	271.9	290.6	375.4	221.1
9	289.5	407.0	220.9	285.7	407.0	223.2	280.8	375.1	224.0	277.0	377.2	221.2	289.7	370.6	223.6
10	278.8	370.6	216.8	276.6	356.3	220.8	278.8	358.5	221.6	279.4	365.6	221.3	274.2	359.4	216.8
11	265.4	318.8	211.0	241.7	289.9	215.1	253.7	290.8	215.3	258.4	291.7	215.3	265.7	286.2	211.0
12	264.5	323.7	208.7	233.5	278.0	208.7	246.6	284.2	209.7	251.4	272.5	209.3	266.0	289.5	213.1
13	265.9	327.2	208.6	234.5	276.4	208.6	248.3	296.0	210.9	253.0	282.4	209.8	265.7	292.0	216.1
14	265.3	329.2	208.7	231.2	266.5	208.7	244.3	278.1	211.6	249.6	282.2	209.7	266.7	297.8	223.0
15	271.1	342.4	212.0	230.4	258.7	212.0	243.3	273.7	214.9	251.7	286.7	213.0	277.2	319.3	242.3
16	274.7	410.1	200.5	238.6	267.2	209.9	251.6	295.0	217.3	263.1	302.3	216.5	272.0	372.8	205.1
17	338.2	522.8	187.1	260.4	366.8	198.7	251.3	353.6	191.7	252.8	369.4	187.1	369.6	432.9	201.4
18	459.3	637.2	319.3	405.5	520.7	323.8	391.0	497.4	322.5	381.2	495.3	319.3	475.2	512.6	337.2
19	558.5	629.9	453.3	569.9	591.3	524.7	576.5	596.0	544.7	583.2	603.8	543.0	574.5	607.2	544.4
20	568.7	604.6	526.0	564.6	581.8	526.0	574.0	590.7	546.7	579.9	597.7	547.1	568.3	598.1	541.4
21	543.4	579.0	493.6	546.5	563.9	513.6	556.0	572.3	532.7	561.4	579.0	525.6	534.7	569.7	494.8
22	494.6	546.0	443.7	511.5	533.6	468.2	522.5	539.1	486.2	528.3	546.0	488.8	477.7	537.2	445.1
23	400.2	483.2	329.5	450.4	472.6	417.5	462.4	476.4	428.7	468.6	483.2	435.2	361.5	475.2	329.5
24	296.3	366.7	229.4	327.9	364.7	311.2	336.0	355.6	323.8	343.2	366.7	325.4	261.2	348.2	229.4
day)	7,936	9,893	6,241	7,591	8,655	6,685	7,720	8,649	6,820	7,815	8,821	6,805	7,880	9,048	6,535
kW)		637.2			591.3			596.0			603.8			607.2	
kW)			186.3			186.3			189.9			187.1			194.0

Hour	May Average (Condotel Demand (kW))	May MAX (Condotel Demand (kW))	May MIN (Condotel Demand (kW))	Jun Average (Condotel Demand (kW))	Jun MAX (Condotel Demand (kW))	Jun MIN (Condotel Demand (kW))	Jul Average (Condotel Demand (kW))	Jul MAX (Condotel Demand (kW))	Jul MIN (Condotel Demand (kW))	Aug Average (Condotel Demand (kW))	Aug MAX (Condotel Demand (kW))	Aug MIN (Condotel Demand (kW))	Sep Average (Condotel Demand (kW))	Sep MAX (Condotel Demand (kW))	Sep MIN (Condotel Demand (kW))
1	236.7	264.3	225.9	247.7	273.3	228.2	252.6	271.8	236.2	252.7	274.7	233.4	256.6	279.4	234.6
2	214.7	235.8	203.9	224.7	249.3	209.2	228.4	244.6	215.4	229.0	248.5	212.9	232.9	264.1	214.0
3	209.2	226.9	199.9	217.8	243.3	204.5	221.3	235.2	209.4	221.8	241.0	207.5	224.8	259.6	209.0
4	202.3	216.9	194.0	209.8	235.7	197.6	213.4	225.7	202.5	217.7	237.5	205.3	219.9	255.0	206.2
5	230.4	252.9	192.9	242.7	275.3	202.3	243.5	269.7	200.1	253.7	278.9	211.5	254.2	304.5	206.7
6	348.8	420.2	234.6	369.6	434.0	236.9	370.6	438.4	242.9	387.9	448.5	249.2	386.9	456.9	248.0
7	347.2	390.9	288.3	361.8	398.1	297.5	362.7	401.0	298.7	371.2	412.4	306.3	381.0	441.3	299.2
8	294.6	378.7	222.6	291.0	388.3	224.3	294.4	409.1	231.8	287.4	393.5	228.3	298.7	409.6	226.9
9	296.4	370.3	221.5	295.7	377.8	228.4	302.1	396.5	250.6	295.0	373.5	238.0	303.7	388.4	227.6
10	274.1	305.8	217.7	281.2	318.0	231.7	285.2	340.0	253.2	281.8	311.8	247.1	288.0	330.3	229.6
11	268.5	297.7	214.2	276.7	307.1	230.3	280.5	317.0	253.8	280.1	301.2	252.8	285.8	318.8	239.4
12	271.4	301.8	217.1	279.8	304.4	243.1	285.0	314.6	262.9	286.1	303.7	264.8	289.9	323.7	246.0
13	272.6	311.4	219.2	282.2	309.6	254.4	287.4	315.9	268.7	288.5	311.7	266.5	290.7	327.2	251.2
14	275.7	314.4	224.7	284.2	316.3	260.5	289.5	316.1	271.6	289.6	310.2	269.0	292.7	329.2	253.8
15	285.3	334.8	242.0	294.8	340.0	258.9	300.0	323.0	281.4	299.3	322.5	272.8	302.2	342.4	250.0
16	290.7	391.1	200.5	290.9	382.3	229.6	302.7	402.5	243.0	299.7	388.7	229.0	302.6	410.1	229.8
17	386.3	447.0	339.5	390.7	445.3	349.9	398.7	460.1	356.9	408.6	457.8	364.9	411.8	489.3	361.7
18	466.4	508.6	418.9	471.6	525.5	431.5	472.9	509.8	429.8	494.2	576.0	456.7	549.8	622.0	491.3
19	515.0	564.8	466.3	496.5	547.4	459.2	497.6	559.4	453.3	555.3	597.3	496.7	594.3	629.9	561.6
20	556.2	579.3	532.1	562.0	597.4	529.6	560.9	574.8	534.3	573.6	603.5	546.0	574.4	604.6	547.0
21	530.7	552.1	495.7	538.0	556.2	494.6	537.6	551.5	498.8	537.7	562.5	498.9	538.9	566.4	501.9
22	471.7	485.5	445.4	477.6	489.4	445.4	477.9	487.7	447.9	477.7	489.7	448.6	479.3	502.0	451.2
23	353.5	369.6	332.4	356.7	369.6	350.0	358.7	372.2	351.7	358.0	371.1	351.2	359.6	376.2	350.7
24	260.0	303.7	239.2	267.7	304.5	242.6	275.1	305.6	250.4	270.6	305.5	250.1	275.3	308.6	249.8
day)	7,859	8,825	6,789	8,011	8,988	7,040	8,099	9,042	7,244	8,217	9,122	7,308	8,394	9,540	7,287
kW)		579.3			597.4			574.8			603.5			629.9	
kW)			192.3			197.6			200.1			205.3			206.2

Hour	Oct Average (Condotel Demand (kW))	Oct MAX (Condotel Demand (kW))	Oct MIN (Condotel Demand (kW))	Nov Average (Condotel Demand (kW))	Nov MAX (Condotel Demand (kW))	Nov MIN (Condotel Demand (kW))	Dec Average (Condotel Demand (kW))	Dec MAX (Condotel Demand (kW))	Dec MIN (Condotel Demand (kW))
1	245.7	299.4	224.1	249.1	294.7	218.9	236.7	273.7	215.9
2	221.9	257.0	206.1	227.8	251.0	210.1	218.2	238.3	206.2
3	214.3	244.6	201.5	207.2	225.0	193.1	199.0	216.4	189.5
4	210.7	241.3	198.6	202.6	219.1	188.5	195.2	211.7	186.6
5	243.0	274.2	204.1	200.7	216.5	187.7	194.0	210.2	186.3
6	365.4	447.7	219.5	234.7	259.8	197.4	228.2	252.0	190.8
7	377.7	427.6	250.1	361.7	437.3	240.3	354.2	422.4	231.1
8	289.8	413.6	225.2	357.8	412.9	291.3	366.7	406.0	294.0
9	294.6	379.1	227.7	284.3	406.8	223.6	269.1	393.6	220.9
10	274.7	370.6	220.8	283.7	361.9	222.5	268.0	347.2	222.5
11	269.5	311.7	216.5	260.7	298.4	215.0	243.2	275.3	214.7
12	273.4	311.2	219.2	254.8	288.4	216.7	236.0	267.0	208.8
13	276.0	320.3	222.2	254.7	288.0	217.4	236.8	268.7	209.3
14	277.4	320.0	227.1	250.9	287.7	218.0	231.0	257.6	209.8
15	286.5	324.1	242.7	251.5	291.5	222.7	230.0	249.5	213.1
16	291.2	409.1	205.4	255.4	307.1	219.8	236.8	252.3	211.4
17	407.8	522.8	359.5	265.0	374.5	205.0	249.8	359.3	201.3
18	596.3	637.2	539.4	411.0	523.4	337.8	392.3	514.7	327.2
19	587.4	622.8	554.1	581.9	601.7	544.8	572.4	591.0	537.2
20	568.3	598.7	539.9	574.9	592.0	542.8	567.4	584.0	532.3
21	534.4	560.7	493.6	556.9	574.2	526.2	549.2	566.0	516.7
22	476.1	502.8	443.7	523.3	539.7	480.2	513.7	533.6	468.8
23	359.6	450.4	345.8	464.9	478.0	428.8	452.3	472.2	416.1
24	271.0	361.2	236.2	342.1	366.3	319.5	327.1	345.9	312.7
day)	8,213	9,608	7,023	7,858	8,896	6,868	7,567	8,509	6,723
kW)		637.2			601.7			591.0	
kW)			198.6			187.7			186.3

Gas Demand Profiles - Condotel

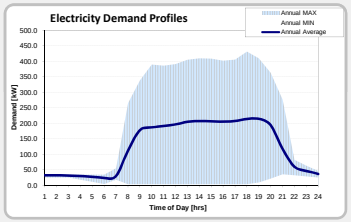
Hour	Annual Average (Condotel Demand (Btu/h))	Annual MAX (Condotel Demand (Btu/h))	Annual MIN (Condotel Demand (Btu/h))	Jan Average (Condotel Demand (Btu/h))	Jan MAX (Condotel Demand (Btu/h))	Jan MIN (Condotel Demand (Btu/h))	Feb Average (Condotel Demand (Btu/h))	Feb MAX (Condotel Demand (Btu/h))	Feb MIN (Condotel Demand (Btu/h))	Mar Average (Condotel Demand (Btu/h))	Mar MAX (Condotel Demand (Btu/h))	Mar MIN (Condotel Demand (Btu/h))	Apr Average (Condotel Demand (Btu/h))	Apr MAX (Condotel Demand (Btu/h))	Apr MIN (Condotel Demand (Btu/h))
1	730,632	1,860,000	229,475	1,216,173	1,860,000	747,041	985,592	1,250,000	770,588	871,328	1,200,000	428,424	758,210	1,190,000	383,997
2	685,860	1,640,000	150,084	1,167,619	1,600,000	731,029	967,264	1,250,000	684,514	812,154	1,170,000	365,210	751,892	1,090,000	534,969
3	718,195	1,600,000	150,077	1,136,306	1,590,000	670,416	939,378	1,200,000	655,942	817,830	1,180,000	471,803	781,872	1,070,000	555,761
4	801,338	1,700,000	230,093	1,166,642	1,680,000	667,310	977,974	1,300,000	677,273	858,556	1,260,000	486,869	912,976	1,220,000	689,487
5	1,001,027	1,760,000	385,104	1,268,192	1,760,000	769,960	1,101,941	1,400,000	770,776	985,865	1,390,000	578,912	1,181,832	1,550,000	796,940
6	1,368,021	2,220,000	385,116	1,529,411	2,080,000	921,735	1,401,771	1,720,000	929,600	1,299,649	1,740,000	815,441	1,643,108	2,220,000	845,868
7	1,576,375	2,680,000	230,091	1,910,962	2,680,000	859,833	1,871,671	2,450,000	966,776	1,764,610	2,380,000	795,217	1,653,052	2,050,000	881,388
8	1,387,237	2,460,000	725,968	1,852,226	2,460,000	969,016	1,774,286	2,160,000	1,190,000	1,729,085	2,110,000	925,388	1,352,000	1,840,000	1,050,000
9	1,118,515	2,120,000	742,039	1,556,129	2,120,000	1,170,000	1,431,786	1,630,000	1,150,000	1,378,710	1,610,000	1,050,000	1,092,491	1,400,000	857,308
10	908,116	1,830,000	591,482	1,300,645	1,830,000	1,070,000	1,182,500	1,320,000	1,080,000	1,125,596	1,390,000	863,485	886,344	1,170,000	652,731
11	776,110	1,550,000	517,565	1,113,453	1,550,000	931,362	997,989	1,280,000	888,907	937,821	1,310,000	657,325	772,129	1,160,000	571,814
12	756,289	1,360,000	538,505	999,309	1,360,000	834,272	892,241	1,140,000	799,393	817,924	1,110,000	575,910	762,874	1,010,000	652,645
13	794,272	1,400,000	604,346	1,044,238	1,400,000	897,170	939,012	1,140,000	761,265	864,534	1,050,000	657,259	800,205	1,300,000	670,145
14	867,008	1,530,000	629,573	1,082,737	1,530,000	898,686	979,334	1,280,000	812,650	893,540	1,220,000	675,069	882,345	1,320,000	786,931
15	918,624	1,680,000	704,680	1,200,000	1,680,000	1,010,000	1,091,607	1,470,000	797,660	1,021,972	1,490,000	793,021	929,792	1,520,000	786,919
16	984,237	1,870,000	677,832	1,221,935	1,870,000	1,020,000	1,099,513	1,330,000	792,566	1,030,856	1,530,000	793,001	1,001,276	1,250,000	756,306
17	1,043,919	1,900,000	559,702	1,374,194	1,900,000	1,030,000	1,254,425	1,520,000	977,091	1,177,737	1,820,000	761,803	1,057,790	1,730,000	622,551
18	1,022,872	1,930,000	565,137	1,412,542	1,930,000	964,947	1,236,112	1,560,000	866,250	1,228,405	1,770,000	626,856	1,030,879	1,740,000	625,669
19	1,054,725	1,740,000	573,293	1,284,551	1,680,000	963,495	1,170,470	1,620,000	880,130	1,093,751	1,610,000	635,624	1,092,419	1,330,000	747,046
20	1,033,365	1,790,000	671,296	1,413,226	1,780,000	1,100,000	1,330,714	1,790,000	1,060,000	1,220,484	1,580,000	769,961	1,034,970	1,570,000	740,088
21	968,132	1,690,000	671,295	1,262,903	1,570,000	1,070,000	1,150,000	1,360,000	1,030,000	1,080,968	1,530,000	826,804	1,031,230	1,600,000	740,105
22	959,368	1,630,000	658,228	1,319,032	1,620,000	1,120,000	1,191,786	1,330,000	1,070,000	1,097,941	1,630,000	826,791	1,005,610	1,550,000	722,489
23	881,542	1,650,000	504,349	1,310,645	1,650,000	1,040,000	1,155,714	1,330,000	1,000,000	1,077,184	1,590,000	727,565	892,828	1,440,000	612,108
24	781,911	1,650,000	303,932	1,274,915	1,650,000	886,095	1,082,840	1,310,000	900,632	990,111	1,390,000	599,377	881,217	1,250,000	443,339
day)	########	########	11,999,260	31,417,986	42,830,000	22,342,367	28,205,919	35,140,000	21,511,963	26,176,612	36,060,000	16,707,115	24,189,341	34,570,000	16,726,604
u/h)		2,680,000			2,680,000			2,450,000			2,380,000			2,220,000	
u/h)			150,077			667,310			655,942			365,210			383,997

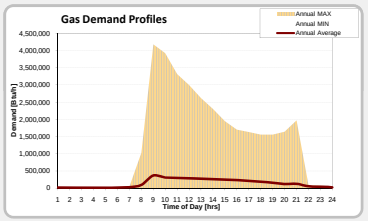
Hour	May Average (Condotel Demand (Btu/h))	May MAX (Condotel Demand (Btu/h))	May MIN (Condotel Demand (Btu/h))	Jun Average (Condotel Demand (Btu/h))	Jun MAX (Condotel Demand (Btu/h))	Jun MIN (Condotel Demand (Btu/h))	Jul Average (Condotel Demand (Btu/h))	Jul MAX (Condotel Demand (Btu/h))	Jul MIN (Condotel Demand (Btu/h))	Aug Average (Condotel Demand (Btu/h))	Aug MAX (Condotel Demand (Btu/h))	Aug MIN (Condotel Demand (Btu/h))	Sep Average (Condotel Demand (Btu/h))	Sep MAX (Condotel Demand (Btu/h))	Sep MIN (Condotel Demand (Btu/h))
1	675,968	1,170,000	301,188	531,499	1,090,000	239,191	482,426	1,090,000	232,883	394,211	1,060,000	229,475	275,632	536,299	229,489
2	661,809	1,020,000	242,334	396,021	982,798	156,008	402,839	1,050,000	152,675	338,486	1,040,000	150,568	313,678	1,010,000	150,084
3	651,340	1,000,000	479,771	523,785	1,060,000	156,025	472,108	1,010,000	152,825	394,448	982,166	150,585	355,152	1,010,000	150,077
4	760,255	982,329	582,337	621,682	1,070,000	234,537	485,060	1,040,000	238,437	563,273	1,080,000	231,009	554,968	1,060,000	230,091
5	1,019,925	1,240,000	760,760	840,593	1,340,000	397,102	856,325	1,340,000	527,160	802,248	1,320,000	385,104	738,696	1,390,000	397,533
6	1,413,362	1,830,000	746,608	1,285,212	1,670,000	399,523	1,214,661	1,970,000	390,770	1,243,610	1,560,000	385,116	1,258,872	1,990,000	391,115
7	1,474,348	1,850,000	863,476	1,367,009	1,730,000	563,081	1,304,747	1,660,000	550,520	1,316,555	1,620,000	542,530	1,271,005	1,630,000	541,684
8	1,211,223	1,470,000	979,264	1,082,718	1,330,000	757,537	1,006,012	1,240,000	738,922	1,025,050	1,230,000	726,962	1,001,030	1,290,000	725,968
9	959,087	1,140,000	795,396	863,937	1,070,000	773,462	791,039	843,631	754,927	782,276	968,885	743,116	813,982	1,020,000	742,039
10	752,717	1,090,000	634,946	680,337	1,070,000	617,260	652,471	849,278	602,217	634,112	834,660	592,694	647,502	833,539	591,482
11	637,705	828,877	556,056	599,927	929,003	540,402	574,032	716,372	527,105	558,806	704,473	518,705	559,274	703,584	517,565
12	694,045	892,122	634,873	657,664	916,663	617,204	634,422	707,140	602,150	620,924	695,417	592,652	620,915	694,556	591,400
13	731,010	899,341	651,049	681,112	869,372	632,077	673,250	846,253	615,885	654,611	831,675	605,686	655,192	830,559	604,346
14	843,579	1,100,000	763,087	791,015	1,060,000	739,386	779,457	1,030,000	719,099	755,468	1,010,000	706,319	756,038	1,010,000	704,731
15	839,088	988,641	763,069	785,433	945,148	739,362	772,869	918,265	719,074	752,639	901,338	706,310	752,908	900,000	704,680
16	928,737	1,180,000	733,466	899,473	930,788	710,721	867,790	904,120	691,290	852,255	887,445	679,121	849,652	886,212	677,832
17	896,443	1,200,000	604,247	900,383	1,670,000	585,980	839,991	904,076	570,441	826,648	887,387	560,776	823,245	886,169	559,702
18	876,379	1,570,000	608,058	803,950	1,000,000	590,436	774,498	921,655	575,453	757,092	905,509	566,166	755,363	904,342	565,137
19	1,079,549	1,740,000	726,745	998,658	1,700,000	706,530	911,437	1,000,000	689,245	894,990	986,389	678,538	892,571	985,196	677,402
20	888,814	1,540,000	720,015	835,205	1,690,000	700,049	773,422	925,828	682,936	755,933	910,507	672,387	755,172	909,436	671,296
21	953,996	1,690,000	720,057	808,424	1,060,000	700,089	761,110	849,361	682,956	746,485	835,622	672,431	745,198	834,617	671,295
22	953,312	1,540,000	703,916	736,885	1,020,000	685,310	690,255	776,754	669,471	674,951	764,494	659,547	673,560	763,601	658,228
23	858,251	1,480,000	540,126	598,481	886,349	525,289	559,092	1,360,000	513,109	552,808	1,340,000	505,484	543,266	1,290,000	504,349
24	666,779	1,220,000	367,666	519,686	1,200,000	316,162	362,909	622,776	309,005	424,482	1,160,000	304,567	364,708	1,160,000	303,932
day)	21,427,721	30,661,310	15,478,508	18,809,089	28,290,121	13,082,823	17,642,224	24,575,509	12,908,535	17,322,362	24,515,967	12,565,848	16,977,576	24,528,110	12,561,457
u/h)		1,850,000			1,730,000			1,970,000			1,620,000			1,990,000	
u/h)			242,334			156,008			152,675			150,568			150,077

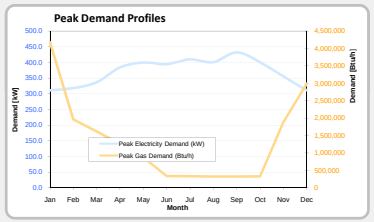
Hour	Oct Average (Condotel Demand (Btu/h))	Oct MAX (Condotel Demand (Btu/h))	Oct MIN (Condotel Demand (Btu/h))	Nov Average (Condotel Demand (Btu/h))	Nov MAX (Condotel Demand (Btu/h))	Nov MIN (Condotel Demand (Btu/h))	Dec Average (Condotel Demand (Btu/h))	Dec MAX (Condotel Demand (Btu/h))	Dec MIN (Condotel Demand (Btu/h))
1	558,788	1,140,000	231,680	857,851	1,450,000	549,527	1,168,478	1,580,000	804,803
2	455,738	1,010,000	151,889	819,745	1,390,000	485,538	1,155,406	1,640,000	734,080
3	595,757	1,060,000	152,454	814,035	1,310,000	465,201	1,144,939	1,600,000	700,674
4	649,895	1,040,000	233,453	867,346	1,430,000	477,973	1,206,417	1,700,000	740,918
5	930,323	1,350,000	389,224	977,414	1,480,000	573,893	1,310,166	1,750,000	829,813
6	1,300,520	1,840,000	389,228	1,242,152	1,820,000	830,974	1,585,806	2,080,000	1,050,000
7	1,388,196	1,800,000	548,374	1,617,872	2,360,000	795,330	1,992,258	2,650,000	1,040,000
8	1,137,971	1,380,000	735,331	1,570,022	2,080,000	878,515	1,925,161	2,400,000	1,140,000
9	939,122	1,050,000	751,705	1,274,944	1,580,000	968,308	1,555,161	1,910,000	1,260,000
10	754,036	1,040,000	599,558	1,052,997	1,260,000	770,496	1,242,903	1,570,000	1,090,000
11	635,216	778,935	524,750	888,970	1,090,000	679,819	1,050,304	1,470,000	885,054
12	671,693	840,744	599,482	764,543	1,010,000	538,505	945,005	1,320,000	795,382
13	686,052	842,596	613,017	820,579	1,210,000	614,948	988,374	1,290,000	862,874
14	790,351	1,030,000	715,516	834,537	1,030,000	629,573	1,019,986	1,390,000	882,295
15	809,987	1,470,000	715,473	937,185	1,080,000	736,068	1,138,065	1,550,000	1,000,000
16	884,284	1,150,000	687,898	1,022,885	1,630,000	736,358	1,158,065	1,440,000	1,020,000
17	852,210	1,150,000	567,736	1,179,341	1,750,000	707,532	1,358,065	1,620,000	1,130,000
18	807,609	1,520,000	568,117	1,205,303	1,710,000	604,697	1,397,419	1,730,000	1,030,000
19	941,740	1,440,000	573,293	1,042,641	1,270,000	603,193	1,259,032	1,530,000	1,020,000
20	812,004	1,430,000	680,085	1,210,246	1,750,000	720,328	1,389,355	1,670,000	1,130,000
21

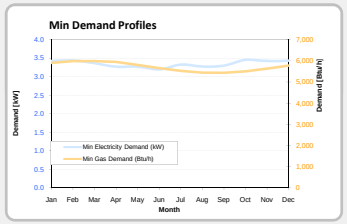
AR eQUEST Simulation Results

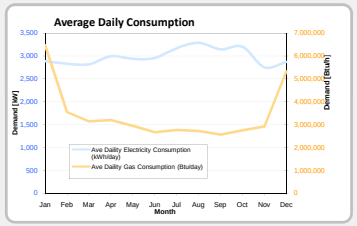
ITERATION: % construction cost premium











Electricity Demand Profiles - AR

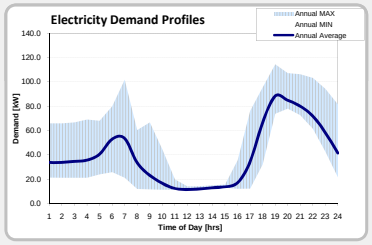
Hour	Annual Average (kW)	Annual MAX (kW)	Annual MIN (kW)	Jan Average (kW)	Jan MAX (kW)	Jan MIN (kW)	Feb Average (kW)	Feb MAX (kW)	Feb MIN (kW)	Mar Average (kW)	Mar MAX (kW)	Mar MIN (kW)	Apr Average (kW)	Apr MAX (kW)	Apr MIN (kW)	May Average (kW)	May MAX (kW)	May MIN (kW)	Jun Average (kW)	Jun MAX (kW)	Jun MIN (kW)	Jul Average (kW)	Jul MAX (kW)	Jul MIN (kW)	Aug Average (kW)	Aug MAX (kW)	Aug MIN (kW)	Sep Average (kW)	Sep MAX (kW)	Sep MIN (kW)	Oct Average (kW)	Oct MAX (kW)	Oct MIN (kW)	Nov Average (kW)	Nov MAX (kW)	Nov MIN (kW)	Dec Average (kW)	Dec MAX (kW)	Dec MIN (kW)
1	32.4	36.7	25.2	33.0	36.7	25.2	33.0	36.7	25.2	33.0	36.7	25.2	32.6	36.7	25.2	32.0	34.9	25.2	31.6	34.9	25.2	32.0	34.9	25.2	32.0	34.9	25.2	31.6	34.9	25.2	32.3	36.7	25.2	32.4	36.7	25.2	33.0	36.7	25.2
2	31.7	34.9	25.2	31.7	34.9	25.2	31.7	34.9	25.2	31.7	34.9	25.2	32.2	34.9	25.2	31.9	34.6	25.2	31.5	34.6	25.2	31.9	34.6	25.2	31.9	34.6	25.2	31.5	34.6	25.2	31.9	34.9	25.2	31.3	34.9	25.2	31.7	34.9	25.2
3	31.7	34.6	25.2	31.6	34.6	25.2	31.6	34.6	25.2	31.6	34.6	25.2	32.1	34.6	25.2	31.9	34.6	25.2	31.5	34.6	25.2	31.9	34.6	25.2	31.9	34.6	25.2	31.5	34.6	25.2	31.9	34.6	25.2	31.2	34.6	25.2	31.6	34.6	25.2
4	29.9	34.6	18.1	31.6	34.6	25.2	31.6	34.6	25.2	31.6	34.6	25.2	32.1	34.6	25.2	24.9	27.6	18.1	24.5	27.6	18.1	24.9	27.6	18.1	31.9	34.6	25.2	31.5	34.6	25.2	31.9	34.6	25.2	31.2	34.6	25.2	31.6	34.6	25.2
5	27.9	34.6	11.1	31.6	34.6	25.2	31.6	34.6	25.2	31.6	34.6	25.2	27.9	34.6	19.9	17.8	20.6	11.1	17.4	20.6	11.1	17.8	20.6	11.1	31.9	34.6	25.2	31.5	34.6	25.2	31.9	34.6	25.2	31.2	34.6	25.2	31.6	34.6	25.2
6	23.5	34.6	3.9	31.6	34.6	25.2	26.3	29.4	19.9	26.3	29.4	19.9	20.8	29.4	9.3	13.6	17.8	4.0	12.8	17.6	3.9	13.6	17.8	4.0	24.4	28.4	14.6	23.8	28.4	14.6	25.5	34.6	14.6	31.2	34.6	25.2	31.6	34.6	25.2
7	29.9	55.2	18.1	27.4	31.9	18.1	18.7	23.1	9.3	18.6	23.1	9.2	30.8	51.1	3.5	31.7	50.5	3.3	29.0	49.0	3.2	32.6	50.2	3.9	38.4	54.2	7.1	38.2	54.9	7.3	37.9	55.2	7.5	26.8	31.9	18.1	27.4	31.9	18.1
8	111.5	265.5	3.3	39.8	55.2	7.6	35.4	51.5	3.9	32.5	50.7	3.4	143.1	260.0	3.3	171.3	259.9	3.3	162.0	256.6	3.3	172.9	257.0	3.4	173.5	259.8	3.3	168.3	264.3	3.3	157.1	265.5	3.6	36.8	54.9	7.4	39.7	55.2	7.9
9	177.3	338.7	3.3	179.1	266.1	3.8	174.4	264.0	3.6	168.2	262.1	3.4	183.1	261.8	3.4	177.4	275.1	3.3	175.2	331.6	3.4	182.5	330.6	3.3	182.0	273.1	3.3	180.8	338.7	3.4	189.9	309.7	3.6	163.9	264.2	3.7	177.5	265.4	3.8
10	186.8	390.0	3.5	181.7	275.6	3.7	180.7	272.9	3.7	179.0	270.5	3.6	190.6	275.3	3.5	187.9	337.7	3.5	192.3	390.0	3.6	199.9	387.6	3.5	194.3	294.4	3.5	192.7	387.6	3.5	196.8	335.4	3.7	165.8	273.1	3.6	179.3	275.1	3.6
11	191.7	386.2	3.5	180.1	275.6	3.6	182.4	272.1	3.7	178.9	269.5	3.6	193.0	297.6	3.6	195.8	333.3	3.5	198.8	358.3	3.5	212.3	380.0	3.5	209.9	339.5	3.5	200.4	386.2	3.6	201.0	334.5	3.7	169.2	273.1	3.6	177.3	275.1	3.8
12	196.4	391.6	3.4	180.5	274.1	3.6	181.5	270.3	3.6	178.4	268.6	3.5	195.6	331.5	3.6	199.8	340.5	3.4	207.1	353.2	3.4	224.7	384.8	3.5	223.0	353.0	3.5	207.2	391.6	3.6	206.2	338.4	3.6	173.0	298.3	3.7	177.7	273.8	3.8
13	205.1	405.2	3.4	180.6	273.8	3.6	182.2	317.8	3.6	180.8	297.2	3.5	201.1	353.2	3.5	213.6	395.8	3.4	229.0	388.6	3.5	248.1	405.2	3.5	244.0	398.7	3.6	219.8	395.2	3.5	214.1	377.7	3.5	170.4	292.0	3.6	175.6	273.8	3.5
14	207.3	410.0	3.4	178.1	274.9	3.5	178.9	287.5	3.5	178.1	290.6	3.5	203.6	383.8	3.5	218.8	399.7	3.5	233.4	394.3	3.5	251.3	409.6	3.4	252.0	400.8	3.6	227.3	410.0	3.5	218.2	382.3	3.5	170.6	312.7	3.5	173.9	275.1	3.5
15	206.9	409.2	3.4	175.6	276.6	3.4	179.9	283.3	3.5	181.3	324.5	3.5	198.8	375.4	3.5	221.0	397.1	3.5	230.9	394.3	3.5	249.1	409.2	3.4	249.1	394.9	3.5	228.0	408.8	3.6	222.1	381.2	3.5	170.5	311.7	3.4	174.2	277.4	3.4
16	205.4	402.5	3.4	177.2	279.7	3.5	178.4	279.0	3.4	184.6	336.6	3.5	200.3	370.7	3.5	214.9	384.8	3.4	220.5	380.3	3.4	238.8	399.5	3.5	246.8	389.4	8.7	223.5	402.5	8.7	224.5	381.5	3.5	173.2	319.6	3.5	178.8	280.2	3.8
17	207.3	406.2	3.4	198.2	293.6	14.3	181.0	284.8	3.5	179.9	318.0	3.4	197.9	341.9	3.4	200.9	364.3	3.5	200.0	372.3	3.5	225.6	384.5	3.5	238.8	394.4	24.5	227.5	406.2	24.5	238.4	400.5	9.1	194.1	355.3	14.5	203.0	293.9	14.9
18	214.1	431.9	3.4	220.9	310.8	32.2	200.8	294.2	12.8	199.6	312.4	12.5	213.6	308.6	12.4	187.3	320.5	3.5	183.4	329.7	3.4	204.3	358.2	3.4	233.7	395.5	35.0	243.1	431.9	35.3	249.5	393.0	25.2	210.7	342.1	32.2	220.9	310.8	32.2
19	214.5	410.2	9.0	221.0	309.2	35.7	214.3	303.4	28.7	216.1	328.1	28.7	227.7	320.9	28.7	193.1	296.1	9.1	182.9	300.3	9.0	200.2	333.2	9.0	228.5	336.0	35.5	227.0	410.2	35.7	232.9	382.3	35.7	209.6	316.1	35.7	221.0	309.2	35.7
20	194.4	363.5	21.6	211.2	294.8	35.7	211.5	294.8	35.7	211.7	302.1	35.7	199.8	301.5	35.7	173.0	240.1	21.6	165.4	252.7	21.6	176.5	264.1	21.6	190.1	281.1	35.7	184.7	293.3	35.7	198.4	363.5	35.7	199.8	295.3	35.7	211.2	294.8	35.7
21	118.1	276.9	35.7	179.8	248.4	35.7	180.0	248.4	35.7	179.8	248.5	35.7	97.8	249.6	35.7	69.0	82.7	35.7	67.0	82.7	35.7	69.0	82.7	35.7	69.0	82.7	35.7	67.0	82.7	35.7	91.7	276.9	35.7	170.4	248.4	35.7	179.8	248.4	35.7
22	60.0	82.7	32.2	67.5	82.7	35.7	67.6	82.7	35.7	67.5	82.7	35.7	58.4	82.7	32.2	54.3	63.4	32.2	53.0	63.4	32.2	54.3	63.4	32.2	54.3	63.4	32.2	53.0	63.4	32.2	56.9	82.7	32.2	65.4	82.7	35.7	67.5	82.7	35.7
23	46.4	63.4	28.7	53.3	63.4	32.2	53.4	63.4	32.2	53.3	63.4	32.2	44.5	63.4	28.7	41.1	46.2	28.7	40.4	46.2	28.7	41.1	46.2	28.7	41.1	46.2	28.7	40.4	46.2	28.7	43.5	63.4	28.7	52.0	63.4	32.2	53.3	63.4	32.2
24	36.5	46.2	25.2	40.6	46.2	28.7	40.6	46.2	28.7	40.6	46.2	28.7	35.7	46.2	25.2	33.0	36.7	25.2	33.2	36.7	25.2	33.3	36.7	25.2	33.0	36.7	25.2	33.2	36.7	25.2	34.3	46.2	25.2	39.8	46.2	28.7	40.6	46.2	28.7
day)	2,987	5,745	316	2,884	4,143	455	2,827	4,144	400	2,815	4,300	399	2,993	4,880	367	2,936	4,795	302	2,953	4,950	302	3,169	5,153	303	3,285	4,996	437	3,144	5,412	437	3,199	5,380	407	2,751	4,391	455	2,870	4,143	456
kW)		431.9			310.8			317.8			336.6			383.8			399.7			394.3			409.6			400.8			431.9			400.5			355.3			310.8	
kW)			3.3			3.4			3.4			3.4			3.3			3.3			3.2			3.3			3.3			3.3			3.5			3.4			3.4

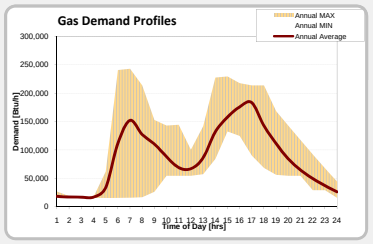
Gas Demand Profiles - AR

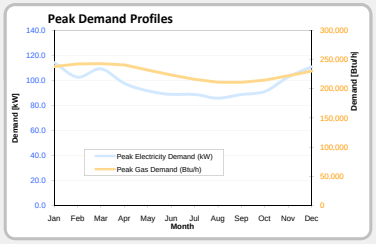
Hour	Annual Average (Btu/h)	Annual MAX (Btu/h)	Annual MIN (Btu/h)	Jan Average (Btu/h)	Jan MAX (Btu/h)	Jan MIN (Btu/h)	Feb Average (Btu/h)	Feb MAX (Btu/h)	Feb MIN (Btu/h)	Mar Average (Btu/h)	Mar MAX (Btu/h)	Mar MIN (Btu/h)	Apr Average (Btu/h)	Apr MAX (Btu/h)	Apr MIN (Btu/h)	May Average (Btu/h)	May MAX (Btu/h)	May MIN (Btu/h)	Jun Average (Btu/h)	Jun MAX (Btu/h)	Jun MIN (Btu/h)	Jul Average (Btu/h)	Jul MAX (Btu/h)	Jul MIN (Btu/h)	Aug Average (Btu/h)	Aug MAX (Btu/h)	Aug MIN (Btu/h)	Sep Average (Btu/h)	Sep MAX (Btu/h)	Sep MIN (Btu/h)	Oct Average (Btu/h)	Oct MAX (Btu/h)	Oct MIN (Btu/h)	Nov Average (Btu/h)	Nov MAX (Btu/h)	Nov MIN (Btu/h)	Dec Average (Btu/h)	Dec MAX (Btu/h)	Dec MIN (Btu/h)
1	15,859	23,297	5,439	17,464	22,970	5,907	17,716	23,273	5,985	17,714	23,297	5,991	16,679	23,152	5,954	15,400	19,326	5,805	14,439	18,830	5,656	14,663	18,401	5,527	14,446	18,129	5,446	13,883	18,106	5,439	15,001	21,404	5,505	15,930	21,894	5,631	17,074	22,455	5,779
2	14,874	19,947	5,439	15,228	19,668	5,907	15,445	19,927	5,985	15,445	19,947	5,991	16,125	19,824	5,954	15,400	19,326	5,805	14,439	18,830	5,656	14,663	18,401	5,527	14,446	18,129	5,446	13,883	18,106	5,439	14,604	18,327	5,505	13,937	18,746	5,631	14,887	19,227	5,779
3	14,874	19,947	5,439	15,228	19,668	5,907	15,445	19,927	5,985	15,445	19,947	5,991	16,125	19,824	5,954	15,400	19,326	5,805	14,439	18,830	5,656	14,663	18,401	5,527	14,446	18,129	5,446	13,883	18,106	5,439	14,604	18,327	5,505	13,937	18,746	5,631	14,887	19,227	5,779
4	14,874	19,947	5,439	15,228	19,668	5,907	15,445	19,927	5,985	15,445	19,947	5,992	16,125	19,824	5,954	15,400	19,326	5,805	14,439	18,830	5,656	14,663	18,401	5,527	14,446	18,129	5,446	13,883	18,106	5,439	14,604	18,327	5,505	13,937	18,746	5,631	14,887	19,227	5,779
5	14,874	19,948	5,439	15,228	19,668	5,907	15,445	19,927	5,985	15,445	19,948	5,992	16,125	19,824	5,954	15,400	19,326	5,805	14,439	18,830	5,656	14,663	18,401	5,527	14,446	18,129	5,446	13,883	18,106	5,439	14,604	18,327	5,505	13,937	18,746	5,631	14,887	19,227	5,779
6	15,768	22,280	5,439	15,228	19,668	5,907	15,445	19,927	5,985	15,445	19,948	5,992	17,517	22,280	5,954	17,100	21,721	5,805	15,994	21,164	5,656	16,281	20,681	5,527	16,041	20,375	5,446	15,379	20,350	5,439	15,923	20,598	5,505	13,937	18,746	5,631	14,887	19,227	5,779
7	29,335	57,545	5,439	16,879	22,105	5,907	17,121	22,397	5,985	17,120	22,420	5,992	37,910	57,545	5,954	41,498	56,100	5,805	38,326	54,662	5,656	39,512	53,415	5,527	38,928	52,625	5,446	36,851	52,558	5,439	35,147	53,201	5,505	15,408	21,069	5,631	16,501	21,610	5,779
8	92,975	1,029,750	5,439	40,577	57,088	5,907	41,176	57,845	5,985	41,159	57,905	5,992	169,488	1,029,750	5,954	170,269	868,717	5,805	116,465	171,869	5,656	120,794	167,948	5,527	119,007	165,465	5,446	111,982	165,254	5,439	105,590	167,274	5,505	36,528	54,416	5,631	39,670	55,811	5,779
9	366,573	4,179,830	5,439	1,059,178	4,179,830	5,907	481,216	1,963,770	5,986	310,970	1,620,990	5,992	221,499	1,257,780	5,954	179,978	425,063	5,805	159,700	236,723	5,656	165,769	231,322	5,527	163,317	227,901	5,446	153,553	227,611	5,439	156,959	230,393	5,505	332,446	1,883,690	5,631	1,006,047	2,992,590	5,779
10	307,726	3,925,620	5,439	733,201	3,925,620	5,907	310,441	1,227,460	5,986	233,786	899,228	5,992	250,103	684,102	5,954	236,693	331,148	5,805	216,990	322,656	5,656	225,363	315,295	5,527	222,030	310,632	5,446	208,637	310,236	5,439	213,665	314,029	5,505	222,738	1,159,960	5,631	608,606	2,057,010	5,779
11	295,172	3,314,230	5,439	599,843	3,314,230	5,907	295,179	906,758	5,986	254,598	635,125	5,992	266,512	526,179	5,954	248,427	347,682	5,805	227,730	338,767	5,656	236,535	331,038	5,527	233,037	326,142	5,446	218,964	325,726	5,439	233,562	329,708	5,505	239,926	911,703	5,631	480,418	1,529,720	5,779
12	286,733	2,996,920	5,439	557,169	2,996,920	5,907	286,904	869,789	5,986	256,152	535,811	5,992	263,122	356,638	5,954	248,427	347,682	5,805	227,730	338,766	5,656	236,535	331,038	5,527	233,037	326,142	5,446	218,964	325,726	5,439	235,585	329,708	5,505	232,696	848,603	5,631	437,899	1,438,400	5,779
13	274,390	2,616,910	5,439	497,967	2,616,910	5,907	268,516	764,011	5,986	245,038	358,869	5,992	263,122	356,638	5,954	248,427	347,682	5,805	227,729	338,766	5,656	236,535	331,038	5,527	233,037	326,142	5,446	218,964	325,726	5,439	235,585	329,708	5,505	227,218	684,269	5,631	384,796	1,272,900	5,779
14	262,405	2,301,420	5,439	430,884	2,301,420	5,907	261,152	626,105	5,986	245,038	358,869	5,992	263,122	356,638	5,954	248,427	347,682	5,805	227,729	338,766	5,656	236,535	331,038	5,527	233,037	326,142	5,446	218,964	325,726	5,439	235,585	329,708	5,505	221,913	525,117	5,631	322,551	992,683	5,779
15	250,775	1,948,310	5,439	374,768	1,948,310	5,907	251,060	522,942	5,986	245,038	358,869	5,992	261,259	356,638	5,954	246,152	344,475	5,805	225,647	335,642	5,656	234,368	327,985	5,527	230,902	323,134	5,446	216,961	322,722	5,439	233,819	329,708	5,505	215,650	337,240	5,631	271,011	748,737	5,779
16	237,089	1,701,440	5,439	347,979	1,701,440	5,907	242,943	355,187	5,986	242,796	355,560	5,992	247,619	353,349	5,954	230,168	321,953	5,805	211,017	313,697	5,656	219,150	306,541	5,527	215,909	302,007	5,446	202,894	301,622	5,439	221,025	326,667	5,505	213,680	334,130	5,631	248,078	625,548	5,779
17	214,330	1,635,420	5,439	327,780	1,635,420	5,907	227,185	331,964	5,986	227,048	332,313	5,992	219,584	330,247	5,954	200,641	280,347	5,805	183,991	273,158	5,656	191,036	266,927	5,527	188,211	262,979	5,446	176,908	262,644	5,439	195,360	305,309	5,505	199,845	312,284	5,631	233,131	606,825	5,779
18	186,817	1,560,100	5,439	298,464	1,560,100	5,907	198,075	289,064	5,986	197,956	289,368	5,992	187,030	287,569	5,954	169,579	236,578	5,805	155,560	230,512	5,656	161,462	225,253	5,527	159,074	221,922	5,446	149,572	221,639	5,439	166,169	265,854	5,505	174,285	271,928	5,631	223,059	764,073	5,779
19	157,527	1,559,050	5,439	274,777	1,559,050	5,907	167,451	243,935	5,986	167,352	244,190	5,992	151,008	242,672	5,954	134,734	187,479	5,805	123,666	182,672	5,656	128,285	178,504	5,527	126,388	175,864	5,446	118,906	175,640	5,439	133,778	224,348	5,505	147,398	229,474	5,631	214,665	797,013	5,779
20	121,770	1,643,400	5,439	276,103	1,643,400	5,907	133,097	193,308	5,986	133,021	193,511	5,992	101,455	192,308	5,954	84,483	116,670	5,805	77,671	113,679	5,656	80,439	111,085	5,527	79,250	109,443	5,446	74,682	109,303	5,439	88,781	177,787	5,505	117,235	181,849	5,631	212,376	840,538	5,779
21	127,066	1,972,640	5,439	398,272	1,972,640	5,907	126,132	724,417	5,986	83,510	120,424	5,992	69,658	119,676	5,954	60,441	82,792	5,805	55,665	80,670	5,656	57,548	78,829	5,527	56,697	77,664	5,446	53,523	77,565	5,439	61,462	110,639	5,505	103,720	1,012,660	5,631	390,791	1,305,570	5,779
22	54,279	85,456	5,439	58,977	84,248	5,907	59,851	85,367	5,986	59,822	85,456	5,992	58,297	84,925	5,954	53,642	73,212	5,805	49,442	71,335	5,656	51,075	69,708	5,527	50,320	68,677	5,446	47,539	68,590	5,439	52,042	78,513	5,505	52,926	80,307	5,631	57,658	82,365	5,779
23	40,462	75,568	5,439	52,373	74,500	5,907	53,149	75,489	5,986	53,124	75,568	5,992	39,685	75,098	5,954	32,917	44,009	5,805	30,472	42,881	5,656	31,342	41,902	5,527	30,879	41,283	5,446	29,300	41,230	5,439	34,790	69,428	5,505	47,040	71,015	5,631	51,202	72,834	5,779
24	23,586	45,425	5,439	32,242	44,784	5,908	32,716	45,378	5,986	32,704	45,425	5,992	22,804	45,143	5,954	17,162	22,571	5,805	17,091	21,992	5,656	16,856	21,490	5,527	16,099	21,172	5,446	16,433	21,146	5,439	18,898	41,734	5,505	29,100	42,688	5,631	31,522	43,782	5,779
day)	3,420,129	########	130,530	6,471,035	31,759,323	141,774	3,548,307	9,428,093	143,652	3,141,170	6,712,935	143,798	3,191,972	6,837,622	142,902	2,946,165	4,900,192	139,320	2,660,809	3,922,527	135,750	2,758,735	3,833,041	132,658	2,717,430	3,776,355	130,699	2,558,392	3,771,542	130,530	2,747,142	4,129,028	132,128	2,915,367	9,078,026	135,147	5,321,492	16,366,598	138,614
u/h)		4,179,830			4,179,830			1,963,770			1,620,990			1,257,780			868,717			338,767			331,038			326,142			325,726			329,708			1,883,690			2,992,590	
u/h)			5,439			5,907			5,985			5,991			5,954			5,805			5,656			5,527			5,446			5,439			5,505			5,631			5,779

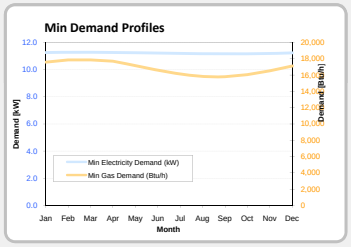
Low-Rise Residential eQUEST Simulation Results

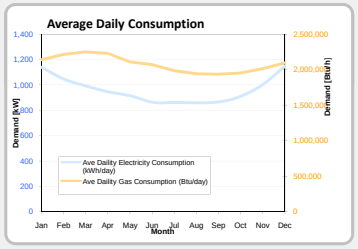
ITERATION: % cost premium minus LR & MR Res cooling











Electricity Demand Profiles - LR Res

Hour	Annual Average (kW)	Annual MAX (kW)	Annual MIN (kW)	Jan Average (kW)	Jan MAX (kW)	Jan MIN (kW)	Feb Average (kW)	Feb MAX (kW)	Feb MIN (kW)	Mar Average (kW)	Mar MAX (kW)	Mar MIN (kW)	Apr Average (kW)	Apr MAX (kW)	Apr MIN (kW)	May Average (kW)	May MAX (kW)	May MIN (kW)
1	33.7	66.0	21.4	47.0	66.0	34.4	40.8	52.1	34.4	36.3	50.6	25.7	34.3	46.0	27.1	31.3	39.5	25.6
2	33.7	65.9	21.2	46.0	65.9	34.4	40.0	51.5	35.2	36.1	45.7	27.9	35.2	42.2	28.6	31.8	40.1	25.6
3	34.6	66.7	21.2	46.2	66.7	34.2	40.1	47.0	35.3	36.8	46.6	28.2	36.3	43.2	30.6	32.7	40.1	27.1
4	35.6	69.0	21.2	46.4	69.0	33.9	40.9	52.8	35.6	38.3	53.0	29.0	37.3	44.2	32.7	33.8	40.0	28.4
5	40.4	68.1	24.0	46.3	68.1	34.2	41.6	52.3	35.6	39.1	53.7	30.2	45.0	55.2	34.1	41.3	48.4	31.6
6	52.8	80.0	25.9	53.3	80.0	35.0	49.7	58.9	36.0	48.1	65.4	33.0	61.2	78.0	36.9	55.5	70.9	33.6
7	53.5	101.9	21.2	68.1	101.9	37.0	66.8	89.8	38.3	64.8	87.5	35.0	47.1	69.1	37.4	42.9	47.6	34.2
8	33.5	60.3	12.0	48.6	54.9	38.8	48.1	50.0	40.6	46.4	50.0	37.2	23.6	52.4	12.3	24.8	50.9	12.2
9	23.2	66.7	11.9	30.5	64.8	12.2	25.3	57.7	12.3	22.9	60.4	12.3	20.2	49.3	12.1	22.4	42.3	12.6
10	16.7	44.6	11.2	23.8	44.6	12.0	21.0	42.4	12.1	20.0	44.6	12.1	13.8	42.4	11.3	13.3	17.5	11.3
11	12.3	19.8	11.2	14.0	19.3	11.3	13.2	17.6	11.3	12.9	19.8	11.3	11.8	17.6	11.3	11.5	11.9	11.2
12	11.6	14.2	11.2	11.9	14.2	11.3	11.5	11.9	11.3	11.5	11.9	11.3	11.6	11.9	11.5	11.6	11.9	11.5
13	12.0	14.2	11.5	11.9	14.2	11.6	11.7	11.9	11.6	11.6	11.9	11.6	12.2	12.8	11.6	12.2	12.8	12.0
14	12.8	15.1	12.0	12.6	15.1	12.1	12.3	12.8	12.1	12.2	12.9	12.1	13.2	14.5	12.1	13.3	14.4	13.1
15	13.8	15.6	13.0	13.6	15.6	13.1	13.4	14.5	13.1	13.4	14.5	13.1	14.2	14.6	13.1	14.1	14.5	13.2
16	17.0	35.6	12.1	14.3	16.8	13.3	14.2	14.6	13.3	14.4	16.1	13.4	17.9	35.6	12.4	20.3	35.6	12.3
17	34.1	76.2	12.2	24.4	66.3	12.4	19.7	41.2	12.4	18.3	50.9	12.4	38.8	74.6	12.4	45.9	76.2	32.1
18	66.4	95.4	32.0	59.5	95.4	38.2	50.3	79.0	32.4	45.3	86.3	32.2	74.5	89.1	32.8	72.6	91.8	65.4
19	88.5	114.4	73.9	101.4	114.4	91.1	94.2	102.7	85.4	90.8	109.4	85.3	84.6	97.7	82.3	83.7	88.5	82.2
20	84.8	107.2	78.1	97.0	107.2	87.9	90.6	96.1	82.6	87.6	103.1	82.3	81.2	93.3	78.2	79.9	84.5	78.2
21	80.0	106.3	72.6	93.0	102.0	83.1	87.0	92.7	78.9	83.7	97.7	78.2	76.4	89.7	72.7	74.6	79.2	72.7
22	71.9	103.3	61.5	88.1	98.1	76.1	82.4	88.0	74.6	78.7	90.5	72.7	67.3	84.5	61.5	64.7	72.5	61.5
23	58.3	94.4	42.6	78.7	88.6	66.4	73.3	78.7	65.6	69.2	80.5	61.8	52.7	74.4	43.0	49.2	57.3	42.8
24	41.4	81.5	21.5	63.7	81.5	53.2	58.3	66.6	51.4	53.9	66.1	43.9	35.9	60.7	24.9	31.6	44.2	24.9
day)	962	1,582	656	1,140	1,530	887	1,046	1,283	872	992	1,329	812	946	1,293	743	915	1,132	775
kW)		114.4			114.4			102.7			109.4			97.7			91.8	
kW)			11.2			11.3			11.3			11.3			11.3			11.2

Hour	Jun Average (kW)	Jun MAX (kW)	Jun MIN (kW)	Jul Average (kW)	Jul MAX (kW)	Jul MIN (kW)	Aug Average (kW)	Aug MAX (kW)	Aug MIN (kW)	Sep Average (kW)	Sep MAX (kW)	Sep MIN (kW)	Oct Average (kW)	Oct MAX (kW)	Oct MIN (kW)	Nov Average (kW)	Nov MAX (kW)	Nov MIN (kW)	Dec Average (kW)	Dec MAX (kW)	Dec MIN (kW)
1	26.9	32.8	22.0	25.5	28.7	21.1	25.5	29.4	21.7	24.5	30.4	21.4	28.7	33.9	21.4	37.1	54.1	23.6	46.8	61.1	37.4
2	27.5	33.8	21.7	26.1	29.5	22.1	26.1	30.6	22.0	25.1	30.6	21.2	29.3	35.6	22.5	36.3	53.1	24.5	45.7	62.7	37.0
3	28.5	35.1	21.9	27.0	31.2	22.6	27.0	32.2	23.4	26.1	31.8	21.2	30.6	37.3	23.7	37.2	53.0	26.7	47.0	64.4	36.7
4	29.6	36.5	22.0	27.6	32.4	23.2	27.7	33.0	24.3	27.0	33.5	21.2	31.6	38.8	24.0	38.4	55.9	27.2	48.8	67.4	37.0
5	37.6	46.4	24.0	35.5	42.5	27.0	35.9	43.8	25.9	35.5	43.5	25.1	39.3	49.8	25.8	38.9	53.6	28.4	48.8	65.1	36.9
6	53.1	66.5	25.9	50.8	63.6	26.5	52.5	64.3	29.2	51.9	64.4	29.1	54.3	71.7	28.8	46.7	65.8	33.0	56.7	74.9	39.0
7	42.8	47.5	34.0	43.6	47.4	34.3	44.3	47.4	36.3	44.6	47.4	37.9	44.6	49.7	35.6	61.6	87.7	35.1	72.2	97.6	41.7
8	22.0	50.8	12.1	23.8	50.8	12.1	22.3	50.8	12.0	22.7	50.8	12.0	24.8	50.8	12.1	45.9	49.7	38.3	49.8	60.3	43.8
9	19.7	42.2	12.0	21.3	42.2	11.9	20.4	42.1	11.9	20.4	42.1	11.9	21.6	44.4	11.9	24.7	60.4	12.1	28.4	66.7	12.2
10	12.8	17.5	11.3	13.1	17.4	11.5	12.9	17.4	11.2	12.9	17.4	11.2	13.9	38.0	11.3	21.0	43.1	11.9	21.8	44.5	12.0
11	11.4	11.8	11.2	11.4	11.8	11.2	11.4	11.8	11.2	11.4	11.8	11.2	11.6	16.3	11.2	13.1	18.6	11.3	13.4	19.8	11.3
12	11.6	11.9	11.5	11.6	11.8	11.5	11.5	11.8	11.5	11.5	11.8	11.5	11.5	11.8	11.2	11.4	11.8	11.2	11.7	14.1	11.2
13	12.1	12.7	12.0	12.1	12.7	12.0	12.1	12.6	11.9	12.1	12.6	11.9	12.1	12.7	11.6	11.6	11.8	11.5	11.8	14.1	11.5
14	13.2	14.3	13.0	13.2	14.2	12.9	13.1	14.1	12.9	13.1	14.1	12.9	13.1	14.2	12.3	12.2	12.7	12.0	12.3	14.3	12.0
15	14.1	14.4	13.2	14.0	14.4	13.1	14.0	14.3	13.0	14.0	14.3	13.0	14.0	14.4	13.1	13.2	14.3	13.0	13.3	14.4	13.1
16	18.3	35.5	12.2	19.5	35.4	12.1	18.7	35.3	12.1	18.7	35.3	12.1	19.0	35.4	12.1	14.1	14.4	13.1	14.1	14.5	13.2
17	43.6	76.1	32.0	45.9	76.0	31.9	42.0	74.4	31.9	41.5	76.0	31.9	45.2	76.0	31.9	20.3	40.9	12.2	22.5	52.2	12.3
18	71.0	88.9	63.6	71.6	88.9	67.6	73.7	85.1	69.8	84.5	88.8	76.8	86.2	91.2	74.5	49.5	78.5	32.0	56.8	84.7	37.8
19	79.6	86.0	73.9	81.0	85.9	73.9	83.0	85.9	82.1	83.0	85.9	82.1	83.7	87.3	82.1	91.9	102.8	85.1	102.5	111.0	95.7
20	79.0	82.0	78.1	79.0	81.2	78.1	78.8	81.2	78.1	78.9	81.2	78.1	79.7	84.5	78.1	88.3	97.2	82.3	97.5	104.7	90.7
21	73.3	75.9	72.7	73.1	74.3	72.6	73.0	74.3	72.6	73.2	74.3	72.6	74.1	80.3	72.6	84.8	93.1	78.5	93.7	106.3	87.2
22	62.7	66.6	61.5	62.2	64.0	61.5	62.2	64.1	61.5	62.2	63.7	61.5	63.7	73.8	61.5	79.7	88.5	73.9	89.2	103.3	82.9
23	45.8	53.3	42.6	44.8	49.3	42.6	44.9	50.1	42.6	44.6	47.8	42.6	47.6	63.3	42.6	70.2	83.6	63.7	79.9	94.4	73.3
24	27.4	37.6	21.6	26.5	33.3	21.5	26.1	33.7	21.5	25.3	34.8	21.5	30.2	48.4	21.5	54.9	69.5	48.1	64.5	78.6	56.6
day)	863	1,076	726	860	1,039	735	859	1,040	751	865	1,044	752	910	1,159	753	1,003	1,314	809	1,149	1,491	943
kW)		88.9			88.9			85.9			88.8			91.2			102.8			111.0	
kW)			11.2			11.2			11.2			11.2			11.2			11.2			11.2

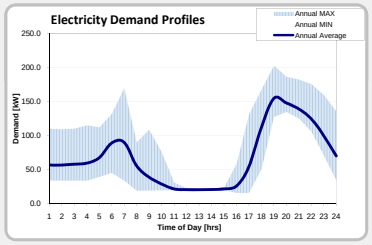
Gas Demand Profiles - LR Res

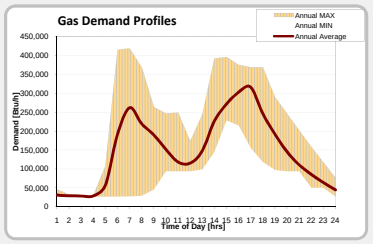
Hour	Annual Average (Btu/h)	Annual MAX (Btu/h)	Annual MIN (Btu/h)	Jan Average (Btu/h)	Jan MAX (Btu/h)	Jan MIN (Btu/h)	Feb Average (Btu/h)	Feb MAX (Btu/h)	Feb MIN (Btu/h)	Mar Average (Btu/h)	Mar MAX (Btu/h)	Mar MIN (Btu/h)	Apr Average (Btu/h)	Apr MAX (Btu/h)	Apr MIN (Btu/h)	May Average (Btu/h)	May MAX (Btu/h)	May MIN (Btu/h)
1	18,292	27,098	15,810	21,076	26,620	17,567	20,811	27,062	17,851	20,238	27,098	17,850	18,298	26,810	17,719	17,560	18,256	17,168
2	17,030	19,026	15,814	18,027	18,711	17,582	18,234	19,004	17,871	18,172	19,026	17,867	17,788	18,839	17,729	17,197	17,225	17,173
3	16,888	17,921	15,816	17,615	17,641	17,587	17,888	17,901	17,875	17,897	17,921	17,869	17,759	17,782	17,737	17,202	17,230	17,179
4	16,892	17,926	15,820	17,618	17,643	17,589	17,891	17,905	17,880	17,901	17,926	17,874	17,763	17,784	17,742	17,207	17,231	17,183
5	33,286	62,458	15,845	17,619	17,644	17,590	17,893	17,907	17,883	17,905	17,931	17,878	47,547	62,458	17,753	44,982	60,272	17,194
6	111,467	241,146	15,847	44,682	61,799	17,596	48,435	62,911	17,883	51,350	63,002	17,881	169,869	241,146	17,753	156,411	232,463	17,198
7	152,086	243,310	15,820	153,281	238,422	17,593	170,915	242,948	17,888	185,411	243,310	17,885	164,361	241,141	18,823	141,240	204,472	18,230
8	127,235	214,002	17,069	138,681	209,712	18,648	153,741	213,686	18,967	166,059	214,002	18,965	128,675	212,095	29,413	112,676	146,321	28,432
9	110,401	153,110	26,490	111,660	150,080	29,116	120,862	152,890	29,647	128,110	153,110	29,650	116,940	151,751	61,081	109,731	136,330	58,955
10	88,128	143,210	54,682	110,607	139,853	60,435	115,251	142,471	61,571	118,216	142,685	61,614	79,868	143,210	62,347	76,596	138,098	60,137
11	68,798	144,546	54,780	79,257	141,677	61,742	78,225	144,330	62,859	76,156	144,546	62,927	69,905	143,226	62,334	67,520	96,240	60,118
12	66,984	100,739	54,762	69,571	98,772	61,751	69,745	100,587	62,855	68,885	100,739	62,925	71,139	99,800	62,323	71,223	93,339	60,104
13	85,911	142,230	57,670	74,097	95,811	61,755	73,344	97,566	62,852	71,411	97,714	62,923	100,126	142,230	62,416	103,591	137,136	88,081
14	131,654	227,704	84,419	107,617	140,740	90,459	106,735	143,363	92,106	104,132	143,576	92,222	157,663	227,704	91,450	161,827	219,507	146,195
15	157,661	229,827	132,843	166,705	225,232	150,067	167,462	229,488	152,863	165,617	229,827	153,072	166,444	227,730	151,652	164,317	208,112	146,178
16	175,765	217,897	124,890	170,000	213,544	150,055	169,934	217,578	152,854	167,096	217,897	153,062	198,414	215,899	142,572	190,711	204,476	137,420
17	183,374	214,037	90,372	193,481	209,817	140,991	200,510	213,723	143,632	204,314	214,037	143,826	195,199	212,080	103,081	180,729	204,472	99,357
18	142,639	214,038	68,611	181,994	209,813	101,968	190,988	213,727	103,844	196,981	214,038	103,965	129,374	212,066	78,149	116,846	160,913	75,364
19	111,379	168,537	56,477	118,530	165,153	77,346	122,012	168,251	78,742	123,762	168,537	78,828	118,257	166,919	64,264	110,353	136,652	61,999
20	84,600	143,081	54,688	111,375	140,217	63,606	115,863	142,841	64,746	118,662	143,081	64,819	74,413	141,727	62,193	68,551	112,275	60,011
21	64,271	117,517	54,700	70,323	115,178	61,553	70,606	117,318	62,664	69,943	117,517	62,735	67,052	116,426	62,200	64,669	88,176	60,021
22	50,123	92,266	39,442	66,330	90,448	61,555	67,003	92,109	62,674	66,686	92,266	62,744	44,123	91,416	33,304	42,419	65,311	32,184
23	37,256	68,314	29,453	44,339	66,990	33,024	43,240	68,201	33,575	41,500	68,314	33,607	36,865	67,686	33,316	35,710	42,535	32,197
24	26,182	44,459	15,796	36,933	43,624	33,029	36,908	44,389	33,586	36,304	44,459	33,615	21,762	44,052	17,699	19,995	25,961	17,150
day)	2,078,266	3,264,400	1,117,915	2,141,419	2,855,140	1,380,204	2,214,497	2,908,155	1,405,168	2,252,707	2,912,559	1,406,601	2,229,603	3,241,975	1,305,049	2,109,265	2,783,002	1,345,226
u/h)		243,310			238,422			242,948			243,310			241,146			232,463	
u/h)			15,796			17,567			17,851			17,850			17,699			17,150

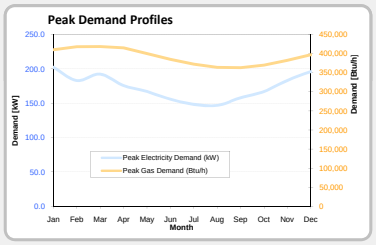
Hour	Jun Average (Btu/h)	Jun MAX (Btu/h)	Jun MIN (Btu/h)	Jul Average (Btu/h)	Jul MAX (Btu/h)	Jul MIN (Btu/h)	Aug Average (Btu/h)	Aug MAX (Btu/h)	Aug MIN (Btu/h)	Sep Average (Btu/h)	Sep MAX (Btu/h)	Sep MIN (Btu/h)	Oct Average (Btu/h)	Oct MAX (Btu/h)	Oct MIN (Btu/h)	Nov Average (Btu/h)	Nov MAX (Btu/h)	Nov MIN (Btu/h)	Dec Average (Btu/h)	Dec MAX (Btu/h)	Dec MIN (Btu/h)
1	16,900	17,664	16,614	16,472	17,147	16,141	16,138	16,832	15,849	16,118	16,798	15,810	16,663	24,192	16,057	19,351	24,987	16,517	19,926	25,853	17,102
2	16,640	16,664	16,621	16,167	16,176	16,149	15,870	15,886	15,858	15,841	15,863	15,814	16,130	17,067	16,067	16,910	17,616	16,537	17,469	18,198	17,118
3	16,645	16,670	16,624	16,172	16,183	16,154	15,876	15,891	15,862	15,847	15,868	15,816	16,104	16,130	16,074	16,584	16,616	16,544	17,138	17,156	17,117
4	16,649	16,675	16,627	16,176	16,189	16,158	15,880	15,896	15,866	15,851	15,872	15,820	16,109	16,136	16,080	16,590	16,616	16,552	17,141	17,158	17,120
5	47,035	58,110	16,632	43,295	56,217	16,175	43,660	55,039	15,870	43,200	54,937	15,845	41,782	55,926	16,088	16,593	16,618	16,556	17,142	17,160	17,124
6	168,833	223,828	16,634	152,074	216,332	16,174	155,015	211,601	15,874	152,837	211,197	15,847	144,773	215,077	16,091	44,030	57,771	16,571	46,083	59,880	17,125
7	151,348	196,883	17,625	137,097	190,304	17,129	139,060	186,149	16,813	137,230	185,794	16,785	130,720	189,205	16,113	154,041	222,386	16,575	162,111	230,763	17,126
8	117,161	140,911	27,428	108,479	136,220	26,590	108,102	133,265	26,080	107,059	133,015	26,029	104,042	135,446	17,069	138,523	195,629	17,558	145,627	202,985	18,150
9	108,639	131,275	56,784	103,979	126,932	54,940	101,210	124,180	53,813	100,797	123,942	53,704	100,721	126,210	26,490	108,927	140,032	27,305	114,047	145,282	28,289
10	70,547	132,983	57,960	70,789	128,572	56,080	67,002	125,786	54,925	67,271	125,546	54,798	70,380	127,844	54,682	104,212	130,479	56,474	108,437	135,403	58,602
11	63,629	92,715	57,942	62,704	89,651	56,060	60,325	87,725	54,907	60,384	87,569	54,780	62,980	89,165	55,788	71,430	132,164	57,670	73,653	137,160	59,853
12	66,018	89,935	57,928	65,495	86,952	56,046	63,140	85,088	54,895	63,291	84,946	54,762	65,403	86,488	55,770	63,807	92,155	57,671	66,003	95,650	59,859
13	96,192	132,085	84,852	95,305	127,673	82,058	91,825	124,903	80,332	92,028	124,693	80,140	94,844	126,967	81,622	67,566	89,392	57,670	69,783	92,787	59,861
14	152,722	211,356	140,780	150,044	204,259	136,093	144,636	199,791	133,168	144,735	199,442	132,864	148,635	203,096	117,652	98,146	131,255	84,419	101,403	136,258	87,627
15	154,127	200,385	140,772	151,686	193,657	136,087	146,575	189,427	133,158	146,734	189,101	132,843	151,414	192,559	135,311	153,047	209,989	139,977	158,419	218,006	145,292
16	187,611	196,847	132,330	179,488	190,227	127,901	175,703	186,076	125,164	175,013	185,752	124,890	177,978	189,198	127,186	155,866	199,079	139,962	161,254	206,700	145,284
17	180,646	196,835	95,718	171,350	190,218	92,535	168,217	186,060	90,575	167,292	185,736	90,372	168,378	189,197	92,015	182,199	195,646	131,523	189,570	203,053	136,535
18	113,869	154,969	72,626	110,091	149,785	70,238	106,462	146,518	68,759	106,211	146,276	68,611	108,916	148,945	69,844	172,863	195,652	95,146	180,196	203,055	98,788
19	109,058	131,616	59,761	104,469	127,235	57,815	101,677	124,471	56,607	101,278	124,254	56,477	102,602	126,515	57,499	110,502	153,974	72,200	114,796	159,875	74,967
20	64,671	108,152	57,849	63,920	104,570	55,970	61,038	102,308	54,800	61,125	102,129	54,688	63,627	103,979	55,662	104,840	130,777	59,412	109,071	135,746	61,660
21	61,584	84,957	57,858	60,311	82,162	55,980	58,217	80,399	54,809	58,215	80,257	54,700	59,978	81,702	55,669	64,303	107,469	57,509	66,472	111,525	59,657
22	38,566	62,950	31,064	38,863	60,901	30,107	37,094	59,611	29,507	37,276	59,505	29,442	39,491	60,566	29,954	61,230	84,430	57,515	63,380	87,600	59,656
23	33,634	41,029	31,078	33,097	39,721	30,120	32,124	38,903	29,518	32,150	38,834	29,453	33,678	53,220	29,965	39,975	62,568	30,925	41,129	64,905	32,044
24	18,861	25,078	16,595	19,030	24,310	16,123	17,900	23,836	15,830	18,200	23,791	15,796	19,675	38,697	16,043	34,071	40,792	30,932	35,197	42,300	32,049
day)	2,071,585	2,680,572	1,296,701	1,986,554	2,591,593	1,254,823	1,942,745	2,535,641	1,228,839	1,935,982	2,531,116	1,226,086	1,955,023	2,613,529	1,190,788	2,015,606	2,664,093	1,289,719	2,095,447	2,764,457	1,338,004
u/h)		223,828			216,332			211,601			211,197			215,077			222,386			230,763	
u/h)			16,595			16,123			15,830			15,796			16,043			16,517			17,102

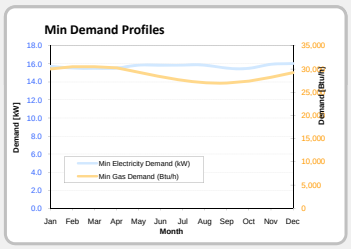
Mid-Rise Residential eQUEST Simulation Results

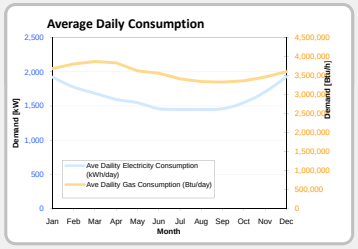
ITERATION: % cost premium minus LR & MR Res cooling











Electricity Demand Profiles - MR Res

Hour	Annual Average MR Res Demand (kW)	Annual MAX MR Res Demand (kW)	Annual MIN MR Res Demand (kW)	Jan Average MR Res Demand (kW)	Jan MAX MR Res Demand (kW)	Jan MIN MR Res Demand (kW)	Feb Average MR Res Demand (kW)	Feb MAX MR Res Demand (kW)	Feb MIN MR Res Demand (kW)	Mar Average MR Res Demand (kW)	Mar MAX MR Res Demand (kW)	Mar MIN MR Res Demand (kW)	Apr Average MR Res Demand (kW)	Apr MAX MR Res Demand (kW)	Apr MIN MR Res Demand (kW)
1	56.6	109.9	33.8	78.0	109.9	59.6	68.1	86.8	57.2	61.5	84.3	44.2	57.9	76.6	45.2
2	56.4	109.0	33.5	76.0	109.0	58.7	66.3	85.1	59.3	60.7	75.3	48.7	58.8	69.2	47.7
3	57.6	110.1	33.5	76.2	110.1	58.2	66.2	77.1	59.3	61.5	76.6	49.3	60.2	71.3	50.7
4	59.2	114.9	33.5	76.5	114.9	57.6	67.4	85.6	59.5	63.7	86.7	49.9	61.7	72.4	53.9
5	67.1	111.9	39.0	76.2	111.9	58.0	68.4	85.3	59.5	64.7	87.8	51.7	74.4	90.6	57.3
6	88.8	131.6	45.0	87.8	131.6	59.2	81.9	96.8	60.3	79.6	107.0	56.2	103.1	130.2	64.5
7	89.7	169.4	33.5	114.6	169.4	65.4	112.3	149.1	66.8	109.3	145.4	63.2	76.6	116.1	61.3
8	55.2	89.8	18.9	79.2	83.3	66.9	78.0	83.2	67.2	75.4	82.7	59.6	38.6	89.6	18.9
9	38.6	108.6	18.9	49.9	104.9	18.8	42.2	96.7	18.9	37.1	97.0	18.9	33.7	85.5	18.9
10	28.7	75.6	19.4	40.7	75.6	19.4	36.1	73.1	19.4	33.1	74.0	19.4	23.7	71.3	19.4
11	21.4	30.8	19.7	23.8	30.7	20.1	22.8	28.6	20.1	22.2	30.4	20.1	20.5	28.4	19.7
12	20.3	22.4	19.7	20.4	22.4	19.7	20.1	20.3	19.7	20.2	20.3	19.7	20.3	20.5	19.8
13	20.4	22.6	19.8	20.5	22.6	19.8	20.3	20.5	19.8	20.3	20.5	19.8	20.4	20.5	20.0
14	20.5	22.6	20.0	20.6	22.6	20.0	20.4	20.5	20.0	20.4	20.5	20.0	20.5	20.5	20.3
15	21.5	23.4	19.4	20.7	22.6	20.3	20.5	20.5	20.3	20.5	20.5	20.3	22.2	23.4	19.4
16	25.6	58.1	15.5	22.0	25.5	19.4	22.1	23.4	19.4	22.4	23.4	19.4	26.1	57.0	15.8
17	53.5	130.9	15.5	36.9	108.6	15.7	29.1	66.6	15.5	26.5	80.4	15.5	61.8	121.7	15.5
18	111.9	167.3	50.3	96.6	161.2	55.5	81.5	133.3	51.1	72.7	142.0	50.3	125.3	151.2	50.5
19	154.3	202.6	127.1	182.9	202.6	170.5	172.2	183.2	153.2	165.8	192.5	148.7	146.7	175.8	139.2
20	147.5	186.2	134.3	169.6	186.2	155.7	160.0	167.5	144.7	153.6	177.6	141.2	141.8	162.2	134.7
21	138.6	182.1	124.8	161.7	175.6	144.9	152.6	160.3	138.8	146.6	167.5	135.2	132.8	154.7	124.8
22	124.3	175.3	105.6	152.0	167.8	132.6	143.4	151.2	130.3	137.3	154.9	125.6	117.2	144.8	106.1
23	99.5	159.3	70.3	134.9	150.9	116.1	126.7	134.8	114.2	120.3	137.1	107.1	89.8	127.1	72.4
24	69.9	135.1	34.1	106.4	135.1	91.3	97.9	112.0	87.0	91.3	110.8	74.6	61.2	102.8	41.8
day)	1,627	2,649	1,085	1,924	2,555	1,523	1,777	2,162	1,481	1,687	2,215	1,379	1,595	2,183	1,238
kW)		202.6			202.6			183.2			192.5			175.8	
kW)			15.5			15.7			15.5			15.5			15.5

Hour	May Average MR Res Demand (kW)	May MAX MR Res Demand (kW)	May MIN MR Res Demand (kW)	Jun Average MR Res Demand (kW)	Jun MAX MR Res Demand (kW)	Jun MIN MR Res Demand (kW)	Jul Average MR Res Demand (kW)	Jul MAX MR Res Demand (kW)	Jul MIN MR Res Demand (kW)	Aug Average MR Res Demand (kW)	Aug MAX MR Res Demand (kW)	Aug MIN MR Res Demand (kW)	Sep Average MR Res Demand (kW)	Sep MAX MR Res Demand (kW)	Sep MIN MR Res Demand (kW)
1	52.9	65.1	41.3	45.9	56.8	36.7	43.1	50.0	36.2	43.1	51.5	35.2	41.3	51.5	33.8
2	53.7	65.5	41.4	46.8	56.9	36.4	44.2	50.1	36.6	44.2	51.8	36.5	42.1	51.4	33.5
3	54.9	65.6	42.4	48.3	57.4	36.8	45.6	51.7	37.7	45.5	53.3	37.2	43.7	52.6	33.5
4	56.4	65.3	46.0	49.9	59.5	37.0	46.8	52.9	39.6	46.9	54.8	39.1	45.2	54.8	33.5
5	68.9	80.5	53.9	63.4	76.3	39.0	59.5	70.7	44.8	60.6	72.4	42.6	59.3	72.1	41.9
6	94.2	119.6	57.3	89.9	113.9	45.9	86.7	109.7	45.0	89.8	110.4	50.8	88.7	110.7	51.5
7	70.4	80.7	55.2	70.3	80.6	55.5	72.8	80.5	56.9	74.5	80.8	60.9	75.7	81.1	63.9
8	41.4	88.1	18.9	36.3	88.4	18.9	39.6	88.4	18.9	37.2	88.9	18.9	38.4	89.7	18.9
9	37.5	71.7	19.4	32.9	72.6	19.4	35.6	72.2	19.4	34.2	72.4	19.4	34.6	73.6	19.4
10	22.9	28.4	20.1	22.2	28.6	20.1	22.7	28.4	20.1	22.4	28.4	20.1	22.5	28.7	20.1
11	20.1	20.3	19.7	20.2	20.3	19.7	20.1	20.3	19.7	20.2	20.3	19.7	20.2	20.3	19.7
12	20.3	20.5	19.8	20.3	20.5	19.8	20.3	20.5	19.8	20.3	20.5	19.8	20.3	20.5	19.8
13	20.4	20.5	20.0	20.4	20.5	20.0	20.4	20.5	20.0	20.4	20.5	20.0	20.4	20.5	20.0
14	20.5	20.5	20.3	20.5	20.5	20.3	20.5	20.5	20.3	20.5	20.5	20.3	20.5	20.5	20.3
15	22.0	23.4	19.4	22.3	23.4	19.4	22.1	23.4	19.4	22.2	23.4	19.4	22.2	23.4	19.4
16	30.5	57.2	15.9	26.8	57.4	15.8	29.1	57.4	15.9	27.8	57.0	15.9	27.9	58.1	15.5
17	74.2	123.3	50.1	70.2	127.2	50.7	74.1	127.4	50.7	68.1	121.4	49.7	67.2	130.4	49.7
18	127.1	167.3	118.5	124.5	155.8	118.8	123.6	148.8	117.8	123.1	146.9	117.8	141.3	158.2	126.9
19	140.3	156.7	132.9	133.2	150.0	127.1	133.9	146.1	128.0	139.8	145.7	135.2	142.6	147.4	140.0
20	139.0	149.5	134.7	136.3	144.2	134.3	135.8	139.0	134.3	135.9	138.9	134.7	136.0	139.1	134.7
21	129.5	139.8	124.8	126.4	133.0	124.8	125.6	127.4	124.8	125.6	127.7	124.8	125.7	127.8	124.8
22	112.5	124.8	105.8	108.2	115.8	105.6	106.8	112.0	105.6	106.9	111.1	105.6	106.8	111.5	105.6
23	83.6	95.1	71.5	77.3	92.5	70.4	75.3	86.1	70.7	75.4	85.7	70.3	74.3	81.6	70.3
24	54.2	73.7	39.7	46.9	66.0	35.9	44.9	55.9	35.9	44.0	58.4	34.9	42.4	58.7	34.1
day)	1,547	1,923	1,289	1,459	1,838	1,228	1,449	1,760	1,238	1,449	1,763	1,249	1,459	1,784	1,251
kW)		167.3			155.8			148.8			146.9			158.2	
kW)			15.9			15.8			15.9			15.9			15.5

Hour	Oct Average MR Res Demand (kW)	Oct MAX MR Res Demand (kW)	Oct MIN MR Res Demand (kW)	Nov Average MR Res Demand (kW)	Nov MAX MR Res Demand (kW)	Nov MIN MR Res Demand (kW)	Dec Average MR Res Demand (kW)	Dec MAX MR Res Demand (kW)	Dec MIN MR Res Demand (kW)
1	48.6	57.5	34.9	62.0	87.6	42.0	77.1	100.4	61.5
2	49.3	58.6	36.8	60.5	86.4	44.7	75.2	102.9	62.4
3	51.2	61.0	39.2	61.6	86.0	48.8	77.1	105.5	61.5
4	52.7	63.2	40.7	63.4	90.4	50.3	79.9	110.1	61.7
5	65.5	81.7	45.1	64.0	86.9	50.9	79.9	106.4	61.6
6	92.9	120.4	52.3	77.0	107.3	56.2	93.0	122.7	64.9
7	76.1	83.3	61.9	104.1	145.6	62.4	120.9	161.6	71.9
8	42.0	89.8	18.9	76.5	83.2	64.9	80.7	88.7	68.6
9	37.9	84.8	19.4	41.9	99.1	18.9	45.3	108.6	18.9
10	24.3	69.4	20.1	36.5	75.2	19.4	37.2	75.6	19.4
11	20.4	28.2	19.7	22.9	30.5	20.1	23.1	30.8	20.1
12	20.3	20.5	19.7	20.1	20.3	19.7	20.3	22.4	19.7
13	20.4	20.5	19.8	20.3	20.5	19.8	20.5	22.6	19.8
14	20.5	20.5	20.0	20.4	20.5	20.0	20.4	22.6	20.0
15	22.0	23.4	19.4	20.5	20.5	20.3	20.5	20.5	20.3
16	28.2	58.1	15.5	22.1	23.4	19.4	22.1	23.4	19.4
17	72.9	130.9	50.0	30.5	63.1	15.9	33.6	83.4	16.0
18	152.2	167.1	131.5	81.0	134.9	51.2	91.8	142.7	58.4
19	144.8	152.0	140.8	167.7	183.6	149.8	183.3	196.3	173.4
20	138.0	146.6	134.7	154.7	169.7	142.5	169.7	181.7	159.9
21	127.8	138.6	124.8	147.7	161.6	136.3	162.3	182.1	152.3
22	110.0	126.8	105.6	138.0	151.9	127.6	153.2	175.3	142.1
23	80.4	108.4	70.6	121.3	142.0	110.0	136.5	159.3	126.5
24	51.4	82.5	35.1	92.3	114.2	80.8	107.2	130.7	94.3
day)	1,550	1,994	1,276	1,707	2,204	1,393	1,931	2,476	1,595
kW)		167.1			183.6			196.3	
kW)			15.5			15.9			16.0

Gas Demand Profiles - MR Res

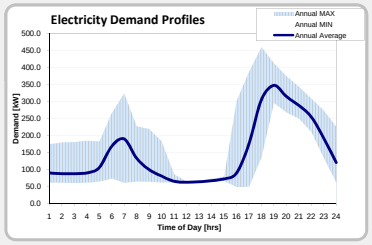
Hour	Annual Average MR Res Demand (Btu/h)	Annual MAX MR Res Demand (Btu/h)	Annual MIN MR Res Demand (Btu/h)	Jan Average MR Res Demand (Btu/h)	Jan MAX MR Res Demand (Btu/h)	Jan MIN MR Res Demand (Btu/h)	Feb Average MR Res Demand (Btu/h)	Feb MAX MR Res Demand (Btu/h)	Feb MIN MR Res Demand (Btu/h)	Mar Average MR Res Demand (Btu/h)	Mar MAX MR Res Demand (Btu/h)	Mar MIN MR Res Demand (Btu/h)	Apr Average MR Res Demand (Btu/h)	Apr MAX MR Res Demand (Btu/h)	Apr MIN MR Res Demand (Btu/h)
1	31,255	46,431	26,989	36,057	45,599	30,028	35,604	46,367	30,510	34,629	46,431	30,514	31,288	45,934	30,295
2	29,098	32,532	26,993	30,808	31,983	30,052	31,167	32,490	30,540	31,068	32,532	30,544	30,407	32,207	30,310
3	28,855	30,631	26,995	30,100	30,145	30,058	30,572	30,593	30,552	30,593	30,631	30,555	30,354	30,386	30,319
4	28,857	30,640	27,001	30,104	30,147	30,060	30,576	30,599	30,558	30,599	30,640	30,561	30,359	30,389	30,326
5	57,095	107,328	27,060	30,105	30,148	30,059	30,579	30,601	30,560	30,603	30,646	30,564	81,654	107,328	30,344
6	191,741	415,087	27,060	76,715	106,195	30,064	83,181	108,112	30,561	88,205	108,271	30,569	292,329	415,087	30,345
7	261,698	418,816	27,001	263,755	410,395	30,061	294,128	418,189	30,572	319,098	418,816	30,573	282,842	415,077	32,189
8	218,933	368,334	29,154	238,607	360,944	31,879	264,545	367,789	32,432	285,756	368,334	32,433	221,430	365,023	50,544
9	189,994	263,530	45,521	192,170	258,347	50,053	207,999	263,160	50,947	220,472	263,530	50,982	201,249	261,159	105,147
10	151,637	246,583	94,109	190,395	240,749	104,035	198,369	245,266	105,942	203,470	245,643	106,089	137,402	246,583	107,149
11	118,349	248,865	94,087	136,414	243,915	106,253	134,612	248,478	108,068	131,043	248,865	108,199	120,258	246,554	107,153
12	115,208	173,443	94,064	119,751	170,047	106,281	120,027	173,162	108,099	118,544	173,443	108,225	122,409	171,787	107,173
13	147,846	244,895	99,202	127,555	164,960	106,297	126,238	167,973	108,118	122,909	168,237	108,244	172,347	244,895	107,390
14	226,631	392,110	145,262	185,291	242,350	155,739	183,752	246,860	158,509	179,268	247,230	158,712	271,444	392,110	157,402
15	271,426	395,787	228,529	287,064	387,875	258,401	288,347	395,201	263,160	285,168	395,787	263,521	286,573	392,142	261,038
16	302,619	375,257	214,935	292,746	367,749	258,385	292,611	374,693	263,155	287,723	375,257	263,513	341,639	371,773	245,506
17	315,751	368,633	155,637	333,196	361,363	242,781	345,282	368,081	247,314	351,830	368,633	247,653	336,133	365,250	177,566
18	245,667	368,654	118,253	313,418	361,377	175,619	328,906	368,106	178,873	339,230	368,654	179,112	222,839	365,199	134,682
19	191,725	290,188	97,168	204,086	284,355	133,242	210,114	289,718	135,687	213,155	290,188	135,862	203,559	287,522	110,574
20	145,515	246,221	93,991	191,629	241,287	109,418	199,382	245,825	111,413	204,223	246,221	111,553	127,971	243,980	106,928
21	110,476	202,165	93,994	120,890	198,134	105,814	121,390	201,837	107,752	120,260	202,165	107,883	115,274	200,331	106,923
22	86,098	158,673	50,471	114,006	155,534	105,802	115,175	158,417	107,749	114,638	158,673	107,877	75,778	157,238	57,132
23	63,937	117,420	50,493	76,126	115,129	56,637	74,243	117,233	57,601	71,255	117,420	57,651	63,273	116,361	57,156
24	44,862	76,331	26,968	63,368	74,884	56,641	63,333	76,215	57,616	62,302	76,331	57,661	37,259	75,650	30,261
day)	3,575,264	5,618,554	1,920,935	3,684,357	4,913,610	2,373,659	3,810,131	5,004,964	2,416,288	3,876,039	5,012,578	2,419,049	3,836,068	5,579,965	2,243,853
u/h)		418,816			410,395			418,189			418,816			415,087	
u/h)			26,968			30,028			30,510			30,514			30,261

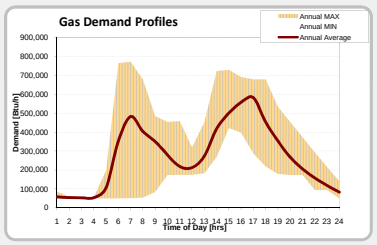
Hour	May Average MR Res Demand (Btu/h)	May MAX MR Res Demand (Btu/h)	May MIN MR Res Demand (Btu/h)	Jun Average MR Res Demand (Btu/h)	Jun MAX MR Res Demand (Btu/h)	Jun MIN MR Res Demand (Btu/h)	Jul Average MR Res Demand (Btu/h)	Jul MAX MR Res Demand (Btu/h)	Jul MIN MR Res Demand (Btu/h)	Aug Average MR Res Demand (Btu/h)	Aug MAX MR Res Demand (Btu/h)	Aug MIN MR Res Demand (Btu/h)	Sep Average MR Res Demand (Btu/h)	Sep MAX MR Res Demand (Btu/h)	Sep MIN MR Res Demand (Btu/h)
1	30,021	31,219	29,345	28,885	30,206	28,386	28,144	29,313	27,583	27,567	28,769	27,065	27,529	28,700	26,989
2	29,393	29,431	29,355	28,435	28,471	28,399	27,617	27,638	27,594	27,103	27,128	27,072	27,052	27,081	26,993
3	29,399	29,439	29,359	28,442	28,478	28,402	27,624	27,643	27,600	27,111	27,134	27,076	27,060	27,089	26,995
4	29,404	29,441	29,365	28,447	28,480	28,404	27,629	27,647	27,605	27,116	27,139	27,085	27,066	27,094	27,001
5	77,239	103,566	29,385	80,777	99,835	28,408	74,333	96,588	27,619	74,959	94,552	27,091	74,167	94,373	27,060
6	269,153	400,130	29,394	290,551	385,257	28,426	261,684	372,356	27,631	266,746	364,201	27,113	262,996	363,502	27,060
7	243,018	351,918	31,171	260,426	338,851	30,134	235,883	327,524	29,258	239,264	320,362	28,730	236,112	319,748	28,680
8	193,892	251,840	48,875	201,597	242,509	47,149	186,659	234,426	45,694	186,009	229,326	44,844	184,213	228,893	44,765
9	188,854	234,718	101,470	186,955	226,079	97,787	178,940	218,582	94,615	174,169	213,841	92,668	173,449	213,426	92,484
10	131,771	237,718	103,312	121,332	228,991	99,507	121,750	221,359	96,323	115,225	216,555	94,298	115,678	216,160	94,109
11	116,145	165,619	103,304	109,421	159,625	99,508	107,818	154,306	96,312	103,719	150,983	94,290	103,815	150,740	94,087
12	122,544	160,644	103,316	113,556	154,826	99,526	112,645	149,653	96,321	108,583	146,425	94,308	108,831	146,213	94,064
13	178,299	236,087	151,521	165,533	227,412	145,920	163,995	219,777	141,136	157,990	214,989	138,131	158,327	214,664	137,770
14	278,598	377,956	251,581	262,892	363,933	242,255	258,266	351,674	234,201	248,942	343,970	229,126	249,102	343,402	228,566
15	282,889	358,336	251,551	265,314	345,039	242,234	261,094	333,417	234,189	252,283	326,116	229,110	252,546	325,596	228,529
16	328,353	352,090	236,546	322,987	338,917	227,809	308,982	327,479	220,117	302,453	320,334	215,440	301,256	319,775	214,935
17	311,214	352,101	171,166	311,040	338,910	164,907	295,024	327,478	159,360	289,619	320,338	156,025	288,016	319,764	155,637
18	201,277	277,208	129,887	196,143	266,970	125,179	189,641	258,055	121,048	183,386	252,428	118,506	182,941	251,993	118,253
19	189,933	235,245	106,663	187,698	226,576	102,821	179,789	219,026	99,443	174,979	214,259	97,379	174,291	213,892	97,168
20	117,869	193,185	103,166	111,180	186,088	99,440	109,881	179,912	96,190	104,917	176,007	94,190	105,065	175,701	93,991
21	111,171	151,662	103,170	105,852	146,121	99,441	103,656	141,302	96,198	100,046	138,257	94,190	100,040	138,007	93,994
22	72,845	112,274	55,199	66,203	108,211	53,267	66,711	104,676	51,630	63,662	102,450	50,582	63,972	102,258	50,471
23	61,287	73,041	55,224	57,707	70,453	53,293	56,778	68,193	51,653	55,099	66,784	50,602	55,139	66,650	50,493
24	34,218	44,493	29,310	32,262	42,977	28,352	32,549	41,648	27,552	30,600	40,831	27,035	31,113	40,742	26,968
day)	3,628,786	4,789,361	2,312,634	3,563,634	4,613,214	2,228,955	3,417,094	4,459,673	2,156,869	3,341,547	4,363,178	2,111,955	3,329,776	4,355,464	2,107,061
u/h)		400,130			385,257			372,356			364,201			363,502	
u/h)			29,310			28,352			27,552			27,035			26,968

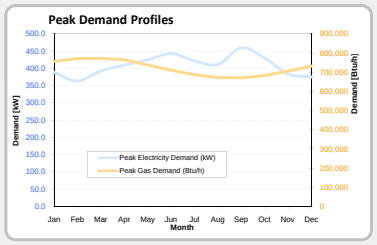
Hour	Oct Average MR Res Demand (Btu/h)	Oct MAX MR Res Demand (Btu/h)	Oct MIN MR Res Demand (Btu/h)	Nov Average MR Res Demand (Btu/h)	Nov MAX MR Res Demand (Btu/h)	Nov MIN MR Res Demand (Btu/h)	Dec Average MR Res Demand (Btu/h)	Dec MAX MR Res Demand (Btu/h)	Dec MIN MR Res Demand (Btu/h)
1	28,466	41,435	27,419	33,091	42,779	28,231	34,067	44,271	29,215
2	27,547	29,163	27,437	28,886	30,085	28,206	29,839	31,094	29,239
3	27,501	27,531	27,450	28,322	28,373	28,278	29,270	29,300	29,239
4	27,507	27,539	27,460	28,330	28,375	28,289	29,275	29,305	29,244
5	71,721	96,069	27,482	28,334	28,380	28,294	29,278	29,309	29,248
6	249,102	370,174	27,485	75,588	99,257	28,307	79,121	102,885	29,251
7	224,897	325,612	27,509	265,059	382,774	28,309	278,957	397,198	29,251
8	179,032	233,088	29,154	238,329	336,683	30,004	250,564	349,354	31,014
9	173,348	217,306	45,521	187,437	241,015	46,951	196,272	250,082	48,605
10	121,076	220,099	94,150	179,352	224,613	97,256	186,643	233,085	100,836
11	108,324	153,471	95,882	122,895	227,501	99,182	126,747	236,140	102,954
12	112,503	148,856	95,862	109,776	158,599	99,200	113,588	164,675	102,974
13	163,208	218,567	140,386	116,253	153,831	99,202	120,106	159,758	102,983
14	255,850	349,679	202,501	168,924	225,941	145,262	174,568	234,637	150,807
15	260,636	331,540	232,855	263,483	361,546	240,920	272,772	375,435	250,133
16	306,392	325,758	218,911	268,347	342,764	240,889	277,662	355,966	250,133
17	289,915	325,767	158,517	313,710	336,911	226,445	326,441	349,701	235,111
18	187,611	256,579	120,389	297,677	336,945	163,918	310,308	349,724	170,113
19	176,582	217,779	98,908	190,307	265,236	124,442	197,631	275,269	129,093
20	109,380	178,887	95,668	180,403	225,118	102,233	187,644	233,592	106,027
21	103,078	140,500	95,664	110,537	184,900	98,873	114,246	191,841	102,535
22	67,787	104,090	51,357	105,233	145,202	98,861	108,914	150,626	102,523
23	57,774	91,444	51,375	68,619	107,539	53,035	70,588	111,537	54,943
24	33,655	66,432	27,410	58,446	70,029	53,049	60,368	72,602	54,949
day)	3,362,892	4,497,363	2,046,752	3,467,338	4,584,396	2,217,696	3,604,871	4,757,387	2,300,419
u/h)		370,174			382,774			397,198	
u/h)			27,410			28,231			29,215

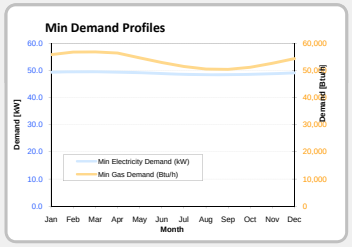
High-Rise Residential eQUEST Simulation Results

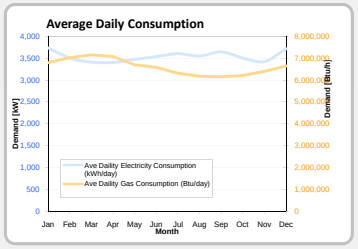
ITERATION: % cost premium minus LR & MR Res cooling











Electricity Demand Profiles - HR Res

Hour	Annual Average HR Res Demand (kW)	Annual MAX HR Res Demand (kW)	Annual MIN HR Res Demand (kW)	Jan Average HR Res Demand (kW)	Jan MAX HR Res Demand (kW)	Jan MIN HR Res Demand (kW)	Feb Average HR Res Demand (kW)	Feb MAX HR Res Demand (kW)	Feb MIN HR Res Demand (kW)	Mar Average HR Res Demand (kW)	Mar MAX HR Res Demand (kW)	Mar MIN HR Res Demand (kW)	Apr Average HR Res Demand (kW)	Apr MAX HR Res Demand (kW)	Apr MIN HR Res Demand (kW)
1	89.7	174.4	61.2	124.2	174.4	84.4	104.1	138.1	76.5	91.0	140.0	67.8	83.8	121.2	68.2
2	87.1	179.6	60.4	119.9	179.6	87.4	102.0	127.5	82.7	89.8	121.5	71.8	84.9	105.3	68.2
3	87.8	180.3	60.9	120.5	180.3	88.0	102.7	118.8	87.3	92.1	123.1	70.0	87.7	107.5	70.9
4	89.6	184.8	60.4	121.5	184.8	86.2	104.7	124.7	88.3	95.2	129.3	69.3	90.5	110.5	74.2
5	105.1	182.5	64.9	121.8	182.5	90.0	106.8	130.1	91.1	97.7	131.8	72.2	115.7	148.3	81.2
6	168.0	265.4	73.5	144.0	216.2	92.2	132.9	158.8	96.2	126.4	169.0	80.5	198.8	261.2	97.5
7	189.5	324.0	60.4	217.9	324.0	103.5	215.3	283.1	110.5	210.7	277.9	93.8	175.3	238.8	109.2
8	132.7	226.9	64.5	178.7	203.2	123.1	177.2	203.1	121.2	174.0	202.2	109.4	97.8	199.1	65.2
9	99.2	218.9	63.8	113.9	217.9	65.1	98.8	196.2	65.2	93.8	203.6	65.2	93.4	179.2	64.4
10	80.6	182.7	61.6	104.2	182.7	64.3	96.0	180.5	64.4	92.8	179.3	64.4	70.7	176.6	61.9
11	64.9	86.0	61.5	69.7	85.3	61.9	68.6	85.1	61.9	67.3	85.6	61.9	63.1	84.5	61.8
12	62.5	64.8	61.5	62.6	64.8	61.8	62.4	63.8	61.8	62.4	63.8	61.8	62.8	63.8	62.3
13	63.8	67.2	62.3	63.0	64.8	62.5	62.9	63.8	62.5	62.8	63.9	62.5	64.6	67.2	62.5
14	66.7	73.0	63.9	65.2	68.1	64.1	65.0	67.2	64.2	64.8	67.2	64.2	68.1	73.0	64.1
15	72.3	78.9	66.4	68.9	73.0	67.4	68.7	73.1	67.5	68.5	73.1	67.5	75.4	78.9	67.4
16	88.9	301.5	48.4	74.7	79.9	67.3	75.4	78.9	67.4	76.2	78.9	67.4	77.9	196.9	49.4
17	174.5	387.3	48.8	97.4	249.3	49.3	83.1	167.6	49.5	78.7	197.1	49.5	186.2	296.4	49.4
18	304.9	459.5	154.8	222.8	318.4	151.6	196.9	294.8	141.5	185.2	314.7	135.5	335.3	408.7	144.8
19	347.1	412.3	295.0	347.7	388.7	326.0	338.2	363.1	325.7	344.5	392.3	320.5	330.8	377.5	295.0
20	314.3	374.1	267.2	315.5	344.1	301.5	307.8	324.5	300.3	312.0	348.4	294.2	294.3	335.3	267.2
21	287.9	343.0	249.0	291.1	313.9	275.7	281.9	294.1	274.2	283.7	317.6	268.1	269.7	304.6	252.2
22	254.4	308.3	209.7	273.0	301.2	260.5	263.0	269.3	257.7	263.0	286.2	250.6	229.3	262.3	209.7
23	191.7	272.9	133.0	240.4	270.3	224.8	228.2	235.7	219.9	225.8	240.4	209.5	156.2	228.4	135.4
24	120.3	225.0	61.1	179.2	225.0	151.9	161.5	185.7	142.3	154.2	191.5	134.4	91.0	169.0	65.0
day)	3,544	5,573	2,394	3,738	4,892	3,011	3,504	4,228	2,980	3,413	4,399	2,812	3,403	4,594	2,547
kW)		459.5			388.7			363.1			392.3			408.7	
kW)			48.4			49.3			49.5			49.5			49.4

Hour	May Average HR Res Demand (kW)	May MAX HR Res Demand (kW)	May MIN HR Res Demand (kW)	Jun Average HR Res Demand (kW)	Jun MAX HR Res Demand (kW)	Jun MIN HR Res Demand (kW)	Jul Average HR Res Demand (kW)	Jul MAX HR Res Demand (kW)	Jul MIN HR Res Demand (kW)	Aug Average HR Res Demand (kW)	Aug MAX HR Res Demand (kW)	Aug MIN HR Res Demand (kW)	Sep Average HR Res Demand (kW)	Sep MAX HR Res Demand (kW)	Sep MIN HR Res Demand (kW)
1	78.0	96.5	65.1	76.4	89.7	64.3	73.5	91.6	61.2	73.7	91.2	63.1	79.4	109.3	63.5
2	77.9	99.9	64.6	74.1	85.2	62.6	69.9	87.3	60.4	70.7	84.7	61.8	74.9	107.5	62.1
3	78.8	100.7	60.9	73.0	81.7	62.9	69.3	82.3	62.0	69.6	79.9	62.3	72.9	101.5	64.1
4	81.2	100.9	66.1	74.0	83.4	62.1	69.6	77.4	60.4	69.1	77.3	62.2	72.6	96.6	63.9
5	105.9	132.0	79.0	101.0	117.8	71.0	95.3	114.9	65.3	95.7	113.2	64.9	98.0	132.3	69.8
6	185.1	241.4	88.8	196.7	253.1	87.2	189.4	253.5	83.6	190.6	246.7	83.3	193.1	265.4	88.2
7	163.6	200.9	108.1	169.6	200.4	111.1	171.1	200.1	113.9	173.8	200.5	113.1	175.5	200.9	117.2
8	105.1	187.9	65.0	98.8	207.8	64.8	104.6	226.9	64.6	97.8	186.2	64.5	100.0	201.2	64.5
9	102.8	175.7	64.2	92.8	179.4	64.1	98.6	178.4	63.8	95.3	178.8	63.8	95.0	181.2	63.8
10	69.1	84.3	61.8	67.2	84.6	61.7	68.2	84.1	61.7	67.5	84.0	61.6	67.7	84.5	61.6
11	62.3	63.6	61.7	62.2	63.5	61.6	62.2	63.4	61.5	62.1	63.3	61.5	62.1	63.3	61.5
12	62.8	63.7	62.4	62.6	63.6	62.3	62.6	63.4	62.3	62.5	63.4	62.2	62.5	63.4	62.2
13	64.9	67.0	64.0	64.5	66.8	63.9	64.5	66.6	63.8	64.4	66.5	63.7	64.4	66.5	63.7
14	68.6	72.7	67.3	68.1	72.4	67.1	68.1	72.1	66.9	67.8	72.0	66.8	67.8	72.0	66.8
15	74.8	78.7	67.1	75.6	78.5	66.8	74.7	78.3	66.6	74.9	78.2	66.5	74.8	78.2	66.4
16	101.7	261.5	49.1	94.3	245.5	48.8	110.5	301.5	48.6	101.4	257.3	48.4	104.6	283.7	48.4
17	234.0	342.7	136.0	245.8	359.0	139.3	263.4	387.3	170.1	248.7	349.6	148.1	253.7	353.2	138.5
18	365.4	424.4	319.8	382.5	442.8	345.0	389.3	421.2	370.1	382.6	411.2	362.9	402.5	459.5	355.2
19	339.4	388.9	295.1	351.8	399.8	318.8	359.6	391.5	340.8	359.1	389.1	338.9	364.5	399.3	322.3
20	305.2	344.9	268.9	321.2	359.8	288.5	329.0	362.2	306.8	323.8	347.0	302.6	328.9	360.9	290.3
21	277.8	313.4	249.0	292.5	325.7	263.7	300.0	324.7	284.8	296.8	317.0	278.2	303.2	331.0	268.9
22	234.0	262.6	217.0	247.0	274.5	222.0	254.6	276.1	241.1	252.2	270.0	234.5	259.0	286.9	225.6
23	153.3	181.6	133.0	160.8	191.0	134.6	168.6	201.3	150.1	166.2	193.3	144.6	174.1	213.5	137.5
24	83.6	112.4	64.3	84.1	122.0	61.1	88.9	115.7	69.6	84.8	123.1	63.6	93.5	130.2	65.5
day)	3,475	4,398	2,778	3,537	4,448	2,855	3,606	4,522	3,000	3,551	4,344	2,943	3,645	4,642	2,892
kW)		424.4			442.8			421.2			411.2			459.5	
kW)			49.1			48.8			48.6			48.4			48.4

Hour	Oct Average HR Res Demand (kW)	Oct MAX HR Res Demand (kW)	Oct MIN HR Res Demand (kW)	Nov Average HR Res Demand (kW)	Nov MAX HR Res Demand (kW)	Nov MIN HR Res Demand (kW)	Dec Average HR Res Demand (kW)	Dec MAX HR Res Demand (kW)	Dec MIN HR Res Demand (kW)
1	77.4	105.2	69.1	93.1	129.5	70.2	122.7	158.2	97.5
2	74.4	84.5	67.1	89.0	126.8	73.2	118.7	158.1	96.4
3	75.4	86.8	66.7	91.0	127.0	73.4	121.3	163.0	94.9
4	77.0	90.0	64.9	94.5	135.4	72.2	125.8	170.7	99.5
5	101.1	129.1	69.7	95.7	131.7	71.0	126.4	165.4	99.5
6	184.1	245.2	73.5	121.0	170.4	77.0	151.6	198.3	105.1
7	172.4	202.3	90.8	199.3	278.3	90.6	230.3	307.9	119.6
8	101.7	187.0	64.6	173.9	202.4	118.1	184.7	202.9	129.0
9	98.2	180.8	63.9	100.6	202.0	64.7	106.0	218.9	64.9
10	71.3	156.8	61.7	96.4	177.3	64.0	96.4	182.5	64.2
11	62.8	80.5	61.5	68.3	84.1	61.7	68.1	86.0	61.8
12	62.5	63.4	61.5	62.2	63.5	61.6	62.4	64.7	61.7
13	64.5	66.6	62.9	62.6	63.5	62.3	62.8	64.7	62.4
14	68.0	72.1	65.7	64.6	66.7	63.9	64.8	66.9	64.0
15	74.4	78.2	66.6	68.1	72.4	67.0	68.3	72.7	67.2
16	98.5	264.6	48.5	74.7	78.4	66.8	75.1	78.6	67.1
17	226.3	359.3	134.5	86.6	182.5	48.8	87.8	195.0	49.0
18	380.6	429.8	321.7	195.8	309.5	134.8	213.0	293.6	156.0
19	343.4	412.3	295.2	342.4	383.2	320.9	343.2	375.1	327.2
20	310.8	374.1	270.0	311.6	347.4	294.0	311.2	330.2	298.9
21	285.8	343.0	252.0	284.0	318.6	265.7	288.1	314.0	273.1
22	242.8	308.3	213.3	263.8	291.3	249.1	271.5	302.2	256.0
23	161.9	257.4	134.4	226.6	247.3	211.9	240.0	272.9	225.1
24	90.3	180.5	66.7	156.7	175.8	139.1	178.3	214.9	152.9
day)	3,506	4,758	2,747	3,423	4,365	2,822	3,718	4,657	3,093
kW)		429.8			383.2			375.1	
kW)			48.5			48.8			49.0

Gas Demand Profiles - HR Res

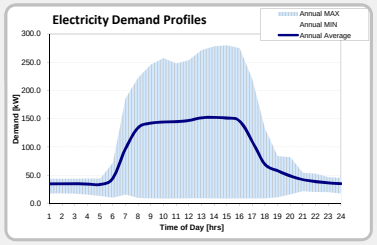
Hour	Annual Average HR Res Demand (Btu/h)	Annual MAX HR Res Demand (Btu/h)	Annual MIN HR Res Demand (Btu/h)	Jan Average HR Res Demand (Btu/h)	Jan MAX HR Res Demand (Btu/h)	Jan MIN HR Res Demand (Btu/h)	Feb Average HR Res Demand (Btu/h)	Feb MAX HR Res Demand (Btu/h)	Feb MIN HR Res Demand (Btu/h)	Mar Average HR Res Demand (Btu/h)	Mar MAX HR Res Demand (Btu/h)	Mar MIN HR Res Demand (Btu/h)	Apr Average HR Res Demand (Btu/h)	Apr MAX HR Res Demand (Btu/h)	Apr MIN HR Res Demand (Btu/h)
1	58,088	85,955	50,383	66,841	84,387	55,788	66,044	85,836	56,695	64,279	85,955	56,757	58,121	85,077	56,350
2	54,096	60,324	50,391	57,149	59,280	55,811	57,844	60,244	56,718	57,691	60,324	56,780	56,478	59,767	56,350
3	53,624	56,813	50,394	55,832	55,852	55,816	56,731	56,740	56,718	56,799	56,813	56,785	56,368	56,382	56,359
4	53,628	56,813	50,396	55,833	55,852	55,818	56,733	56,742	56,722	56,801	56,813	56,788	56,369	56,383	56,361
5	105,639	198,107	50,403	55,834	55,852	55,819	56,734	56,743	56,724	56,802	56,814	56,790	150,856	198,107	56,363
6	353,676	765,041	50,404	141,696	195,941	55,822	153,631	199,536	56,725	162,908	199,826	56,792	538,950	765,041	56,363
7	482,557	771,895	50,396	486,254	756,320	55,822	542,226	770,739	56,725	588,245	771,895	56,792	521,482	765,044	59,759
8	403,722	678,913	54,201	439,937	665,237	59,178	487,737	677,898	60,146	526,846	678,913	60,219	408,325	672,897	93,359
9	350,356	485,842	84,053	354,260	476,155	92,401	383,494	485,129	94,020	406,525	485,842	94,128	371,149	481,547	193,805
10	279,729	454,464	173,475	350,951	443,572	191,750	365,731	451,942	195,284	375,185	452,612	195,519	253,584	454,464	198,071
11	218,441	458,632	174,025	251,541	449,475	196,071	248,309	457,950	199,594	241,788	458,632	199,873	222,017	454,470	198,057
12	212,653	319,738	173,986	220,852	313,435	196,119	221,441	319,250	199,598	218,759	319,738	199,879	225,962	316,781	198,049
13	272,782	451,494	183,165	235,234	304,085	196,145	232,884	309,709	199,607	226,796	310,183	199,892	317,947	451,494	198,283
14	417,915	722,697	268,038	341,599	446,660	287,210	338,837	455,032	292,424	330,619	455,718	292,850	500,496	722,697	290,408
15	500,435	729,384	421,720	529,083	714,750	476,317	531,519	728,301	485,196	525,703	729,384	485,916	528,365	722,733	481,474
16	557,888	691,549	396,454	539,554	677,681	476,295	539,376	690,527	485,186	530,412	691,549	485,903	629,808	685,215	452,614
17	582,031	679,362	286,981	614,069	665,907	447,524	636,406	678,333	455,927	648,512	679,362	456,612	619,614	673,167	327,265
18	452,754	679,371	217,906	577,602	665,906	323,641	606,187	678,348	329,639	625,247	679,371	330,114	410,716	673,124	248,061
19	353,556	534,664	179,583	376,118	523,937	245,388	387,258	533,845	249,882	392,865	534,664	250,215	375,412	529,657	204,137
20	268,566	453,886	173,830	353,334	444,800	201,904	367,657	453,205	205,613	376,601	453,886	205,905	236,273	449,826	197,544
21	204,065	372,819	173,842	223,109	365,383	195,376	224,073	372,265	198,968	222,027	372,819	199,254	212,902	369,526	197,549
22	159,164	292,727	93,710	210,452	286,928	195,379	212,648	292,294	198,973	211,691	292,727	199,259	140,143	290,160	105,905
23	118,334	216,741	93,723	140,678	212,499	104,809	137,249	216,424	106,652	131,777	216,741	106,797	117,095	214,859	105,917
24	83,178	141,048	50,358	117,170	138,354	104,818	117,144	140,846	106,662	115,277	141,048	106,806	69,151	139,847	56,327
day)	6,596,871	########	3,551,816	6,794,982	9,058,248	4,381,019	7,027,893	9,227,878	4,460,397	7,150,154	9,241,629	4,466,625	7,077,582	10,288,265	4,144,734
u/h)		771,895			756,320			770,739			771,895			765,044	
u/h)			50,358			55,788			56,695			56,757			56,327

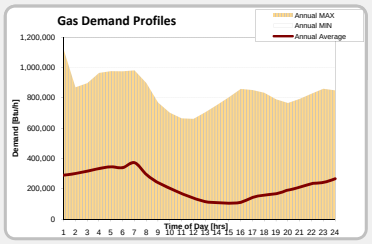
Hour	May Average HR Res Demand (Btu/h)	May MAX HR Res Demand (Btu/h)	May MIN HR Res Demand (Btu/h)	Jun Average HR Res Demand (Btu/h)	Jun MAX HR Res Demand (Btu/h)	Jun MIN HR Res Demand (Btu/h)	Jul Average HR Res Demand (Btu/h)	Jul MAX HR Res Demand (Btu/h)	Jul MIN HR Res Demand (Btu/h)	Aug Average HR Res Demand (Btu/h)	Aug MAX HR Res Demand (Btu/h)	Aug MIN HR Res Demand (Btu/h)	Sep Average HR Res Demand (Btu/h)	Sep MAX HR Res Demand (Btu/h)	Sep MIN HR Res Demand (Btu/h)
1	55,810	57,995	54,619	53,761	56,149	52,899	52,415	54,545	51,408	51,355	53,534	50,469	51,300	53,450	50,383
2	54,636	54,653	54,624	52,915	52,928	52,904	51,425	51,435	51,415	50,483	50,491	50,475	50,401	50,413	50,391
3	54,639	54,654	54,628	52,918	52,929	52,908	51,429	51,437	51,418	50,486	50,493	50,479	50,405	50,417	50,394
4	54,641	54,655	54,630	52,920	52,930	52,911	51,431	51,438	51,420	50,488	50,495	50,481	50,407	50,418	50,396
5	142,754	191,229	54,633	149,314	184,376	52,913	137,463	178,436	51,427	138,618	174,676	50,484	137,167	174,358	50,403
6	496,288	737,545	54,634	535,749	710,166	52,913	482,592	686,440	51,428	491,919	671,409	50,485	485,015	670,134	50,404
7	448,163	648,742	57,905	480,285	624,705	56,063	435,081	603,871	54,471	441,306	590,671	53,460	435,503	589,552	53,374
8	357,580	464,332	90,247	371,842	447,173	87,150	344,285	432,312	84,483	343,075	422,905	82,801	339,769	422,112	82,655
9	348,280	432,536	187,055	344,852	416,539	180,255	330,037	402,720	174,414	321,237	393,977	170,774	319,925	393,235	170,450
10	243,205	438,229	191,084	224,036	422,030	184,166	224,777	408,000	178,187	212,738	399,141	174,480	213,590	398,382	174,086
11	214,457	305,516	191,055	202,129	294,334	184,138	199,166	284,591	178,151	191,590	278,461	174,442	191,768	277,972	174,025
12	226,237	296,356	191,032	209,736	285,544	184,118	208,052	276,066	178,127	200,547	270,123	174,422	201,006	269,675	173,986
13	328,944	435,331	279,802	305,482	419,295	269,551	302,645	405,277	260,662	291,565	396,465	255,129	292,184	395,793	254,502
14	513,713	696,673	464,169	484,833	670,811	446,995	476,310	648,274	432,092	459,117	634,076	422,754	459,408	632,958	421,779
15	521,617	660,525	464,119	489,292	636,012	446,965	481,519	614,649	432,067	465,271	601,195	422,723	465,753	600,156	421,720
16	605,369	649,012	436,257	595,530	624,799	420,134	569,732	603,796	406,059	557,690	590,595	397,350	555,487	589,545	396,454
17	573,686	649,006	315,433	573,415	624,771	303,881	543,896	603,771	293,855	533,928	590,557	287,555	530,990	589,510	286,981
18	370,928	510,625	239,269	361,489	491,744	230,596	349,482	475,329	223,073	337,951	464,971	218,324	337,162	464,132	217,906
19	350,370	433,780	197,013	346,304	417,815	189,937	331,755	403,962	183,798	322,884	395,194	179,926	321,630	394,467	179,583
20	217,713	356,405	190,667	205,441	343,347	183,832	203,069	332,018	177,901	193,916	324,847	174,160	194,198	324,249	173,830
21	205,380	279,926	190,677	195,630	269,741	183,842	191,604	260,906	177,914	184,948	255,314	174,171	184,950	254,845	173,842
22	134,770	207,365	102,370	122,583	199,905	98,852	123,538	193,435	95,807	117,917	189,341	93,884	118,503	188,996	93,710
23	113,463	135,081	102,382	106,915	130,338	98,867	105,224	126,222	95,820	102,129	123,620	93,897	102,220	123,401	93,723
24	63,574	82,470	54,595	60,016	79,704	52,875	60,564	77,302	51,384	56,973	75,786	50,444	57,937	75,659	50,358
day)	6,696,219	8,832,640	4,272,899	6,577,387	8,508,084	4,119,664	6,307,492	8,226,232	3,986,781	6,168,131	8,048,336	3,903,568	6,146,679	8,033,829	3,895,333
u/h)		737,545			710,166			686,440			671,409			670,134	
u/h)			54,595			52,875			51,384			50,444			50,358

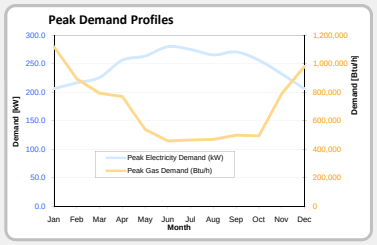
Hour	Oct Average HR Res Demand (Btu/h)	Oct MAX HR Res Demand (Btu/h)	Oct MIN HR Res Demand (Btu/h)	Nov Average HR Res Demand (Btu/h)	Nov MAX HR Res Demand (Btu/h)	Nov MIN HR Res Demand (Btu/h)	Dec Average HR Res Demand (Btu/h)	Dec MAX HR Res Demand (Btu/h)	Dec MIN HR Res Demand (Btu/h)
1	52,988	76,905	51,153	61,461	79,256	52,578	63,183	81,951	54,268
2	51,274	54,273	51,161	53,686	55,853	52,605	55,372	57,655	54,291
3	51,176	51,190	51,164	52,631	52,641	52,612	54,310	54,320	54,296
4	51,178	51,191	51,167	52,634	52,645	52,615	54,312	54,321	54,299
5	132,620	177,422	51,172	52,635	52,646	52,618	54,312	54,322	54,300
6	459,380	682,363	51,173	139,680	183,209	52,625	146,129	189,859	54,302
7	414,803	600,290	51,176	488,713	705,488	52,626	514,257	732,029	54,302
8	330,164	429,787	54,201	439,487	620,598	55,754	461,961	643,906	57,549
9	319,646	400,411	84,053	345,614	444,272	86,649	361,813	460,928	89,686
10	223,415	405,667	173,475	330,682	413,877	179,193	344,047	429,413	185,819
11	199,966	283,009	177,209	226,712	419,300	183,145	233,739	435,118	190,013
12	207,671	274,546	177,161	202,559	292,441	183,160	209,503	303,488	190,047
13	301,084	402,986	259,183	214,498	283,695	183,165	221,513	294,449	190,064
14	471,752	644,529	373,409	311,528	416,534	268,038	321,846	432,397	278,165
15	480,574	611,113	429,531	485,724	666,360	444,270	502,756	691,779	461,133
16	564,869	600,472	403,735	494,686	631,770	444,229	511,768	655,923	461,125
17	534,410	600,469	292,154	578,247	620,877	417,473	601,628	644,411	433,345
18	345,710	472,581	221,789	548,613	620,902	301,998	571,867	644,418	313,498
19	325,763	401,601	182,757	350,674	488,517	229,131	364,252	507,170	237,784
20	202,085	330,085	176,895	332,722	415,088	188,746	345,997	430,631	195,653
21	190,497	259,397	176,895	204,121	341,115	182,676	210,872	353,800	189,324
22	125,486	192,332	95,288	194,371	268,000	182,683	201,076	277,894	189,325
23	107,029	169,087	95,300	126,927	198,631	98,272	130,481	205,881	101,697
24	62,575	122,984	51,129	108,182	129,528	98,284	111,649	134,145	101,708
day)	6,206,116	8,294,691	3,782,329	6,396,790	8,453,243	4,095,144	6,648,643	8,770,208	4,245,990
u/h)		682,363			705,488			732,029	
u/h)			51,129			52,578			54,268

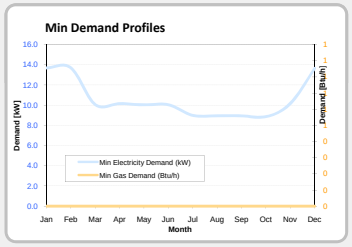
Commercial eQUEST Simulation Results

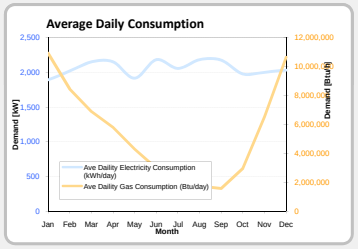
ITERATION: % cost premium minus LR & MR Res cooling











Electricity Demand Profiles - Commercial

Hour	Annual Average	Annual MAX	Annual MIN	Jan Average	Jan MAX	Jan MIN	Feb Average	Feb MAX	Feb MIN	Mar Average	Mar MAX	Mar MIN	Apr Average	Apr MAX	Apr MIN
	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)
1	34.6	44.0	17.7	35.6	44.0	19.7	35.9	44.0	18.8	36.1	43.9	18.8	35.8	43.8	18.8
2	34.7	44.0	17.7	35.7	44.0	22.5	36.2	44.0	18.8	36.3	43.9	18.8	36.0	43.8	18.8
3	34.8	44.0	17.7	35.7	44.0	22.5	36.5	43.9	19.7	36.6	43.9	18.8	36.1	43.8	18.8
4	34.2	44.1	15.9	35.7	44.0	22.5	36.8	43.9	22.5	37.2	43.9	18.8	36.3	43.9	18.8
5	33.4	44.1	13.1	35.7	44.0	22.5	37.0	43.9	22.5	37.4	43.9	18.8	34.7	43.8	16.7
6	44.1	72.3	10.2	35.7	44.0	22.5	34.9	41.8	20.4	35.5	41.8	16.7	52.6	70.3	12.4
7	96.4	186.1	15.9	53.0	74.0	19.7	52.9	70.4	16.1	55.3	70.4	12.4	126.3	180.5	11.1
8	134.1	222.8	10.0	117.6	182.3	15.4	126.4	180.7	13.9	134.5	180.4	10.1	143.8	202.1	13.7
9	141.9	245.8	8.9	127.6	202.6	13.8	137.3	202.2	13.7	147.8	201.8	10.0	151.8	205.8	13.8
10	144.4	257.5	9.0	128.8	206.4	13.8	139.9	206.2	13.8	153.6	205.7	10.1	152.1	205.3	13.8
11	144.6	247.8	9.0	128.4	205.8	13.7	141.9	205.6	13.8	153.7	205.0	10.1	150.5	212.3	10.1
12	146.7	253.8	8.9	127.2	201.8	13.8	139.7	201.9	13.8	151.0	201.3	10.2	151.8	220.5	10.2
13	151.6	271.5	9.0	127.5	202.2	13.8	140.1	201.9	13.8	151.7	211.1	10.3	157.3	246.9	10.4
14	152.4	278.4	9.0	128.8	205.8	13.8	142.2	205.4	13.8	154.3	213.5	10.3	158.2	250.8	10.4
15	151.2	280.0	8.9	126.6	206.1	13.7	142.7	213.8	13.8	155.3	217.4	10.2	157.9	256.3	10.4
16	146.3	274.9	9.0	125.7	204.3	13.7	140.4	216.4	13.7	153.9	225.9	10.2	151.3	254.7	10.4
17	110.4	220.8	9.0	126.8	197.6	18.1	133.5	196.1	13.7	143.0	198.1	10.2	94.7	192.8	13.7
18	69.4	132.6	9.0	86.4	125.0	25.4	84.9	117.1	17.5	90.3	117.0	13.8	62.8	116.8	17.4
19	58.0	83.9	11.2	58.6	82.1	26.8	58.9	75.4	23.9	61.9	75.5	20.2	64.0	78.5	23.1
20	48.8	82.1	16.2	59.0	82.1	26.8	61.8	78.3	26.8	64.8	78.3	23.1	46.0	78.3	23.1
21	41.8	54.5	21.9	42.3	54.5	26.8	43.3	54.4	26.8	44.3	51.6	23.1	43.0	50.7	23.1
22	38.8	52.8	20.5	41.7	52.8	26.8	42.3	52.8	26.8	43.2	52.7	23.1	38.7	49.0	21.7
23	36.2	46.7	20.2	37.8	46.7	25.4	38.2	46.7	25.4	38.4	46.6	24.4	37.0	45.2	23.0
24	35.0	45.3	17.7	36.7	45.3	24.0	36.8	45.3	24.0	37.3	45.2	23.0	35.6	43.8	18.8
day)	2,064	3,530	315	1,895	2,841	477	2,021	2,832	448	2,154	2,859	376	2,154	3,180	383
kW)		280.0			206.4			216.4			225.9			256.3	
kW)			8.9			13.7			13.7			10.0			10.1

Hour	May Average	May MAX	May MIN	Jun Average	Jun MAX	Jun MIN	Jul Average	Jul MAX	Jul MIN	Aug Average	Aug MAX	Aug MIN	Sep Average	Sep MAX	Sep MIN	Oct Average	Oct MAX	Oct MIN	Nov Average	Nov MAX	Nov MIN	Dec Average	Dec MAX	Dec MIN
	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)	Commercial Demand (kW)
1	33.2	43.8	18.8	34.7	43.7	18.8	33.0	40.0	17.7	33.3	40.0	17.7	33.1	40.0	17.7	32.6	43.7	17.7	34.8	43.9	18.8	37.0	44.0	22.5
2	33.3	43.8	18.8	34.7	43.7	18.8	33.0	40.0	18.8	33.5	40.0	17.7	33.2	40.0	17.7	32.6	43.7	17.7	35.1	43.9	18.8	37.0	44.0	22.5
3	33.3	43.8	18.8	34.7	43.7	18.8	33.1	40.0	18.8	33.5	40.0	17.7	33.3	40.0	17.7	32.6	43.7	17.7	35.3	43.9	18.8	37.0	44.0	22.5
4	30.7	40.9	16.0	31.9	40.9	15.9	30.3	37.1	15.9	33.5	40.0	17.7	33.4	40.0	17.7	32.6	43.7	17.7	35.4	43.9	18.8	37.0	44.1	22.5
5	27.9	38.1	13.1	29.0	38.0	13.1	27.4	34.3	13.1	33.5	40.0	17.7	33.4	40.0	17.7	32.8	43.7	18.8	35.6	43.9	18.8	37.0	44.1	22.6
6	46.3	67.9	10.2	49.9	67.9	10.2	46.5	64.2	10.2	52.5	68.5	14.5	51.9	68.5	14.5	49.9	72.3	14.5	35.8	43.9	18.8	37.0	44.1	22.6
7	117.9	180.1	10.0	131.5	182.3	10.0	123.6	179.7	10.1	131.0	181.3	11.5	130.2	186.1	11.6	121.6	182.4	11.6	54.8	73.9	15.9	56.4	74.1	19.7
8	130.6	201.5	10.1	148.0	215.7	10.1	137.9	203.3	10.0	142.7	202.6	10.0	141.7	222.8	10.0	131.7	203.4	10.1	125.4	181.8	11.7	128.3	182.2	15.4
9	135.3	218.0	10.1	155.2	245.8	10.1	142.4	222.7	10.1	148.5	215.6	9.0	149.6	232.0	8.9	132.7	215.5	8.9	135.4	201.9	10.2	138.9	202.3	13.9
10	136.5	229.6	10.1	158.5	257.5	10.1	146.5	236.5	10.1	151.4	225.5	9.0	153.7	247.0	9.0	136.3	232.6	9.0	136.8	205.5	10.2	138.9	206.1	13.8
11	135.1	226.3	10.1	158.4	245.9	10.2	146.9	233.9	9.0	152.8	234.7	9.0	154.2	247.8	9.0	136.8	232.6	9.0	138.1	205.2	10.1	138.7	205.7	13.7
12	137.7	237.7	10.1	162.6	251.9	10.2	153.6	245.1	9.0	161.5	245.9	8.9	160.2	253.8	9.0	140.3	237.4	9.0	137.4	211.5	10.2	137.4	202.1	13.8
13	143.7	263.5	10.1	173.1	271.5	10.1	163.4	269.3	9.0	171.3	265.6	9.0	168.2	267.8	9.0	147.0	256.0	9.0	138.2	214.7	10.2	137.6	202.1	13.7
14	144.0	261.2	10.1	171.3	278.4	10.1	162.8	272.1	9.0	170.2	262.0	9.0	169.9	270.9	9.0	147.9	250.7	9.0	140.0	231.2	10.2	138.5	205.7	13.7
15	143.2	258.7	10.1	169.2	280.0	10.2	161.8	275.3	9.0	167.8	253.8	9.0	167.6	268.4	9.0	145.6	254.5	8.9	138.3	228.1	10.2	137.9	206.0	13.6
16	136.5	244.8	10.1	159.4	274.1	10.1	153.6	274.9	9.0	160.2	242.5	11.1	158.0	248.4	11.0	138.3	244.1	11.0	138.6	232.2	10.2	139.4	204.3	13.8
17	79.2	146.5	10.1	92.9	166.3	10.1	89.5	151.1	9.0	98.7	152.4	17.5	100.2	159.7	17.5	99.9	156.0	17.4	138.2	220.8	14.5	139.6	197.6	18.2
18	45.4	77.0	10.1	51.0	84.9	10.1	48.1	73.5	9.0	61.2	87.3	21.8	61.0	85.9	21.9	58.2	84.5	19.1	91.7	132.6	21.7	92.8	124.9	25.4
19	47.9	72.7	12.3	53.0	80.5	12.3	48.8	67.4	11.2	61.5	83.6	21.9	61.3	83.9	21.9	58.2	78.1	23.1	60.9	78.2	23.1	61.7	79.2	26.8
20	35.4	44.9	17.4	37.3	45.5	17.4	35.2	44.8	16.2	41.7	49.3	23.1	41.4	49.3	21.9	40.5	50.5	23.1	61.0	79.1	23.1	62.1	82.0	26.8
21	40.2	49.0	23.1	41.9	49.0	23.1	39.9	49.0	23.1	40.7	48.9	23.1	40.4	48.9	21.9	39.7	49.0	23.1	42.6	51.5	23.1	43.8	54.4	26.9
22	35.9	42.9	21.7	37.3	42.8	21.7	35.5	42.8	21.7	36.0	42.8	21.7	35.7	42.8	20.5	35.4	42.8	21.7	41.7	52.7	23.1	43.2	52.8	26.9
23	34.6	41.4	20.2	35.9	41.4	20.2	34.1	41.4	20.2	34.6	41.4	20.2	34.4	41.4	20.2	34.0	41.4	20.2	37.2	46.7	21.7	38.9	46.7	25.5
24	34.0	43.8	18.8	34.5	43.7	18.8	32.1	40.0	17.7	34.0	40.0	17.7	33.0	40.0	17.7	31.9	43.7	17.7	36.1	45.3	20.2	37.8	45.3	24.0
day)	1,918	3,118	331	2,186	3,335	331	2,059	3,178	317	2,186	3,144	365	2,179	3,265	362	1,979	3,146	365	2,004	2,956	392	2,034	2,838	481
kW)		263.5			280.0			275.3			265.6			270.9			256.0			232.2			206.1	
kW)			10.0			10.0			9.0			8.9			8.9			8.9			10.1			13.6

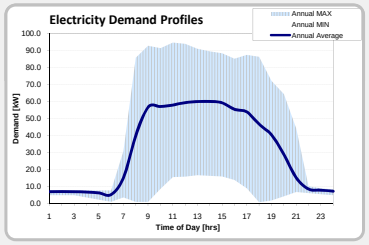
Gas Demand Profiles - Commercial

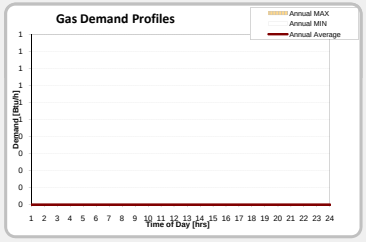
Hour	Annual Average	Annual MAX	Annual MIN	Jan Average	Jan MAX	Jan MIN	Feb Average	Feb MAX	Feb MIN	Mar Average	Mar MAX	Mar MIN	Apr Average	Apr MAX	Apr MIN
	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)
1	289,508	1,120,000	0	595,429	1,120,000	211,777	429,966	770,219	177,917	315,532	641,412	151,165	312,308	677,619	162,120
2	300,475	870,378	0	599,946	841,739	281,753	453,146	805,879	186,436	332,141	672,743	155,944	333,170	717,181	167,379
3	316,208	897,743	0	613,067	869,497	271,566	479,853	796,645	194,085	365,360	722,303	157,669	350,605	749,088	181,349
4	333,264	965,347	0	623,764	898,077	274,120	507,091	801,633	212,670	418,529	775,680	158,115	376,621	761,659	188,477
5	344,761	976,161	0	628,393	883,621	298,398	543,625	830,971	294,522	448,038	788,481	158,470	397,240	770,310	188,515
6	339,096	975,192	0	627,676	849,504	331,571	562,384	862,723	276,830	472,543	793,416	169,188	377,050	756,570	127,158
7	372,067	981,508	0	617,146	892,041	360,992	572,846	894,640	277,558	468,203	788,896	127,748	350,988	727,385	157,463
8	295,103	898,577	0	509,483	851,165	161,153	436,361	765,225	159,517	364,152	679,068	0	332,161	579,750	182,681
9	239,729	770,018	0	422,562	770,018	204,135	364,059	603,259	148,172	345,327	572,360	169,867	290,574	427,435	148,074
10	204,091	702,581	0	435,182	682,722	213,937	359,569	501,351	204,570	320,491	554,579	144,521	216,216	398,555	0
11	167,936	665,645	0	395,463	643,759	203,895	309,322	424,353	162,729	269,051	488,565	121,161	172,508	399,055	0
12	139,162	662,431	0	356,877	662,431	203,684	260,446	383,361	133,075	223,878	420,527	0	140,064	379,705	0
13	114,904	705,448	0	319,165	705,448	0	219,825	384,702	124,781	193,226	421,832	0	104,267	359,310	0
14	108,461	754,144	0	300,454	754,144	0	199,828	366,028	0	171,703	406,382	0	110,891	339,665	0
15	105,133	804,960	0	284,561	804,960	0	186,268	323,016	0	164,452	464,130	0	106,112	319,869	0
16	110,609	859,632	0	279,106	859,632	0	178,397	328,419	0	159,135	506,332	0	128,798	444,183	0
17	142,795	852,452	0	317,229	852,452	127,618	195,219	331,013	0	189,702	546,200	0	154,339	445,131	0
18	158,533	833,543	0	370,429	833,543	182,653	248,512	388,733	0	210,782	584,790	0	154,013	441,204	0
19	167,204	791,244	0	351,467	791,244	155,599	266,455	494,632	158,195	204,167	641,817	0	217,043	454,628	0
20	192,019	766,692	0	380,425	766,692	149,362	265,693	549,721	139,595	218,660	617,400	133,305	187,290	375,228	0
21	209,509	794,321	0	410,665	744,525	162,174	302,985	596,437	149,800	231,027	601,003	118,114	218,914	446,841	143,828
22	234,259	827,965	0	459,169	757,793	188,907	338,242	677,467	161,261	252,516	585,646	129,637	234,662	454,274	145,274
23	241,532	860,251	0	500,107	768,533	172,953	372,334	715,540	183,762	262,326	588,531	136,167	258,799	514,867	152,774
24	266,055	849,375	0	546,331	776,795	180,171	395,030	748,691	179,738	294,264	595,237	145,390	278,231	595,915	156,888
day)	5,392,455	########	0	10,944,096	19,380,335	4,336,418	8,447,455	########	3,525,213	6,895,206	########	2,176,461	5,802,865	########	2,101,980
u/h)		1,120,000			1,120,000			894,640			793,416			770,310	
u/h)			0			0			0			0			0

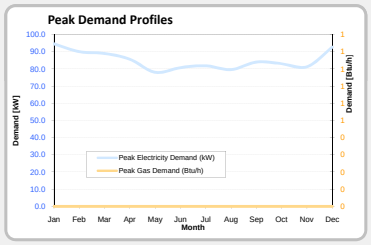
Hour	May Average	May MAX	May MIN	Jun Average	Jun MAX	Jun MIN	Jul Average	Jul MAX	Jul MIN	Aug Average	Aug MAX	Aug MIN	Sep Average	Sep MAX	Sep MIN	Oct Average	Oct MAX	Oct MIN	Nov Average	Nov MAX	Nov MIN	Dec Average	Dec MAX	Dec MIN
	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)	Commercial Demand (Btu/h)
1	227,858	467,935	145,247	173,310	371,353	130,453	191,026	465,496	0	103,438	464,743	0	92,610	458,223	0	152,815	456,075	0	320,754	761,389	143,812	564,292	839,381	314,815
2	230,523	499,254	145,512	176,031	376,703	126,751	146,175	448,492	0	129,044	470,145	0	103,963	467,044	0	164,391	465,366	0	355,217	757,263	150,330	589,190	870,378	314,625
3	244,132	526,412	160,440	180,047	413,038	126,019	151,823	455,120	0	129,414	456,633	0	131,153	467,465	0	160,768	450,184	0	387,633	743,652	155,814	609,533	897,743	317,825
4	271,834	534,476	163,177	185,664	432,141	127,581	157,265	453,275	0	110,337	172,676	0	132,779	460,647	0	166,261	494,487	0	421,180	790,745	158,744	637,668	965,347	301,479
5	269,644	539,330	163,890	180,124	392,610	128,966	160,377	452,384	130,499	110,067	171,848	0	144,309	464,796	0	186,588	487,145	0	435,516	778,586	161,266	645,301	976,161	293,602
6	244,410	495,796	0	168,412	372,674	123,128	124,931	168,499	0	124,430	458,775	0	107,587	442,484	0	173,559	403,700	0	447,090	779,898	163,029	652,420	975,192	302,666
7	284,220	411,027	127,360	188,599	303,252	0	193,628	325,706	123,706	254,152	459,912	131,599	226,752	499,620	0	268,151	461,111	134,918	408,522	762,640	162,305	640,922	981,508	233,600
8	258,244	359,877	133,137	173,250	320,254	0	147,285	289,185	0	148,680	256,829	0	130,408	189,790	0	213,218	383,216	0	331,727	588,912	138,101	503,068	898,577	225,560
9	200,708	340,684	0	125,384	301,498	0	105,933	168,647	0	85,828	161,486	0	65,344	147,969	0	148,299	303,615	0	288,846	566,957	144,979	439,783	758,906	261,754
10	145,482	296,953	0	85,397	286,817	0	56,287	135,970	0	36,922	136,364	0	25,417	142,060	0	104,552	233,567	0	243,559	510,817	126,335	427,134	702,581	260,667
11	113,139	290,183	0	60,502	238,532	0	23,205	128,241	0	15,518	123,809	0	12,515	133,470	0	70,324	201,087	0	197,526	423,934	0	383,105	665,645	219,212
12	80,141	247,569	0	39,178	180,490	0	0	0	0	3,871	119,987	0	11,915	124,012	0	57,478	180,508	0	163,467	409,057	0	337,855	632,966	139,814
13	51,247	172,770	0	28,352	132,653	0	0	0	0	0	0	0	3,840	115,204	0	36,302	160,360	0	140,744	339,655	0	286,150	602,548	0
14	55,563	277,561	0	24,361	130,862	0	0	0	0	0	0	0	3,840	115,203	0	24,335	140,977	0	138,396	302,654	0	275,964	533,678	0
15	61,892	300,431	0	42,646	385,655	0	0	0	0	0	0	0	3,840	115,203	0	33,214	277,215	0	128,907	304,984	0	253,074	473,566	0
16	72,273	444,206	0	43,698	449,065	0	0	0	0	14,339	444,516	0	3,840	115,203	0	42,106	440,808	0	153,052	443,353	0	255,473	476,825	126,593
17	152,807	447,190	0	78,139	442,109	0	14,261	442,098	0	18,194	441,199	0	18,765	447,741	0	75,811	443,291	0	210,014	462,471	0	290,590	488,150	129,423
18	139,436	448,983	0	71,040	445,767	0	43,605	454,130	0	3,999	123,974	0	18,523	440,471	0	55,657	443,693	0	235,908	505,150	0	354,210	610,935	182,682
19	139,700	448,171	0	81,436	440,858	0	42,331	445,347	0	47,265	444,596	0	37,307	443,133	0	97,128	449,332	0	225,886	508,765	0	302,416	714,893	151,161
20	219,748	458,906	0	175,184	450,013	0	79,988	449,046	0	60,745	454,200	0	31,376	444,273	0	112,709	448,003	0	231,723	546,903	136,132	343,157	760,989	141,111
21	190,158	444,040	126,931	156,687	455,977	0	94,487	456,952	0	73,437	453,162	0	65,469	446,233	0	140,195	449,600	0	243,330	600,111	134,323	390,843	794,321	152,742
22	195,221	373,060	129,969	209,451	459,049	0	114,596	457,827	0	88,412	461,550	0	48,696	443,539	0	162,694	459,835	0	261,484	663,546	134,233	450,137	827,965	165,083
23	212,019	402,898	131,627	170,285	454,260	119,287	89,970	376,290	0	74,074	442,141	0	68,751	444,324	0	140,775	453,454	0	269,071	672,358	130,423	486,104	860,251	173,138
24	226,872	444,536	138,776	160,068	373,797	129,454	141,317	465,748	0	94,051	454,925	0	77,862	454,858	0	160,844	455,441	0	293,266	722,747	136,851	528,726	849,375	201,945
day)	4,287,268	9,672,248	1,566,066	2,977,244	8,609,427	1,011,639	2,078,490	7,038,453	254,205	1,726,218	7,173,470	131,599	1,566,862	8,022,965	0	2,948,175	9,142,070	134,918	6,532,820	########	2,176,677	########	18,157,881	4,609,494
u/h)		539,330			459,049			465,748			470,145			499,620			494,487			790,745			981,508	
u/h)			0			0			0			0			0			0			0			0

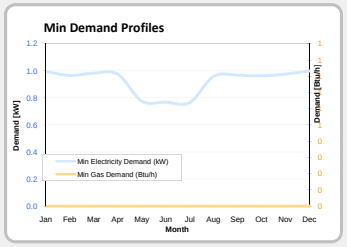
Retail eQUEST Simulation Results

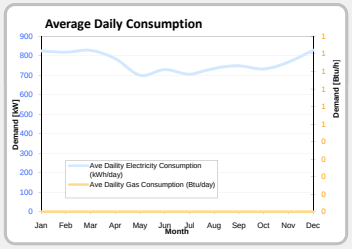
ITERATION: % cost premium minus LR & MR Res cooling











Electricity Demand Profiles - Retail

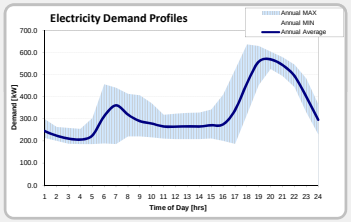
Hour	Annual Average Retail Demand (kW)	Annual MAX Retail Demand (kW)	Annual MIN Retail Demand (kW)	Jan Average Retail Demand (kW)	Jan MAX Retail Demand (kW)	Jan MIN Retail Demand (kW)	Feb Average Retail Demand (kW)	Feb MAX Retail Demand (kW)	Feb MIN Retail Demand (kW)	Mar Average Retail Demand (kW)	Mar MAX Retail Demand (kW)	Mar MIN Retail Demand (kW)	Apr Average Retail Demand (kW)	Apr MAX Retail Demand (kW)	Apr MIN Retail Demand (kW)	May Average Retail Demand (kW)	May MAX Retail Demand (kW)	May MIN Retail Demand (kW)	Jun Average Retail Demand (kW)	Jun MAX Retail Demand (kW)	Jun MIN Retail Demand (kW)	Jul Average Retail Demand (kW)	Jul MAX Retail Demand (kW)	Jul MIN Retail Demand (kW)	Aug Average Retail Demand (kW)	Aug MAX Retail Demand (kW)	Aug MIN Retail Demand (kW)	Sep Average Retail Demand (kW)	Sep MAX Retail Demand (kW)	Sep MIN Retail Demand (kW)	Oct Average Retail Demand (kW)	Oct MAX Retail Demand (kW)	Oct MIN Retail Demand (kW)	Nov Average Retail Demand (kW)	Nov MAX Retail Demand (kW)	Nov MIN Retail Demand (kW)	Dec Average Retail Demand (kW)	Dec MAX Retail Demand (kW)	Dec MIN Retail Demand (kW)
1	7.0	7.7	4.9	7.0	7.7	4.9	7.1	7.7	4.9	7.1	7.7	4.9	7.1	7.7	4.9	6.9	7.7	4.9	7.0	7.7	4.9	6.9	7.3	4.9	6.9	7.2	4.9	6.8	7.2	4.9	6.8	7.6	4.9	7.0	7.7	4.9	7.1	7.7	4.9
2	7.0	7.7	4.9	7.0	7.7	4.9	7.1	7.7	4.9	7.1	7.7	4.9	7.2	7.7	4.9	6.9	7.7	4.9	7.0	7.7	4.9	6.9	7.3	4.9	6.9	7.2	4.9	6.8	7.2	4.9	6.8	7.6	4.9	7.0	7.7	4.9	7.1	7.7	4.9
3	7.0	7.7	4.9	7.0	7.7	4.9	7.1	7.7	4.9	7.2	7.7	4.9	7.2	7.7	4.9	6.9	7.7	4.9	7.0	7.7	4.9	6.9	7.3	4.9	6.9	7.2	4.9	6.8	7.2	4.9	6.9	7.6	4.9	7.0	7.7	4.9	7.1	7.7	4.9
4	6.7	7.7	3.6	7.0	7.7	4.9	7.1	7.7	4.9	7.2	7.7	4.9	7.3	7.7	4.9	5.7	6.4	3.6	5.7	6.4	3.6	5.6	6.0	3.6	6.9	7.2	4.9	6.8	7.2	4.9	6.9	7.6	4.9	7.0	7.7	4.9	7.1	7.7	4.9
5	6.3	7.7	2.3	7.0	7.7	4.9	7.1	7.7	4.9	7.2	7.7	4.9	6.3	7.7	3.9	4.4	5.1	2.3	4.4	5.1	2.3	4.3	4.7	2.3	6.9	7.2	4.9	6.8	7.2	4.9	6.9	7.6	4.9	7.0	7.7	4.9	7.1	7.7	4.9
6	5.2	7.7	1.0	7.0	7.7	4.9	6.2	6.7	3.9	6.3	6.7	3.9	4.6	6.7	2.0	3.1	4.4	1.0	3.2	3.9	1.0	3.1	4.0	1.0	5.0	5.9	2.9	5.0	5.9	2.9	5.1	5.9	2.9	7.0	7.7	4.9	7.2	7.7	4.9
7	15.1	30.8	3.6	5.8	6.9	3.6	4.4	5.3	2.0	4.5	5.3	2.0	21.3	29.8	1.0	20.6	29.5	1.0	22.7	29.5	1.0	21.5	29.4	1.0	22.9	30.2	1.6	22.8	30.4	1.6	21.8	30.8	1.7	5.8	6.9	3.6	5.9	6.9	3.6
8	39.7	85.6	1.0	21.1	30.9	1.7	22.1	30.2	1.0	23.3	29.9	1.0	57.4	85.6	1.0	52.4	78.0	1.0	54.7	77.7	1.0	49.7	69.4	1.0	50.5	68.7	1.0	49.6	68.9	1.0	50.4	76.1	1.0	22.0	30.8	1.7	22.7	30.9	1.7
9	56.6	92.7	1.0	58.4	91.2	1.0	61.1	90.0	1.0	63.2	89.0	1.0	61.1	77.9	8.8	55.7	71.1	8.6	56.2	69.8	8.7	52.4	63.7	8.6	51.9	63.6	8.7	51.5	64.6	8.7	52.9	67.9	1.0	54.3	81.2	1.0	61.1	92.7	1.0
10	57.0	91.2	8.7	63.1	91.2	8.8	62.5	79.8	8.8	63.8	81.2	8.8	60.2	74.9	15.6	54.8	69.0	15.6	55.4	68.7	15.4	51.3	64.8	15.7	50.8	63.4	15.7	51.4	65.6	15.5	51.9	66.1	8.7	56.0	73.6	8.7	62.8	89.9	8.9
11	57.8	94.6	15.5	61.6	94.6	15.9	61.0	75.6	15.8	61.8	75.6	15.5	61.0	77.0	15.7	55.9	71.4	15.6	57.1	71.2	15.9	53.7	70.1	16.1	54.6	70.3	15.6	56.4	73.7	15.6	53.8	68.1	15.9	55.5	69.6	15.9	60.8	85.9	15.9
12	59.3	93.8	15.8	62.6	93.8	16.4	62.2	77.2	16.4	63.2	77.0	15.8	60.5	74.3	16.5	55.6	70.6	16.3	59.2	73.5	17.0	57.5	75.2	17.1	58.2	75.1	16.3	58.7	76.3	16.6	55.4	75.1	16.3	56.4	72.0	16.3	62.2	84.3	16.4
13	59.8	90.9	16.6	61.6	90.9	17.4	61.4	77.7	17.1	62.2	75.8	16.7	59.5	72.7	16.8	56.3	75.8	16.7	60.6	76.9	17.3	60.3	81.8	17.1	61.6	79.5	16.7	61.0	81.5	16.6	56.0	83.0	17.0	56.2	70.1	17.1	61.3	84.1	17.3
14	59.9	89.4	16.3	61.3	89.4	17.4	61.2	76.6	17.4	62.1	75.4	16.8	59.9	72.0	16.4	56.3	75.5	16.3	60.6	79.1	16.9	60.5	80.3	16.7	61.3	78.1	16.8	61.5	80.4	16.8	56.8	82.6	16.5	56.6	70.4	17.3	61.1	81.6	17.4
15	59.2	88.3	15.9	61.0	88.3	17.0	61.1	75.4	17.2	62.2	76.5	16.4	57.9	71.4	15.9	53.8	75.2	16.0	59.2	80.7	16.3	60.2	78.4	16.3	60.2	75.9	16.2	60.5	84.0	16.5	56.2	80.5	16.2	56.7	71.0	17.0	61.2	79.6	17.1
16	55.3	85.0	13.8	60.2	85.0	16.7	60.2	74.7	16.9	59.6	77.0	15.3	51.9	66.9	13.9	47.7	66.4	13.8	51.4	72.8	13.8	53.3	68.0	13.8	53.3	65.8	14.8	55.1	75.4	14.9	54.8	79.5	16.1	56.2	70.7	16.8	60.2	77.1	16.7
17	53.8	87.3	8.9	61.5	87.3	18.8	58.7	73.1	15.6	56.4	75.9	13.8	49.4	67.5	10.5	44.7	63.3	8.9	47.7	65.3	9.2	47.6	61.5	9.2	51.2	63.9	12.7	53.9	70.6	12.7	54.7	73.5	14.1	58.1	73.4	18.9	62.3	77.8	19.0
18	46.5	86.2	0.8	62.7	86.2	16.6	59.7	73.8	12.8	59.6	73.6	12.2	42.8	69.6	5.3	31.2	48.2	0.8	31.1	47.7	0.8	29.6	43.9	0.8	35.8	48.6	6.5	41.6	59.7	6.7	42.0	58.4	6.8	59.6	75.3	16.6	63.3	78.6	16.6
19	40.4	72.1	1.8	48.4	72.1	6.8	47.8	60.8	5.5	49.2	62.9	5.5	44.0	57.2	6.8	32.5	45.2	1.9	31.6	43.2	1.8	28.5	37.0	1.8	35.6	47.6	6.7	36.7	48.4	6.8	36.9	48.2	6.8	45.3	59.4	6.8	48.6	63.0	6.8
20	28.9	64.3	4.2	44.1	64.3	6.8	44.6	57.8	6.8	45.8	54.6	6.8	25.1	53.6	6.8	17.4	27.0	4.2	16.5	25.6	4.2	15.0	23.2	4.2	17.4	22.0	6.8	17.7	26.4	6.8	18.5	27.3	6.8	41.2	54.1	6.8	44.4	59.0	6.9
21	15.2	44.1	6.8	24.8	44.1	6.8	24.2	33.5	6.8	24.2	35.2	6.8	10.8	32.0	6.8	8.8	9.7	6.8	8.9	9.7	6.8	8.9	9.7	6.8	8.8	9.7	6.8	8.8	9.7	6.8	8.8	9.7	6.8	21.4	30.7	6.8	24.1	36.4	6.9
22	8.5	10.2	6.1	9.0	10.1	6.8	9.0	10.2	6.8	9.0	10.2	6.8	8.4	9.8	6.1	8.1	8.9	6.1	8.2	8.5	6.1	8.1	8.5	6.1	8.1	8.5	6.1	8.1	8.5	6.1	8.1	8.5	6.1	8.9	9.7	6.8	9.1	10.1	7.2
23	7.9	9.0	5.5	8.3	9.0	6.1	8.3	9.0	6.1	8.3	9.0	6.1	7.8	9.0	5.5	7.5	8.3	5.5	7.6	7.9	5.5	7.5	7.9	5.5	7.5	7.9	5.5	7.5	7.9	5.5	7.4	7.9	5.5	8.1	8.9	6.1	8.4	8.9	6.5
24	7.2	8.3	4.9	7.7	8.3	5.5	7.7	8.3	5.5	7.7	8.3	5.5	7.2	8.3	4.9	6.9	7.7	4.9	6.9	7.3	4.9	6.8	7.3	4.9	6.9	7.2	4.9	6.8	7.2	4.9	6.7	7.2	4.9	7.6	8.3	5.5	7.7	8.3	5.9
day)	767	1,270	169	825	1,190	219	819	1,034	208	828	1,038	201	786	1,055	200	700	940	182	730	954	184	706	917	184	736	928	207	749	981	207	733	995	195	768	982	219	830	1,101	221
kW)		94.6			94.6			90.0			89.0			85.6			78.0			80.7			81.8			79.5			84.0			83.0			81.2			92.7	
kW)			0.8			1.0			1.0			1.0			1.0			0.8			0.8			0.8			1.0			1.0			1.0			1.0			1.0

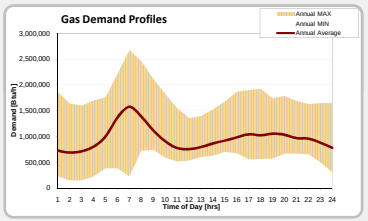
Gas Demand Profiles - Retail

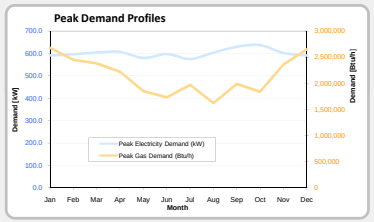
Hour	Annual Average Retail Demand (Btu/h)	Annual MAX Retail Demand (Btu/h)	Annual MIN Retail Demand (Btu/h)	Jan Average Retail Demand (Btu/h)	Jan MAX Retail Demand (Btu/h)	Jan MIN Retail Demand (Btu/h)	Feb Average Retail Demand (Btu/h)	Feb MAX Retail Demand (Btu/h)	Feb MIN Retail Demand (Btu/h)	Mar Average Retail Demand (Btu/h)	Mar MAX Retail Demand (Btu/h)	Mar MIN Retail Demand (Btu/h)	Apr Average Retail Demand (Btu/h)	Apr MAX Retail Demand (Btu/h)	Apr MIN Retail Demand (Btu/h)	May Average Retail Demand (Btu/h)	May MAX Retail Demand (Btu/h)	May MIN Retail Demand (Btu/h)	Jun Average Retail Demand (Btu/h)	Jun MAX Retail Demand (Btu/h)	Jun MIN Retail Demand (Btu/h)	Jul Average Retail Demand (Btu/h)	Jul MAX Retail Demand (Btu/h)	Jul MIN Retail Demand (Btu/h)	Aug Average Retail Demand (Btu/h)	Aug MAX Retail Demand (Btu/h)	Aug MIN Retail Demand (Btu/h)	Sep Average Retail Demand (Btu/h)	Sep MAX Retail Demand (Btu/h)	Sep MIN Retail Demand (Btu/h)	Oct Average Retail Demand (Btu/h)	Oct MAX Retail Demand (Btu/h)	Oct MIN Retail Demand (Btu/h)	Nov Average Retail Demand (Btu/h)	Nov MAX Retail Demand (Btu/h)	Nov MIN Retail Demand (Btu/h)	Dec Average Retail Demand (Btu/h)	Dec MAX Retail Demand (Btu/h)	Dec MIN Retail Demand (Btu/h)
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
day)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
u/h)		0			0			0			0			0			0			0			0			0			0			0			0			0	
u/h)			0			0			0			0			0			0			0			0			0			0			0			0			0	

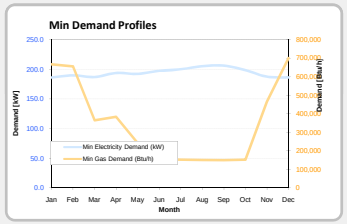
Condotel eQUEST Simulation Results

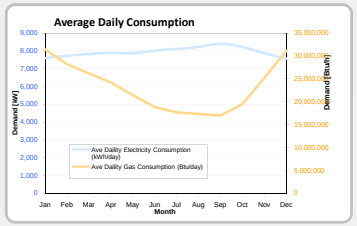
ITERATION: % cost premium minus LR & MR Res cooling











Electricity Demand Profiles - Condotel

Hour	Annual Average (Condotel Demand (kW))	Annual MAX (Condotel Demand (kW))	Annual MIN (Condotel Demand (kW))	Jan Average	Jan MAX	Jan MIN	Feb Average	Feb MAX	Feb MIN	Mar Average	Mar MAX	Mar MIN	Apr Average	Apr MAX	Apr MIN
1	245.0	299.4	213.6	239.3	285.3	213.6	242.4	277.2	225.2	247.7	296.9	226.0	232.4	259.5	218.5
2	223.2	264.1	200.5	218.5	241.3	204.4	223.0	238.2	215.3	228.0	255.9	215.7	211.1	226.6	200.5
3	210.9	259.6	188.2	199.4	217.5	188.2	203.7	215.2	198.2	207.8	231.6	197.0	204.5	216.5	196.2
4	206.3	255.0	186.3	196.0	213.4	186.3	199.7	210.6	191.8	203.0	225.3	192.2	201.9	215.6	194.0
5	224.3	304.5	186.3	194.7	212.8	186.3	197.9	208.8	189.9	200.7	220.7	189.9	233.0	253.8	195.6
6	311.9	456.9	189.4	226.4	253.6	189.4	229.4	247.8	193.3	235.0	261.4	195.2	355.4	425.6	194.3
7	361.0	441.3	186.3	344.3	426.1	232.7	352.6	416.3	226.9	365.5	433.7	229.4	351.2	406.1	240.5
8	319.4	413.6	221.1	364.1	409.8	293.7	354.7	402.4	277.0	345.3	393.7	271.9	290.6	375.4	221.1
9	289.5	407.0	220.9	285.7	407.0	223.2	280.8	375.1	224.0	277.0	377.2	221.2	289.7	370.6	223.6
10	278.8	370.6	216.8	276.6	356.3	220.8	278.8	358.5	221.6	279.4	365.6	221.3	274.2	359.4	216.8
11	265.4	318.8	211.0	241.7	289.9	215.1	253.7	290.8	215.3	258.4	291.7	215.3	265.7	286.2	211.0
12	264.5	323.7	208.7	233.5	278.0	208.7	246.6	284.2	209.7	251.4	272.5	209.3	266.0	289.5	213.1
13	265.9	327.2	208.6	234.5	276.4	208.6	248.3	296.0	210.9	253.0	282.4	209.8	265.7	292.0	216.1
14	265.3	329.2	208.7	231.2	266.5	208.7	244.3	278.1	211.6	249.6	282.2	209.7	266.7	297.8	223.0
15	271.1	342.4	212.0	230.4	258.7	212.0	243.3	273.7	214.9	251.7	286.7	213.0	277.2	319.3	242.3
16	274.7	410.1	200.5	238.6	267.2	209.9	251.6	295.0	217.3	263.1	302.3	216.5	272.0	372.8	205.1
17	338.2	522.8	187.1	260.4	366.8	198.7	251.3	353.6	191.7	252.8	369.4	187.1	369.6	432.9	201.4
18	459.3	637.2	319.3	405.5	520.7	323.8	391.0	497.4	322.5	381.2	495.3	319.3	475.2	512.6	337.2
19	558.5	629.9	453.3	569.9	591.3	524.7	576.5	596.0	544.7	583.2	603.8	543.0	574.5	607.2	544.4
20	568.7	604.6	526.0	564.6	581.8	526.0	574.0	590.7	546.7	579.9	597.7	547.1	568.3	598.1	541.4
21	543.4	579.0	493.6	546.5	563.9	513.6	556.0	572.3	532.7	561.4	579.0	525.6	534.7	569.7	494.8
22	494.6	546.0	443.7	511.5	533.6	468.2	522.5	539.1	486.2	528.3	546.0	488.8	477.7	537.2	445.1
23	400.2	483.2	329.5	450.4	472.6	417.5	462.4	476.4	428.7	468.6	483.2	435.2	361.5	475.2	329.5
24	296.3	366.7	229.4	327.9	364.7	311.2	336.0	355.6	323.8	343.2	366.7	325.4	261.2	348.2	229.4
day)	7,936	9,893	6,241	7,591	8,655	6,685	7,720	8,649	6,820	7,815	8,821	6,805	7,880	9,048	6,535
kW)		637.2			591.3			596.0			603.8			607.2	
kW)			186.3			186.3			189.9			187.1			194.0

Hour	May Average (Condotel Demand (kW))	May MAX (Condotel Demand (kW))	May MIN (Condotel Demand (kW))	Jun Average	Jun MAX	Jun MIN	Jul Average	Jul MAX	Jul MIN	Aug Average	Aug MAX	Aug MIN	Sep Average	Sep MAX	Sep MIN
1	236.7	264.3	225.9	247.7	273.3	228.2	252.6	271.8	236.2	252.7	274.7	233.4	256.6	279.4	234.6
2	214.7	235.8	203.9	224.7	249.3	209.2	228.4	244.6	215.4	229.0	248.5	212.9	232.9	264.1	214.0
3	209.2	226.9	199.9	217.8	243.3	204.5	221.3	235.2	209.4	221.8	241.0	207.5	224.8	259.6	209.0
4	202.3	216.9	194.6	209.8	235.7	197.6	213.4	225.7	202.5	217.7	237.5	205.3	219.9	255.0	206.2
5	230.4	252.9	192.9	242.7	275.3	202.3	243.5	269.7	200.1	253.7	278.9	211.5	254.2	304.5	206.7
6	348.8	420.2	234.6	369.6	434.0	236.9	370.6	438.4	242.9	387.9	448.5	249.2	386.9	456.9	248.0
7	347.2	390.9	288.3	361.8	398.1	297.5	362.7	401.0	298.7	371.2	412.4	306.3	381.0	441.3	299.2
8	294.6	378.7	222.6	291.0	388.3	224.3	294.4	409.1	231.8	287.4	393.5	228.3	298.7	409.6	226.9
9	296.4	370.3	221.5	295.7	377.8	228.4	302.1	396.5	250.6	295.0	373.5	238.0	303.7	388.4	227.6
10	274.1	305.8	217.7	281.2	318.0	231.7	285.2	340.0	253.2	281.8	311.8	247.1	288.0	330.3	229.6
11	268.5	297.7	214.2	276.7	307.1	230.3	280.5	317.0	253.8	280.1	301.2	252.8	285.8	318.8	239.4
12	271.4	301.8	217.1	279.8	304.4	243.1	285.0	314.6	262.9	286.1	303.7	264.8	289.9	323.7	246.0
13	272.6	311.4	219.2	282.2	309.6	254.4	287.4	315.9	268.7	288.5	311.7	266.5	290.7	327.2	251.2
14	275.7	314.4	224.7	284.2	316.3	260.5	289.5	316.1	271.6	289.6	310.2	269.0	292.7	329.2	253.8
15	285.3	334.8	242.0	294.8	340.0	258.9	300.0	323.0	281.4	299.3	322.5	272.8	302.2	342.4	250.0
16	290.7	391.1	200.5	290.9	382.3	229.6	302.7	402.5	243.0	299.7	388.7	229.0	302.6	410.1	229.8
17	386.3	447.0	339.5	390.7	445.3	349.9	398.7	460.1	356.9	408.6	457.8	364.9	411.8	489.3	361.7
18	466.4	508.6	418.9	471.6	525.5	431.5	472.9	509.8	429.8	494.2	576.0	456.7	549.8	622.0	491.2
19	515.0	564.8	466.3	496.5	547.4	459.2	497.6	559.4	453.3	555.3	597.3	496.7	594.3	629.9	561.6
20	556.2	579.3	532.1	562.0	597.4	529.6	560.9	574.8	534.3	573.6	603.5	546.0	574.4	604.6	547.0
21	530.7	552.1	495.7	538.0	556.2	494.6	537.6	551.5	498.8	537.7	562.5	498.9	538.9	566.4	501.9
22	471.7	485.5	445.4	477.6	489.4	445.4	477.9	487.7	447.9	477.7	489.7	448.6	479.3	502.0	451.2
23	353.5	369.6	332.4	356.7	369.6	350.0	358.7	372.2	351.7	358.0	371.1	351.2	359.6	376.2	350.7
24	260.0	303.7	239.2	267.7	304.5	242.6	275.1	305.6	250.4	270.6	305.5	250.1	275.3	308.6	249.8
day)	7,859	8,825	6,789	8,011	8,988	7,040	8,099	9,042	7,244	8,217	9,122	7,308	8,394	9,540	7,287
kW)		579.3			597.4			574.8			603.5			629.9	
kW)			192.3			197.6			200.1			205.3			206.2

Hour	Oct Average (Condotel Demand (kW))	Oct MAX (Condotel Demand (kW))	Oct MIN (Condotel Demand (kW))	Nov Average (Condotel Demand (kW))	Nov MAX (Condotel Demand (kW))	Nov MIN (Condotel Demand (kW))	Dec Average (Condotel Demand (kW))	Dec MAX (Condotel Demand (kW))	Dec MIN (Condotel Demand (kW))
1	245.7	299.4	224.1	249.1	294.7	218.9	236.7	273.7	215.9
2	221.9	257.0	206.1	227.8	251.0	210.1	218.2	238.3	206.2
3	214.3	244.6	201.5	207.2	225.0	193.1	199.0	216.4	189.5
4	210.7	241.3	198.6	202.6	219.1	188.5	195.2	211.7	186.6
5	243.0	274.2	204.1	200.7	216.5	187.7	194.0	210.2	186.3
6	365.4	447.7	219.5	234.7	259.8	197.4	228.2	252.0	190.8
7	377.7	427.6	250.1	361.7	437.3	240.3	354.2	422.4	231.1
8	289.8	413.6	225.2	357.8	412.9	291.3	366.7	406.0	294.0
9	294.6	379.1	227.7	284.3	406.8	223.6	269.1	393.6	220.9
10	274.7	370.6	220.8	283.7	361.9	222.5	268.0	347.2	222.5
11	269.5	311.7	216.5	260.7	298.4	215.0	243.2	275.3	214.7
12	273.4	311.2	219.2	254.8	288.4	216.7	236.0	267.0	208.8
13	276.0	320.3	222.2	254.7	288.0	217.4	236.8	268.7	209.3
14	277.4	320.0	227.1	250.9	287.7	218.0	231.0	257.6	209.8
15	286.5	324.1	242.7	251.5	291.5	222.7	230.0	249.5	213.1
16	291.2	409.1	205.4	255.4	307.1	219.8	236.8	252.3	211.4
17	407.8	522.8	359.5	265.0	374.5	205.0	249.8	359.3	201.3
18	596.3	637.2	539.4	411.0	523.4	337.8	392.3	514.7	327.2
19	587.4	622.8	554.1	581.9	601.7	544.8	572.4	591.0	537.2
20	568.3	598.7	539.9	574.9	592.0	542.8	567.4	584.0	532.3
21	534.4	560.7	493.6	556.9	574.2	526.2	549.2	566.0	516.7
22	476.1	502.8	443.7	523.3	539.7	480.2	513.7	533.6	468.8
23	359.6	450.4	345.8	464.9	478.0	428.8	452.3	472.2	416.1
24	271.0	361.2	236.2	342.1	366.3	319.5	327.1	345.9	312.7
day)	8,213	9,608	7,023	7,858	8,896	6,868	7,567	8,509	6,723
kW)		637.2			601.7			591.0	
kW)			198.6			187.7			186.3

Gas Demand Profiles - Condotel

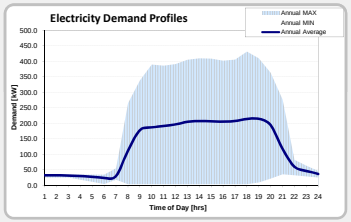
Hour	Annual Average (Condotel Demand (Btu/h))	Annual MAX (Condotel Demand (Btu/h))	Annual MIN (Condotel Demand (Btu/h))	Jan Average (Condotel Demand (Btu/h))	Jan MAX (Condotel Demand (Btu/h))	Jan MIN (Condotel Demand (Btu/h))	Feb Average (Condotel Demand (Btu/h))	Feb MAX (Condotel Demand (Btu/h))	Feb MIN (Condotel Demand (Btu/h))	Mar Average (Condotel Demand (Btu/h))	Mar MAX (Condotel Demand (Btu/h))	Mar MIN (Condotel Demand (Btu/h))	Apr Average (Condotel Demand (Btu/h))	Apr MAX (Condotel Demand (Btu/h))	Apr MIN (Condotel Demand (Btu/h))
1	730,632	1,860,000	229,475	1,216,173	1,860,000	747,041	985,592	1,250,000	770,588	871,328	1,200,000	428,424	758,210	1,190,000	383,997
2	685,860	1,640,000	150,084	1,167,619	1,600,000	731,029	967,264	1,250,000	684,514	812,154	1,170,000	365,210	751,892	1,090,000	534,969
3	718,195	1,600,000	150,077	1,136,306	1,590,000	670,416	939,378	1,200,000	655,942	817,830	1,180,000	471,803	781,872	1,070,000	555,761
4	801,338	1,700,000	230,093	1,166,642	1,680,000	667,310	977,974	1,300,000	677,273	858,556	1,260,000	486,869	912,976	1,220,000	689,487
5	1,001,027	1,760,000	385,104	1,268,192	1,760,000	769,960	1,101,941	1,400,000	770,776	985,865	1,390,000	578,912	1,181,832	1,550,000	796,940
6	1,368,021	2,220,000	385,116	1,529,411	2,080,000	921,735	1,401,771	1,720,000	929,600	1,299,649	1,740,000	815,441	1,643,108	2,220,000	845,868
7	1,576,375	2,680,000	230,091	1,910,962	2,680,000	859,833	1,871,671	2,450,000	966,776	1,764,610	2,380,000	795,217	1,653,052	2,050,000	881,388
8	1,387,237	2,460,000	725,968	1,852,226	2,460,000	969,016	1,774,286	2,160,000	1,190,000	1,729,085	2,110,000	925,388	1,352,000	1,840,000	1,050,000
9	1,118,515	2,120,000	742,039	1,556,129	2,120,000	1,170,000	1,431,786	1,630,000	1,150,000	1,378,710	1,610,000	1,050,000	1,092,491	1,400,000	857,308
10	908,116	1,830,000	591,482	1,300,645	1,830,000	1,070,000	1,182,500	1,320,000	1,080,000	1,125,596	1,390,000	863,485	886,344	1,170,000	652,731
11	776,110	1,550,000	517,565	1,113,453	1,550,000	931,362	997,989	1,280,000	888,907	937,821	1,310,000	657,325	772,129	1,160,000	571,814
12	756,289	1,360,000	538,505	999,309	1,360,000	834,272	892,241	1,140,000	799,393	817,924	1,110,000	575,910	762,874	1,010,000	652,645
13	794,272	1,400,000	604,346	1,044,238	1,400,000	897,170	939,012	1,140,000	761,265	864,534	1,050,000	657,259	800,205	1,300,000	670,145
14	867,008	1,530,000	629,573	1,082,737	1,530,000	898,686	979,334	1,280,000	812,650	893,540	1,220,000	675,069	882,345	1,320,000	786,931
15	918,624	1,680,000	704,680	1,200,000	1,680,000	1,010,000	1,091,607	1,470,000	797,660	1,021,972	1,490,000	793,021	929,792	1,520,000	786,919
16	984,237	1,870,000	677,832	1,221,935	1,870,000	1,020,000	1,099,513	1,330,000	792,566	1,030,856	1,530,000	793,001	1,001,276	1,250,000	756,306
17	1,043,919	1,900,000	559,702	1,374,194	1,900,000	1,030,000	1,254,425	1,520,000	977,091	1,177,737	1,820,000	761,803	1,057,790	1,730,000	622,551
18	1,022,872	1,930,000	565,137	1,412,542	1,930,000	964,947	1,236,112	1,560,000	866,250	1,228,405	1,770,000	626,856	1,030,879	1,740,000	625,669
19	1,054,725	1,740,000	573,293	1,284,551	1,680,000	963,495	1,170,470	1,620,000	880,130	1,093,751	1,610,000	635,624	1,092,419	1,330,000	747,046
20	1,033,365	1,790,000	671,296	1,413,226	1,780,000	1,100,000	1,330,714	1,790,000	1,060,000	1,220,484	1,580,000	769,961	1,034,970	1,570,000	740,088
21	968,132	1,690,000	671,295	1,262,903	1,570,000	1,070,000	1,150,000	1,360,000	1,030,000	1,080,968	1,530,000	826,804	1,031,230	1,600,000	740,105
22	959,368	1,630,000	658,228	1,319,032	1,620,000	1,120,000	1,191,786	1,330,000	1,070,000	1,097,941	1,630,000	826,791	1,005,610	1,550,000	722,489
23	881,542	1,650,000	504,349	1,310,645	1,650,000	1,040,000	1,155,714	1,330,000	1,000,000	1,077,184	1,590,000	727,565	892,828	1,440,000	612,108
24	781,911	1,650,000	303,932	1,274,915	1,650,000	886,095	1,082,840	1,310,000	900,632	990,111	1,390,000	599,377	881,217	1,250,000	443,339
day)	########	########	11,999,260	31,417,986	42,830,000	22,342,367	28,205,919	35,140,000	21,511,963	26,176,612	36,060,000	16,707,115	24,189,341	34,570,000	16,726,604
u/h)		2,680,000			2,680,000			2,450,000			2,380,000			2,220,000	
u/h)			150,077			667,310			655,942			365,210			383,997

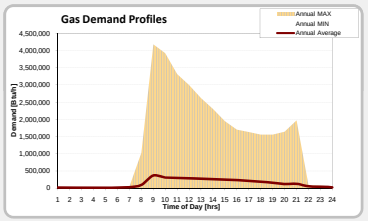
Hour	May Average (Condotel Demand (Btu/h))	May MAX (Condotel Demand (Btu/h))	May MIN (Condotel Demand (Btu/h))	Jun Average (Condotel Demand (Btu/h))	Jun MAX (Condotel Demand (Btu/h))	Jun MIN (Condotel Demand (Btu/h))	Jul Average (Condotel Demand (Btu/h))	Jul MAX (Condotel Demand (Btu/h))	Jul MIN (Condotel Demand (Btu/h))	Aug Average (Condotel Demand (Btu/h))	Aug MAX (Condotel Demand (Btu/h))	Aug MIN (Condotel Demand (Btu/h))	Sep Average (Condotel Demand (Btu/h))	Sep MAX (Condotel Demand (Btu/h))	Sep MIN (Condotel Demand (Btu/h))
1	675,968	1,170,000	301,188	531,499	1,090,000	239,191	482,426	1,090,000	232,883	394,211	1,060,000	229,475	275,632	536,299	229,489
2	661,809	1,020,000	242,334	396,021	982,798	156,008	402,839	1,050,000	152,675	338,486	1,040,000	150,584	313,678	1,010,000	150,084
3	651,340	1,000,000	479,771	523,785	1,060,000	156,025	472,108	1,010,000	152,825	394,448	982,166	150,585	355,152	1,010,000	150,077
4	760,255	982,329	582,337	621,682	1,070,000	234,537	485,060	1,040,000	238,437	563,273	1,080,000	231,009	554,968	1,060,000	230,091
5	1,019,925	1,240,000	760,760	840,593	1,340,000	397,102	856,325	1,340,000	527,160	802,248	1,320,000	385,104	738,696	1,390,000	397,533
6	1,413,362	1,830,000	746,608	1,285,212	1,670,000	399,523	1,214,661	1,970,000	390,770	1,243,610	1,560,000	385,116	1,258,872	1,990,000	391,115
7	1,474,348	1,850,000	863,476	1,367,009	1,730,000	563,081	1,304,747	1,660,000	550,520	1,316,555	1,620,000	542,530	1,271,005	1,630,000	541,684
8	1,211,223	1,470,000	979,264	1,082,718	1,330,000	757,537	1,006,012	1,240,000	738,922	1,025,050	1,230,000	726,962	1,001,030	1,290,000	725,968
9	959,087	1,140,000	795,396	863,937	1,070,000	773,462	791,039	843,631	754,927	782,276	968,885	743,116	813,982	1,020,000	742,039
10	752,717	1,090,000	634,946	680,337	1,070,000	617,260	652,471	849,278	602,217	634,112	834,660	592,694	647,502	833,539	591,482
11	637,705	828,877	556,056	599,927	929,003	540,402	574,032	716,372	527,105	558,806	704,473	518,705	559,274	703,584	517,565
12	694,045	892,122	634,873	657,664	916,663	617,204	634,422	707,140	602,150	620,924	695,417	592,652	620,915	694,556	591,400
13	681,112	869,372	632,077	673,250	846,253	615,885	654,611	831,675	605,686	655,192	830,559	604,346	686,052	842,596	613,017
14	843,579	1,100,000	763,087	791,015	1,060,000	739,386	779,457	1,030,000	719,099	755,468	1,010,000	706,319	756,038	1,010,000	704,731
15	839,088	988,641	763,069	785,433	945,148	739,362	772,869	918,265	719,074	752,639	901,338	706,310	752,908	900,000	704,680
16	928,737	1,180,000	733,466	899,473	930,788	710,721	867,790	904,120	691,290	852,255	887,445	679,121	849,652	886,212	677,832
17	896,443	1,200,000	604,247	900,383	1,670,000	585,980	839,991	904,076	570,441	826,648	887,387	560,776	823,245	886,169	559,702
18	876,379	1,570,000	608,058	803,950	1,000,000	590,436	774,498	921,655	575,453	757,092	905,509	566,166	755,363	904,342	565,137
19	1,079,549	1,740,000	726,745	998,658	1,700,000	706,530	911,437	1,000,000	689,245	894,990	986,389	678,538	892,571	985,196	677,402
20	888,814	1,540,000	720,015	835,205	1,690,000	700,049	773,422	925,828	682,936	755,933	910,507	672,387	755,172	909,436	671,296
21	953,996	1,690,000	720,057	808,424	1,060,000	700,089	761,110	849,361	682,956	746,485	835,622	672,431	745,198	834,617	671,295
22	953,312	1,540,000	703,916	736,885	1,020,000	685,310	690,255	776,754	669,471	674,951	764,494	659,547	673,560	763,601	658,228
23	858,251	1,480,000	540,126	598,481	886,349	525,289	559,092	1,360,000	513,109	552,808	1,340,000	505,484	543,266	1,290,000	504,349
24	666,779	1,220,000	367,666	519,686	1,200,000	316,162	362,909	622,776	309,005	424,482	1,160,000	304,567	364,708	1,160,000	303,932
day)	21,427,721	30,661,310	15,478,508	18,809,089	28,290,121	13,082,823	17,642,224	24,575,509	12,908,535	17,322,362	24,515,967	12,565,848	16,977,576	24,528,110	12,561,457
u/h)		1,850,000			1,730,000			1,970,000			1,620,000			1,990,000	
u/h)			242,334			156,008			152,675			150,568			150,077

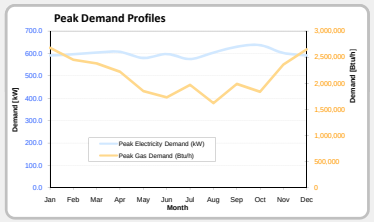
Hour	Oct Average (Condotel Demand (Btu/h))	Oct MAX (Condotel Demand (Btu/h))	Oct MIN (Condotel Demand (Btu/h))	Nov Average (Condotel Demand (Btu/h))	Nov MAX (Condotel Demand (Btu/h))	Nov MIN (Condotel Demand (Btu/h))	Dec Average (Condotel Demand (Btu/h))	Dec MAX (Condotel Demand (Btu/h))	Dec MIN (Condotel Demand (Btu/h))
1	558,788	1,140,000	231,680	857,851	1,450,000	549,527	1,168,478	1,580,000	804,803
2	455,738	1,010,000	151,889	819,745	1,390,000	485,538	1,155,406	1,640,000	734,080
3	595,757	1,060,000	152,454	814,035	1,310,000	465,201	1,144,939	1,600,000	700,674
4	649,895	1,040,000	233,453	867,346	1,430,000	477,973	1,206,417	1,700,000	740,918
5	930,323	1,350,000	389,224	977,414	1,480,000	573,893	1,310,166	1,750,000	829,813
6	1,300,520	1,840,000	389,228	1,242,152	1,820,000	830,974	1,585,806	2,080,000	1,050,000
7	1,388,196	1,800,000	548,374	1,617,872	2,360,000	795,330	1,992,258	2,650,000	1,040,000
8	1,137,971	1,380,000	735,331	1,570,022	2,080,000	878,515	1,925,161	2,400,000	1,140,000
9	939,122	1,050,000	751,705	1,274,944	1,580,000	968,308	1,555,161	1,910,000	1,260,000
10	754,036	1,040,000	599,558	1,052,997	1,260,000	770,496	1,242,903	1,570,000	1,090,000
11	635,216	778,935	524,750	888,970	1,090,000	679,819	1,050,304	1,470,000	885,054
12	671,693	840,744	599,482	764,543	1,010,000	538,505	945,005	1,320,000	795,382
13	686,052	842,596	613,017	820,579	1,210,000	614,948	988,374	1,290,000	862,874
14	790,351	1,030,000	715,516	834,537	1,030,000	629,573	1,019,986	1,390,000	882,295
15	809,987	1,470,000	715,473	937,185	1,080,000	736,068	1,138,065	1,550,000	1,000,000
16	884,284	1,150,000	687,898	1,022,885	1,630,000	736,358	1,158,065	1,440,000	1,020,000
17	852,210	1,150,000	567,736	1,179,341	1,750,000	707,532	1,358,065	1,620,000	1,130,000
18	807,609	1,520,000	568,117	1,205,303	1,710,000	604,697	1,397,419	1,730,000	1,030,000
19	941,740	1,440,000	573,293	1,042,641	1,270,000	603,193	1,259,032	1,530,000	1,020,000
20	812,004	1,430,000	680,085	1,210,246	1,750,000	720,328	1,389,355	1,670,000	1,130,000
21	802,934	1,220,000	680,065	1,046,746	1,240,000	704,634	1,237,419	1,520,000	1,070,000
22	779,515	1,470,000	666,741	1,101,745	1,460,000	833,915	1,300,000	1,630,000	1,120,000
23

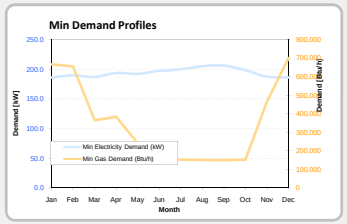
AR eQUEST Simulation Results

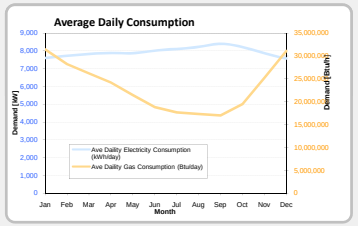
ITERATION: % cost premium minus LR & MR Res cooling











Electricity Demand Profiles - AR

Hour	Annual Average AR Demand (kW)	Annual MAX AR Demand (kW)	Annual MIN AR Demand (kW)	Jan Average AR Demand (kW)	Jan MAX AR Demand (kW)	Jan MIN AR Demand (kW)	Feb Average AR Demand (kW)	Feb MAX AR Demand (kW)	Feb MIN AR Demand (kW)	Mar Average AR Demand (kW)	Mar MAX AR Demand (kW)	Mar MIN AR Demand (kW)
1	32.4	36.7	25.2	239.3	285.3	213.6	242.4	277.2	225.2	247.7	296.9	226.0
2	31.7	34.9	25.2	218.5	241.3	204.4	223.0	238.2	215.3	228.0	255.9	215.7
3	31.7	34.6	25.2	199.4	217.5	188.2	203.7	215.2	198.2	207.8	231.6	197.0
4	29.9	34.6	18.1	196.0	213.4	186.3	199.7	210.6	191.8	203.0	225.3	192.2
5	27.9	34.6	11.1	194.7	212.8	186.3	197.9	208.8	189.9	200.7	220.7	189.9
6	23.5	34.6	3.9	226.4	253.6	189.4	229.4	247.8	193.3	235.0	261.4	195.2
7	29.9	55.2	18.1	344.3	426.1	232.7	352.6	416.3	226.9	365.5	433.7	229.4
8	111.5	265.5	3.3	364.1	409.8	293.7	354.7	402.4	277.0	345.3	393.7	271.9
9	177.3	338.7	3.5	285.7	407.0	223.2	280.8	375.1	224.0	277.0	377.2	221.2
10	186.8	390.0	3.5	276.6	356.3	220.8	278.8	358.5	221.6	279.4	365.6	221.5
11	191.7	386.2	3.5	241.7	289.9	215.1	253.7	290.8	215.3	258.4	291.7	215.3
12	196.4	391.6	3.4	233.5	278.0	208.7	246.6	284.2	209.7	251.4	272.5	209.3
13	205.1	405.2	3.4	234.5	276.4	208.6	248.3	296.0	210.9	253.0	282.4	209.8
14	207.2	410.0	3.4	231.2	266.5	208.7	244.3	278.1	211.6	249.6	282.2	209.7
15	206.9	409.2	3.4	230.4	258.7	212.0	243.3	273.7	214.9	251.7	286.7	213.0
16	205.4	402.5	3.4	238.6	267.2	209.9	251.6	295.0	217.3	263.1	302.3	216.5
17	207.3	406.2	3.4	260.4	366.8	198.7	251.3	353.6	191.7	252.8	369.4	187.1
18	214.1	431.9	3.4	405.5	520.7	323.8	391.0	497.4	322.5	381.2	495.3	319.3
19	214.5	410.2	9.0	569.9	591.3	524.7	576.5	596.0	544.7	583.2	603.8	543.0
20	194.4	363.5	21.6	564.6	581.8	526.0	574.0	590.7	546.7	579.9	597.7	547.1
21	118.1	276.9	35.7	546.5	563.9	513.6	556.0	572.3	532.7	561.4	579.0	525.6
22	60.0	82.7	32.2	511.5	533.6	468.2	522.5	539.1	486.2	528.3	546.0	488.8
23	46.4	63.4	28.7	450.4	472.6	417.5	462.4	476.4	428.7	468.6	483.2	435.2
24	36.5	46.2	25.2	327.9	364.7	311.2	336.0	355.6	323.8	343.2	366.7	325.4
day)	2,987	5,745	316	7,591	8,655	6,685	7,720	8,649	6,820	7,815	8,821	6,805
kW)		431.9			591.3			596.0			603.8	
kW)			3.3			186.3			189.9			187.1

Hour	Apr Average AR Demand (kW)	Apr MAX AR Demand (kW)	Apr MIN AR Demand (kW)	May Average AR Demand (kW)	May MAX AR Demand (kW)	May MIN AR Demand (kW)	Jun Average AR Demand (kW)	Jun MAX AR Demand (kW)	Jun MIN AR Demand (kW)	Jul Average AR Demand (kW)	Jul MAX AR Demand (kW)	Jul MIN AR Demand (kW)
1	232.4	259.5	218.5	236.7	254.3	225.9	247.7	273.3	228.2	252.6	271.8	236.2
2	211.1	226.6	200.5	214.7	235.8	203.9	224.7	249.3	209.2	228.4	244.6	215.4
3	204.5	216.5	196.2	209.2	226.9	199.9	217.8	243.3	204.5	221.3	235.2	209.4
4	201.9	215.6	194.0	202.3	216.9	194.6	209.8	235.7	197.6	213.4	225.7	202.5
5	233.0	253.8	195.6	230.4	252.9	192.9	242.7	275.3	202.3	243.5	269.7	200.1
6	355.4	425.6	194.3	348.8	420.2	234.6	369.6	434.0	236.9	370.6	438.4	242.9
7	351.2	406.1	240.5	347.2	390.9	288.3	361.8	398.1	297.5	362.7	401.0	298.7
8	290.6	375.4	221.1	294.6	378.7	222.6	291.0	388.3	224.3	294.4	409.1	231.8
9	289.7	370.6	223.6	296.4	370.3	221.5	295.7	377.8	228.4	302.1	396.5	250.6
10	274.2	359.4	216.8	274.1	305.8	217.7	281.2	318.0	231.7	285.2	340.0	253.2
11	265.7	286.2	211.0	268.5	297.7	214.2	276.7	307.1	230.3	280.5	317.0	253.8
12	266.0	289.5	213.1	271.4	301.8	217.1	279.8	304.4	243.1	285.0	314.6	262.9
13	265.7	292.0	216.1	272.6	311.4	219.2	282.2	309.6	254.4	287.4	315.9	268.7
14	266.7	297.8	223.0	275.7	314.4	224.7	284.2	316.3	260.5	289.5	316.1	271.6
15	277.2	319.3	242.3	285.3	334.8	242.0	294.8	340.0	258.9	300.0	323.0	281.4
16	272.0	372.8	205.1	290.7	391.1	200.5	290.9	382.3	229.6	302.7	402.5	243.0
17	369.6	432.9	201.4	386.3	447.0	339.5	390.7	445.3	349.9	398.7	460.1	356.9
18	475.2	512.6	337.2	466.4	508.6	418.9	471.6	525.5	431.5	472.9	509.8	429.8
19	574.5	607.2	544.4	515.0	564.8	466.3	496.5	547.4	459.2	497.6	559.4	453.3
20	568.3	598.1	541.4	556.2	579.3	532.1	562.0	597.4	529.6	560.9	574.8	534.3
21	534.7	569.7	494.8	530.7	552.1	495.7	538.0	556.2	494.6	537.6	551.5	498.8
22	477.7	537.2	445.1	471.7	485.5	445.4	477.6	489.4	445.4	477.9	487.7	447.9
23	361.5	475.2	329.5	353.5	369.6	332.4	356.7	369.6	350.0	358.7	372.2	351.7
24	261.2	348.2	229.4	260.0	303.7	239.2	267.7	304.5	242.6	275.1	305.6	250.4
day)	7,880	9,048	6,535	7,859	8,825	6,789	8,011	8,988	7,040	8,099	9,042	7,244
kW)		607.2			579.3			597.4			574.8	
kW)			194.0			192.3			197.6			200.1

Hour	Aug Average AR Demand (kW)	Aug MAX AR Demand (kW)	Aug MIN AR Demand (kW)	Sep Average AR Demand (kW)	Sep MAX AR Demand (kW)	Sep MIN AR Demand (kW)	Oct Average AR Demand (kW)	Oct MAX AR Demand (kW)	Oct MIN AR Demand (kW)	Nov Average AR Demand (kW)	Nov MAX AR Demand (kW)	Nov MIN AR Demand (kW)	Dec Average AR Demand (kW)	Dec MAX AR Demand (kW)	Dec MIN AR Demand (kW)
1	252.7	274.7	233.4	256.6	279.4	234.6	245.7	299.4	224.1	249.1	294.7	218.9	236.7	273.7	215.8
2	229.0	248.5	212.9	232.9	264.1	214.0	221.9	257.0	206.1	227.8	251.0	210.1	218.2	238.3	206.2
3	221.8	241.0	207.5	224.8	259.6	209.0	214.3	244.6	201.5	207.2	225.0	193.1	199.0	216.4	189.5
4	217.7	237.5	205.3	219.9	255.0	206.2	210.7	241.3	198.6	202.6	219.1	188.5	195.2	211.7	186.6
5	253.7	278.9	211.5	254.2	304.5	206.7	243.0	274.2	204.1	200.7	216.5	187.7	194.0	210.2	186.0
6	387.9	448.5	249.2	386.9	456.9	248.0	365.4	447.7	219.5	234.7	259.8	197.4	228.2	252.0	190.8
7	371.2	412.4	306.3	381.0	441.3	299.2	377.7	427.6	250.1	361.7	437.3	240.3	354.2	422.4	231.1
8	287.4	393.5	228.3	298.7	409.6	226.9	289.8	413.6	225.2	357.8	412.9	291.2	366.7	406.0	294.0
9	295.0	373.5	238.0	303.7	388.4	227.6	294.6	379.1	227.7	284.3	406.8	223.6	269.1	393.6	220.9
10	281.8	311.8	247.1	288.0	330.3	229.6	274.7	370.6	220.8	283.7	361.9	222.5	268.0	347.2	222.5
11	280.1	301.2	252.8	285.8	318.8	239.4	269.5	311.7	216.5	260.7	298.4	215.0	243.2	275.3	214.7
12	286.1	303.7	264.8	289.9	323.7	246.0	273.4	311.2	219.2	254.8	288.4	216.7	236.0	267.0	208.8
13	288.5	311.7	266.5	290.7	327.2	251.2	276.0	320.3	222.2	254.7	288.0	217.4	236.8	268.7	209.3
14	289.6	310.2	269.0	292.7	329.2	253.8	277.4	320.0	227.1	250.9	287.7	218.0	231.0	257.6	209.8
15	299.3	322.5	272.8	302.2	342.4	250.0	286.5	324.1	242.7	251.5	291.5	222.7	230.0	249.5	213.1
16	299.7	388.7	229.0	302.6	410.1	229.8	291.2	409.1	205.4	255.4	307.1	219.8	236.8	252.3	211.4
17	408.6	457.8	364.9	411.8	489.3	361.7	407.8	522.8	359.5	265.0	374.5	205.0	249.8	359.3	201.3
18	494.2	576.0	456.7	549.8	622.0	491.3	596.3	637.2	539.4	411.0	523.4	337.8	392.3	514.7	327.2
19	555.3	597.3	496.7	594.3	629.9	561.6	587.4	622.8	554.1	581.9	601.7	544.8	572.4	591.0	537.0
20	573.6	603.5	546.0	574.4	604.6	547.0	568.3	598.7	539.9	574.9	592.0	542.8	567.4	584.0	532.3
21	537.7	562.5	498.9	538.9	566.4	501.9	534.4	560.7	493.6	556.9	574.2	526.2	549.2	566.0	516.7
22	477.7	489.7	448.6	479.3	502.0	451.2	476.1	502.8	443.7	523.3	539.7	480.2	513.7	533.6	468.8
23	358.0	371.1	351.2	359.6	376.2	350.7	359.6	450.4	345.8	464.9	478.0	428.8	452.3	472.2	416.1
24	270.6	305.5	250.1	275.3	308.6	249.8	271.0	361.2	236.2	342.1	366.3	319.5	327.1	345.9	312.7
day)	8,217	9,122	7,308	8,394	9,540	7,287	8,213	9,608	7,023	7,858	8,896	6,868	7,567	8,509	6,723
kW)		603.5			629.9			637.2			601.7			591.0	
kW)			205.3			206.2			198.6			187.7			186.3

Gas Demand Profiles - AR

Hour	Annual Average AR Demand (Btu/h)	Annual MAX AR Demand (Btu/h)	Annual MIN AR Demand (Btu/h)	Jan Average AR Demand (Btu/h)	Jan MAX AR Demand (Btu/h)	Jan MIN AR Demand (Btu/h)	Feb Average AR Demand (Btu/h)	Feb MAX AR Demand (Btu/h)	Feb MIN AR Demand (Btu/h)	Mar Average AR Demand (Btu/h)	Mar MAX AR Demand (Btu/h)	Mar MIN AR Demand (Btu/h)
1	15,859	23,297	5,439	1,216,173	1,860,000	747,041	985,592	1,250,000	770,588	871,328	1,200,000	428,424
2	14,874	19,947	5,439	1,167,619	1,600,000	731,029	967,264	1,250,000	684,514	812,154	1,170,000	365,210
3	14,874	19,947	5,439	1,136,306	1,590,000	670,416	939,378	1,200,000	655,942	817,830	1,180,000	471,803
4	14,874	19,947	5,439	1,166,642	1,680,000	667,310	977,974	1,300,000	677,273	858,556	1,260,000	486,869
5	14,874	19,948	5,439	1,268,192	1,760,000	769,960	1,101,941	1,400,000	770,776	985,865	1,390,000	578,912
6	15,768	22,280	5,439	1,529,411	2,080,000	921,735	1,401,771	1,720,000	929,600	1,299,649	1,740,000	815,441
7	29,335	57,545	5,439	1,910,962	2,680,000	859,833	1,871,671	2,450,000	966,776	1,764,610	2,380,000	795,217
8	92,975	1,029,750	5,439	1,852,226	2,460,000	969,016	1,774,286	2,160,000	1,190,000	1,729,085	2,110,000	925,388
9	366,573	4,179,830	5,439	1,556,129	2,120,000	1,170,000	1,431,786	1,630,000	1,150,000	1,378,710	1,610,000	1,050,000
10	307,726	3,925,620	5,439	1,300,645	1,830,000	1,070,000	1,182,500	1,320,000	1,080,000	1,125,596	1,390,000	863,485
11	295,172	3,314,230	5,439	1,113,453	1,550,000	931,362	997,989	1,280,000	888,907	937,821	1,310,000	657,325
12	286,733	2,996,920	5,439	999,309	1,360,000	834,272	892,241	1,140,000	799,393	817,924	1,110,000	575,910
13	274,390	2,616,910	5,439	1,044,238	1,400,000	897,170	939,012	1,140,000	761,265	864,534	1,050,000	657,259
14	262,405	2,301,420	5,439	1,082,737	1,530,000	898,686	979,334	1,280,000	812,650	893,540	1,220,000	675,069
15	250,775	1,948,310	5,439	1,200,000	1,680,000	1,010,000	1,091,607	1,470,000	797,660	1,021,972	1,490,000	793,021
16	237,088	1,701,440	5,439	1,221,935	1,870,000	1,020,000	1,099,513	1,330,000	792,566	1,030,856	1,530,000	793,001
17	214,330	1,635,420	5,439	1,374,194	1,900,000	1,030,000	1,254,425	1,520,000	977,091	1,177,737	1,820,000	761,803
18	186,817	1,560,100	5,439	1,412,542	1,930,000	964,947	1,236,112	1,560,000	866,250	1,228,405	1,770,000	626,856
19	157,527	1,559,050	5,439	1,284,551	1,680,000	963,495	1,170,470	1,620,000	880,130	1,093,751	1,610,000	635,624
20	121,770	1,643,400	5,439	1,413,226	1,780,000	1,100,000	1,330,714	1,790,000	1,060,000	1,220,484	1,580,000	769,961
21	127,066	1,972,640	5,439	1,262,903	1,570,000	1,070,000	1,150,000	1,360,000	1,030,000	1,080,968	1,530,000	826,804
22	54,279	85,456	5,439	1,319,032	1,620,000	1,120,000	1,191,786	1,330,000	1,070,000	1,097,941	1,630,000	826,791
23	40,462	75,568	5,439	1,310,645	1,650,000	1,040,000	1,155,714	1,330,000	1,000,000	1,077,184	1,590,000	727,565
24	23,585	45,425	5,439	1,274,915	1,650,000	886,095	1,082,840	1,310,000	900,632	990,111	1,390,000	599,377
day)	3,420,129	########	130,530	31,417,986	42,830,000	22,342,367	28,205,919	35,140,000	21,511,963	26,176,612	36,060,000	16,707,115
u/h)		4,179,830			2,680,000			2,450,000			2,380,000	
u/h)			5,439			667,310			655,942			365,210

Hour	Apr Average AR Demand (Btu/h)	Apr MAX AR Demand (Btu/h)	Apr MIN AR Demand (Btu/h)	May Average AR Demand (Btu/h)	May MAX AR Demand (Btu/h)	May MIN AR Demand (Btu/h)	Jun Average AR Demand (Btu/h)	Jun MAX AR Demand (Btu/h)	Jun MIN AR Demand (Btu/h)	Jul Average AR Demand (Btu/h)	Jul MAX AR Demand (Btu/h)	Jul MIN AR Demand (Btu/h)
1	758,210	1,190,000	383,997	675,968	1,170,000	301,188	531,499	1,090,000	239,191	482,426	1,090,000	232,863
2	751,892	1,090,000	534,969	661,809	1,020,000	242,334	396,021	982,798	156,008	402,839	1,050,000	152,675
3	781,872	1,070,000	555,761	651,340	1,000,000	479,771	523,785	1,060,000	156,025	472,108	1,010,000	152,825
4	912,976	1,220,000	689,487	760,255	982,329	582,337	621,682	1,070,000	234,537	485,060	1,040,000	238,437
5	1,181,832	1,550,000	796,940	1,019,925	1,240,000	760,760	840,593	1,340,000	397,102	856,325	1,340,000	527,160
6	1,643,108	2,220,000	845,868	1,413,362	1,830,000	746,608	1,285,212	1,670,000	399,523	1,214,661	1,970,000	390,770
7	1,653,052	2,050,000	881,388	1,474,348	1,850,000	863,476	1,367,009	1,730,000	563,081	1,304,747	1,660,000	550,520
8	1,352,000	1,840,000	1,050,000	1,211,223	1,470,000	979,264	1,082,718	1,330,000	757,537	1,006,012	1,240,000	738,922
9	1,092,491	1,400,000	857,308	959,087	1,140,000	795,396	863,937	1,070,000	773,462	791,039	843,631	754,927
10	886,344	1,170,000	652,731	752,717	1,090,000	634,946	680,337	1,070,000	617,260	652,471	849,278	602,217
11	772,129	1,160,000	571,814	637,705	828,877	556,056	599,927	929,003	540,402	574,032	716,372	527,105
12	762,874	1,010,000	652,645	694,045	892,122	634,873	657,664	916,663	617,204	634,422	707,140	602,150
13	800,205	1,300,000	670,145	731,010	899,341	651,049	681,112	869,372	632,077	673,250	846,253	615,885
14	882,345	1,320,000	786,931	843,579	1,100,000	763,087	791,015	1,060,000	739,386	779,457	1,030,000	719,099
15	929,792	1,520,000	786,919	839,088	988,641	763,069	785,433	945,148	739,362	772,869	918,265	719,074
16	1,001,276	1,250,000	756,306	928,737	1,180,000	733,466	899,473	930,788	710,721	867,790	904,120	691,290
17	1,057,790	1,730,000	622,551	896,443	1,200,000	604,247	900,383	1,670,000	585,980	839,991	904,076	570,441
18	1,030,879	1,740,000	625,669	876,379	1,570,000	608,058	803,950	1,000,000	590,436	774,498	921,655	575,453
19	1,092,419	1,330,000	747,046	1,079,549	1,740,000	726,745	998,658	1,700,000	706,530	911,437	1,000,000	689,245
20	1,034,970	1,570,000	740,088	888,814	1,540,000	720,015	835,205	1,690,000	700,049	773,422	925,828	682,939
21	1,031,230	1,600,000	740,105	953,996	1,690,000	720,057	808,424	1,060,000	700,089	761,110	849,361	682,956
22	1,005,610	1,550,000	722,489	953,312	1,540,000	703,916	736,885	1,020,000	685,310	690,255	776,754	669,471
23	892,828	1,440,000	612,108	858,251	1,480,000	540,126	598,481	886,349	525,289	559,092	1,360,000	513,109
24	881,217	1,250,000	443,339	666,779	1,220,000	367,666	519,686	1,200,000	316,162	362,909	622,776	309,005
day)	24,189,341	34,570,000	16,726,604	21,427,721	30,661,310	15,478,508	18,809,089	28,290,121	13,082,823	17,642,224	24,575,509	12,908,535
u/h)		2,220,000			1,850,000			1,730,000			1,970,000	
u/h)			383,997			242,334			156,008			152,675

Hour	Aug Average AR Demand (Btu/h)	Aug MAX AR Demand (Btu/h)	Aug MIN AR Demand (Btu/h)	Sep Average AR Demand (Btu/h)	Sep MAX AR Demand (Btu/h)	Sep MIN AR Demand (Btu/h)	Oct Average AR Demand (Btu/h)	Oct MAX AR Demand (Btu/h)	Oct MIN AR Demand (Btu/h)	Nov Average AR Demand (Btu/h)	Nov MAX AR Demand (Btu/h)	Nov MIN AR Demand (Btu/h)	Dec Average AR Demand (Btu/h)	Dec MAX AR Demand (Btu/h)	Dec MIN AR Demand (Btu/h)
1	394,211	1,060,000	229,475	275,632	536,299	229,489	558,788	1,140,000	231,680	857,851	1,450,000	549,527	1,168,478	1,580,000	804,803
2	338,486	1,040,000	150,568	313,678	1,010,000	150,084	455,738	1,010,000	151,889	819,745	1,390,000	485,538	1,155,406	1,640,000	734,080
3	394,448	982,166	150,585	355,152	1,010,000	150,077	595,757	1,060,000	152,454	814,035	1,310,000	465,201	1,144,939	1,600,000	700,674
4	563,273	1,080,000	231,009	554,968	1,060,000	230,091	649,895	1,040,000	233,453	867,346	1,430,000	477,973	1,206,417	1,700,000	740,918
5	802,248	1,320,000	385,104	738,696	1,390,000	397,533	930,323	1,350,000	389,224	977,414	1,480,000	573,893	1,310,166	1,750,000	829,813
6	1,243,610	1,560,000	385,116	1,258,872	1,990,000	391,115	1,300,520	1,840,000	389,228	1,242,152	1,820,000	830,974	1,585,806	2,080,000	1,050,000
7	1,316,555	1,620,000	542,530	1,271,005	1,630,000	541,684	1,388,196	1,800,000	548,374	1,617,872	2,360,000	795,330	1,992,258	2,650,000	1,040,000
8	1,025,050	1,230,000	726,962	1,001,030	1,290,000	725,968	1,137,971	1,380,000	735,331	1,570,022	2,080,000	878,515	1,925,161	2,400,000	1,140,000
9	782,276	968,885	743,116	813,982	1,020,000	742,039	939,122	1,050,000	751,705	1,274,944	1,580,000	968,308	1,555,161	1,910,000	1,260,000
10	634,112	834,660	592,694	647,502	833,539	591,482	754,036	1,040,000	599,558	1,052,997	1,260,000	770,496	1,242,903	1,570,000	1,090,000
11	558,806	704,473	518,705	559,274	703,584	517,565	635,216	778,935	524,750	888,970	1,090,000	679,819	1,050,304	1,470,000	885,054
12	620,924	695,417	592,652	620,915	694,556	591,400	671,693	840,744	599,482	764,543	1,010,000	538,505	945,005	1,320,000	795,382
13	654,611	831,675	605,686	655,192	830,559	604,346	686,052	842,596	613,017	820,579	1,210,000	614,948	988,374	1,290,000	862,874
14	755,468	1,010,000	706,319	756,038	1,010,000	704,731	790,351	1,030,000	715,516	834,537	1,030,000	629,573	1,019,986	1,390,000	882,295
15	752,639	901,338	706,310	752,908	900,000	704,680	809,987	1,470,000	715,473	937,185	1,080,000	736,068	1,138,065	1,550,000	1,000,000
16	852,255	887,445	679,121	849,652	886,212	677,832	884,284	1,150,000	687,898	1,022,885	1,630,000	736,358	1,158,065	1,440,000	1,020,000
17	826,648	887,387	560,776	823,245	886,169	559,702	852,210	1,150,000	567,736	1,179,341	1,750,000	707,532	1,358,065	1,620,000	1,130,000
18	757,092	905,509	566,166	755,363	904,342	565,137	807,609	1,520,000	568,117	1,205,303	1,710,000	604,697	1,397,419	1,730,000	1,030,000
19	894,990	986,389	678,538	892,571	985,196	677,402	941,740	1,440,000	573,293	1,042,641	1,270,000	603,193	1,259,032	1,530,000	1,020,000
20	755,933	910,507	672,387	755,172	909,436	671,296	812,004	1,430,000	680,085	1,210,246	1,750,000	720,328	1,389,355	1,670,000	1,130,000
21	746,485	835,622	672,431	745,198	834,617	671,295	802,934	1,220,000	680,065	1,046,746	1,240,000	704,634	1,237,419	1,520,000	1,070,000
22	674,951	764,494	659,547	673,560	763,601	658,228	779,515	1,470,000	666,741	1,101,745	1,460,000	833,915	1,300,000	1,630,000	1,120,000
23	552,808	1,340,000	505,484	543,266	1,290,000	504,349	686,568	1,330,000	511,061	1,065,822	1,550,000	803,415	1,290,645	1,640,000	1,050,000
24	424,482	1,160,000	304,567	364,708	1,160,000	303,932	591,404	1,220,000	307,741	981,570	1,410,000	773,861	1,259,164	1,620,000

Appendix G

Waste to Energy Feasibility Analysis

G1 Waste to Energy Feasibility Analysis

- Letter report from Kennedy/Jenks detailing results of a high level analysis of the viability of a waste to energy system located at the WWTP.

Kennedy/Jenks Consultants
Engineers & Scientists
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Palo Alto, California 94303
650-852-2800
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27 August 2009

Martin Howell
Senior Consultant
Arup North America, Ltd.
12777 West Jefferson Boulevard, Suite 200
Los Angeles, CA 90066

Subject: Letter Report
Treasure Island Preliminary Waste to Energy Feasibility Analysis
K/J B10680015/B09115

Dear Martin:

The purpose of this letter report is to present the results of the preliminary waste to energy feasibility analysis you asked Kennedy/Jenks Consultants to perform for the Treasure Island Redevelopment project. This work was performed in accordance with the Agreement Letter dated 19 August 2009.

Preliminary Analysis:

The purpose of this analysis was to develop preliminary information that could be used to estimate a simple payback on a system that could recover energy from fats, oils, and grease (FOG) and food scrap waste that would be generated from the planned redevelopment on Treasure Island. The energy recovery system would include a waste receiving station and cogeneration equipment and would be part of a new wastewater treatment plant that will be constructed as part of the redevelopment project.

Results:

The findings of the preliminary analysis are summarized in the following table. FOG was not included in the energy recovery estimates because the small population associated with the development (18,240 people) would not generate enough FOG to provide a continuous source of FOG to the system. It is recommended that FOG be received at the facility but to be conservative, the potential energy and benefits from receiving this waste was not included.

The simple payback for the construction cost of the food waste and cogeneration equipment is very sensitive to the assumptions made for food waste. This is primarily due to the increased

savings associated with avoided landfill disposal costs and avoided electricity costs that result from increasing the amount of food waste received.

Four project options were investigated. Options A and B were based on using Capstone 65kW Microturbines. Options C and D were based on using Stirling Biopower FleXgen G43 Stirling Engines. It was not appropriate to consider fuel cells for this project due to the small project size (amount of digester gas that could be produced)

Options A and C were based on a conservative assumption for food waste. It was assumed that no residential food waste would be received. Options B and D were based on more optimistic expectations for food waste receiving. It was assumed that both commercial and residential food scrap waste would be received.

Table 1: Simple Payback Summary

Project Option	Capital Cost	Electrical Savings	Natural Gas Savings	Avoided Food Disposal Costs	O&M Costs	Simple Payback
A	$2,100,000	$47,000	$22,000	$27,000	($65,000)	68 yr
B	$2,400,000	$109,000	$44,000	$117,000	($71,000)	12 yr
C	$2,100,000	$36,000	$24,000	$27,000	($64,000)	91 yr
D	$2,400,000	$77,000	$47,000	$117,000	($68,000)	14 yr

Notes:

1) Capital Cost is a planning level opinion of probable construction cost for a food waste receiving and cogeneration system (maximum gross power output of 130 kW). The cost value does not include soft costs such as engineering and permitting. The opinion of construction cost has an accuracy of +50% to (-) 30%.
2) Electrical savings estimate is the avoided cost of purchasing utility supplied electricity. It is assumed that the cogeneration system has a 90% availability and the price of electricity is $0.12/kWh.
3) Natural gas savings estimate is the avoided cost of purchasing natural gas for anaerobic digester heating. It is assumed that all of the heat that is recovered from the cogeneration system will be used to heat the digester and the cost of natural gas is $1.00/therm.
4) Avoided Food Disposal Costs is the avoided cost of disposal of food waste that results because the mass of food is reduced through the digestion process. It is assumed that the cost to dispose of food scrap waste in a landfill is $50/wet ton and that food waste disposal occurs 365 days per year.
5) O&M Costs include labor, power, and equipment maintenance costs for the food waste receiving and cogeneration system.
6) Simple payback is Capital Cost divided by the sun of Electrical Savings, Natural Gas Savings, Avoided Food Disposal Costs, and O&M Costs.

It is recommended that this evaluation be revisited when there is a better understanding of food waste quantity and quality as this could favorably change project economics. In addition, the following assumptions should be clarified:

- Type of wastewater treatment process that will be used. If the treatment plant does not have primary clarifiers as part of the wastewater treatment plant process, anaerobic digesters may not be appropriate.
- Is there is a possibility to receive waste streams from adjacent communities? This is probably not ideal given the location of the treatment plant on Treasure Island.
- Are the assumed utility rates and landfill disposal rates applicable?
- It is assumed that the food scrap waste will not require additional sorting to remove plastic, metals, and other debris prior to entering the food receiving station.

Supporting Information:

Supporting documentation for the project options and results are included in the following tables. The following information was received from Arup:

Population in Service Area:	18,240 people
Wastewater Treatment Plant Flow Rate:	1.31 MGD
Restaurants in Service Area:	4

Table 2: Food Scrap Waste Quantity Estimation

Commercial			Residential			Total
Food Scrap Generation	Capture	Food Scraps	Food Scrap Generation	Capture	Food Scraps	
0.25 lb/cap/d	75%	1.7 tons/d	0.6 lb/cap/d	50%	2.7 tons/d	4.4 tons/d
0.25 lb/cap/d	75%	1.7 tons/d	0.79 lb/cap/d	75%	5.4 tons/d	7.1 tons/d

Notes:

1) Estimates based on a population of 18,240 people.
2) Commercial food scrap generation rate of 0.25 lb/cap/day based on City of San Rafael – CSMA Methane Capture Feasibility Study Task 2 – Food Waste Processing Reference Search, K/J 0868015 (EBMUD data).
3) Residential food scrap generation rate of 0.6 lb/cap/day based on Newell, T. et al, (1993), "Commercial Food Waste From Restaurants And Grocery Stores", Resource Recycling, February 1993.
4) Residential food scrap generation rate of 0.79 lb/cap/day based on City of San Rafael – CSMA Methane Capture Feasibility Study Task 2 – Food Waste Processing Reference Search, K/J 0868015 (MSA data)
5) Capture rate percentages are conservative estimates and represent the fraction of food scrap waste that would reach the digestion process.

Table 3: Anaerobic Digester Loading Scenarios

Project Option	Volatile Solids from Wastewater	Fats, Oils, Grease	Food Scrap Waste
A	3,500 lb/d	0 gal/d	1.7 tons
B	3,500 lb/d	0 gal/d	7.1 tons
C	3,500 lb/d	0 gal/d	1.7 tons
D	3,500 lb/d	0 gal/d	7.1 tons

Notes:

1) Fats, Oils, and Grease (FOG) quantity is assumed to be 0 gal/d because FOG generation rates for a service area of 18,240 people will not sustain a steady source of FOG to the wastewater treatment plant.
2) Food scrap waste quantities for Options A & C are based on a population of 18,240 people and that 75% of commercial waste and 50% of residential waste is recovered for energy production. It is assumed that commercial food scrap waste is generated at 0.25 lb/person/day and residential food scrap waste is generated at 0.6 lb/person/day.
3) Food scrap waste quantities for Options B & D are based on a population of 18,240 people and that 75% of commercial waste and 75% of residential waste is recovered for energy production. It is assumed that commercial food scrap waste is generated at 0.25 lb/person/day and residential food scrap waste is generated at 0.79 lb/person/day.

Energy and Food Disposal Quantities

Project Option	Gross Power Production	Parasitic Load	Net Power Production	Heat Recovered	Avoided Food Disposal
A	65 kW	-15 kW	50 kW	2.51 therm	1.5 tons
B	130 kW	-15 kW	115 kW	5.02 therm	6.4 tons
C	43 KW	-5 kW	38 kW	2.79 therm	1.5 tons
D	86 kW	-5 kW	81 kW	5.40 therm	6.4 tons

Notes:

1) Gross power production is the power that can be produced from available digester gas and is dependent on the type of cogeneration technology used (unit size and efficiency). Available digester gas is the sum of digester gas produced from the digestion of wastewater solids and food scrap waste.
2) Power production and heat recovery estimates for Options A & B are based on using Capstone 65kW Microturbines.
3) Power production and heat recovery estimates for Options C & D are based on using Stirling Biopower FleXgen G43 Stirling Engines.
4) Avoided food disposal quantities for Options A & C are based on a population of 18,240 people and that 75% of commercial waste and 50% of residential waste is recovered for energy production. It is assumed that commercial food scrap waste is generated at 0.25 lb/person/day and residential food scrap waste is generated at 0.6 lb/person/day.

   The estimated residual solids from food scrap waste that would be left over after digestion is subtracted from the total quantity of food waste recovered for energy production and this difference is used to determine the amount of waste that would NOT have to be disposed of in a landfill.
5) Avoided food disposal quantities for Options B & D are based on a population of 18,240 people and that 75% of commercial waste and 75% of residential waste is recovered for energy production. It is assumed that commercial food scrap waste is generated at 0.25 lb/person/day and residential food scrap waste is generated at 0.79 lb/person/day.

We appreciate the opportunity to work with you on this interesting and exciting potential waste to energy project. Please let me know if you have questions or require additional assistance.

Very truly yours,

KENNEDY/JENKS CONSULTANTS

Greg K. Chung, P.E.
Environmental Engineer

Enclosure

Appendix H

Plant Space Analysis

H1 Plant Space Analysis

- Space calculations results for comparison of plant space required for BaU and district energy heating and cooling scenarios.

District Energy Scenario

Small Building or Residence Connection		Min	Max
Building Area Served	2500 - 25000 sf	2500	25000
Cooling Demand:	2.5 - 25 tons	2.5	25
	0.03 - 0.3 MBtuh	0.03	0.3
Cooling Delta T	10		
Cooling Flow	6 - 60 gpm	6	60
Pump Hp	fractional	0.004298	0.135916
Pump Area	10 sf	5	10
Heat Exchanger Area	15 sf	10	15
Balance of Plant	25 sf	15	20
Plant Size	50 sf	30	45
Heating Demand	0.0375 - 0.375 Mbtuh	0.0375	0.375
Heating Delta T	40		
Heating Flow	1.875 - 18.75 gpm	1.875	18.75
Pump Hp	fractional	0.001343	0.042474
Pump Area	10 sf	5	10
Heat Exchanger Area	10 sf	10	10
Balance of Plant	20 sf	10	15
Plant Size	40sf	25	35
Plant-Bldg Area Ratio		**1.0%**	**0.1%**
Total Plant Area		**55**	**80**
Total Plant-Bldg Area Ratio		**2.2%**	**0.3%**
Area Savings for DE		**-5**	**20**
		-0.2%	**0.1%**

Medium Building Connection:			
Building Area Served	25000 - 150000 sf	25000	150000
Cooling Demand:	25 - 150 tons	25	150
	0.3 - 1.8 Mbtuh	0.3	1.8
Cooling Delta T	10		
Cooling Flow	60 - 360 gpm	60	360
Pump Hp	0.25-5	0.135916	1.997542
Pump Area	20 sf		
Heat Exchanger Area	40 sf		
Balance of Plant	60 sf		
Plant Size	120 sf		
Heating Demand	0.375 - 2.25 Mbtuh	0.375	2.25
Heating Delta T	40		
Heating Flow	18.75 - 112.5 gpm	18.75	112.5
Pump Hp	0.25-2	0.106184	1.56058
Pump Area	20 sf	20	20
Heat Exchanger Area	30 sf	30	30
Balance of Plant	50 sf	50	50
Plant Size	100 sf	100	100
Plant-Bldg Area Ratio		**0.4%**	**0.1%**
Total Plant Area		**100**	**100**
Total Plant-Bldg Area Ratio		**0.4%**	**0.1%**
Area Savings for DE		**261**	**1348**
		1.0%	0.9%

Large Building Connection			
Building Area Served	150000 - 750000 sf	150000	750000
Cooling Demand:	150 - 750 tons	150	750
	1.8 - 9 Mbtuh	1.8	9
Cooling Delta T	10		
Cooling Flow	360 - 1800 gpm	360	1800
Pump Hp	5-50 hp	1.997542	22.3332
Pump Area	100 sf		
Heat Exchanger Area	100 sf		
Balance of Plant	200 sf		
Plant Size	400 sf		
Heating Demand	2.25 - 11.25 Mbtuh	2.25	11.25
Heating Delta T	40		
Heating Flow	112.5 - 562.5 gpm	112.5	562.5
Pump Hp	2-25 hp	1.56058	17.44781
Pump Area	75 sf	20	20
Heat Exchanger Area	75 sf	30	30
Balance of Plant	150 sf	50	50
Plant Size	300 sf	100	100
		0.1%	**0.0%**
		100	**100**
		0.1%	**0.0%**
Savings		**2317**	**8111**
		1.5%	1.1%

BAU Scenario

Small Building or Residence Connection	Min	Max
Area Required (sf)		
Small AC Unit		
50 sf - 100 sf	50	100
Packaged AC Unit		
serving Multiple Units		
300-600 sf	300	600
assume serves 6 units	50	100
Plant Size	50	100
Plant-Bldg Area Ratio	**2.0%**	**0.4%**
Total Plant Area	**50.02**	**100.004**
Total Plant-Bldg Area Ratio	**2.0%**	**0.4%**

Medium Building BAU Cooling and Heating Plants		
Pump Area	15	30
Air-Cooled Chiller	125	750
Balance of Plant	50	100
Total	190	880
Percent	0.8%	0.6%
Pump Area	15	30
Boiler	56.25	337.5
Balance of Plant	100	200
Total	171.25	567.5
Percent	**0.7%**	**0.4%**
	361.25	**1447.5**
	1.4%	**1.0%**

Large Building BAU Cooling and Heating Plants		
Pump Area	75	200
Chiller	600	3000
Cooling Tower	600	1875
Balance of Plant	446.25	1268.75
Total	1721.25	6343.75
Percent	1.1%	0.8%
Pump Area	60	120
Boiler	337.5	1125
Balance of Plant	298.125	622.5
Total	695.625	1867.5
Percent	**0.5%**	**0.2%**
	2416.875	**8211.25**
	1.6%	**1.1%**

Appendix I

End Use Demand Calculations

I1 End Use Demand Calculations

- Summary of Energy End Use breakdown calculations by building type.

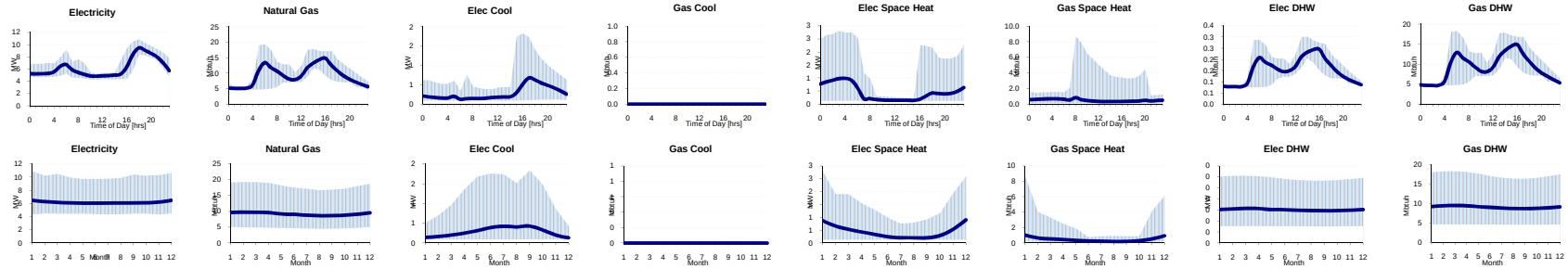
Treasure Island - District Energy Study

Energy End Use Summary - All Phases

Business As Usual - BAU

Energy Source Demand

	Electricity			Natural Gas			Elec Cool			Gas Cool			Elec Space Heat			Gas Space Heat			Elec DHW			Gas DHW		
	Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual		
	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min
Hour	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh
0	3.8	6.8	2.8	2.6	4.9	1.7	0.1	0.4	0.0	0.0	0.0	0.0	1.0	3.5	0.0	0.6	2.1	0.0	0.0	0.0	0.0	2.0	2.9	1.7
1	3.8	6.8	2.8	2.4	3.6	1.6	0.1	0.4	0.0	0.0	0.0	0.0	1.1	3.6	0.0	0.6	1.8	0.0	0.0	0.0	0.0	1.8	2.1	1.6
2	3.8	6.8	2.8	2.4	3.6	1.6	0.1	0.3	0.0	0.0	0.0	0.0	1.2	3.7	0.0	0.7	1.8	0.0	0.0	0.0	0.0	1.8	1.9	1.6
3	3.9	7.0	2.8	2.5	3.7	1.7	0.1	0.3	0.0	0.0	0.0	0.0	1.3	3.9	0.0	0.7	1.9	0.0	0.0	0.0	0.0	1.8	1.9	1.7
4	4.4	6.9	2.9	4.2	7.7	1.8	0.1	0.3	0.0	0.0	0.0	0.0	1.3	3.8	0.0	0.8	1.9	0.0	0.0	0.1	0.0	3.5	6.5	1.8
5	5.7	8.3	3.2	12.0	25.3	1.9	0.1	0.4	0.0	0.0	0.0	0.0	1.2	3.8	0.0	0.7	2.0	0.0	0.1	0.3	0.0	11.3	24.1	1.9
6	6.1	10.6	3.9	16.1	25.7	2.1	0.1	0.2	0.0	0.0	0.0	0.0	0.8	3.6	0.0	0.7	1.9	0.0	0.2	0.3	0.0	15.5	24.3	1.9
7	4.6	6.6	2.4	13.5	22.6	2.4	0.1	0.5	0.0	0.0	0.0	0.0	0.1	1.5	0.0	0.5	2.7	0.0	0.2	0.3	0.0	13.2	21.8	2.1
8	3.9	7.7	2.4	11.6	16.4	3.3	0.1	0.4	0.0	0.0	0.0	0.0	0.1	1.2	0.0	0.9	11.6	0.0	0.1	0.2	0.0	11.6	16.0	3.3
9	3.3	6.4	2.3	9.3	15.2	5.7	0.1	0.5	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.6	10.5	0.0	0.1	0.2	0.1	9.5	15.3	5.7
10	2.9	3.8	1.9	7.3	15.2	5.6	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.4	8.6	0.0	0.1	0.2	0.1	7.7	15.4	5.6
11	2.8	3.5	1.9	7.1	10.8	5.7	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.3	7.7	0.0	0.1	0.2	0.1	7.5	11.2	5.7
12	2.9	3.7	1.9	8.9	14.6	6.0	0.1	0.5	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.3	6.6	0.0	0.1	0.2	0.1	9.4	15.2	6.0
13	3.0	3.7	1.9	13.3	22.9	8.6	0.2	0.5	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	5.8	0.0	0.2	0.3	0.1	13.8	23.6	8.6
14	3.1	3.9	2.0	15.9	23.5	13.2	0.2	0.5	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	4.8	0.0	0.2	0.3	0.2	16.3	23.8	13.2
15	3.3	6.3	2.0	17.6	22.3	12.5	0.2	1.3	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	4.5	0.0	0.2	0.3	0.2	18.0	22.5	12.8
16	5.1	10.1	2.2	18.4	22.0	9.1	0.3	1.2	0.0	0.0	0.0	0.0	0.1	2.9	0.0	0.3	4.3	0.0	0.2	0.3	0.1	18.7	22.1	9.3
17	8.5	11.6	4.4	14.5	22.0	7.0	0.4	1.2	0.0	0.0	0.0	0.0	0.3	2.8	0.0	0.3	4.3	0.0	0.2	0.3	0.1	14.7	22.0	7.2
18	10.7	13.6	8.8	11.6	17.8	5.9	0.4	1.0	0.0	0.0	0.0	0.0	0.5	3.0	0.0	0.3	4.4	0.0	0.1	0.2	0.1	11.7	17.5	6.1
19	10.1	12.6	8.9	9.0	15.4	5.7	0.3	0.8	0.1	0.0	0.0	0.0	0.4	2.5	0.0	0.3	4.7	0.0	0.1	0.2	0.1	9.0	15.0	5.8
20	9.3	11.7	8.4	7.1	12.9	5.7	0.3	0.6	0.1	0.0	0.0	0.0	0.4	2.4	0.0	0.5	5.9	0.0	0.1	0.1	0.1	6.9	12.3	5.8
21	8.3	10.9	7.3	5.7	10.5	3.3	0.2	0.5	0.1	0.0	0.0	0.0	0.5	2.4	0.0	0.4	1.3	0.0	0.1	0.1	0.0	5.5	9.8	3.3
22	6.7	10.0	5.3	4.4	8.2	3.2	0.2	0.4	0.0	0.0	0.0	0.0	0.6	2.6	0.0	0.4	1.4	0.0	0.0	0.1	0.0	4.1	7.4	3.2
23	4.6	8.3	2.9	3.3	6.0	1.7	0.1	0.4	0.0	0.0	0.0	0.0	0.8	3.1	0.0	0.5	1.5	0.0	0.0	0.1	0.0	2.9	4.8	1.8
Sum	**45,552**			**80,645**			**1,473**			**0**			**4,366**			**4,207**			**1,010**			**79,683**		
Average	5.2	7.8	3.7	9.2	14.7	4.9	0.2	0.6	0.0	0.0	0.0	0.0	0.5	2.2	0.0	0.5	4.3	0.0	0.1	0.2	0.1	9.1	14.1	4.9
Max	10.7	13.6	8.9	18.4	25.7	13.2	0.4	1.3	0.1	0.0	0.0	0.0	1.3	3.9	0.0	0.9	11.6	0.0	0.2	0.3	0.2	18.7	24.3	13.2
Min	2.8	3.5	1.9	2.4	3.6	1.6	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	1.3	0.0	0.0	0.0	0.0	1.8	1.9	1.6
Jan	5.8	13.6	1.9	9.9	25.6	2.4	0.1	0.3	0.0	0.0	0.0	0.0	1.1	3.9	0.0	1.3	11.6	0.2	0.1	0.3	0.0	9.4	23.9	1.8
Feb	5.5	12.4	2.3	10.0	25.7	2.4	0.1	0.4	0.0	0.0	0.0	0.0	0.8	2.6	0.0	0.7	5.3	0.0	0.1	0.3	0.0	9.7	24.3	1.8
Mar	5.3	12.9	2.2	10.1	25.7	2.1	0.1	0.6	0.0	0.0	0.0	0.0	0.6	2.6	0.0	0.6	4.3	0.0	0.1	0.3	0.0	9.8	24.3	1.8
Apr	5.1	11.8	2.2	9.9	25.3	2.1	0.1	0.8	0.0	0.0	0.0	0.0	0.5	2.1	0.0	0.4	3.2	0.0	0.1	0.3	0.0	9.8	24.1	1.8
May	5.0	10.9	2.2	9.2	24.0	2.0	0.2	1.2	0.0	0.0	0.0	0.0	0.3	1.7	0.0	0.3	2.4	0.0	0.1	0.3	0.0	9.2	23.3	1.8
Jun	4.9	10.7	2.2	9.0	22.9	1.8	0.2	1.0	0.0	0.0	0.0	0.0	0.2	1.3	0.0	0.2	0.9	0.0	0.1	0.3	0.0	9.1	22.4	1.7
Jul	4.9	10.8	1.9	8.5	22.3	1.7	0.3	1.3	0.0	0.0	0.0	0.0	0.1	1.0	0.0	0.1	1.0	0.0	0.1	0.3	0.0	8.7	21.7	1.7
Aug	4.9	10.7	2.2	8.4	21.5	1.6	0.3	1.1	0.0	0.0	0.0	0.0	0.1	1.1	0.0	0.1	1.1	0.0	0.1	0.3	0.0	8.5	21.2	1.6
Sep	4.9	11.6	2.2	8.3	21.8	1.6	0.3	1.2	0.0	0.0	0.0	0.0	0.1	1.2	0.0	0.1	1.1	0.0	0.1	0.3	0.0	8.5	21.2	1.6
Oct	5.0	11.4	2.2	8.5	22.2	1.6	0.2	1.1	0.0	0.0	0.0	0.0	0.3	1.6	0.0	0.2	1.0	0.0	0.1	0.3	0.0	8.6	21.5	1.7
Nov	5.3	12.3	1.9	9.1	23.7	2.1	0.1	0.5	0.0	0.0	0.0	0.0	0.6	2.7	0.0	0.6	5.4	0.0	0.1	0.3	0.0	8.8	22.3	1.7
Dec	5.9	13.1	2.3	9.7	24.9	2.5	0.1	0.3	0.0	0.0	0.0	0.0	1.1	3.6	0.0	1.1	8.1	0.2	0.1	0.3	0.0	9.2	23.1	1.8



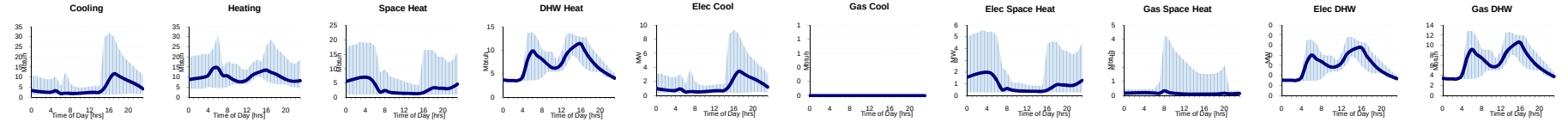
Treasure Island - District Energy Study

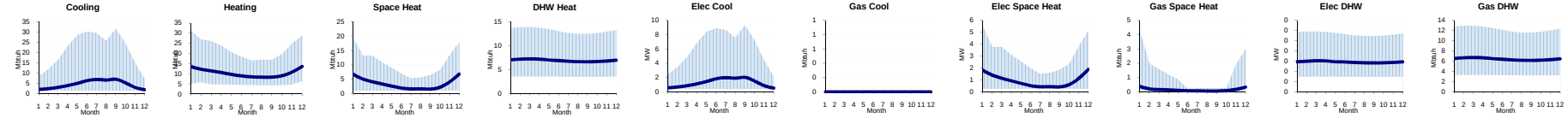
Energy End Use Summary - All Phases

Business As Usual - BAU

Energy End Use Demand

Cooling			Heating			Space Heat			DHW Heat			Elec Cool			Gas Cool			Elec Space Heat			Gas Space Heat			Elec DHW			Gas DHW		
Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual		
Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min
Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh
1.5	6.0	0.2	8.9	26.7	1.3	7.4	25.2	0.0	1.5	2.2	1.3	0.4	1.8	0.1	0.0	0.0	0.0	2.1	7.2	0.0	0.2	0.6	0.0	0.0	0.0	0.0	1.4	2.1	1.2
1.2	5.9	0.2	9.6	27.8	1.2	8.2	26.4	0.0	1.4	1.5	1.2	0.4	1.7	0.0	0.0	0.0	0.0	2.4	7.6	0.0	0.2	0.5	0.0	0.0	0.0	0.0	1.3	1.5	1.2
1.0	5.4	0.1	10.2	28.3	1.2	8.9	26.9	0.0	1.3	1.4	1.2	0.3	1.6	0.0	0.0	0.0	0.0	2.5	7.7	0.0	0.2	0.6	0.0	0.0	0.0	0.0	1.3	1.3	1.2
0.9	4.9	0.1	10.8	29.7	1.3	9.5	28.3	0.0	1.4	1.5	1.3	0.3	1.4	0.0	0.0	0.0	0.0	2.7	8.1	0.0	0.2	0.6	0.0	0.0	0.0	0.0	1.3	1.4	1.2
0.9	5.0	0.1	12.2	28.9	2.7	9.6	27.5	0.0	2.6	4.8	1.3	0.3	1.5	0.0	0.0	0.0	0.0	2.7	7.9	0.0	0.2	0.6	0.0	0.0	0.1	0.0	2.5	4.6	1.2
1.4	5.8	0.1	17.3	32.5	2.3	8.9	27.8	0.0	8.4	18.0	1.4	0.4	1.7	0.0	0.0	0.0	0.0	2.5	8.0	0.0	0.2	0.6	0.0	0.1	0.3	0.0	8.0	17.0	1.3
0.6	3.0	0.2	17.1	44.0	1.6	5.6	26.2	0.0	11.5	18.1	1.4	0.2	0.9	0.1	0.0	0.0	0.0	1.6	7.5	0.0	0.2	0.6	0.0	0.2	0.3	0.0	10.9	17.2	1.3
0.8	8.6	0.2	11.1	16.5	1.7	1.2	11.2	0.0	9.9	16.2	1.6	0.2	2.5	0.0	0.0	0.0	0.0	0.3	3.1	0.0	0.2	1.3	0.0	0.2	0.2	0.0	9.3	15.4	1.5
1.0	6.7	0.1	10.7	20.4	2.7	2.0	12.9	0.0	8.7	11.9	2.4	0.3	2.0	0.0	0.0	0.0	0.0	0.5	2.6	0.0	0.4	5.8	0.0	0.1	0.2	0.0	8.2	11.3	2.3
1.1	8.5	0.1	8.3	19.9	4.3	1.1	8.9	0.0	7.1	11.4	4.3	0.3	2.5	0.0	0.0	0.0	0.0	0.3	1.2	0.0	0.2	5.2	0.0	0.1	0.2	0.1	6.7	10.8	4.0
1.3	7.5	0.1	6.6	19.6	4.4	0.8	8.3	0.0	5.8	11.5	4.4	0.4	2.2	0.0	0.0	0.0	0.0	0.2	1.2	0.0	0.2	4.3	0.0	0.1	0.2	0.1	5.4	10.9	4.0
1.6	7.3	0.1	6.4	15.7	4.4	0.7	7.4	0.0	5.7	8.4	4.4	0.5	2.1	0.0	0.0	0.0	0.0	0.2	1.1	0.0	0.1	3.8	0.0	0.1	0.2	0.1	5.3	7.9	4.0
2.1	9.2	0.1	7.6	14.4	4.7	0.6	6.4	0.0	7.1	11.5	4.6	0.6	2.7	0.0	0.0	0.0	0.0	0.1	0.9	0.0	0.1	3.3	0.0	0.1	0.2	0.1	6.6	10.8	4.2
2.2	9.6	0.1	10.9	18.6	7.0	0.5	5.7	0.0	10.4	17.7	6.5	0.6	2.8	0.0	0.0	0.0	0.0	0.1	0.8	0.0	0.1	2.8	0.0	0.2	0.3	0.1	9.7	16.7	6.1
2.2	10.1	0.1	12.7	22.6	10.0	0.5	5.1	0.0	12.3	17.8	10.0	0.6	3.0	0.0	0.0	0.0	0.0	0.1	0.8	0.0	0.1	2.4	0.0	0.2	0.3	0.2	11.5	16.8	9.4
3.4	20.2	0.1	14.0	21.1	9.5	0.4	4.5	0.0	13.5	16.9	9.5	1.0	5.9	0.0	0.0	0.0	0.0	0.1	0.8	0.0	0.1	2.0	0.0	0.2	0.3	0.1	12.8	15.9	9.0
5.4	21.1	0.1	14.9	33.9	6.9	0.9	22.8	0.0	14.0	16.5	6.9	1.6	6.2	0.0	0.0	0.0	0.0	0.2	6.1	0.0	0.1	2.0	0.0	0.2	0.3	0.1	13.2	15.6	6.6
6.9	19.1	0.2	13.3	38.4	5.3	2.3	22.3	0.0	11.0	16.4	5.3	2.0	5.6	0.1	0.0	0.0	0.0	0.6	6.2	0.0	0.1	2.0	0.0	0.2	0.3	0.1	10.4	15.5	5.1
6.2	15.0	0.4	12.7	33.4	4.5	4.0	23.8	0.0	8.7	13.1	4.5	1.8	4.4	0.1	0.0	0.0	0.0	1.1	6.6	0.0	0.1	2.1	0.0	0.1	0.2	0.1	8.3	12.4	4.3
5.3	12.2	0.5	10.4	30.0	4.4	3.7	20.4	0.0	6.7	11.2	4.4	1.5	3.6	0.2	0.0	0.0	0.0	1.0	5.6	0.0	0.1	2.2	0.0	0.1	0.2	0.1	6.4	10.6	4.1
4.6	9.9	0.6	8.7	25.7	4.3	3.6	19.9	0.0	5.2	9.2	4.3	1.3	2.9	0.2	0.0	0.0	0.0	1.0	5.3	0.0	0.2	2.8	0.0	0.1	0.1	0.1	4.9	8.7	4.1
3.9	8.7	0.6	7.5	22.3	2.5	3.5	17.5	0.0	4.1	7.3	2.5	1.1	2.6	0.2	0.0	0.0	0.0	1.0	5.0	0.0	0.1	0.4	0.0	0.1	0.1	0.0	3.9	6.9	2.4
2.9	7.4	0.5	7.5	21.5	2.4	4.4	18.8	0.0	3.1	5.5	2.4	0.9	2.2	0.2	0.0	0.0	0.0	1.2	5.4	0.0	0.1	0.4	0.0	0.0	0.1	0.0	2.9	5.2	2.3
2.0	6.1	0.4	8.1	25.5	1.3	6.0	22.8	0.0	2.2	3.6	1.3	0.6	1.8	0.1	0.0	0.0	0.0	1.7	6.6	0.0	0.2	0.5	0.0	0.0	0.1	0.0	2.0	3.4	1.2
22,025			**94,004**			**34,316**			**59,689**			**6,455**			**0**			**9,646**			**1,403**			**978**			**56,352**		
2.5	9.3	0.2	10.7	25.7	3.8	3.9	17.8	0.0	6.8	10.6	3.7	0.7	2.7	0.1	0.0	0.0	0.0	1.1	4.7	0.0	0.2	2.0	0.0	0.1	0.2	0.1	6.4	10.0	3.5
6.9	21.1	0.6	17.3	44.0	10.0	9.6	28.3	0.0	14.0	18.1	10.0	2.0	6.2	0.2	0.0	0.0	0.0	2.7	8.1	0.0	0.4	5.8	0.0	0.2	0.3	0.2	13.2	17.2	9.4
0.6	3.0	0.1	6.4	14.4	1.2	0.4	4.5	0.0	1.3	1.4	1.2	0.2	0.9	0.0	0.0	0.0	0.0	0.1	0.8	0.0	0.1	0.4	0.0	0.0	0.0	0.0	1.3	1.3	1.2
0.7	4.9	0.1	15.8	44.0	2.3	8.8	28.3	0.1	7.0	17.8	1.4	0.2	1.4	0.0	0.0	0.0	0.0	2.4	8.1	0.0	0.5	5.8	0.1	0.1	0.3	0.0	6.6	16.9	1.3
1.0	6.9	0.2	13.6	37.2	3.6	6.3	19.3	0.0	7.2	18.1	1.4	0.3	2.0	0.0	0.0	0.0	0.0	1.8	5.5	0.0	0.2	2.6	0.0	0.1	0.3	0.0	6.8	17.2	1.3
1.4	10.1	0.2	12.4	35.8	2.0	5.0	19.1	0.0	7.4	18.1	1.4	0.4	3.0	0.0	0.0	0.0	0.0	1.4	5.5	0.0	0.2	2.1	0.0	0.1	0.3	0.0	7.0	17.2	1.3
2.1	15.0	0.2	11.1	32.0	2.0	3.8	15.5	0.0	7.3	18.0	1.4	0.6	4.4	0.0	0.0	0.0	0.0	1.1	4.4	0.0	0.1	1.6	0.0	0.1	0.3	0.0	6.9	17.0	1.3
2.8	20.8	0.2	9.6	26.8	1.8	2.7	12.5	0.0	6.9	17.3	1.3	0.8	6.1	0.0	0.0	0.0	0.0	0.8	3.6	0.0	0.1	1.1	0.0	0.1	0.3	0.0	6.5	16.4	1.3
3.9	20.9	0.2	8.3	23.5	1.7	1.5	9.9	0.0	6.8	16.7	1.3	1.1	6.1	0.1	0.0	0.0	0.0	0.4	2.8	0.0	0.1	0.3	0.0	0.1	0.3	0.0	6.4	15.8	1.2
4.4	20.8	0.3	7.6	21.0	1.6	1.1	7.2	0.0	6.5	16.2	1.2	1.3	6.1	0.1	0.0	0.0	0.0	0.3	2.1	0.0	0.0	0.3	0.0	0.1	0.3	0.0	6.2	15.3	1.2
4.2	18.0	0.2	7.5	21.2	1.4	1.1	7.7	0.0	6.4	15.8	1.2	1.2	5.3	0.1	0.0	0.0	0.0	0.3	2.2	0.0	0.0	0.3	0.0	0.1	0.3	0.0	6.0	15.0	1.2
4.4	21.1	0.2	7.3	21.2	1.2	1.0	8.8	0.0	6.4	15.8	1.2	1.3	6.2	0.1	0.0	0.0	0.0	0.3	2.5	0.0	0.0	0.3	0.0	0.1	0.3	0.0	6.0	14.9	1.2
3.1	16.5	0.2	8.5	25.9	1.6	2.1	11.4	0.0	6.4	16.1	1.2	0.9	4.8	0.1	0.0	0.0	0.0	0.6	3.3	0.0	0.1	0.3	0.0	0.1	0.3	0.0	6.1	15.2	1.2
1.4	8.7	0.2	11.4	34.3	2.0	4.8	19.8	0.0	6.6	16.6	1.3	0.4	2.6	0.0	0.0	0.0	0.0	1.4	5.6	0.0	0.2	2.6	0.0	0.1	0.3	0.0	6.2	15.7	1.2
0.7	4.1	0.2	15.8	40.5	4.5	8.9	26.6	0.1	6.9	17.2	1.3	0.2	1.2	0.0	0.0	0.0	0.0	2.5	7.6	0.0	0.4	4.0	0.1	0.1	0.3	0.0	6.5	16.3	1.3





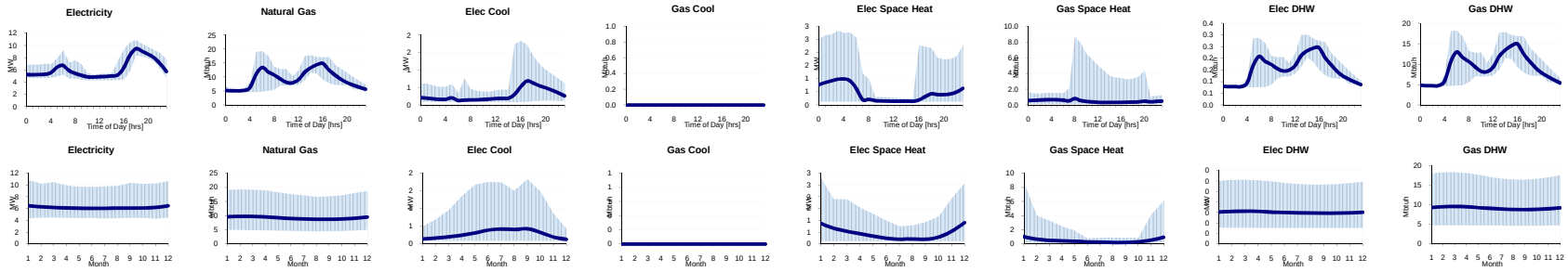
Treasure Island - District Energy Study

Energy End Use Summary - All Phases

TOTAL

Energy Source Demand

	Electricity			Natural Gas			Elec Cool			Gas Cool			Elec Space Heat			Gas Space Heat			Elec DHW			Gas DHW		
	Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual		
	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min
Hour	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh
0	5.3	6.9	4.7	5.1	6.6	4.6	0.2	0.6	0.1	0.0	0.0	0.0	0.8	2.5	0.1	0.6	1.7	0.1	0.1	0.1	0.1	4.8	5.4	4.7
1	5.2	6.9	4.7	5.0	5.9	4.6	0.2	0.6	0.1	0.0	0.0	0.0	0.9	2.7	0.1	0.6	1.5	0.1	0.1	0.1	0.1	4.7	4.9	4.6
2	5.3	6.9	4.7	5.1	5.8	4.6	0.2	0.6	0.1	0.0	0.0	0.0	0.9	2.7	0.1	0.6	1.5	0.1	0.1	0.1	0.1	4.7	4.8	4.6
3	5.3	7.0	4.7	5.1	5.9	4.6	0.2	0.5	0.1	0.0	0.0	0.0	1.0	2.8	0.1	0.7	1.6	0.1	0.1	0.1	0.1	4.7	4.8	4.6
4	5.6	7.0	4.8	6.2	8.3	4.7	0.2	0.5	0.1	0.0	0.0	0.0	1.0	2.7	0.1	0.7	1.6	0.1	0.1	0.1	0.1	5.7	7.5	4.7
5	6.4	7.9	4.9	10.9	19.0	4.7	0.2	0.6	0.1	0.0	0.0	0.0	0.9	2.8	0.1	0.7	1.6	0.1	0.2	0.3	0.1	10.4	18.2	4.7
6	6.7	9.2	5.3	13.4	19.4	4.9	0.1	0.3	0.1	0.0	0.0	0.0	0.6	2.6	0.1	0.6	1.5	0.1	0.2	0.3	0.1	12.9	18.3	4.8
7	5.9	7.2	4.6	11.8	17.5	5.0	0.1	0.8	0.1	0.0	0.0	0.0	0.2	1.2	0.1	0.5	2.1	0.1	0.2	0.3	0.1	11.6	16.7	4.9
8	5.4	7.6	4.6	10.7	13.7	5.6	0.1	0.5	0.1	0.0	0.0	0.0	0.2	1.0	0.1	0.8	8.7	0.1	0.2	0.2	0.1	10.6	13.2	5.6
9	5.1	6.9	4.5	9.3	12.9	7.1	0.1	0.4	0.1	0.0	0.0	0.0	0.2	0.3	0.1	0.6	7.9	0.1	0.2	0.2	0.1	9.3	12.8	7.1
10	4.9	5.5	4.3	8.1	12.9	7.0	0.2	0.4	0.1	0.0	0.0	0.0	0.2	0.3	0.1	0.4	6.5	0.1	0.1	0.2	0.1	8.2	12.9	7.0
11	4.9	5.3	4.3	7.9	10.3	7.1	0.2	0.4	0.1	0.0	0.0	0.0	0.2	0.3	0.1	0.4	5.8	0.1	0.1	0.2	0.1	8.1	10.3	7.1
12	4.9	5.4	4.3	9.0	12.5	7.2	0.2	0.4	0.1	0.0	0.0	0.0	0.1	0.3	0.1	0.3	5.0	0.1	0.2	0.2	0.1	9.2	12.8	7.2
13	4.9	5.4	4.4	11.7	17.6	8.8	0.2	0.4	0.1	0.0	0.0	0.0	0.1	0.3	0.1	0.3	4.4	0.1	0.2	0.3	0.2	11.9	17.8	8.8
14	5.0	5.5	4.4	13.3	17.9	11.7	0.2	0.4	0.1	0.0	0.0	0.0	0.1	0.3	0.1	0.3	3.7	0.1	0.2	0.3	0.2	13.4	17.9	11.6
15	5.2	7.5	4.3	14.4	17.2	11.2	0.3	1.7	0.1	0.0	0.0	0.0	0.1	0.2	0.1	0.3	3.5	0.1	0.2	0.3	0.2	14.5	17.2	11.3
16	6.4	9.5	4.5	14.9	17.1	9.1	0.5	1.8	0.1	0.0	0.0	0.0	0.2	2.3	0.1	0.3	3.4	0.1	0.2	0.3	0.2	14.9	16.9	9.2
17	8.4	10.5	5.8	12.5	17.2	7.9	0.7	1.7	0.1	0.0	0.0	0.0	0.3	2.2	0.1	0.4	3.3	0.1	0.2	0.3	0.1	12.5	16.8	7.9
18	9.5	10.9	8.4	10.7	14.5	7.2	0.6	1.4	0.1	0.0	0.0	0.0	0.4	2.2	0.1	0.4	3.4	0.1	0.2	0.2	0.1	10.7	14.2	7.3
19	9.1	10.3	8.3	9.1	13.0	7.1	0.5	1.2	0.1	0.0	0.0	0.0	0.4	1.8	0.1	0.4	3.6	0.1	0.1	0.2	0.1	9.1	12.7	7.1
20	8.6	9.8	8.0	7.9	11.5	7.1	0.5	1.0	0.1	0.0	0.0	0.0	0.4	1.7	0.1	0.5	4.5	0.1	0.1	0.2	0.1	7.8	11.0	7.1
21	8.0	9.3	7.4	7.1	10.1	5.6	0.4	0.9	0.1	0.0	0.0	0.0	0.4	1.8	0.1	0.4	1.1	0.1	0.1	0.1	0.1	6.9	9.5	5.6
22	7.0	8.7	6.1	6.3	8.7	5.5	0.3	0.8	0.1	0.0	0.0	0.0	0.5	1.9	0.1	0.4	1.2	0.1	0.1	0.1	0.1	6.1	8.1	5.6
23	5.7	7.8	4.7	5.6	7.3	4.6	0.3	0.6	0.1	0.0	0.0	0.0	0.6	2.3	0.1	0.5	1.2	0.1	0.1	0.1	0.1	5.4	6.5	4.7
Sum	**54,220**			**80,671**			**2,445**			**0**			**3,939**			**4,207**			**1,324**			**79,709**		
Average	6.2	7.7	5.3	9.2	12.6	6.6	0.3	0.8	0.1	0.0	0.0	0.0	0.4	1.6	0.1	0.5	3.3	0.1	0.2	0.2	0.1	9.1	12.1	6.6
Max	9.5	10.9	8.4	14.9	19.4	11.7	0.7	1.8	0.1	0.0	0.0	0.0	1.0	2.8	0.1	0.8	8.7	0.1	0.2	0.3	0.2	14.9	18.3	11.6
Min	4.9	5.3	4.3	5.0	5.8	4.6	0.1	0.3	0.1	0.0	0.0	0.0	0.1	0.2	0.1	0.3	1.1	0.1	0.1	0.1	0.1	4.7	4.8	4.6
Jan	6.5	10.9	4.3	9.6	19.2	5.1	0.1	0.5	0.1	0.0	0.0	0.0	0.9	2.8	0.1	1.0	8.7	0.3	0.2	0.3	0.1	9.3	18.1	4.7
Feb	6.3	10.2	4.5	9.7	19.3	5.0	0.2	0.7	0.1	0.0	0.0	0.0	0.7	1.9	0.1	0.7	4.0	0.1	0.2	0.3	0.1	9.4	18.3	4.7
Mar	6.2	10.5	4.5	9.7	19.3	4.9	0.2	1.0	0.1	0.0	0.0	0.0	0.5	1.9	0.1	0.5	3.3	0.1	0.2	0.3	0.1	9.5	18.4	4.7
Apr	6.1	10.0	4.5	9.6	19.0	4.9	0.2	1.4	0.1	0.0	0.0	0.0	0.4	1.6	0.1	0.5	2.5	0.1	0.2	0.3	0.1	9.5	18.2	4.7
May	6.1	9.8	4.5	9.2	18.3	4.8	0.3	1.7	0.1	0.0	0.0	0.0	0.3	1.3	0.1	0.4	1.9	0.1	0.2	0.3	0.1	9.2	17.7	4.7
Jun	6.0	9.7	4.4	9.1	17.6	4.7	0.4	1.8	0.1	0.0	0.0	0.0	0.2	1.0	0.1	0.3	0.8	0.1	0.2	0.3	0.1	9.1	17.2	4.7
Jul	6.1	9.8	4.3	8.8	17.2	4.6	0.4	1.7	0.1	0.0	0.0	0.0	0.2	0.8	0.1	0.2	0.9	0.1	0.1	0.3	0.1	8.9	16.8	4.6
Aug	6.1	9.9	4.4	8.7	16.8	4.6	0.4	1.5	0.1	0.0	0.0	0.0	0.2	0.8	0.1	0.2	0.9	0.1	0.1	0.3	0.1	8.8	16.5	4.6
Sep	6.1	10.4	4.5	8.7	16.9	4.6	0.4	1.8	0.1	0.0	0.0	0.0	0.2	0.9	0.1	0.2	0.9	0.1	0.1	0.3	0.1	8.7	16.4	4.6
Oct	6.1	10.2	4.4	8.8	17.2	4.6	0.3	1.5	0.1	0.0	0.0	0.0	0.3	1.2	0.1	0.3	0.9	0.1	0.1	0.3	0.1	8.8	16.7	4.6
Nov	6.2	10.3	4.3	9.1	18.1	4.9	0.2	0.9	0.1	0.0	0.0	0.0	0.5	1.9	0.1	0.5	4.2	0.1	0.1	0.3	0.1	8.9	17.1	4.7
Dec	6.5	10.7	4.5	9.5	18.8	5.1	0.1	0.4	0.1	0.0	0.0	0.0	0.9	2.6	0.1	1.0	6.2	0.3	0.2	0.3	0.1	9.1	17.6	4.7



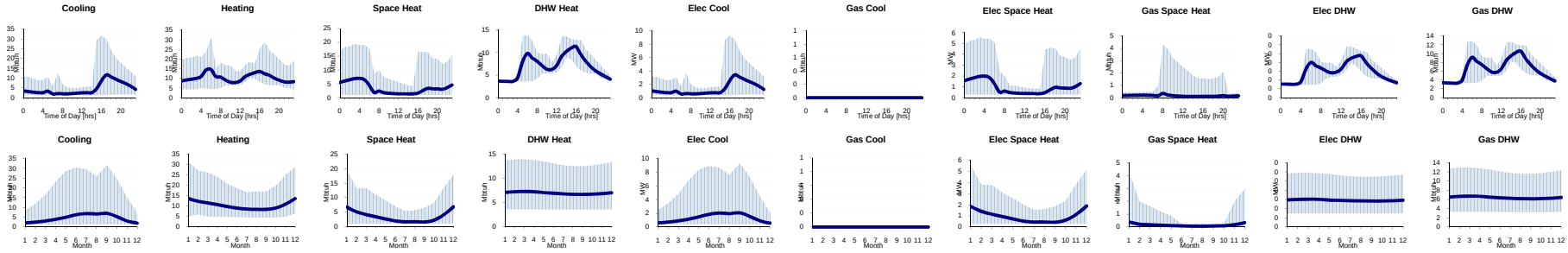
Treasure Island - District Energy Study

Energy End Use Summary - All Phases

TOTAL

Energy End Use Demand

Cooling			Heating			Space Heat			DHW Heat			Elec Cool			Gas Cool			Elec Space Heat			Gas Space Heat			Elec DHW			Gas DHW		
Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual		
Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min
Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh
3.4	10.8	1.4	8.7	19.8	4.3	5.5	17.3	1.0	3.7	4.1	3.5	1.0	3.2	0.4	0.0	0.0	0.0	1.6	5.0	0.3	0.2	0.5	0.0	0.1	0.1	0.1	3.4	3.8	3.3
3.0	10.6	1.4	9.1	20.7	4.3	6.0	18.3	1.0	3.6	3.7	3.5	0.9	3.1	0.4	0.0	0.0	0.0	1.7	5.3	0.3	0.2	0.4	0.0	0.1	0.1	0.1	3.3	3.4	3.3
2.7	9.7	1.4	9.5	20.9	4.3	6.5	18.6	1.0	3.6	3.6	3.5	0.8	2.9	0.4	0.0	0.0	0.0	1.8	5.3	0.3	0.2	0.5	0.0	0.1	0.1	0.1	3.3	3.4	3.3
2.5	9.0	1.4	9.9	21.7	4.3	6.9	19.5	1.0	3.6	3.7	3.5	0.7	2.6	0.4	0.0	0.0	0.0	2.0	5.6	0.3	0.2	0.5	0.0	0.1	0.1	0.1	3.3	3.4	3.3
2.5	9.1	1.4	10.9	21.3	5.0	7.0	19.0	1.0	4.4	5.7	3.6	0.7	2.7	0.4	0.0	0.0	0.0	2.0	5.4	0.3	0.2	0.5	0.0	0.1	0.1	0.1	4.1	5.3	3.3
3.3	10.6	1.4	14.3	24.2	4.8	6.5	19.1	1.0	7.9	13.8	3.6	1.0	3.1	0.4	0.0	0.0	0.0	1.8	5.5	0.3	0.2	0.5	0.0	0.2	0.3	0.1	7.4	12.8	3.4
1.8	5.6	1.4	14.6	31.3	4.6	4.5	17.8	1.0	9.8	13.9	3.6	0.5	1.6	0.4	0.0	0.0	0.0	1.3	5.1	0.3	0.2	0.5	0.0	0.2	0.3	0.1	9.1	12.9	3.4
2.0	12.9	1.4	11.0	15.3	4.6	1.9	8.6	1.0	8.8	12.7	3.7	0.6	3.8	0.4	0.0	0.0	0.0	0.5	2.4	0.3	0.2	1.0	0.0	0.2	0.3	0.1	8.2	11.8	3.5
1.9	6.8	1.4	10.6	18.1	5.2	2.4	9.9	1.0	8.1	10.1	4.2	0.6	2.0	0.4	0.0	0.0	0.0	0.6	2.0	0.3	0.3	4.3	0.0	0.2	0.2	0.1	7.5	9.4	3.9
1.9	5.2	1.4	9.0	16.8	6.4	1.8	7.3	1.0	7.1	9.7	5.4	0.6	1.5	0.4	0.0	0.0	0.0	0.5	1.1	0.3	0.2	3.9	0.0	0.2	0.2	0.1	6.6	9.1	5.0
2.0	5.0	1.4	7.9	16.6	6.4	1.6	6.9	1.0	6.3	9.8	5.4	0.6	1.5	0.4	0.0	0.0	0.0	0.4	1.1	0.3	0.2	3.2	0.0	0.1	0.2	0.1	5.8	9.1	5.0
2.2	4.9	1.4	7.8	14.0	6.4	1.5	6.2	1.0	6.2	7.9	5.5	0.6	1.4	0.4	0.0	0.0	0.0	0.4	1.0	0.3	0.1	2.9	0.0	0.1	0.2	0.1	5.8	7.3	5.0
2.4	5.5	1.4	8.6	13.8	6.6	1.4	5.5	1.0	7.1	9.8	5.6	0.7	1.6	0.4	0.0	0.0	0.0	0.4	0.9	0.3	0.1	2.5	0.0	0.2	0.2	0.1	6.5	9.0	5.1
2.5	5.6	1.4	10.8	17.1	8.2	1.3	5.0	1.0	9.1	13.6	6.8	0.7	1.7	0.4	0.0	0.0	0.0	0.4	0.9	0.3	0.1	2.1	0.0	0.2	0.3	0.2	8.4	12.6	6.2
2.5	5.7	1.4	12.1	18.7	10.2	1.3	4.6	1.0	10.3	13.7	8.9	0.7	1.7	0.4	0.0	0.0	0.0	0.4	0.8	0.3	0.1	1.8	0.0	0.2	0.3	0.2	9.5	12.7	8.2
4.5	29.6	1.4	12.9	17.7	9.9	1.3	4.2	1.0	11.0	13.1	8.6	1.3	8.7	0.4	0.0	0.0	0.0	0.4	0.8	0.3	0.1	1.6	0.0	0.2	0.3	0.2	10.2	12.1	8.0
8.6	31.9	1.4	13.5	25.6	8.1	1.6	16.6	1.0	11.3	12.9	7.0	2.5	9.3	0.4	0.0	0.0	0.0	0.4	4.5	0.3	0.1	1.5	0.0	0.2	0.3	0.1	10.5	12.0	6.5
11.7	29.9	1.4	12.4	28.9	7.1	2.5	16.5	1.0	9.5	12.8	6.0	3.4	8.8	0.4	0.0	0.0	0.0	0.7	4.6	0.3	0.1	1.5	0.0	0.2	0.3	0.1	8.8	11.9	5.6
10.7	24.3	1.5	11.6	24.5	6.5	3.3	16.5	1.0	8.1	10.8	5.5	3.1	7.1	0.5	0.0	0.0	0.0	0.9	4.6	0.3	0.1	1.6	0.0	0.2	0.2	0.1	7.5	10.0	5.1
9.3	20.1	1.6	10.1	22.4	6.4	3.2	14.2	1.0	6.9	9.6	5.4	2.7	5.9	0.5	0.0	0.0	0.0	0.9	3.9	0.3	0.1	1.7	0.0	0.1	0.2	0.1	6.4	9.0	5.0
8.3	17.7	1.8	9.0	19.9	6.4	3.2	14.1	1.0	5.9	8.4	5.4	2.4	5.2	0.5	0.0	0.0	0.0	0.9	3.8	0.3	0.2	2.1	0.0	0.1	0.2	0.1	5.5	7.8	5.0
7.2	15.4	1.8	8.1	17.3	5.1	3.0	12.2	1.0	5.3	7.2	4.3	2.1	4.5	0.5	0.0	0.0	0.0	0.8	3.5	0.3	0.1	0.3	0.0	0.1	0.1	0.1	4.9	6.7	4.0
5.7	13.3	1.7	8.0	16.6	5.1	3.6	13.0	1.0	4.6	6.1	4.2	1.7	3.9	0.5	0.0	0.0	0.0	1.0	3.7	0.3	0.1	0.4	0.0	0.1	0.1	0.1	4.3	5.7	3.9
4.2	11.0	1.5	8.3	19.1	4.3	4.6	15.8	1.0	4.1	5.0	3.6	1.2	3.2	0.4	0.0	0.0	0.0	1.3	4.5	0.3	0.2	0.4	0.0	0.1	0.1	0.1	3.8	4.6	3.3
38,948			**90,769**			**30,049**			**60,720**			**11,415**			**0**			**8,396**			**1,403**			**1,281**			**56,350**		
4.4	12.9	1.4	10.4	20.1	6.0	3.4	12.8	1.0	6.9	9.2	5.0	1.3	3.8	0.4	0.0	0.0	0.0	1.0	3.4	0.3	0.2	1.5	0.0	0.1	0.2	0.1	6.4	8.6	4.6
11.7	31.9	1.8	14.6	31.3	10.2	7.0	19.5	1.0	11.3	13.9	8.9	3.4	9.3	0.5	0.0	0.0	0.0	2.0	5.6	0.3	0.3	4.3	0.0	0.2	0.3	0.2	10.5	12.9	8.2
1.8	4.9	1.4	7.8	13.8	4.3	1.3	4.2	1.0	3.6	3.6	3.5	0.5	1.4	0.4	0.0	0.0	0.0	0.4	0.8	0.3	0.1	0.3	0.0	0.1	0.1	0.1	3.3	3.4	3.3
2.0	8.6	1.4	13.5	31.3	5.0	6.7	19.5	1.1	7.0	13.8	3.6	0.6	2.5	0.4	0.0	0.0	0.0	1.8	5.6	0.3	0.4	4.3	0.1	0.1	0.3	0.1	6.5	12.8	3.3
2.4	12.1	1.4	12.1	27.0	5.8	5.0	13.4	1.0	7.2	14.0	3.6	0.7	3.5	0.4	0.0	0.0	0.0	1.4	3.8	0.3	0.2	2.0	0.0	0.2	0.3	0.1	6.7	13.0	3.4
3.0	16.7	1.4	11.4	26.1	4.8	4.1	13.3	1.0	7.3	14.0	3.6	0.9	4.9	0.4	0.0	0.0	0.0	1.2	3.8	0.3	0.2	1.6	0.0	0.2	0.3	0.1	6.7	13.0	3.3
3.9	23.4	1.4	10.6	24.0	4.8	3.3	10.9	1.0	7.2	13.9	3.6	1.1	6.9	0.4	0.0	0.0	0.0	0.9	3.1	0.3	0.1	1.2	0.0	0.2	0.3	0.1	6.7	12.9	3.3
5.0	28.7	1.4	9.7	20.6	4.7	2.6	9.0	1.0	7.0	13.5	3.6	1.5	8.4	0.4	0.0	0.0	0.0	0.7	2.6	0.3	0.1	0.9	0.0	0.1	0.3	0.1	6.5	12.5	3.3
6.3	30.5	1.4	8.9	18.6	4.5	1.9	7.0	1.0	6.9	13.1	3.5	1.8	8.9	0.4	0.0	0.0	0.0	0.5	2.0	0.3	0.1	0.2	0.0	0.1	0.3	0.1	6.4	12.2	3.3
6.9	29.6	1.4	8.4	16.7	4.4	1.6	5.4	1.0	6.8	12.8	3.5	2.0	8.7	0.4	0.0	0.0	0.0	0.4	1.5	0.3	0.1	0.3	0.0	0.1	0.3	0.1	6.3	11.8	3.3
6.6	26.0	1.4	8.4	17.0	4.4	1.6	5.7	1.0	6.7	12.6	3.5	1.9	7.6	0.4	0.0	0.0	0.0	0.4	1.6	0.3	0.1	0.3	0.0	0.1	0.3	0.1	6.2	11.6	3.3
7.0	31.9	1.4	8.3	17.0	4.3	1.5	6.6	1.0	6.7	12.5	3.5	2.1	9.3	0.4	0.0	0.0	0.0	0.4	1.9	0.3	0.1	0.3	0.0	0.1	0.3	0.1	6.2	11.6	3.3
5.3	24.8	1.4	8.9	19.9	4.4	2.2	8.2	1.0	6.7	12.7	3.5	1.6	7.3	0.4	0.0	0.0	0.0	0.6	2.4	0.3	0.1	0.3	0.0	0.1	0.3	0.1	6.2	11.8	3.3
3.0	15.0	1.4	10.7	25.2	4.7	4.0	13.6	1.0	6.8	13.0	3.5	0.9	4.4	0.4	0.0	0.0	0.0	1.1	3.9	0.3	0.2	2.0	0.0	0.1	0.3	0.1	6.3	12.1	3.3
1.9	7.2	1.4	13.5	29.0	6.4	6.7	18.1	1.1	7.0	13.4	3.6	0.6	2.1	0.4	0.0	0.0	0.0	1.9	5.2	0.3	0.3	3.0	0.1	0.1	0.3	0.1	6.5	12.5	3.3



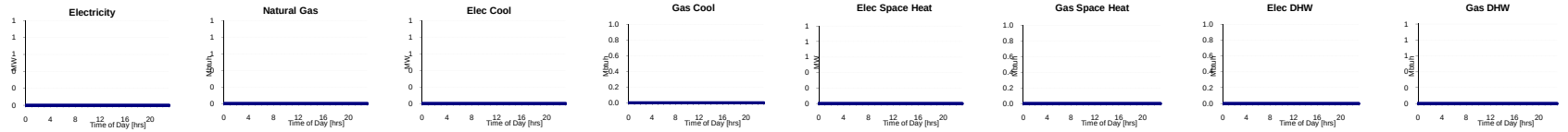
Treasure Island - District Energy Study

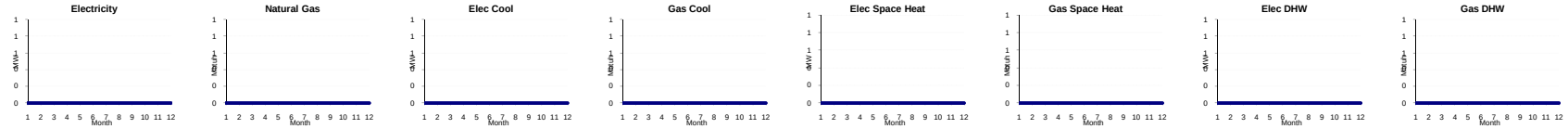
Energy End Use Summary - All Phases

PHASE 1

Energy Source Demand

	Electricity			Natural Gas			Elec Cool			Gas Cool			Elec Space Heat			Gas Space Heat			Elec DHW			Gas DHW		
	Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual		
	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min
Hour	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	**0**			**0**			**0**			**0**			**0**			**0**			**0**			**0**		
Average	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dec	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0





Treasure Island - District Energy Study

Energy End Use Summary - All Phases

PHASE 1

Energy End Use Demand

Cooling			Heating			Space Heat			DHW Heat			Elec Cool			Gas Cool			Elec Space Heat			Gas Space Heat			Elec DHW			Gas DHW		
Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual		
Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min
Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

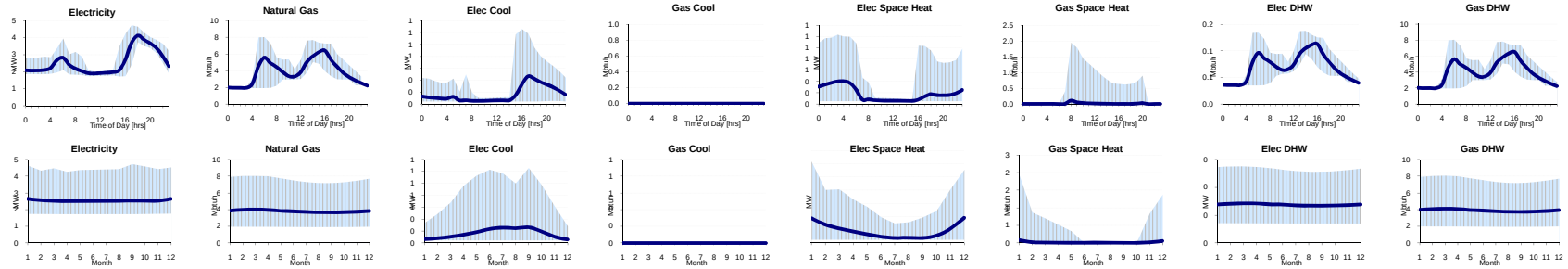
Treasure Island - District Energy Study

Energy End Use Summary - All Phases

PHASE 2

Energy Source Demand

	Electricity			Natural Gas			Elec Cool			Gas Cool			Elec Space Heat			Gas Space Heat			Elec DHW			Gas DHW		
	Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual		
	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min
Hour	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh
0	2.1	2.8	1.9	2.0	2.2	1.9	0.1	0.4	0.0	0.0	0.0	0.0	0.3	1.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.3	2.0
1	2.1	2.8	1.9	1.9	2.0	1.9	0.1	0.4	0.0	0.0	0.0	0.0	0.3	1.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	2.0
2	2.1	2.8	1.9	1.9	2.0	1.9	0.1	0.4	0.0	0.0	0.0	0.0	0.4	1.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	2.0
3	2.1	2.9	1.9	1.9	2.0	1.9	0.1	0.4	0.0	0.0	0.0	0.0	0.4	1.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	2.0
4	2.2	2.9	1.9	2.4	3.2	1.9	0.1	0.4	0.0	0.0	0.0	0.0	0.4	1.2	0.1	0.0	0.0	0.0	0.0	0.1	0.0	2.4	3.2	2.0
5	2.7	3.4	2.0	4.5	8.0	1.9	0.1	0.4	0.0	0.0	0.0	0.0	0.4	1.2	0.1	0.0	0.0	0.0	0.1	0.1	0.0	4.5	8.0	2.0
6	2.8	4.0	2.1	5.6	8.1	1.9	0.1	0.2	0.0	0.0	0.0	0.0	0.3	1.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	5.6	8.1	2.0
7	2.4	3.0	1.8	4.9	7.3	1.9	0.1	0.5	0.0	0.0	0.0	0.0	0.1	0.5	0.1	0.0	0.4	0.0	0.1	0.1	0.0	5.0	7.3	2.0
8	2.2	3.2	1.8	4.5	5.6	2.2	0.1	0.2	0.0	0.0	0.0	0.0	0.1	0.4	0.1	0.1	2.0	0.0	0.1	0.1	0.0	4.6	5.7	2.3
9	2.0	2.9	1.8	3.9	5.4	3.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	1.8	0.0	0.1	0.1	0.1	4.0	5.5	3.0
10	1.9	2.1	1.8	3.3	5.4	3.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	1.5	0.0	0.1	0.1	0.1	3.5	5.5	3.0
11	1.9	2.0	1.8	3.3	4.2	3.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	1.3	0.0	0.1	0.1	0.1	3.4	4.4	3.0
12	1.9	2.0	1.8	3.8	5.3	3.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	1.1	0.0	0.1	0.1	0.1	3.9	5.5	3.1
13	1.9	2.1	1.8	5.0	7.6	3.8	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	1.0	0.0	0.1	0.1	0.1	5.2	7.8	3.8
14	2.0	2.1	1.8	5.7	7.7	5.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.8	0.0	0.1	0.1	0.1	5.9	7.8	5.1
15	2.1	3.5	1.7	6.2	7.4	4.9	0.1	1.2	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.7	0.0	0.1	0.1	0.1	6.3	7.5	5.0
16	2.7	4.2	1.7	6.4	7.3	3.9	0.3	1.3	0.0	0.0	0.0	0.0	0.1	1.0	0.1	0.0	0.6	0.0	0.1	0.1	0.1	6.5	7.4	4.0
17	3.7	4.7	2.4	5.3	7.3	3.3	0.5	1.2	0.0	0.0	0.0	0.0	0.1	1.0	0.1	0.0	0.6	0.0	0.1	0.1	0.1	5.4	7.4	3.4
18	4.1	4.6	3.7	4.5	6.0	3.0	0.4	1.0	0.0	0.0	0.0	0.0	0.2	1.0	0.1	0.0	0.6	0.0	0.1	0.1	0.1	4.6	6.2	3.1
19	3.9	4.3	3.5	3.8	5.4	3.0	0.4	0.8	0.0	0.0	0.0	0.0	0.2	0.8	0.1	0.0	0.7	0.0	0.1	0.1	0.1	3.8	5.4	3.0
20	3.7	4.0	3.4	3.2	4.7	3.0	0.3	0.7	0.1	0.0	0.0	0.0	0.2	0.7	0.1	0.0	0.9	0.0	0.1	0.1	0.1	3.3	4.7	3.0
21	3.4	3.9	3.1	2.8	4.0	2.3	0.3	0.6	0.1	0.0	0.0	0.0	0.2	0.7	0.1	0.0	0.0	0.0	0.1	0.1	0.0	2.9	4.0	2.3
22	2.9	3.6	2.5	2.5	3.3	2.3	0.2	0.5	0.1	0.0	0.0	0.0	0.2	0.8	0.1	0.0	0.0	0.0	0.0	0.1	0.0	2.5	3.4	2.3
23	2.3	3.2	1.9	2.2		1.9	0.2	0.4	0.0	0.0	0.0	0.0	0.2	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.7	2.0
Sum	**22,295**			**33,511**			**1,413**			**0**			**1,593**			**154**			**603**			**34,168**		
Average	2.5	3.2	2.2	3.8	5.3	2.7	0.2	0.5	0.0	0.0	0.0	0.0	0.2	0.7	0.1	0.0	0.6	0.0	0.1	0.1	0.1	3.9	5.3	2.8
Max	4.1	4.7	3.7	6.4	8.1	5.1	0.5	1.3	0.1	0.0	0.0	0.0	0.4	1.2	0.1	0.1	2.0	0.0	0.1	0.1	0.1	6.5	8.1	5.1
Min	1.9	2.0	1.7	1.9	2.0	1.9	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	2.0
Jan	2.7	4.6	1.8	3.9	7.9	2.0	0.1	0.3	0.0	0.0	0.0	0.0	0.4	1.2	0.1	0.1	2.0	0.0	0.1	0.1	0.0	4.0	7.9	2.0
Feb	2.6	4.3	1.8	4.0	8.0	2.0	0.1	0.5	0.0	0.0	0.0	0.0	0.3	0.8	0.1	0.0	0.9	0.0	0.1	0.1	0.0	4.1	8.1	2.0
Mar	2.5	4.5	1.7	4.0	8.1	2.0	0.1	0.7	0.0	0.0	0.0	0.0	0.2	0.8	0.1	0.0	0.7	0.0	0.1	0.1	0.0	4.1	8.1	2.0
Apr	2.5	4.3	1.7	4.0	8.0	2.0	0.1	1.0	0.0	0.0	0.0	0.0	0.2	0.7	0.1	0.0	0.5	0.0	0.1	0.1	0.0	4.1	8.0	2.0
May	2.5	4.4	1.7	3.9	7.8	1.9	0.2	1.1	0.0	0.0	0.0	0.0	0.1	0.5	0.1	0.0	0.3	0.0	0.1	0.1	0.0	3.9	7.8	2.0
Jun	2.5	4.4	1.7	3.8	7.5	1.9	0.2	1.2	0.0	0.0	0.0	0.0	0.1	0.4	0.1	0.0	0.0	0.0	0.1	0.1	0.0	3.9	7.5	2.0
Jul	2.5	4.4	1.7	3.7	7.3	1.9	0.3	1.2	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.0	0.0	0.0	0.1	0.1	0.0	3.8	7.3	2.0
Aug	2.5	4.4	1.7	3.7	7.2	1.9	0.2	1.0	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.0	0.0	0.0	0.1	0.1	0.0	3.7	7.2	2.0
Sep	2.5	4.7	1.7	3.7	7.2	1.9	0.3	1.3	0.0	0.0	0.0	0.0	0.1	0.4	0.1	0.0	0.0	0.0	0.1	0.1	0.0	3.7	7.2	2.0
Oct	2.5	4.6	1.7	3.7	7.3	1.9	0.2	1.0	0.0	0.0	0.0	0.0	0.1	0.5	0.1	0.0	0.0	0.0	0.1	0.1	0.0	3.8	7.3	2.0
Nov	2.5	4.4	1.8	3.8	7.5	1.9	0.1	0.6	0.0	0.0	0.0	0.0	0.2	0.8	0.1	0.0	0.8	0.0	0.1	0.1	0.0	3.8	7.5	2.0
Dec	2.6	4.5	1.8	3.8	7.7	1.9	0.1	0.3	0.0	0.0	0.0	0.0	0.4	1.1	0.1	0.1	1.4	0.0	0.1	0.1	0.0	3.9	7.7	2.0



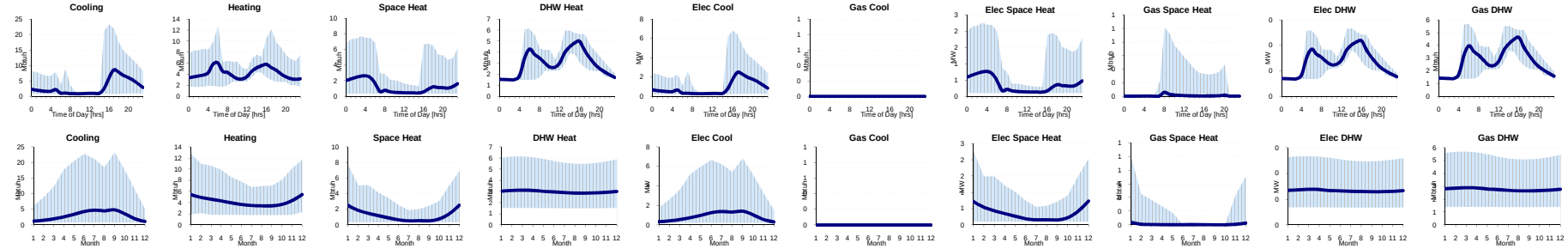
Treasure Island - District Energy Study

Energy End Use Summary - All Phases

PHASE 2

Energy End Use Demand

Cooling			Heating			Space Heat			DHW Heat			Elec Cool			Gas Cool			Elec Space Heat			Gas Space Heat			Elec DHW			Gas DHW		
Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual		
Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min
Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh
2.3	8.1	0.8	3.4	7.9	1.8	2.0	6.8	0.4	1.6	1.7	1.5	0.7	2.4	0.2	0.0	0.0	0.0	0.6	2.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.6	1.4
2.0	7.9	0.8	3.5	8.3	1.8	2.2	7.3	0.4	1.5	1.6	1.5	0.6	2.3	0.2	0.0	0.0	0.0	0.7	2.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.4	1.4
1.8	7.2	0.8	3.7	8.4	1.8	2.4	7.4	0.4	1.5	1.5	1.5	0.5	2.1	0.2	0.0	0.0	0.0	0.7	2.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.4	1.4
1.7	6.6	0.8	3.9	8.7	1.8	2.6	7.7	0.4	1.5	1.5	1.5	0.5	1.9	0.2	0.0	0.0	0.0	0.8	2.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.4	1.4
1.7	6.7	0.8	4.3	8.5	1.9	2.6	7.5	0.4	1.9	2.5	1.5	0.5	2.0	0.2	0.0	0.0	0.0	0.8	2.2	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.7	2.3	1.4
2.2	7.9	0.8	5.8	9.9	1.9	2.4	7.5	0.4	3.5	6.1	1.5	0.7	2.3	0.2	0.0	0.0	0.0	0.7	2.2	0.1	0.0	0.0	0.0	0.1	0.1	0.0	3.2	5.7	1.4
1.1	3.9	0.8	6.0	12.8	1.8	1.7	6.8	0.4	4.3	6.1	1.5	0.3	1.1	0.2	0.0	0.0	0.0	0.5	2.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	4.0	5.7	1.4
1.1	9.1	0.8	4.5	6.2	1.8	0.6	3.0	0.4	3.8	5.6	1.5	0.3	2.7	0.2	0.0	0.0	0.0	0.2	0.9	0.1	0.0	0.2	0.0	0.1	0.1	0.0	3.5	5.2	1.4
0.9	3.6	0.8	4.3	6.5	2.0	0.8	2.8	0.4	3.5	4.4	1.7	0.3	1.0	0.2	0.0	0.0	0.0	0.2	0.7	0.1	0.1	1.0	0.0	0.1	0.1	0.0	3.2	4.0	1.6
0.9	1.5	0.8	3.7	6.3	2.7	0.6	2.2	0.4	3.0	4.2	2.3	0.3	0.4	0.2	0.0	0.0	0.0	0.2	0.4	0.1	0.0	0.9	0.0	0.1	0.1	0.1	2.8	3.9	2.1
0.9	1.5	0.8	3.2	6.3	2.7	0.5	2.1	0.4	2.7	4.2	2.3	0.3	0.4	0.2	0.0	0.0	0.0	0.1	0.4	0.1	0.0	0.8	0.0	0.1	0.1	0.1	2.5	3.9	2.1
0.9	1.5	0.8	3.1	5.2	2.7	0.5	1.9	0.4	2.6	3.4	2.3	0.3	0.4	0.2	0.0	0.0	0.0	0.1	0.4	0.1	0.0	0.7	0.0	0.1	0.1	0.1	2.4	3.1	2.1
1.0	1.6	0.8	3.5	5.0	2.7	0.5	1.7	0.4	3.0	4.2	2.4	0.3	0.5	0.2	0.0	0.0	0.0	0.1	0.3	0.1	0.0	0.6	0.0	0.1	0.1	0.1	2.8	3.9	2.2
1.0	1.6	0.8	4.6	6.9	3.4	0.5	1.5	0.4	4.0	6.0	2.9	0.3	0.5	0.2	0.0	0.0	0.0	0.1	0.3	0.1	0.0	0.5	0.0	0.1	0.1	0.1	3.6	5.5	2.7
1.0	1.6	0.8	5.1	7.6	4.4	0.5	1.4	0.4	4.5	6.0	3.9	0.3	0.5	0.2	0.0	0.0	0.0	0.1	0.3	0.1	0.0	0.4	0.0	0.1	0.1	0.1	4.1	5.5	3.6
2.6	21.3	0.8	5.5	7.2	4.3	0.4	1.3	0.4	4.8	5.7	3.8	0.8	6.2	0.2	0.0	0.0	0.0	0.1	0.3	0.1	0.0	0.3	0.0	0.1	0.1	0.1	4.5	5.3	3.5
6.0	23.3	0.8	5.8	10.6	3.5	0.6	6.7	0.4	5.0	5.6	3.1	1.8	6.8	0.2	0.0	0.0	0.0	0.2	1.9	0.1	0.0	0.3	0.0	0.1	0.1	0.1	4.6	5.2	2.8
8.6	21.9	0.8	5.2	12.2	3.0	0.9	6.8	0.4	4.1	5.6	2.6	2.5	6.4	0.2	0.0	0.0	0.0	0.3	1.9	0.1	0.0	0.3	0.0	0.1	0.1	0.1	3.8	5.2	2.4
7.8	17.6	0.8	4.8	9.9	2.7	1.2	6.5	0.4	3.5	4.7	2.4	2.3	5.2	0.2	0.0	0.0	0.0	0.4	1.9	0.1	0.0	0.3	0.0	0.1	0.1	0.1	3.2	4.3	2.2
6.8	14.7	0.9	4.1	8.9	2.6	1.1	5.4	0.4	2.9	4.2	2.3	2.0	4.3	0.3	0.0	0.0	0.0	0.3	1.5	0.1	0.0	0.4	0.0	0.1	0.1	0.1	2.7	3.8	2.1
6.0	13.3	1.0	3.6	7.6	2.6	1.1	5.2	0.4	2.5	3.6	2.3	1.8	3.9	0.3	0.0	0.0	0.0	0.3	1.5	0.1	0.0	0.5	0.0	0.1	0.1	0.1	2.3	3.3	2.1
5.2	11.8	1.0	3.2	6.8	2.1	1.1	4.7	0.4	2.2	3.1	1.8	1.5	3.5	0.3	0.0	0.0	0.0	0.3	1.4	0.1	0.0	0.0	0.0	0.0	0.1	0.0	2.0	2.9	1.6
4.0	10.1	1.0	3.1	6.4	2.1	1.2	4.9	0.4	1.9	2.6	1.8	1.2	3.0	0.3	0.0	0.0	0.0	0.4	1.4	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.8	2.4	1.6
2.9	8.2	0.9	3.2	7.6	1.8	1.6	6.2	0.4	1.7	2.1	1.5	0.8	2.4	0.3	0.0	0.0	0.0	0.5	1.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.9	1.4
25,666			**36,943**			**10,807**			**26,136**			**7,522**			**0**			**3,144**			**80**			**583**			**24,148**		
2.9	8.9	0.8	4.2	8.0	2.5	1.2	4.8	0.4	3.0	4.0	2.1	0.9	2.6	0.2	0.0	0.0	0.0	0.4	1.3	0.1	0.0	0.3	0.0	0.1	0.1	0.0	2.8	3.7	2.0
8.6	23.3	1.0	6.0	12.8	4.4	2.6	7.7	0.4	5.0	6.1	3.9	2.5	6.8	0.3	0.0	0.0	0.0	0.8	2.3	0.1	0.1	1.0	0.0	0.1	0.1	0.1	4.6	5.7	3.6
0.9	1.5	0.8	3.1	5.0	1.8	0.4	1.3	0.4	1.5	1.5	1.5	0.3	0.4	0.2	0.0	0.0	0.0	0.1	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.4	1.4
1.2	6.2	0.8	5.5	12.8	1.9	2.5	7.7	0.4	3.0	6.0	1.5	0.3	1.8	0.2	0.0	0.0	0.0	0.7	2.3	0.1	0.0	1.0	0.0	0.1	0.1	0.0	2.8	5.6	1.4
1.5	9.0	0.8	4.9	11.0	2.1	1.9	5.1	0.4	3.1	6.1	1.5	0.4	2.6	0.2	0.0	0.0	0.0	0.5	1.5	0.1	0.0	0.5	0.0	0.1	0.1	0.0	2.9	5.7	1.4
1.9	12.4	0.8	4.6	10.7	1.8	1.5	5.1	0.4	3.1	6.1	1.5	0.5	3.6	0.2	0.0	0.0	0.0	0.4	1.5	0.1	0.0	0.4	0.0	0.1	0.1	0.0	2.9	5.7	1.4
2.5	17.8	0.8	4.3	9.9	1.9	1.2	4.2	0.4	3.1	6.1	1.5	0.7	5.2	0.2	0.0	0.0	0.0	0.3	1.2	0.1	0.0	0.3	0.0	0.1	0.1	0.0	2.9	5.7	1.4
3.3	20.5	0.8	3.9	8.6	1.8	0.9	3.5	0.4	3.0	5.9	1.5	1.0	6.0	0.2	0.0	0.0	0.0	0.3	1.0	0.1	0.0	0.2	0.0	0.1	0.1	0.0	2.8	5.5	1.4
4.2	22.8	0.8	3.7	7.8	1.8	0.6	2.5	0.4	3.0	5.8	1.5	1.2	6.7	0.2	0.0	0.0	0.0	0.2	0.7	0.1	0.0	0.0	0.0	0.1	0.1	0.0	2.8	5.3	1.4
4.7	21.3	0.8	3.5	6.8	1.8	0.5	1.9	0.4	2.9	5.6	1.5	1.4	6.2	0.2	0.0	0.0	0.0	0.2	0.6	0.1	0.0	0.0	0.0	0.1	0.1	0.0	2.7	5.2	1.4
4.5	18.5	0.8	3.4	7.0	1.8	0.5	2.0	0.4	2.9	5.5	1.5	1.3	5.4	0.2	0.0	0.0	0.0	0.2	0.6	0.1	0.0	0.0	0.0	0.1	0.1	0.0	2.6	5.1	1.4
4.8	23.3	0.8	3.4	7.1	1.8	0.5	2.5	0.4	2.9	5.5	1.5	1.4	6.8	0.2	0.0	0.0	0.0	0.1	0.7	0.1	0.0	0.0	0.0	0.1	0.1	0.0	2.6	5.1	1.4
3.5	17.6	0.8	3.7	8.1	1.8	0.8	3.1	0.4	2.9	5.6	1.5	1.0	5.2	0.2	0.0	0.0	0.0	0.2	0.9	0.1	0.0	0.0	0.0	0.1	0.1	0.0	2.7	5.2	1.4
1.9	11.3	0.8	4.3	10.2	1.8	1.4	5.1	0.4	2.9	5.7	1.5	0.6	3.3	0.2	0.0	0.0	0.0	0.4	1.5	0.1	0.0	0.4	0.0	0.1	0.1	0.0	2.7	5.3	1.4
1.1	5.1	0.8	5.4	11.8	2.3	2.5	7.0	0.4	3.0	5.9	1.5	0.3	1.5	0.2	0.0	0.0	0.0	0.7	2.0	0.1	0.0	0.7	0.0	0.1	0.1	0.0	2.8	5.5	1.4



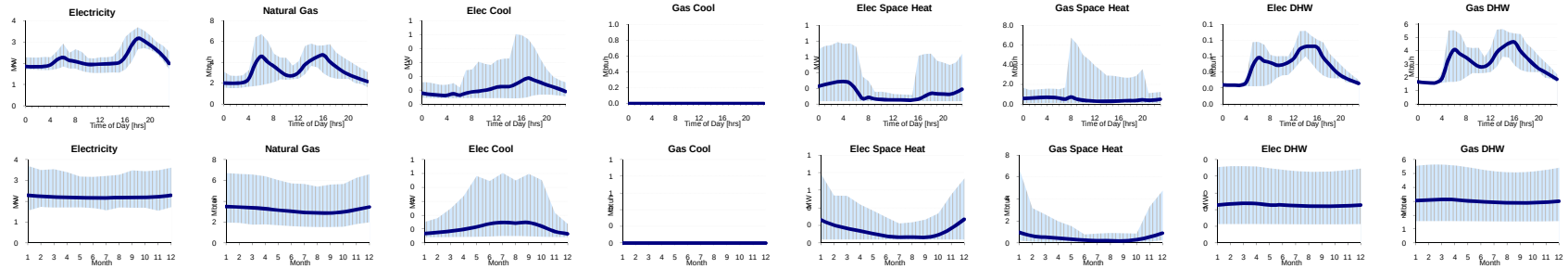
Treasure Island - District Energy Study

Energy End Use Summary - All Phases

PHASE 3

Energy Source Demand

	Electricity			Natural Gas			Elec Cool			Gas Cool			Elec Space Heat			Gas Space Heat			Elec DHW			Gas DHW		
	Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual		
	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min
Hour	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh
0	1.8	2.3	1.7	2.0	3.1	1.6	0.1	0.2	0.0	0.0	0.0	0.0	0.2	0.7	0.0	0.6	1.7	0.1	0.0	0.0	0.0	1.7	1.8	1.6
1	1.8	2.3	1.7	2.0	2.7	1.6	0.1	0.2	0.0	0.0	0.0	0.0	0.2	0.7	0.0	0.6	1.5	0.1	0.0	0.0	0.0	1.6	1.7	1.6
2	1.8	2.3	1.7	2.0	2.7	1.6	0.1	0.1	0.0	0.0	0.0	0.0	0.3	0.7	0.0	0.6	1.5	0.1	0.0	0.0	0.0	1.6	1.6	1.6
3	1.8	2.3	1.7	2.1	2.8	1.6	0.1	0.1	0.0	0.0	0.0	0.0	0.3	0.8	0.0	0.7	1.6	0.1	0.0	0.0	0.0	1.6	1.6	1.6
4	1.9	2.3	1.7	2.4	3.3	1.7	0.1	0.1	0.0	0.0	0.0	0.0	0.3	0.8	0.0	0.7	1.6	0.1	0.0	0.0	0.0	1.9	2.5	1.6
5	2.2	2.6	1.7	3.8	6.4	1.7	0.1	0.2	0.0	0.0	0.0	0.0	0.3	0.8	0.0	0.7	1.6	0.1	0.0	0.1	0.0	3.3	5.5	1.7
6	2.3	2.9	1.9	4.6	6.7	1.8	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.7	0.0	0.6	1.5	0.1	0.1	0.1	0.0	4.1	5.6	1.7
7	2.1	2.5	1.8	4.1	6.1	2.0	0.1	0.2	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.5	1.7	0.1	0.1	0.1	0.0	3.8	5.2	1.8
8	2.1	2.7	1.8	3.6	4.8	2.1	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.7	6.8	0.1	0.1	0.1	0.0	3.5	4.3	2.0
9	2.0	2.5	1.6	3.2	4.5	2.4	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.5	6.1	0.1	0.0	0.1	0.0	3.1	4.2	2.3
10	1.9	2.2	1.6	2.8	4.4	2.3	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.4	5.0	0.1	0.0	0.1	0.0	2.8	4.2	2.3
11	1.9	2.2	1.5	2.7	3.7	2.4	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.3	4.5	0.1	0.1	0.1	0.0	2.8	3.5	2.3
12	2.0	2.3	1.6	3.0	4.1	2.4	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.3	3.9	0.1	0.1	0.1	0.0	3.1	4.2	2.4
13	2.0	2.3	1.6	3.8	5.6	2.9	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.3	3.4	0.1	0.1	0.1	0.1	3.8	5.6	2.8
14	2.0	2.3	1.6	4.2	5.8	3.7	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.3	2.9	0.1	0.1	0.1	0.1	4.3	5.6	3.6
15	2.0	2.7	1.6	4.5	5.6	3.5	0.1	0.5	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.3	2.9	0.1	0.1	0.1	0.1	4.6	5.4	3.5
16	2.3	3.2	1.7	4.7	5.6	2.9	0.2	0.5	0.0	0.0	0.0	0.0	0.1	0.6	0.0	0.3	2.8	0.1	0.1	0.1	0.0	4.7	5.3	2.9
17	2.8	3.5	2.1	4.1	5.8	2.6	0.2	0.5	0.1	0.0	0.0	0.0	0.1	0.6	0.0	0.3	2.7	0.1	0.1	0.1	0.0	4.0	5.3	2.6
18	3.2	3.7	2.7	3.6	5.0	2.5	0.2	0.4	0.1	0.0	0.0	0.0	0.1	0.6	0.0	0.3	2.7	0.1	0.0	0.1	0.0	3.5	4.5	2.4
19	3.0	3.5	2.7	3.2	4.6	2.4	0.2	0.3	0.1	0.0	0.0	0.0	0.1	0.6	0.0	0.4	2.9	0.1	0.0	0.1	0.0	3.0	4.1	2.4
20	2.8	3.3	2.6	2.8	4.2	2.4	0.1	0.3	0.1	0.0	0.0	0.0	0.1	0.5	0.0	0.4	3.5	0.1	0.0	0.0	0.0	2.7	3.6	2.4
21	2.6	3.0	2.5	2.6	3.8	2.0	0.1	0.2	0.1	0.0	0.0	0.0	0.1	0.5	0.0	0.4	1.1	0.1	0.0	0.0	0.0	2.4	3.2	2.0
22	2.4	2.8	2.1	2.4	3.4	1.9	0.1	0.2	0.1	0.0	0.0	0.0	0.1	0.5	0.0	0.4	1.2	0.1	0.0	0.0	0.0	2.1	2.8	1.9
23	2.0	2.5	1.7	2.2	3.1	1.6	0.1	0.2	0.1	0.0	0.0	0.0	0.2	0.6	0.0	0.5	1.2	0.1	0.0	0.0	0.0	1.9	2.2	1.6
Sum	**19,301**			**27,842**			**948**			**0**			**1,211**			**4,052**			**399**			**26,223**		
Average	2.2	2.7	1.9	3.2	4.5	2.2	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.5	2.8	0.1	0.0	0.1	0.0	3.0	3.9	2.2
Max	3.2	3.7	2.7	4.7	6.7	3.7	0.2	0.5	0.1	0.0	0.0	0.0	0.3	0.8	0.0	0.7	6.8	0.1	0.1	0.1	0.1	4.7	5.6	3.6
Min	1.8	2.2	1.5	2.0	2.7	1.6	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.3	1.1	0.1	0.0	0.0	0.0	1.6	1.6	1.6
Jan	2.3	3.7	1.6	3.5	6.7	2.0	0.1	0.2	0.0	0.0	0.0	0.0	0.3	0.8	0.0	1.0	6.8	0.3	0.0	0.1	0.0	3.0	5.6	1.6
Feb	2.2	3.5	1.7	3.4	6.6	1.9	0.1	0.2	0.0	0.0	0.0	0.0	0.2	0.5	0.0	0.6	3.2	0.1	0.0	0.1	0.0	3.1	5.6	1.6
Mar	2.2	3.6	1.7	3.4	6.6	1.8	0.1	0.2	0.0	0.0	0.0	0.0	0.2	0.5	0.0	0.5	2.6	0.1	0.0	0.1	0.0	3.1	5.6	1.6
Apr	2.2	3.4	1.7	3.3	6.4	1.8	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.4	2.0	0.1	0.0	0.1	0.0	3.1	5.6	1.6
May	2.2	3.2	1.7	3.1	6.0	1.7	0.1	0.5	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.4	1.5	0.1	0.0	0.1	0.0	3.0	5.5	1.6
Jun	2.2	3.2	1.7	3.0	5.7	1.6	0.1	0.4	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.3	0.8	0.1	0.0	0.1	0.0	3.0	5.3	1.6
Jul	2.2	3.2	1.6	2.9	5.7	1.6	0.1	0.5	0.1	0.0	0.0	0.0	0.1	0.2	0.0	0.2	0.9	0.1	0.0	0.1	0.0	2.9	5.2	1.6
Aug	2.2	3.3	1.7	2.9	5.4	1.6	0.1	0.4	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.2	0.9	0.1	0.0	0.1	0.0	2.9	5.1	1.6
Sep	2.2	3.5	1.7	2.9	5.6	1.6	0.1	0.5	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.2	0.9	0.1	0.0	0.1	0.0	2.9	5.1	1.6
Oct	2.2	3.4	1.7	3.0	5.7	1.6	0.1	0.5	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.3	0.9	0.1	0.0	0.1	0.0	2.9	5.2	1.6
Nov	2.2	3.5	1.5	3.2	6.3	1.8	0.1	0.2	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.5	3.3	0.1	0.0	0.1	0.0	2.9	5.3	1.6
Dec	2.3	3.6	1.7	3.5	6.6	2.0	0.1	0.1	0.0	0.0	0.0	0.0	0.3	0.7	0.0	0.9	4.8	0.3	0.0	0.1	0.0	3.0	5.4	1.6



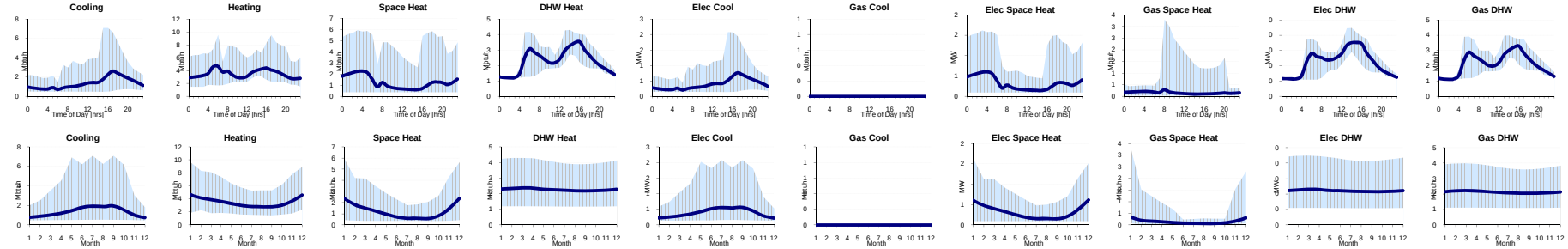
Treasure Island - District Energy Study

Energy End Use Summary - All Phases

PHASE 3

Energy End Use Demand

Cooling			Heating			Space Heat			DHW Heat			Elec Cool			Gas Cool			Elec Space Heat			Gas Space Heat			Elec DHW			Gas DHW		
Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual		
Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min
Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh
1.0	2.2	0.5	2.9	6.2	1.5	1.8	5.3	0.4	1.3	1.4	1.2	0.3	0.7	0.2	0.0	0.0	0.0	0.5	1.4	0.1	0.2	0.5	0.0	0.0	0.0	0.0	1.2	1.3	1.1
0.9	2.2	0.5	3.0	6.4	1.5	2.0	5.6	0.4	1.2	1.3	1.2	0.3	0.6	0.1	0.0	0.0	0.0	0.5	1.5	0.1	0.2	0.4	0.0	0.0	0.0	0.0	1.1	1.2	1.1
0.8	2.1	0.5	3.1	6.5	1.5	2.1	5.7	0.4	1.2	1.2	1.2	0.2	0.6	0.1	0.0	0.0	0.0	0.6	1.5	0.1	0.2	0.5	0.0	0.0	0.0	0.0	1.1	1.1	1.1
0.8	1.9	0.5	3.3	6.7	1.5	2.2	6.0	0.4	1.2	1.2	1.2	0.2	0.6	0.1	0.0	0.0	0.0	0.6	1.6	0.1	0.2	0.5	0.0	0.0	0.0	0.0	1.1	1.2	1.1
0.7	1.9	0.5	3.6	6.6	1.8	2.3	5.8	0.4	1.5	1.9	1.2	0.2	0.6	0.1	0.0	0.0	0.0	0.6	1.6	0.1	0.2	0.5	0.0	0.0	0.0	0.0	1.4	1.7	1.1
0.9	2.2	0.5	4.6	7.4	1.7	2.1	5.9	0.4	2.5	4.2	1.3	0.3	0.6	0.1	0.0	0.0	0.0	0.6	1.6	0.1	0.2	0.5	0.0	0.0	0.1	0.0	2.3	3.9	1.2
0.7	1.5	0.5	4.7	9.6	1.7	1.5	5.5	0.4	3.1	4.2	1.3	0.2	0.4	0.2	0.0	0.0	0.0	0.4	1.5	0.1	0.2	0.5	0.0	0.1	0.1	0.0	2.9	3.9	1.2
0.9	3.3	0.5	3.8	5.4	1.7	0.9	2.9	0.4	2.8	3.9	1.3	0.3	1.0	0.1	0.0	0.0	0.0	0.2	0.7	0.1	0.2	0.8	0.0	0.1	0.1	0.0	2.7	3.7	1.3
1.0	3.0	0.5	3.9	7.8	2.0	1.2	4.9	0.4	2.6	3.2	1.5	0.3	0.9	0.1	0.0	0.0	0.0	0.3	0.6	0.1	0.3	3.3	0.0	0.1	0.1	0.0	2.5	3.0	1.4
1.0	3.7	0.5	3.3	7.8	2.2	0.9	4.9	0.4	2.4	3.2	1.8	0.3	1.1	0.1	0.0	0.0	0.0	0.2	0.6	0.1	0.2	3.0	0.0	0.0	0.1	0.0	2.2	3.0	1.7
1.1	3.4	0.5	3.0	7.6	2.2	0.8	4.5	0.4	2.2	3.2	1.8	0.3	1.0	0.1	0.0	0.0	0.0	0.2	0.6	0.1	0.1	2.5	0.0	0.0	0.1	0.0	2.0	3.0	1.6
1.2	3.3	0.5	2.9	6.6	2.2	0.7	4.1	0.4	2.2	2.7	1.8	0.4	1.0	0.1	0.0	0.0	0.0	0.2	0.6	0.1	0.1	2.2	0.0	0.1	0.1	0.0	2.0	2.5	1.7
1.4	3.8	0.5	3.1	6.1	2.3	0.6	3.5	0.4	2.4	3.2	1.9	0.4	1.1	0.1	0.0	0.0	0.0	0.2	0.5	0.1	0.1	1.9	0.0	0.1	0.1	0.0	2.2	3.0	1.7
1.4	3.9	0.5	3.7	6.4	2.8	0.6	3.2	0.4	3.0	4.3	2.2	0.4	1.2	0.1	0.0	0.0	0.0	0.2	0.5	0.1	0.1	1.7	0.0	0.1	0.1	0.1	2.7	4.0	2.0
1.4	4.1	0.5	4.0	7.2	3.2	0.6	2.9	0.4	3.3	4.3	2.7	0.4	1.2	0.1	0.0	0.0	0.0	0.1	0.5	0.1	0.1	1.4	0.0	0.1	0.1	0.1	3.0	4.0	2.5
1.7	7.1	0.5	4.2	6.8	3.1	0.6	2.6	0.4	3.5	4.1	2.6	0.5	2.1	0.1	0.0	0.0	0.0	0.1	0.4	0.1	0.1	1.2	0.0	0.1	0.1	0.0	3.2	3.8	2.5
2.2	7.1	0.5	4.4	8.3	2.6	0.7	5.4	0.4	3.5	4.0	2.2	0.7	2.1	0.1	0.0	0.0	0.0	0.2	1.3	0.1	0.1	1.2	0.0	0.1	0.1	0.0	3.3	3.8	2.1
2.6	6.6	0.6	4.1	9.5	2.3	1.0	5.7	0.4	3.0	4.0	1.9	0.8	1.9	0.2	0.0	0.0	0.0	0.2	1.5	0.1	0.1	1.2	0.0	0.1	0.1	0.0	2.8	3.7	1.8
2.4	5.6	0.7	3.9	8.4	2.2	1.2	5.9	0.4	2.6	3.4	1.8	0.7	1.6	0.2	0.0	0.0	0.0	0.3	1.5	0.1	0.1	1.2	0.0	0.0	0.1	0.0	2.5	3.2	1.7
2.1	4.5	0.7	3.6	8.0	2.2	1.3	5.4	0.4	2.3	3.1	1.8	0.6	1.3	0.2	0.0	0.0	0.0	0.3	1.3	0.1	0.1	1.3	0.0	0.0	0.1	0.0	2.1	2.9	1.7
1.9	3.6	0.8	3.2	7.6	2.2	1.2	5.4	0.4	2.0	2.7	1.8	0.5	1.0	0.2	0.0	0.0	0.0	0.3	1.3	0.1	0.2	1.7	0.0	0.0	0.0	0.0	1.9	2.6	1.7
1.6	2.9	0.7	2.8	5.5	1.8	1.0	3.8	0.4	1.8	2.4	1.5	0.5	0.9	0.2	0.0	0.0	0.0	0.3	1.0	0.1	0.1	0.3	0.0	0.0	0.0	0.0	1.7	2.2	1.4
1.4	2.6	0.7	2.8	5.4	1.8	1.2	4.1	0.4	1.6	2.1	1.5	0.4	0.8	0.2	0.0	0.0	0.0	0.3	1.1	0.1	0.1	0.4	0.0	0.0	0.0	0.0	1.5	1.9	1.4
1.1	2.2	0.6	2.8	6.0	1.5	1.5	4.9	0.4	1.4	1.7	1.2	0.3	0.7	0.2	0.0	0.0	0.0	0.4	1.3	0.1	0.2	0.4	0.0	0.0	0.0	0.0	1.3	1.6	1.2
11,726			**30,854**			**10,975**			**19,879**			**3,437**			**0**			**2,829**			**1,323**			**388**			**18,555**		
1.3	3.5	0.6	3.5	7.1	2.1	1.3	4.7	0.4	2.3	3.0	1.7	0.4	1.0	0.2	0.0	0.0	0.0	0.3	1.1	0.1	0.2	1.2	0.0	0.0	0.1	0.0	2.1	2.8	1.6
2.6	7.1	0.8	4.7	9.6	3.2	2.3	6.0	0.4	3.5	4.3	2.7	0.8	2.1	0.2	0.0	0.0	0.0	0.6	1.6	0.1	0.3	3.3	0.0	0.1	0.1	0.1	3.3	4.0	2.5
0.7	1.5	0.5	2.8	5.4	1.5	0.6	2.6	0.4	1.2	1.2	1.2	0.2	0.4	0.1	0.0	0.0	0.0	0.1	0.4	0.1	0.1	0.3	0.0	0.0	0.0	0.0	1.1	1.1	1.1
0.8	2.0	0.5	4.6	9.6	1.9	2.4	6.0	0.4	2.3	4.2	1.2	0.2	0.6	0.1	0.0	0.0	0.0	0.6	1.6	0.1	0.3	3.3	0.1	0.0	0.1	0.0	2.2	3.9	1.1
0.9	2.5	0.5	4.1	8.3	2.3	1.8	4.2	0.4	2.3	4.3	1.2	0.3	0.7	0.1	0.0	0.0	0.0	0.5	1.1	0.1	0.2	1.5	0.0	0.0	0.1	0.0	2.2	4.0	1.1
1.0	3.6	0.5	3.9	8.1	1.8	1.5	4.2	0.4	2.4	4.3	1.2	0.3	1.0	0.1	0.0	0.0	0.0	0.4	1.1	0.1	0.2	1.2	0.0	0.0	0.1	0.0	2.2	4.0	1.1
1.2	4.5	0.5	3.6	7.4	1.8	1.3	3.5	0.4	2.4	4.3	1.2	0.4	1.3	0.1	0.0	0.0	0.0	0.3	0.9	0.1	0.1	0.9	0.0	0.0	0.1	0.0	2.2	4.0	1.1
1.4	6.9	0.5	3.3	6.4	1.8	1.0	2.8	0.4	2.3	4.2	1.2	0.4	2.0	0.1	0.0	0.0	0.0	0.3	0.8	0.1	0.1	0.7	0.0	0.0	0.1	0.0	2.1	3.9	1.1
1.8	6.2	0.5	3.0	5.8	1.6	0.7	2.3	0.4	2.3	4.1	1.2	0.5	1.8	0.2	0.0	0.0	0.0	0.2	0.6	0.1	0.1	0.2	0.0	0.0	0.1	0.0	2.1	3.8	1.1
1.9	7.1	0.6	2.9	5.3	1.6	0.6	1.8	0.4	2.2	4.0	1.2	0.6	2.1	0.2	0.0	0.0	0.0	0.2	0.5	0.1	0.1	0.3	0.0	0.0	0.1	0.0	2.1	3.7	1.1
1.9	6.3	0.5	2.8	5.3	1.5	0.6	1.9	0.4	2.2	3.9	1.2	0.5	1.8	0.2	0.0	0.0	0.0	0.2	0.5	0.1	0.1	0.3	0.0	0.0	0.1	0.0	2.0	3.6	1.1
1.9	7.1	0.6	2.8	5.3	1.5	0.6	2.1	0.4	2.2	3.9	1.2	0.6	2.1	0.2	0.0	0.0	0.0	0.1	0.6	0.1	0.1	0.3	0.0	0.0	0.1	0.0	2.0	3.6	1.1
1.5	6.2	0.5	3.0	6.2	1.6	0.8	2.6	0.4	2.2	3.9	1.2	0.5	1.8	0.2	0.0	0.0	0.0	0.2	0.7	0.1	0.1	0.3	0.0	0.0	0.1	0.0	2.1	3.7	1.1
1.0	3.1	0.5	3.7	7.8	1.8	1.4	4.3	0.4	2.2	4.0	1.2	0.3	0.9	0.1	0.0	0.0	0.0	0.4	1.2	0.1	0.2	1.5	0.0	0.0	0.1	0.0	2.1	3.7	1.1
0.7	1.8	0.5	4.6	9.0	2.4	2.4	5.6	0.5	2.3	4.1	1.2	0.2	0.5	0.1	0.0	0.0	0.0	0.6	1.5	0.1	0.3	2.3	0.1	0.0	0.1	0.0	2.1	3.8	1.1



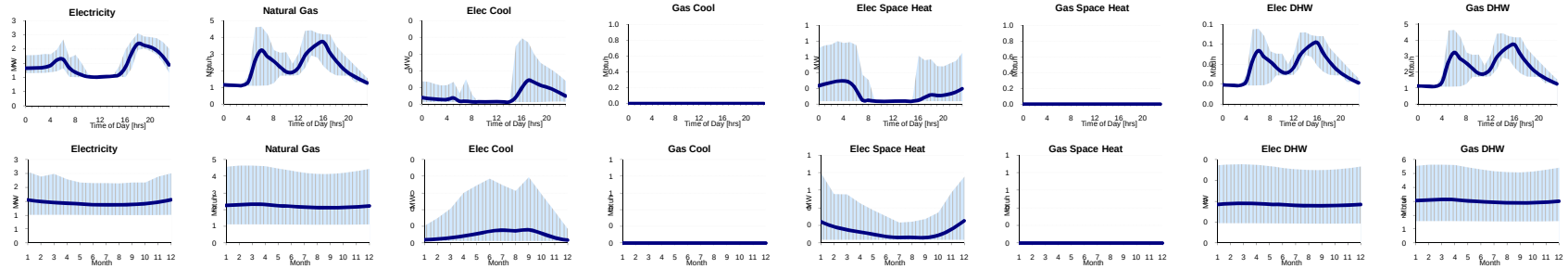
Treasure Island - District Energy Study

Energy End Use Summary - All Phases

PHASE 4

Energy Source Demand

	Electricity			Natural Gas			Elec Cool			Gas Cool			Elec Space Heat			Gas Space Heat			Elec DHW			Gas DHW		
	Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual		
	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min
Hour	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh
0	1.3	1.8	1.2	1.1	1.3	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.3	1.1
1	1.3	1.8	1.2	1.1	1.2	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.2	1.1
2	1.3	1.8	1.2	1.1	1.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.1	1.1
3	1.4	1.8	1.2	1.1	1.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.1	1.1
4	1.4	1.8	1.2	1.4	1.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.8	1.1
5	1.6	2.0	1.2	2.6	4.6	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.6	4.6	1.1
6	1.6	2.3	1.3	3.2	4.6	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.7	0.0	0.0	0.0	0.0	0.1	0.1	0.0	3.2	4.6	1.1
7	1.3	1.7	1.0	2.8	4.2	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.8	4.2	1.1
8	1.2	1.8	1.0	2.6	3.2	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.6	3.2	1.3
9	1.1	1.5	1.0	2.2	3.1	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.2	3.1	1.7
10	1.0	1.1	1.0	1.9	3.1	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.9	3.1	1.7
11	1.0	1.0	1.0	1.9	2.4	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	2.4	1.7
12	1.0	1.1	1.0	2.2	3.1	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.2	3.1	1.8
13	1.0	1.1	1.0	2.9	4.4	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.9	4.4	2.2
14	1.0	1.1	1.0	3.3	4.4	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	3.3	4.4	2.9
15	1.1	1.4	1.0	3.6	4.3	2.8	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	3.6	4.3	2.8
16	1.4	2.0	1.0	3.7	4.2	2.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.1	0.1	0.0	3.7	4.2	2.3
17	1.9	2.3	1.3	3.1	4.2	1.9	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.6	0.0	0.0	0.0	0.0	0.1	0.1	0.0	3.1	4.2	1.9
18	2.2	2.6	2.0	2.6	3.5	1.7	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.6	3.5	1.7
19	2.1	2.4	2.0	2.2	3.1	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.2	3.1	1.7
20	2.1	2.4	1.9	1.9	2.7	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	2.7	1.7
21	1.9	2.4	1.8	1.6	2.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	2.3	1.3
22	1.7	2.3	1.5	1.4	1.9	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.9	1.3
23	1.4	2.0	1.2	1.3	1.5	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.5	1.1
Sum	**12,624**			**19,318**			**84**			**0**			**1,135**			**0**			**322**			**19,318**		
Average	1.4	1.8	1.3	2.2	3.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	3.0	1.6
Max	2.2	2.6	2.0	3.7	4.6	2.9	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.8	0.0	0.0	0.0	0.0	0.1	0.1	0.0	3.7	4.6	2.9
Min	1.0	1.0	1.0	1.1	1.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.1	1.1
Jan	1.5	2.6	1.0	2.2	4.6	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.8	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.2	4.6	1.1
Feb	1.5	2.4	1.0	2.3	4.6	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.3	4.6	1.1
Mar	1.5	2.5	1.0	2.3	4.6	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.3	4.6	1.1
Apr	1.4	2.3	1.0	2.3	4.6	1.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.3	4.6	1.1
May	1.4	2.2	1.0	2.2	4.5	1.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.2	4.5	1.1
Jun	1.4	2.2	1.0	2.2	4.3	1.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.2	4.3	1.1
Jul	1.4	2.2	1.0	2.1	4.2	1.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.1	4.2	1.1
Aug	1.4	2.1	1.0	2.1	4.2	1.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.1	4.2	1.1
Sep	1.4	2.2	1.0	2.1	4.1	1.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.1	4.1	1.1
Oct	1.4	2.2	1.0	2.1	4.2	1.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.1	4.2	1.1
Nov	1.5	2.4	1.0	2.2	4.3	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.2	4.3	1.1
Dec	1.6	2.5	1.0	2.2	4.5	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.2	4.5	1.1



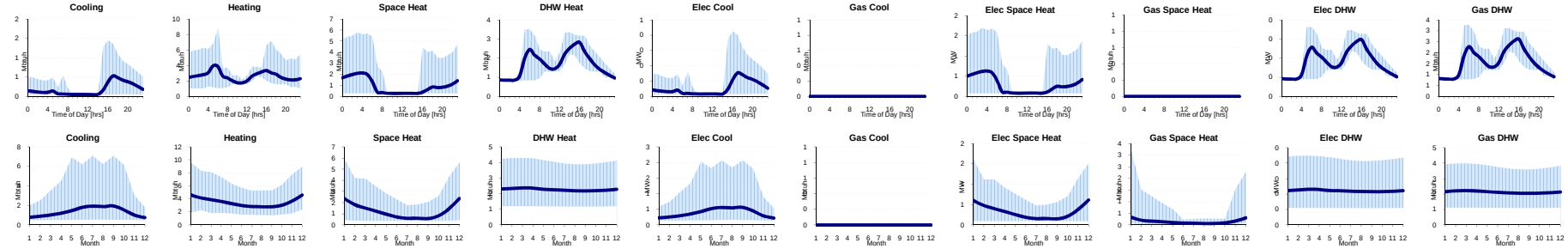
Treasure Island - District Energy Study

Energy End Use Summary - All Phases

PHASE 4

Energy End Use Demand

Cooling			Heating			Space Heat			DHW Heat			Elec Cool			Gas Cool			Elec Space Heat			Gas Space Heat			Elec DHW			Gas DHW		
Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual			Annual		
Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min
Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh	MW	MW	MW	Mbtuh	Mbtuh	Mbtuh
0.1	0.5	0.0	2.4	5.7	1.1	1.7	5.2	0.3	0.9	1.0	0.8	0.0	0.1	0.0	0.0	0.0	0.0	0.5	1.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.9	0.8
0.1	0.5	0.0	2.6	6.0	1.1	1.9	5.4	0.3	0.9	0.9	0.8	0.0	0.1	0.0	0.0	0.0	0.0	0.5	1.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	0.8
0.1	0.5	0.0	2.7	6.0	1.1	2.0	5.5	0.3	0.9	0.9	0.8	0.0	0.1	0.0	0.0	0.0	0.0	0.6	1.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	0.8
0.1	0.4	0.0	2.8	6.3	1.1	2.1	5.8	0.3	0.9	0.9	0.8	0.0	0.1	0.0	0.0	0.0	0.0	0.6	1.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	0.8
0.1	0.4	0.0	3.0	6.2	1.3	2.1	5.6	0.3	1.0	1.4	0.8	0.0	0.1	0.0	0.0	0.0	0.0	0.6	1.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.3	0.8
0.1	0.5	0.0	3.9	6.8	1.2	2.0	5.7	0.3	2.0	3.5	0.8	0.0	0.1	0.0	0.0	0.0	0.0	0.6	1.7	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.8	3.3	0.8
0.1	0.2	0.0	3.9	8.9	1.1	1.4	5.4	0.3	2.5	3.5	0.8	0.0	0.1	0.0	0.0	0.0	0.0	0.4	1.6	0.1	0.0	0.0	0.0	0.1	0.1	0.0	2.3	3.3	0.8
0.1	0.6	0.0	2.6	3.7	1.1	0.4	2.7	0.3	2.2	3.2	0.9	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.8	0.1	0.0	0.0	0.0	0.0	0.1	0.0	2.0	3.0	0.8
0.1	0.2	0.0	2.4	3.7	1.2	0.4	2.2	0.3	2.0	2.5	1.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.7	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.8	2.3	0.9
0.0	0.0	0.0	2.0	2.7	1.6	0.3	0.3	0.3	1.7	2.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.6	2.2	1.2
0.0	0.0	0.0	1.7	2.7	1.6	0.3	0.3	0.3	1.5	2.4	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.4	2.2	1.2
0.0	0.0	0.0	1.7	2.2	1.6	0.3	0.3	0.3	1.4	1.8	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.7	1.2
0.0	0.0	0.0	2.0	2.7	1.6	0.3	0.3	0.3	1.7	2.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.6	2.2	1.2
0.0	0.0	0.0	2.6	3.8	2.0	0.3	0.3	0.3	2.2	3.3	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	2.1	3.1	1.5
0.0	0.0	0.0	2.9	3.9	2.6	0.3	0.3	0.3	2.5	3.4	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	2.3	3.1	2.1
0.1	1.3	0.0	3.2	3.7	2.5	0.3	0.3	0.3	2.7	3.2	2.1	0.0	0.4	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	2.5	3.0	2.0
0.4	1.5	0.0	3.3	6.7	2.0	0.4	4.4	0.3	2.8	3.2	1.7	0.1	0.4	0.0	0.0	0.0	0.0	0.1	1.3	0.1	0.0	0.0	0.0	0.1	0.1	0.0	2.6	3.0	1.6
0.5	1.4	0.0	3.1	7.2	1.7	0.6	4.0	0.3	2.3	3.2	1.5	0.2	0.4	0.0	0.0	0.0	0.0	0.2	1.2	0.1	0.0	0.0	0.0	0.0	0.1	0.0	2.2	3.0	1.4
0.5	1.1	0.0	2.9	6.1	1.6	0.9	4.1	0.3	2.0	2.6	1.3	0.1	0.3	0.0	0.0	0.0	0.0	0.3	1.2	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.8	2.5	1.2
0.4	0.9	0.0	2.5	5.5	1.6	0.8	3.5	0.3	1.7	2.3	1.3	0.1	0.3	0.0	0.0	0.0	0.0	0.2	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.5	2.2	1.2
0.4	0.8	0.1	2.2	4.7	1.6	0.8	3.5	0.3	1.4	2.0	1.3	0.1	0.2	0.0	0.0	0.0	0.0	0.2	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.9	1.2
0.3	0.7	0.1	2.1	4.9	1.2	0.9	3.7	0.3	1.2	1.7	1.0	0.1	0.2	0.0	0.0	0.0	0.0	0.3	1.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.6	0.9
0.3	0.6	0.1	2.1	4.8	1.2	1.1	4.0	0.3	1.1	1.5	1.0	0.1	0.2	0.0	0.0	0.0	0.0	0.3	1.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.4	0.9
0.2	0.5	0.1	2.3	5.5	1.1	1.4	4.7	0.3	1.0	1.2	0.8	0.1	0.2	0.0	0.0	0.0	0.0	0.4	1.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.1	0.8
1,556			**22,972**			**8,266**			**14,706**			**456**			**0**			**2,423**			**0**			**310**			**13,647**		
0.2	0.5	0.1	2.6	5.0	1.5	0.9	3.2	0.3	1.7	2.3	1.2	0.1	0.2	0.0	0.0	0.0	0.0	0.3	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.6	2.1	1.1
0.5	1.5	0.1	3.9	8.9	2.6	2.1	5.8	0.3	2.8	3.5	2.2	0.2	0.4	0.0	0.0	0.0	0.0	0.6	1.7	0.1	0.0	0.0	0.0	0.1	0.1	0.0	2.6	3.3	2.1
0.0	0.0	0.0	1.7	2.2	1.1	0.3	0.3	0.3	0.9	0.9	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	0.8
0.1	0.4	0.0	3.4	8.9	1.2	1.8	5.8	0.3	1.7	3.5	0.9	0.0	0.1	0.0	0.0	0.0	0.0	0.5	1.7	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.6	3.2	0.8
0.1	0.6	0.0	3.1	7.6	1.3	1.4	4.1	0.3	1.7	3.5	0.9	0.0	0.2	0.0	0.0	0.0	0.0	0.4	1.2	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.6	3.3	0.8
0.1	0.8	0.0	2.9	7.4	1.1	1.1	4.0	0.3	1.8	3.5	0.9	0.0	0.2	0.0	0.0	0.0	0.0	0.3	1.2	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.6	3.3	0.8
0.2	1.1	0.0	2.7	6.6	1.1	0.9	3.3	0.3	1.8	3.5	0.9	0.0	0.3	0.0	0.0	0.0	0.0	0.3	1.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.6	3.3	0.8
0.2	1.3	0.0	2.4	5.7	1.1	0.7	2.7	0.3	1.7	3.4	0.8	0.1	0.4	0.0	0.0	0.0	0.0	0.2	0.8	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.6	3.2	0.8
0.3	1.4	0.0	2.2	5.0	1.1	0.5	2.2	0.3	1.7	3.3	0.8	0.1	0.4	0.0	0.0	0.0	0.0	0.2	0.7	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.6	3.1	0.8
0.3	1.3	0.0	2.1	4.6	1.1	0.5	1.7	0.3	1.6	3.2	0.8	0.1	0.4	0.0	0.0	0.0	0.0	0.1	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.5	3.0	0.8
0.3	1.2	0.0	2.1	4.6	1.1	0.5	1.8	0.3	1.6	3.2	0.8	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.5	2.9	0.8
0.3	1.5	0.0	2.1	4.6	1.1	0.4	2.0	0.3	1.6	3.2	0.8	0.1	0.4	0.0	0.0	0.0	0.0	0.1	0.6	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.5	2.9	0.8
0.2	1.1	0.0	2.3	5.5	1.1	0.6	2.5	0.3	1.6	3.2	0.8	0.1	0.3	0.0	0.0	0.0	0.0	0.2	0.7	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.5	3.0	0.8
0.1	0.7	0.0	2.8	7.1	1.1	1.1	4.2	0.3	1.6	3.3	0.8	0.0	0.2	0.0	0.0	0.0	0.0	0.3	1.2	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.5	3.1	0.8
0.1	0.3	0.0	3.5	8.3	1.6	1.8	5.5	0.3	1.7	3.4	0.9	0.0	0.1	0.0	0.0	0.0	0.0	0.5	1.6	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.6	3.1	0.8



Appendix J

District Energy Calculations

J1 District Energy Calculations

- Summary of District energy calculations including energy generation profiles and financial summaries.

Treasure Island - District Energy Study

Technology Summary - All Phases

Option 1 - Heating

Gas-Fired Boiler (Heating Hot Water)

Performamnce Summary

Phase		1	2	3	4
Peak Design Heating Demand	MBH	0	12.797	9.589	8.886
Proposed Case					
Operation		heat follow	heat follow	heat follow	heat follow
Percent of Demand		0%	100%	100%	100%
Boiler Efficiency Formula	`	0	0	0	0
Typical Boiler Size	Mbtu	10	10	10	10
Number of Boilers	boilers	0	2	1	1
Total Boiler Capacity	Mbtu	0	12.79685783	9.58883367	8.885833187
	HP	0	382.2376497	286.4150946	265.416717
Boiler Natural Gas Use Efficiency	%	85%	85%	85%	85%
Boiler Electrical Use Efficiency	kW/Mbtu	0.703	0.703	0.703	0.703
Heating Distribution and Infrastructure					
Area served	sf	0	3.92800675	4.39676675	3.40419675
Customers Served	qty	0	20	30	30
Total Length of Piping	lf	0	10500	4500	6000
Average Pipe Diameter	in.	0	0	0	0
Average Pressure Drop	ft hd / 100 ft	0.75	0.75	0.75	0.75
Design Delta T	degF	40	40	40	40
Peak Flow	gpm	0	639.8428914	479.4416835	444.2916593
Equivalent Length Factor		10	10	10	10
Pump Efficiency		65%	65%	65%	65%
Pump Motor Efficiency		90%	90%	90%	90%
Total Pressure Drop	ft hd	0	787.5	337.5	450
Average Pump Capacity	hp	0	101.58892	32.62360863	40.30910038
Number of Pumps	pumps	0	4	2	2
Average Pump Capcity	hp per pump	#DIV/0!	25.39723	16.31180431	20.15455019

Treasure Island - District Energy Study

Technology Summary - All Phases
Option 1 - Heating

Electric Cooling

Performamnce Summary

Phase		1	2	3	4
Phase Cooling Peak Demand Increase	Mbtuh	0.000	23.343	7.103	1.459
	tons	0	1,945	592	122

Proposed Case					
Operation		load follow	load follow	load follow	load follow
Percent of Demand		0%	0%	0%	0%
Typical Cooling Plant Size	Mbtu	9	9	9	9
	tons	750	750	750	750
Number of Chillers	chiller	0	0	0	0
Total Cooling Capacity	Mbtuh	0.000	0.000	0.000	0.000
	tons	0	0	0	0
Chiller Electrical Use Efficiency	COP	4.00	4.00	4.00	4.00
Chiller Natural Gas Use Efficiency	therm/Mbtu	0%	0%	0%	0%
Heat Rejection Rate	Btu/ton	15,000	15,000	15,000	15,000

Cooling Distribution and Infrastructure					
Area served	sf	0.00	0.00	0.00	0.00
Customers Served	qty	-	-	-	-
Total Length of Piping	lf	0	0	0	0
Average Pipe Diameter	in.	0	0	0	0
Average Pressure Drop	ft hd / 100 ft	0.75	0.75	0.75	0.75
Design Delta T	degF	14	14	14	14
Peak Flow	gpm	0	0	0	0
Equivalent Length Factor		10	10	10	10
Pump Efficiency		65%	65%	65%	65%
Pump Motor Efficiency		90%	90%	90%	90%
Total Pressure Drop	ft hd	0	0	0	0
Average Pump Capacity	hp	0	0	0	0
Number of Pumps	pumps	0	0	0	0
Average Pump Capcity	hp per pump	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Treasure Island - District Energy Study

Technology Summary - All Phases

Option 1 - Heating

Gas Fired Turbine (Heat Recovery)

Performamnce Summary

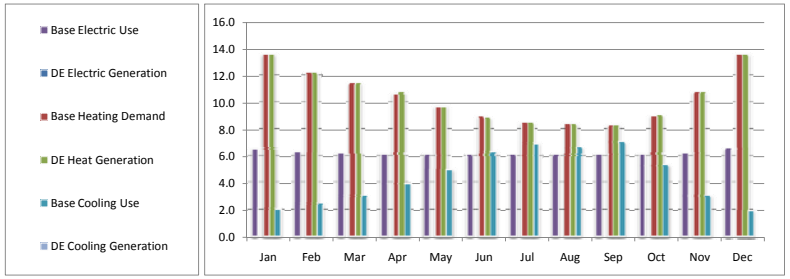
Phase		1	2	3	4
Heat Recovery	y/n	y	y	y	y
Absorption Cooling	y/n	n	n	n	n
Combined Heat and Power					
Type		Gas Turbine	Gas Turbine	Gas Turbine	Gas Turbine
Electrical Capacity	kW-e	0	0	0	0
Electrical Efficiency (HHV)	%	22%	23%	23%	23%
Fuel HHV (Nat Gas)	Btu/scf	1000	1000	1000	1000
Power to Heat Ratio		0.48	0.5	0.48	0.48
Thermal Heat Rate	Mbtu/kWh	0	0	0	0
Max Operating Point	%	100%	100%	100%	100%
Max Turndown	%	50%	50%	50%	50%
Heating Distribution					
Auxillary Boiler Gas Efficiency	%	80%	80%	80%	80%
Auxillary Boiler Elec Efficiency	kW/Mbtu	0.70339977	0.70339977	0.70339977	0.70339977
Cooling Plant					
Absorption Chiller Performance	COP	0.6	0.6	0.6	0.6
Chiller Electrical Performance	kW/Mbtu	1.31887456	1.31887456	1.31887456	1.31887456
Heat Rejection Rate	Btu-heat_ reje	1.5	1.5	1.5	1.5

Treasure Island - District Energy Study

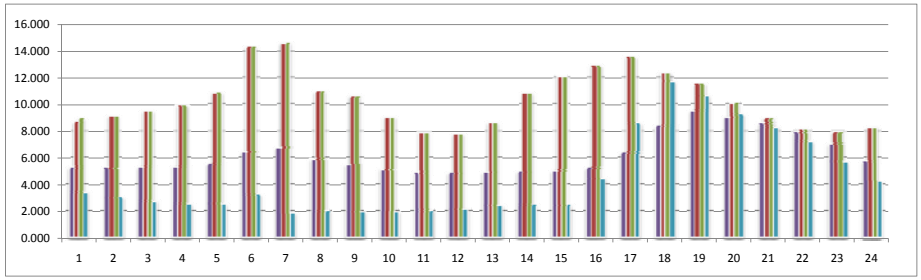
Cashflow Summary - All Phases

Option 1 - Heating

Annual Profiles



Hourly Profiles



Total

	Generation			Generation Resource Use		End Use Energy Savings											Resource Use Savings		Impacts
	Heat Generation	Cool Generation	Electric Generation	Natural Gas Use	Electric Use	Cooling Use	Heat Rejection	Heating Use	Space Heat	DHW Heat	Elec Cool	Gas Cool	Elec Space Heat	Gas Space Heat	Elec DHW	Gas DHW	Electric Use	Natural Gas Use	CO2 Emissions
	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg
Hour	Mbtuh	Mbtuh	MW	Mbtuh	MW	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	MW	Mbtuh	MW	Mbtuh	MW	Mbtuh	MW	Mbtuh	Tonnes CO2
1	8.949	0.000	0.000	10.528	0.006	0.000	0.000	8.949	5.769	3.714	0.000	0.000	1.639	0.182	0.077	3.449	0.890	5.470	-0.202
2	9.127	0.000	0.000	10.738	0.006	0.000	0.000	9.127	6.056	3.595	0.000	0.000	1.722	0.184	0.076	3.337	0.930	5.314	-0.195
3	9.515	0.000	0.000	11.195	0.007	0.000	0.000	9.515	6.492	3.577	0.000	0.000	1.846	0.199	0.075	3.318	0.993	5.338	-0.194
4	9.922	0.000	0.000	11.673	0.007	0.000	0.000	9.922	6.908	3.592	0.000	0.000	1.965	0.209	0.075	3.334	1.054	5.392	-0.195
5	10.880	0.000	0.000	12.800	0.008	0.000	0.000	10.880	7.014	4.367	0.000	0.000	1.995	0.214	0.090	4.057	1.085	6.432	-0.237
6	14.341	0.000	0.000	16.872	0.010	0.000	0.000	14.341	6.515	7.912	0.000	0.000	1.851	0.206	0.162	7.358	1.085	11.080	-0.429
7	14.614	0.000	0.000	17.193	0.010	0.000	0.000	14.614	4.540	9.829	0.000	0.000	1.276	0.191	0.201	9.145	0.837	13.564	-0.533
8	10.962	0.000	0.000	12.896	0.008	0.000	0.000	10.962	1.862	8.800	0.000	0.000	0.499	0.158	0.180	8.185	0.391	12.085	-0.478
9	10.649	0.000	0.000	12.528	0.007	0.000	0.000	10.649	2.382	8.082	0.000	0.000	0.599	0.345	0.168	7.508	0.392	11.444	-0.439
10	9.034	0.000	0.000	10.628	0.006	0.000	0.000	9.034	1.781	7.131	0.000	0.000	0.459	0.216	0.151	6.615	0.324	9.908	-0.388
11	7.913	0.000	0.000	9.310	0.006	0.000	0.000	7.913	1.557	6.308	0.000	0.000	0.409	0.160	0.141	5.827	0.302	8.669	-0.344
12	7.764	0.000	0.000	9.134	0.005	0.000	0.000	7.764	1.465	6.250	0.000	0.000	0.388	0.138	0.144	5.758	0.301	8.515	-0.341
13	8.622	0.000	0.000	10.143	0.006	0.000	0.000	8.622	1.382	7.094	0.000	0.000	0.369	0.119	0.163	6.540	0.316	9.578	-0.387
14	10.830	0.000	0.000	12.742	0.008	0.000	0.000	10.830	1.347	9.117	0.000	0.000	0.362	0.105	0.204	8.422	0.358	12.211	-0.497
15	12.074	0.000	0.000	14.204	0.008	0.000	0.000	12.074	1.319	10.262	0.000	0.000	0.357	0.095	0.224	9.499	0.377	13.718	-0.558
16	12.926	0.000	0.000	15.207	0.009	0.000	0.000	12.926	1.310	11.039	0.000	0.000	0.355	0.093	0.235	10.240	0.388	14.767	-0.600
17	13.554	0.000	0.000	15.946	0.010	0.000	0.000	13.554	1.620	11.345	0.000	0.000	0.443	0.105	0.237	10.537	0.434	15.228	-0.616
18	12.364	0.000	0.000	14.546	0.009	0.000	0.000	12.364	2.522	9.507	0.000	0.000	0.704	0.115	0.196	8.839	0.523	12.857	-0.516
19	11.569	0.000	0.000	13.610	0.008	0.000	0.000	11.569	3.327	8.109	0.000	0.000	0.940	0.116	0.166	7.541	0.602	11.022	-0.440
20	10.093	0.000	0.000	11.874	0.007	0.000	0.000	10.093	3.204	6.881	0.000	0.000	0.902	0.125	0.140	6.405	0.540	9.439	-0.373
21	8.987	0.000	0.000	10.573	0.006	0.000	0.000	8.987	3.160	5.920	0.000	0.000	0.877	0.168	0.119	5.513	0.522	8.266	-0.321
22	8.145	0.000	0.000	9.582	0.006	0.000	0.000	8.145	3.026	5.271	0.000	0.000	0.850	0.121	0.106	4.909	0.522	7.337	-0.286
23	7.971	0.000	0.000	9.378	0.006	0.000	0.000	7.971	3.577	4.648	0.000	0.000	1.009	0.132	0.094	4.326	0.588	6.547	-0.252
24	8.280	0.000	0.000	9.741	0.006	0.000	0.000	8.280	4.575	4.083	0.000	0.000	1.296	0.154	0.084	3.795	0.722	5.865	-0.222
Annual	90,916	0	0	106,960	64	0	0	90,893	30,189	60,748	0	0	8,436	1,406	1,281	56,376	5,284	83,966	-3,300
Avg	10.379	0.000	0.000	12.210	0.007	0.000	0.000	10.379	3.446	6.935	0.000	0.000	0.963	0.160	0.146	6.436	0.603	9.585	-0.377
Max	14.614	0.000	0.000	17.193	0.010	0.000	0.000	14.614	7.014	11.345	0.000	0.000	1.995	0.345	0.237	10.537	1.085	15.228	-0.194
Min	7.764	0.000	0.000	9.134	0.005	0.000	0.000	7.764	1.310	3.577	0.000	0.000	0.355	0.093	0.075	3.318	0.301	5.314	-0.616
Jan	13.520	0.000	0.000	15.905	0.010	0.000	0.000	13.520	6.662	7.050	0.000	0.000	1.844	0.385	0.147	6.548	1.030	10.311	0.000
Feb	12.141	0.000	0.000	14.283	0.009	0.000	0.000	12.141	5.023	7.191	0.000	0.000	1.410	0.216	0.150	6.679	0.818	10.109	0.000
Mar	11.363	0.000	0.000	13.369	0.008	0.000	0.000	11.363	4.107	7.264	0.000	0.000	1.154	0.171	0.152	6.746	0.691	10.080	0.000
Apr	10.730	0.000	0.000	12.624	0.008	0.000	0.000	10.730	3.472	7.247	0.000	0.000	0.975	0.146	0.151	6.731	0.608	9.987	0.000
May	9.654	0.000	0.000	11.358	0.007	0.000	0.000	9.654	2.600	6.995	0.000	0.000	0.728	0.112	0.147	6.494	0.490	9.543	0.000
Jun	8.811	0.000	0.000	10.366	0.006	0.000	0.000	8.811	1.882	6.841	0.000	0.000	0.525	0.084	0.145	6.346	0.392	9.246	0.000
Jul	8.438	0.000	0.000	9.928	0.006	0.000	0.000	8.438	1.580	6.759	0.000	0.000	0.440	0.070	0.144	6.269	0.352	9.090	0.000
Aug	8.351	0.000	0.000	9.824	0.006	0.000	0.000	8.351	1.586	6.676	0.000	0.000	0.443	0.068	0.143	6.190	0.352	8.968	0.000
Sep	8.306	0.000	0.000	9.772	0.006	0.000	0.000	8.306	1.562	6.656	0.000	0.000	0.436	0.068	0.142	6.171	0.349	8.943	0.000
Oct	8.988	0.000	0.000	10.574	0.006	0.000	0.000	8.988	2.149	6.775	0.000	0.000	0.601	0.091	0.144	6.284	0.429	9.179	0.000
Nov	10.739	0.000	0.000	12.634	0.008	0.000	0.000	10.739	3.986	6.802	0.000	0.000	1.117	0.176	0.144	6.310	0.675	9.473	0.000
Dec	13.508	0.000	0.000	15.892	0.010	0.000	0.000	13.508	6.753	6.962	0.000	0.000	1.884	0.338	0.146	6.463	1.053	10.096	0.000

Treasure Island - District Energy Study

Cashflow Summary - All Phases
Option 1 - Heating

Cashflow - Option 1 - Heating

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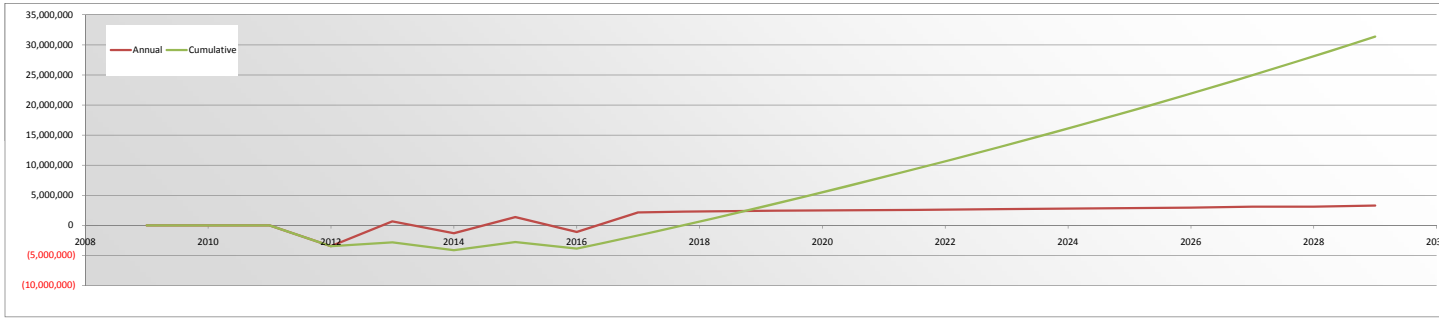


	Cap Ex	OpEx - 1st yr	PV	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21
	(Non-Amortized)	(Non-Amortized)	#REF!	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Plant	1,857,735	87,149	4,676,379	0	0	0	866,283	37,655	698,158	74,118	740,053	114,758	118,775	122,932	127,234	131,688	136,297	141,067	146,004	151,115	156,404	394,678	167,543	351,617	179,477
Total Infrastructure	4,475,000	263,750	11,772,731	0	0	0	2,259,013	128,379	1,424,481	222,803	1,948,178	347,308	359,464	372,045	385,067	398,544	412,493	426,931	441,873	457,339	473,346	564,212	507,060	644,194	543,175
Total	6,332,735	350,899	16,449,110	0	0	0	3,125,296	166,034	2,122,640	296,921	2,688,231	462,067	478,239	494,977	512,301	530,232	548,790	567,998	587,878	608,453	629,749	958,890	674,603	995,811	722,652
Administration & Other Operating Costs	0	175,449	4,297,348	0	0	0	40,105	83,017	114,681	148,460	188,439	231,033	239,119	247,489	256,151	265,116	274,395	283,999	293,939	304,227	314,875	325,895	337,302	349,107	361,326
Total Annual	6,332,735	526,348	20,746,458	0	0	0	3,165,401	249,051	2,237,321	445,381	2,876,670	693,100	717,358	742,466	768,452	795,348	823,185	851,997	881,817	912,680	944,624	1,284,786	1,011,905	1,344,918	1,083,978
Design - Soft Costs	316,637	0	372,850	0	0	0	156,265	0	97,540	0	119,046	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction - Soft Costs	316,637	0	372,850	0	0	0	156,265	0	97,540	0	119,046	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	633,273	0	745,701	0	0	0	312,530	0	195,079	0	238,092	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	6,332,735	526,348	21,492,159	0	0	0	3,477,930	249,051	2,432,400	445,381	3,114,761	693,100	717,358	742,466	768,452	795,348	823,185	851,997	881,817	912,680	944,624	1,284,786	1,011,905	1,344,918	1,083,978
Resource Cost	0	645,598	12,492,596	0	0	0	0	142,482	290,798	420,651	555,700	663,169	774,808	790,675	806,866	823,389	840,251	857,458	875,018	892,937	911,223	929,884	948,927	968,360	988,191
Contingency	0	93,756	2,315,336	0	0	0	250,024	24,681	193,075	57,406	259,514	90,019	100,244	102,852	105,533	108,290	111,123	114,036	117,032	120,111	123,278	151,102	129,882	157,134	136,867
Loan payment	0	776,544	18,558,881	0	0	0	0	373,469	386,540	649,790	672,533	1,022,561	1,058,350	1,095,392	1,133,731	1,173,412	1,214,481	1,256,988	1,300,983	1,346,517	1,393,645	1,442,423	1,492,907	1,545,159	1,599,240
Breakeven	0	2,042,246	45,956,057	0	0	0	0	789,682	972,118	1,573,228	1,758,243	2,468,849	2,650,760	2,731,385	2,814,583	2,900,439	2,989,041	3,080,479	3,174,849	3,272,245	3,372,770	3,808,194	3,583,621	4,015,571	3,808,276
Min Profit	0	306,337	6,893,409	0	0	0	0	118,452	145,818	235,984	263,736	370,327	397,614	409,708	422,187	435,066	448,356	462,072	476,227	490,837	505,915	571,229	537,543	602,336	571,241
Breakeven+Profit	0	2,348,583	52,849,465	0	0	0	0	908,135	1,117,935	1,809,212	2,021,979	2,839,176	3,048,374	3,141,093	3,236,770	3,335,505	3,437,397	3,542,551	3,651,076	3,763,082	3,878,685	4,379,423	4,121,165	4,617,906	4,379,517
$/MWh	0	0	30,972	0	0	0	0	823	507	1,336	1,055	2,121	1,737	1,789	1,844	1,900	1,958	2,018	2,080	2,144	2,210	2,451	2,348	2,649	2,495
Conventional customer charges	0	2,481,316	47,517,991	0	0	0	0	551,055	1,123,629	1,629,133	2,154,081	2,546,515	2,953,380	3,011,128	3,070,012	3,130,056	3,191,283	3,253,716	3,317,379	3,382,297	3,448,493	3,515,994	3,584,826	3,655,014	3,726,586
Cashflow	0	0	31,357,306	0	0	0	(3,477,930)	659,084	(1,314,465)	1,363,831	(1,092,782)	2,146,076	2,331,016	2,398,627	2,468,318	2,540,157	2,614,212	2,690,555	2,769,259	2,850,402	2,934,062	3,094,638	3,109,260	3,272,988	3,295,540
Cashflow - Cumulative	0	0	163,656,230	0	0	0	(3,477,930)	(2,818,847)	(4,133,312)	(2,769,481)	(3,862,263)	(1,716,187)	614,829	3,013,456	5,481,774	8,021,931	10,636,143	13,326,698	16,095,957	18,946,359	21,880,420	24,975,058	28,084,318	31,357,306	34,652,846
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Resource Use																									
Customers				0%	20%	15%	10%	18%	50%	63%	75%	88%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
natural gas use (Mbtu)		106,960		0	0	0	0	21767.306	43534.612	61710.744	79886.875	93423.524	106960.17	106960.17	106960.17	106960.17	106960.17	106960.17	106960.17	106960.17	106960.17	106960.17	106960.17	106960.17	106960.17
electricity use (MWh)		64		0	0	0	0	13	26	37	48	56	64	64	64	64	64	64	64	64	64	64	64	64	64
Resource Cost		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
natural gas use ($)		641,761	12,421,937	0	0	0	0	141647.19	289101.92	418205.83	552481.51	659343.26	770354.16	786146.42	802262.42	818708.8	835492.33	852619.92	870098.63	887935.65	906138.34	924714.17	943670.81	963016.06	982757.89
electricity use ($)		3,837	70,659	0	0	0	0	834.3502	1696.5677	2445.0633	3218.0856	3826.2314	4453.7918	4528.1701	4603.7905	4680.6738	4758.8411	4838.3137	4919.1136	5001.2628	5084.7838	5169.6997	5256.0337	5343.8095	5433.0511
Total		645,598	12,492,596	0	0	0	0	142,482	290,798	420,651	555,700	663,169	774,808	790,675	806,866	823,389	840,251	857,458	875,018	892,937	911,223	929,884	948,927	968,360	988,191
Resource Savings		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
natural gas use (Mbtu)		167,931	0	0	0	0	0	34337.921	68675.842	98976.45	129277.06	148604.07	167931.09	167931.09	167931.09	167931.09	167931.09	167931.09	167931.09	167931.09	167931.09	167931.09	167931.09	167931.09	167931.09
electricity use (MWh)		5,284	0	0	0	0	0	1,103	2,206	3,014	3,822	4,553	5,284	5,284	5,284	5,284	5,284	5,284	5,284	5,284	5,284	5,284	5,284	5,284	5,284
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
natural gas use ($)		1,847,242	35,860,850	0	0	0	0	409655.43	836106.74	1229709.7	1639099.1	1922770.6	2217383.8	2262840.2	2309228.4	2356567.6	2404877.2	2454177.2	2504487.8	2555829.8	2608224.4	2661693	2716257.7	2771940.9	2828765.7
electricity use ($)		634,074	11,657,142	0	0	0	0	141399.67	287522.09	399423.18	514981.57	623744.38	735996.25	748287.39	760783.79	773488.88	786406.14	799539.13	812891.43	826466.72	840268.71	854301.2	868568.03	883073.11	897820.43
		2,481,316	47,517,991	0	0	0	0	551,055	1,123,629	1,629,133	2,154,081	2,546,515	2,953,380	3,011,128	3,070,012	3,130,056	3,191,283	3,253,716	3,317,379	3,382,297	3,448,493	3,515,994	3,584,826	3,655,014	3,726,586

Treasure Island - District Energy Study

Technology Summary - All Phases
Option 2 - Heating and Cooling

Gas-Fired Boiler (Heating Hot Water)

Performamnce Summary

Phase		1	2	3	4
Peak Design Heating Demand	MBH	0	12.797	9.589	8.886
Proposed Case					
Operation		heat follow	heat follow	heat follow	heat follow
Percent of Demand		0%	44%	30%	33%
Boiler Efficiency Formula	`	0	0	0	0
Typical Boiler Size	Mbtu	10	10	10	10
Number of Boilers	boilers	0	1	1	1
Total Boiler Capacity	Mbtu	0	5.688524495	2.911428426	2.900649401
	HP	0	169.9142292	86.96334476	86.64137906
Boiler Natural Gas Use Efficiency	%	85%	85%	85%	85%
Boiler Electrical Use Efficiency	kW/Mbtu	0.703	0.703	0.703	0.703
Heating Distribution and Infrastructure					
Area served	sf	0	3.92800675	4.39676675	3.40419675
Customers Served	qty	0	20	30	30
Total Length of Piping	lf	0	10500	4500	6000
Average Pipe Diameter	in.	0	0	0	0
Average Pressure Drop	ft hd / 100 ft	0.75	0.75	0.75	0.75
Design Delta T	degF	40	40	40	40
Peak Flow	gpm	0	284.4262248	145.5714213	145.0324701
Equivalent Length Factor		10	10	10	10
Pump Efficiency		65%	65%	65%	65%
Pump Motor Efficiency		90%	90%	90%	90%
Total Pressure Drop	ft hd	0	787.5	337.5	450
Average Pump Capacity	hp	0	45.15882474	9.905407143	13.15831227
Number of Pumps	pumps	0	2	2	2
Average Pump Capcity	hp per pump	#DIV/0!	22.57941237	4.952703571	6.579156136

Treasure Island - District Energy Study

Technology Summary - All Phases
Option 2 - Heating and Cooling

Electric Cooling

Performamnce Summary

Phase		1	2	3	4
Phase Cooling Peak Demand Increase	Mbtuh	0.000	23.343	7.103	1.459
	tons	0	1,945	592	122
Proposed Case					
Operation		load follow	load follow	load follow	load follow
Percent of Demand		0%	100%	100%	100%
Typical Cooling Plant Size	Mbtu	9	9	9	9
	tons	750	750	750	750
Number of Chillers	chiller	0	3	1	1
Total Cooling Capacity	Mbtuh	0.000	23.343	7.103	1.459
	tons	0	1,945	592	122
Chiller Electrical Use Efficiency	COP	4.00	4.00	4.00	4.00
Chiller Natural Gas Use Efficiency	therm/Mbtu	0%	0%	0%	0%
Heat Rejection Rate	Btu/ton	15,000	15,000	15,000	15,000
Cooling Distribution and Infrastructure					
Area served	sf	0.00	1.45	1.10	0.08
Customers Served	qty	-	10	8	2
Total Length of Piping	lf	0	6000	0	0
Average Pipe Diameter	in.	0	0	0	0
Average Pressure Drop	ft hd / 100 ft	0.75	0.75	0.75	0.75
Design Delta T	degF	14	14	14	14
Peak Flow	gpm	0	3335	1015	208
Equivalent Length Factor		10	10	10	10
Pump Efficiency		65%	65%	65%	65%
Pump Motor Efficiency		90%	90%	90%	90%
Total Pressure Drop	ft hd	0	450	0	0
Average Pump Capacity	hp	0	303	0	0
Number of Pumps	pumps	0	6	2	2
Average Pump Capcity	hp per pump	#DIV/0!	50	0	0

Treasure Island - District Energy Study

Technology Summary - All Phases
Option 2 - Heating and Cooling

Gas Fired Turbine (Heat Recovery)

Performamnce Summary

Phase		1	2	3	4
Heat Recovery	y/n	y	y	y	y
Absorption Cooling	y/n	y	n	n	n

Combined Heat and Power					
Type		Gas Turbine	Gas Turbine	Gas Turbine	Gas Turbine
Electrical Capacity	kW-e	0	500	500	500
Electrical Efficiency (HHV)	%	22%	23%	23%	23%
Fuel HHV (Nat Gas)	Btu/scf	1000	1000	1000	1000
Power to Heat Ratio		0.48	0.5	0.48	0.48
Thermal Heat Rate	Mbtu/kWh	0	3.412	3.55416667	3.55416667
Max Operating Point	%	100%	100%	100%	100%
Max Turndown	%	50%	50%	50%	50%

Heating Distribution					
Auxillary Boiler Gas Efficiency	%	80%	80%	80%	80%
Auxillary Boiler Elec Efficiency	kW/Mbtu	0.70339977	0.70339977	0.70339977	0.70339977

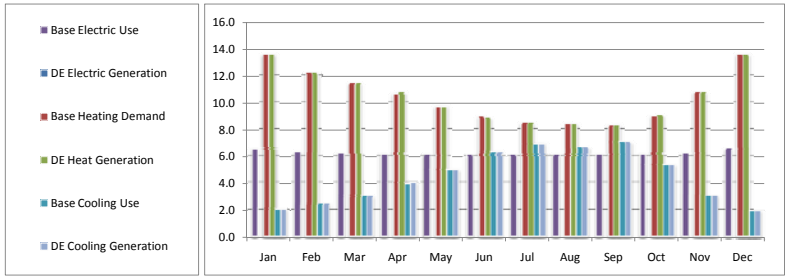
Cooling Plant					
Absorption Chiller Performance	COP	0.6	0.6	0.6	0.6
Chiller Electrical Performance	kW/Mbtu	1.31887456	1.31887456	1.31887456	1.31887456
Heat Rejection Rate	Btu-heat_ reje	1.5	1.5	1.5	1.5

Treasure Island - District Energy Study

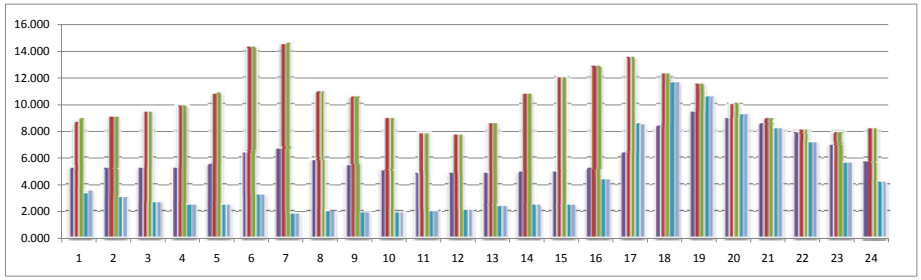
Cashflow Summary - All Phases

Option 2 - Heating and Cooling

Annual Profiles



Hourly Profiles



Total

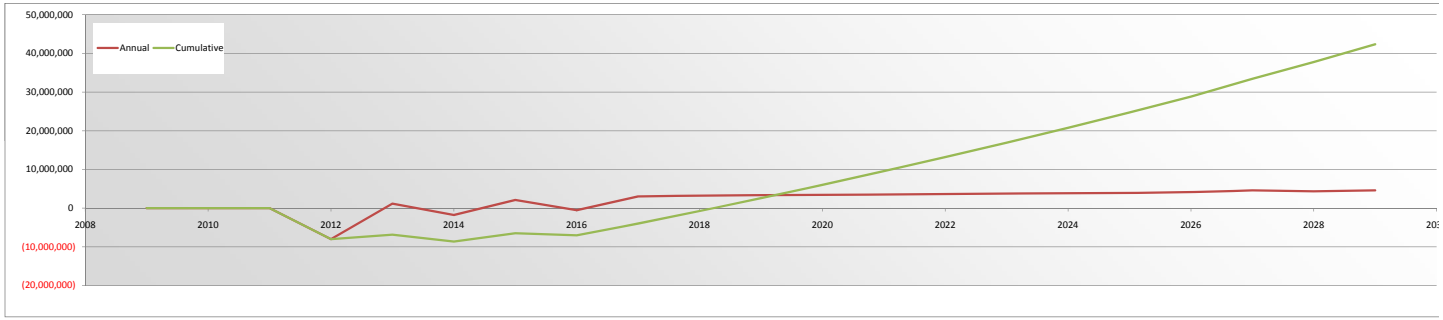
	Generation			Generation Resource Use		End Use Energy Savings											Resource Use Savings		Impacts
	Heat Generation	Cool Generation	Electric Generation	Natural Gas Use	Electric Use	Cooling Use	Heat Rejection	Heating Use	Space Heat	DHW Heat	Elec Cool	Gas Cool	Elec Space Heat	Gas Space Heat	Elec DHW	Gas DHW	Electric Use	Natural Gas Use	CO2 Emissions
	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg
Hour	Mbtuh	Mbtuh	MW	Mbtuh	MW	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	MW	Mbtuh	MW	Mbtuh	MW	Mbtuh	MW	Mbtuh	Tons CO2
1	8.949	3.554	0.000	10.528	0.267	3.554	4.442	8.949	5.769	3.714	1.042	0.000	1.639	0.182	0.077	3.449	1.109	5.470	-0.017
2	9.127	3.001	0.000	10.738	0.226	3.001	3.751	9.127	6.056	3.595	0.880	0.000	1.722	0.184	0.076	3.337	1.118	5.314	-0.039
3	9.515	2.723	0.000	11.195	0.206	2.723	3.404	9.515	6.492	3.577	0.798	0.000	1.846	0.199	0.075	3.318	1.164	5.338	-0.052
4	9.922	2.511	0.000	11.673	0.191	2.511	3.139	9.922	6.908	3.592	0.736	0.000	1.965	0.209	0.075	3.334	1.212	5.392	-0.064
5	10.880	2.501	0.000	12.800	0.191	2.501	3.126	10.880	7.014	4.367	0.733	0.000	1.995	0.214	0.090	4.057	1.243	6.432	-0.107
6	14.341	3.250	0.000	16.872	0.248	3.250	4.063	14.341	6.515	7.912	0.953	0.000	1.851	0.206	0.162	7.358	1.286	11.080	-0.260
7	14.614	1.821	0.000	17.193	0.144	1.821	2.276	14.614	4.540	9.829	0.534	0.000	1.276	0.191	0.201	9.145	0.962	13.564	-0.439
8	10.962	2.007	0.000	12.896	0.155	2.007	2.509	10.962	1.862	8.800	0.588	0.000	0.499	0.158	0.180	8.185	0.533	12.085	-0.373
9	10.649	1.921	0.000	12.528	0.148	1.921	2.401	10.649	2.382	8.082	0.563	0.000	0.599	0.345	0.168	7.508	0.535	11.444	-0.339
10	9.034	1.932	0.000	10.628	0.148	1.932	2.415	9.034	1.781	7.131	0.566	0.000	0.459	0.216	0.151	6.615	0.469	9.908	-0.287
11	7.913	2.034	0.000	9.310	0.155	2.034	2.542	7.913	1.557	6.308	0.596	0.000	0.409	0.160	0.141	5.827	0.456	8.669	-0.238
12	7.764	2.172	0.000	9.134	0.165	2.172	2.715	7.764	1.465	6.250	0.636	0.000	0.388	0.138	0.144	5.758	0.466	8.515	-0.228
13	8.622	2.404	0.000	10.143	0.182	2.404	3.004	8.622	1.382	7.094	0.704	0.000	0.369	0.119	0.163	6.540	0.499	9.578	-0.262
14	10.830	2.451	0.000	12.742	0.187	2.451	3.063	10.830	1.347	9.117	0.718	0.000	0.362	0.105	0.204	8.422	0.545	12.211	-0.369
15	12.074	2.468	0.000	14.204	0.189	2.468	3.085	12.074	1.319	10.262	0.723	0.000	0.357	0.095	0.224	9.499	0.566	13.718	-0.430
16	12.926	4.438	0.000	15.207	0.334	4.438	5.548	12.926	1.310	11.039	1.301	0.000	0.355	0.093	0.235	10.240	0.684	14.767	-0.369
17	13.554	8.558	0.000	15.946	0.637	8.558	10.697	13.554	1.620	11.345	2.508	0.000	0.443	0.105	0.237	10.537	0.950	15.228	-0.170
18	12.364	11.644	0.000	14.546	0.862	11.644	14.555	12.364	2.522	9.507	3.413	0.000	0.704	0.115	0.196	8.839	1.203	12.857	0.090
19	11.569	10.636	0.000	13.610	0.787	10.636	13.295	11.569	3.327	8.109	3.117	0.000	0.940	0.116	0.166	7.541	1.224	11.022	0.114
20	10.093	9.265	0.000	11.874	0.686	9.265	11.582	10.093	3.204	6.881	2.716	0.000	0.902	0.125	0.140	6.405	1.085	9.439	0.109
21	8.987	8.262	0.000	10.573	0.612	8.262	10.328	8.987	3.160	5.920	2.422	0.000	0.877	0.168	0.119	5.513	1.007	8.266	0.109
22	8.145	7.199	0.000	9.582	0.533	7.199	8.999	8.145	3.026	5.271	2.110	0.000	0.850	0.121	0.106	4.909	0.947	7.337	0.089
23	7.971	5.685	0.000	9.378	0.422	5.685	7.107	7.971	3.577	4.648	1.666	0.000	1.009	0.132	0.094	4.326	0.929	6.547	0.044
24	8.280	4.182	0.000	9.741	0.312	4.182	5.227	8.280	4.575	4.083	1.226	0.000	1.296	0.154	0.084	3.795	0.978	5.865	-0.004
Annual	90,916	38,916	0	106,960	2,915	38,916	48,645	90,893	30,189	60,748	11,406	0	8,436	1,406	1,281	56,376	7,727	83,966	-1,273
Avg	10.379	4.442	0.000	12.210	0.333	4.442	5.553	10.379	3.446	6.935	1.302	0.000	0.963	0.160	0.146	6.436	0.882	9.585	-0.145
Max	14.614	11.644	0.000	17.193	0.862	11.644	14.555	14.614	7.014	11.345	3.413	0.000	1.995	0.345	0.237	10.537	1.286	15.228	0.114
Min	7.764	1.821	0.000	9.134	0.144	1.821	2.276	7.764	1.310	3.577	0.534	0.000	0.355	0.093	0.075	3.318	0.456	5.314	-0.439
Jan	13.520	2.011	0.000	15.905	0.157	2.011	2.513	13.520	6.662	7.050	0.589	0.000	1.844	0.385	0.147	6.548	1.167	10.311	0.000
Feb	12.141	2.421	0.000	14.283	0.186	2.421	3.027	12.141	5.023	7.191	0.710	0.000	1.410	0.216	0.150	6.679	0.979	10.109	0.000
Mar	11.363	2.984	0.000	13.369	0.227	2.984	3.730	11.363	4.107	7.264	0.875	0.000	1.154	0.171	0.152	6.746	0.886	10.080	0.000
Apr	10.730	3.972	0.000	12.624	0.299	3.972	4.964	10.730	3.472	7.247	1.164	0.000	0.975	0.146	0.151	6.731	0.859	9.987	0.000
May	9.654	4.957	0.000	11.358	0.370	4.957	6.196	9.654	2.600	6.995	1.453	0.000	0.728	0.112	0.147	6.494	0.798	9.543	0.000
Jun	8.811	6.259	0.000	10.366	0.465	6.259	7.823	8.811	1.882	6.841	1.834	0.000	0.525	0.084	0.145	6.346	0.776	9.246	0.000
Jul	8.438	6.900	0.000	9.928	0.512	6.900	8.625	8.438	1.580	6.759	2.022	0.000	0.440	0.070	0.144	6.269	0.774	9.090	0.000
Aug	8.351	6.592	0.000	9.824	0.489	6.592	8.240	8.351	1.586	6.676	1.932	0.000	0.443	0.068	0.143	6.190	0.757	8.968	0.000
Sep	8.306	6.994	0.000	9.772	0.518	6.994	8.743	8.306	1.562	6.656	2.050	0.000	0.436	0.068	0.142	6.171	0.776	8.943	0.000
Oct	8.988	5.313	0.000	10.574	0.396	5.313	6.642	8.988	2.149	6.775	1.557	0.000	0.601	0.091	0.144	6.284	0.760	9.179	0.000
Nov	10.739	3.009	0.000	12.634	0.228	3.009	3.761	10.739	3.986	6.802	0.882	0.000	1.117	0.176	0.144	6.310	0.870	9.473	0.000
Dec	13.508	1.888	0.000	15.892	0.148	1.888	2.359	13.508	6.753	6.962	0.553	0.000	1.884	0.338	0.146	6.463	1.182	10.096	0.000

Treasure Island - District Energy Study

Cashflow Summary - All Phases
Option 2 - Heating and Cooling

Cashflow - Option 2 - Heating and Cooling

ARUP



	Cap Ex	OpEx - 1st yr	PV	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21
	(Non-Amortized)	(Non-Amortized)	#REF!	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Plant	3,669,973	184,349	9,813,153	0	0	0	2,373,097	101,686	1,210,949	169,263	936,777	242,752	251,248	260,042	269,143	278,564	288,313	298,404	308,848	319,658	330,846	1,175,493	354,411	643,659	379,653
Total Infrastructure	5,725,000	336,250	19,783,413	0	0	0	5,001,484	260,125	2,100,403	396,313	2,249,487	557,878	575,435	593,607	612,415	631,881	652,028	672,881	694,463	716,801	739,921	1,475,566	788,616	1,064,108	840,780
Total	9,394,973	520,599	29,596,566	0	0	0	7,374,581	361,812	3,311,352	565,575	3,186,263	800,630	826,683	853,649	881,558	910,444	940,342	971,285	1,003,312	1,036,459	1,070,767	2,651,059	1,143,027	1,707,767	1,220,433
Administration & Other Operating Costs	0	260,299	6,469,306	0	0	0	72,895	150,893	193,722	239,364	289,457	342,765	354,761	367,178	380,029	393,330	407,097	421,345	436,092	451,355	467,153	483,503	500,426	517,941	536,069
Total Annual	9,394,973	780,898	36,065,872	0	0	0	7,447,476	512,705	3,505,073	804,939	3,475,721	1,143,394	1,181,445	1,220,827	1,261,587	1,303,775	1,347,438	1,392,630	1,439,404	1,487,815	1,537,920	3,134,562	1,643,453	2,225,708	1,756,502
Design - Soft Costs	469,749	0	545,204	0	0	0	295,357	0	124,616	0	125,231	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction - Soft Costs	469,749	0	545,204	0	0	0	295,357	0	124,616	0	125,231	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	939,497	0	1,090,407	0	0	0	590,714	0	249,233	0	250,461	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	6,332,735	780,898	37,156,279	0	0	0	8,038,190	512,705	3,754,306	804,939	3,726,182	1,143,394	1,181,445	1,220,827	1,261,587	1,303,775	1,347,438	1,392,630	1,439,404	1,487,815	1,537,920	3,134,562	1,643,453	2,225,708	1,756,502
Resource Cost	0	816,682	15,818,686	0	0	0	0	202,716	413,278	573,618	740,139	854,590	973,392	992,575	1,012,139	1,032,090	1,052,437	1,073,188	1,094,350	1,115,932	1,137,942	1,160,389	1,183,281	1,206,628	1,230,438
Contingency	0	127,806	3,633,220	0	0	0	589,966	45,162	297,970	91,136	314,112	132,418	144,006	147,698	151,496	155,403	159,422	163,558	167,813	172,191	176,697	304,916	186,105	233,152	196,070
Loan payment	0	1,135,509	27,717,533	0	0	0	0	705,895	730,601	1,075,215	1,112,847	1,495,248	1,547,582	1,601,747	1,657,808	1,715,831	1,775,886	1,838,042	1,902,373	1,968,956	2,037,869	2,109,195	2,183,017	2,259,422	2,338,502
Breakeven	0	2,860,895	69,133,562	0	0	0	0	1,466,477	1,735,423	2,544,908	2,790,013	3,625,650	3,846,425	3,962,847	4,083,030	4,207,099	4,335,183	4,467,417	4,603,940	4,744,894	4,890,428	6,709,062	5,195,855	5,924,910	5,521,512
Min Profit	0	429,134	10,370,034	0	0	0	0	219,972	260,314	381,736	418,502	543,848	576,964	594,427	612,455	631,065	650,277	670,113	690,591	711,734	733,564	1,006,359	779,378	888,736	828,227
Breakeven+Profit	0	3,290,030	79,503,597	0	0	0	0	1,686,449	1,995,737	2,926,644	3,208,515	4,169,498	4,423,389	4,557,274	4,695,485	4,838,164	4,985,461	5,137,530	5,294,531	5,456,628	5,623,992	7,715,421	5,975,234	6,813,646	6,349,739
$/MWh	0	0	73,871	0	0	0	0	1,926	1,128	2,428	1,984	5,668	4,119	4,248	4,381	4,519	4,661	4,808	4,959	5,116	5,278	6,706	5,617	6,325	5,980
Conventional customer charges	0	2,774,522	53,170,272	0	0	0	0	641,585	1,307,713	1,879,058	2,471,995	2,875,500	3,293,716	3,357,147	3,421,811	3,487,730	3,554,930	3,623,436	3,693,273	3,764,468	3,837,047	3,911,036	3,986,465	4,063,361	4,141,752
Cashflow	0	0	42,347,317	0	0	0	(8,038,190)	1,173,744	(1,758,569)	2,121,705	(517,667)	3,026,104	3,241,944	3,336,447	3,433,897	3,534,389	3,638,022	3,744,900	3,855,127	3,968,813	4,086,073	4,580,859	4,331,781	4,587,939	4,593,237
Cashflow - Cumulative	0	0	194,431,096	0	0	0	(8,038,190)	(6,864,446)	(8,623,015)	(6,501,310)	(7,018,978)	(3,992,874)	(750,930)	2,585,517	6,019,415	9,553,804	13,191,826	16,936,726	20,791,853	24,760,666	28,846,738	33,427,598	37,759,379	42,347,317	46,940,554
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Resource Use																									
Customers				0%	20%	15%	10%	18%	50%	63%	75%	88%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
natural gas use (Mbtu)		106,960		0	0	0	0	21767.306	43534.612	61710.744	79886.875	93423.524	106960.17	106960.17	106960.17	106960.17	106960.17	106960.17	106960.17	106960.17	106960.17	106960.17	106960.17	106960.17	106960.17
electricity use (MWh)		2,915		0	0	0	0	953	1,905	2,345	2,785	2,850	2,915	2,915	2,915	2,915	2,915	2,915	2,915	2,915	2,915	2,915	2,915	2,915	2,915
Resource Cost		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
natural gas use ($)		641,761	12,421,937	0	0	0	0	141647.19	289101.92	418205.83	552481.51	659343.26	770354.16	786146.42	802262.42	818708.8	835492.33	852619.92	870098.63	887935.65	906138.34	924714.17	943670.81	963016.06	982757.89
electricity use ($)		174,921	3,396,749	0	0	0	0	61068.403	124176.49	155412.57	187657.31	195247.21	203038.29	206429.03	209876.39	213381.33	216944.79	220567.77	224251.25	227996.25	231803.79	235674.91	239610.68	243612.18	247680.5
Total		816,682	15,818,686	0	0	0	0	202,716	413,278	573,618	740,139	854,590	973,392	992,575	1,012,139	1,032,090	1,052,437	1,073,188	1,094,350	1,115,932	1,137,942	1,160,389	1,183,281	1,206,628	1,230,438
Resource Savings		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
natural gas use (Mbtu)		167,931	0	0	0	0	0	34337.921	68675.842	98976.45	129277.06	148604.07	167931.09	167931.09	167931.09	167931.09	167931.09	167931.09	167931.09	167931.09	167931.09	167931.09	167931.09	167931.09	167931.09
electricity use (MWh)		7,727	0	0	0	0	0	1,809	3,618	4,899	6,181	6,954	7,727	7,727	7,727	7,727	7,727	7,727	7,727	7,727	7,727	7,727	7,727	7,727	7,727
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
natural gas use ($)		1,847,242	35,860,850	0	0	0	0	409655.43	836106.74	1229709.7	1639099.1	1922770.6	2217383.8	2262840.2	2309228.4	2356567.6	2404877.2	2454177.2	2504487.8	2555829.8	2608224.4	2661693	2716257.7	2771940.9	2828765.7
electricity use ($)		927,280	17,309,422	0	0	0	0	231929.97	471606.39	649348.68	832896.03	952729.19	1076332.5	1094307.2	1112582.2	1131162.3	1150052.7	1169258.6	1188785.2	1208637.9	1228822.2	1249343.5	1270207.5	1291420	1312986.7
		2,774,522	53,170,272	0	0	0	0	641,585	1,307,713	1,879,058	2,471,995	2,875,500	3,293,716	3,357,147	3,421,811	3,487,730	3,554,930	3,623,436	3,693,273	3,764,468	3,837,047	3,911,036	3,986,465	4,063,361	4,141,752

Treasure Island - District Energy Study

Technology Summary - All Phases
Option 3 - Heating and Power (CHP)

Gas-Fired Boiler (Heating Hot Water)

Performamnce Summary

Phase		1	2	3	4
Peak Design Heating Demand	MBH	0	12.797	9.589	8.886
Proposed Case					
Operation		heat follow	heat follow	heat follow	heat follow
Percent of Demand		0%	44%	30%	33%
Boiler Efficiency Formula	`	0	0	0	0
Typical Boiler Size	Mbtu	10	10	10	10
Number of Boilers	boilers	0	1	1	1
Total Boiler Capacity	Mbtu	0	5.688524495	2.911428426	2.900649401
	HP	0	169.9142292	86.96334476	86.64137906
Boiler Natural Gas Use Efficiency	%	85%	85%	85%	85%
Boiler Electrical Use Efficiency	kW/Mbtu	0.703	0.703	0.703	0.703
Heating Distribution and Infrastructure					
Area served	sf	0	3.92800675	4.39676675	3.40419675
Customers Served	qty	0	20	30	30
Total Length of Piping	lf	0	10500	4500	6000
Average Pipe Diameter	in.	0	0	0	0
Average Pressure Drop	ft hd / 100 ft	0.75	0.75	0.75	0.75
Design Delta T	degF	40	40	40	40
Peak Flow	gpm	0	284.4262248	145.5714213	145.0324701
Equivalent Length Factor		10	10	10	10
Pump Efficiency		65%	65%	65%	65%
Pump Motor Efficiency		90%	90%	90%	90%
Total Pressure Drop	ft hd	0	787.5	337.5	450
Average Pump Capacity	hp	0	45.15882474	9.905407143	13.15831227
Number of Pumps	pumps	0	2	2	2
Average Pump Capcity	hp per pump	#DIV/0!	22.57941237	4.952703571	6.579156136

Treasure Island - District Energy Study

Technology Summary - All Phases
Option 3 - Heating and Power (CHP)

Electric Cooling

Performamnce Summary

Phase		1	2	3	4
Phase Cooling Peak Demand Increase	Mbtuh	0.000	23.343	7.103	1.459
	tons	0	1,945	592	122
Proposed Case					
Operation		load follow	load follow	load follow	load follow
Percent of Demand		0%	0%	0%	0%
Typical Cooling Plant Size	Mbtu	9	9	9	9
	tons	750	750	750	750
Number of Chillers	chiller	0	0	0	0
Total Cooling Capacity	Mbtuh	0.000	0.000	0.000	0.000
	tons	0	0	0	0
Chiller Electrical Use Efficiency	COP	4.00	4.00	4.00	4.00
Chiller Natural Gas Use Efficiency	therm/Mbtu	0%	0%	0%	0%
Heat Rejection Rate	Btu/ton	15,000	15,000	15,000	15,000
Cooling Distribution and Infrastructure					
Area served	sf	0.00	0.00	0.00	0.00
Customers Served	qty	-	-	-	-
Total Length of Piping	lf	0	0	0	0
Average Pipe Diameter	in.	0	0	0	0
Average Pressure Drop	ft hd / 100 ft	0.75	0.75	0.75	0.75
Design Delta T	degF	14	14	14	14
Peak Flow	gpm	0	0	0	0
Equivalent Length Factor		10	10	10	10
Pump Efficiency		65%	65%	65%	65%
Pump Motor Efficiency		90%	90%	90%	90%
Total Pressure Drop	ft hd	0	0	0	0
Average Pump Capacity	hp	0	0	0	0
Number of Pumps	pumps	0	0	0	0
Average Pump Capcity	hp per pump	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Treasure Island - District Energy Study

Technology Summary - All Phases
Option 3 - Heating and Power (CHP)

Gas Fired Turbine (Heat Recovery)

Performamnce Summary

Phase		1	2	3	4
Heat Recovery	y/n	y	y	y	y
Absorption Cooling	y/n	y	n	n	n

Combined Heat and Power					
Type		Gas Turbine	Gas Turbine	Gas Turbine	Gas Turbine
Electrical Capacity	kW-e	0	500	500	500
Electrical Efficiency (HHV)	%	23%	23%	23%	23%
Fuel HHV (Nat Gas)	Btu/scf	1000	1000	1000	1000
Power to Heat Ratio		0.5	0.5	0.5	0.5
Thermal Heat Rate	Mbtu/kWh	0	3.412	3.412	3.412
Max Operating Point	%	100%	100%	100%	100%
Max Turndown	%	50%	50%	50%	50%

Heating Distribution					
Auxillary Boiler Gas Efficiency	%	80%	80%	80%	80%
Auxillary Boiler Elec Efficiency	kW/Mbtu	0.70339977	0.70339977	0.70339977	0.70339977

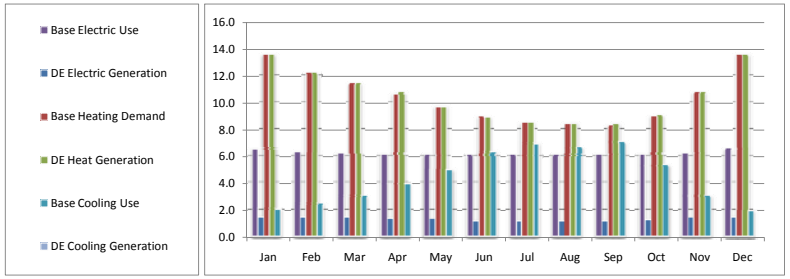
Cooling Plant					
Absorption Chiller Performance	COP	0.6	0.6	0.6	0.6
Chiller Electrical Performance	kW/Mbtu	1.31887456	1.31887456	1.31887456	1.31887456
Heat Rejection Rate	Btu-heat_ reje	1.5	1.5	1.5	1.5

Treasure Island - District Energy Study

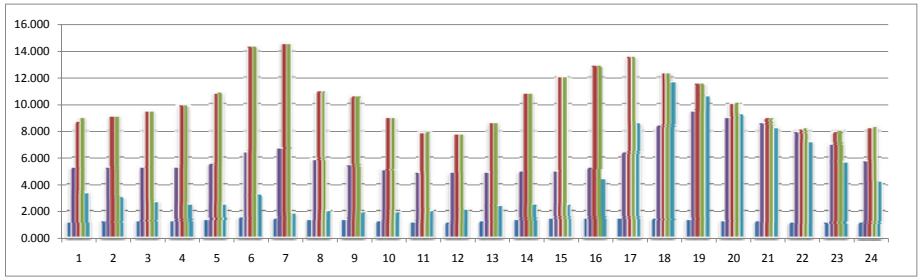
Cashflow Summary - All Phases

Option 3 - Heating and Power (CHP)

Annual Profiles



Hourly Profiles



Total

	Generation			Generation Resource Use		End Use Energy Savings											Resource Use Savings		Impacts
	Heat Generation	Cool Generation	Electric Generation	Natural Gas Use	Electric Use	Cooling Use	Heat Rejection	Heating Use	Space Heat	DHW Heat	Elec Cool	Gas Cool	Elec Space Heat	Gas Space Heat	Elec DHW	Gas DHW	Electric Use	Natural Gas Use	CO2 Emissions
	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg
Hour	Mbtuh	Mbtuh	MW	Mbtuh	MW	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	MW	Mbtuh	MW	Mbtuh	MW	Mbtuh	MW	Mbtuh	Tons CO2
1	9.005	0.000	1.192	18.709	0.001	0.000	0.057	8.949	5.769	3.714	0.000	0.000	1.639	0.182	0.077	3.449	2.082	5.470	0.323
2	9.152	0.000	1.213	19.022	0.001	0.000	0.024	9.127	6.056	3.595	0.000	0.000	1.722	0.184	0.076	3.337	2.143	5.314	0.330
3	9.520	0.000	1.248	19.697	0.001	0.000	0.005	9.515	6.492	3.577	0.000	0.000	1.846	0.199	0.075	3.318	2.241	5.338	0.339
4	9.922	0.000	1.282	20.402	0.001	0.000	0.000	9.922	6.908	3.592	0.000	0.000	1.965	0.209	0.075	3.334	2.336	5.392	0.346
5	10.880	0.000	1.383	22.211	0.001	0.000	0.000	10.880	7.014	4.367	0.000	0.000	1.995	0.214	0.090	4.057	2.468	6.432	0.368
6	14.341	0.000	1.500	27.081	0.003	0.000	0.000	14.341	6.515	7.912	0.000	0.000	1.851	0.206	0.162	7.358	2.585	11.080	0.303
7	14.581	0.000	1.445	26.991	0.003	0.000	0.000	14.581	4.523	9.814	0.000	0.000	1.271	0.189	0.200	9.131	2.280	13.538	0.258
8	10.962	0.000	1.385	22.325	0.001	0.000	0.000	10.962	1.862	8.800	0.000	0.000	0.499	0.158	0.180	8.185	1.777	12.085	0.327
9	10.649	0.000	1.339	21.640	0.001	0.000	0.000	10.649	2.382	8.082	0.000	0.000	0.599	0.345	0.168	7.508	1.731	11.444	0.322
10	9.034	0.000	1.221	18.940	0.000	0.000	0.000	9.034	1.781	7.131	0.000	0.000	0.459	0.216	0.151	6.615	1.545	9.908	0.319
11	7.933	0.000	1.150	17.163	0.000	0.000	0.019	7.913	1.557	6.308	0.000	0.000	0.409	0.160	0.141	5.827	1.452	8.669	0.323
12	7.771	0.000	1.137	16.882	0.000	0.000	0.007	7.764	1.465	6.250	0.000	0.000	0.388	0.138	0.144	5.758	1.438	8.515	0.322
13	8.622	0.000	1.237	18.562	0.000	0.000	0.000	8.622	1.382	7.094	0.000	0.000	0.369	0.119	0.163	6.540	1.552	9.578	0.342
14	10.830	0.000	1.375	22.099	0.001	0.000	0.000	10.830	1.347	9.117	0.000	0.000	0.362	0.105	0.204	8.422	1.732	12.211	0.322
15	12.074	0.000	1.428	23.921	0.002	0.000	0.000	12.074	1.319	10.262	0.000	0.000	0.357	0.095	0.224	9.499	1.805	13.718	0.297
16	12.926	0.000	1.462	25.158	0.002	0.000	0.000	12.926	1.310	11.039	0.000	0.000	0.355	0.093	0.235	10.240	1.850	14.767	0.277
17	13.554	0.000	1.478	26.003	0.002	0.000	0.000	13.554	1.620	11.345	0.000	0.000	0.443	0.105	0.237	10.537	1.912	15.228	0.262
18	12.364	0.000	1.391	24.016	0.002	0.000	0.000	12.364	2.522	9.507	0.000	0.000	0.704	0.115	0.196	8.839	1.914	12.857	0.283
19	11.569	0.000	1.376	22.974	0.002	0.000	0.000	11.569	3.327	8.109	0.000	0.000	0.940	0.116	0.166	7.541	1.978	11.022	0.319
20	10.104	0.000	1.259	20.458	0.001	0.000	0.011	10.093	3.204	6.881	0.000	0.000	0.902	0.125	0.140	6.405	1.799	9.439	0.309
21	9.010	0.000	1.201	18.773	0.001	0.000	0.022	8.987	3.160	5.920	0.000	0.000	0.877	0.168	0.119	5.513	1.722	8.266	0.319
22	8.270	0.000	1.132	17.436	0.000	0.000	0.126	8.145	3.026	5.271	0.000	0.000	0.850	0.121	0.106	4.909	1.654	7.337	0.306
23	8.082	0.000	1.125	17.167	0.000	0.000	0.110	7.971	3.577	4.648	0.000	0.000	1.009	0.132	0.094	4.326	1.713	6.547	0.310
24	8.380	0.000	1.142	17.632	0.000	0.000	0.100	8.280	4.575	4.083	0.000	0.000	1.296	0.154	0.084	3.795	1.864	5.865	0.312
Annual	91,080	0	11,352	184,420	10	0	176	90,881	30,183	60,743	0	0	8,434	1,405	1,281	56,371	16,635	83,956	2,751
Avg	10.397	0.000	1.296	21.053	0.001	0.000	0.020	10.377	3.445	6.934	0.000	0.000	0.963	0.160	0.146	6.435	1.899	9.584	0.314
Max	14.581	0.000	1.500	27.081	0.003	0.000	0.126	14.581	7.014	11.345	0.000	0.000	1.995	0.345	0.237	10.537	2.585	15.228	0.368
Min	7.771	0.000	1.125	16.882	0.000	0.000	0.000	7.764	1.310	3.577	0.000	0.000	0.355	0.093	0.075	3.318	1.438	5.314	0.258
Jan	13.518	0.000	1.446	25.745	0.003	0.000	0.000	13.518	6.661	7.049	0.000	0.000	1.844	0.385	0.147	6.547	2.476	10.309	0.000
Feb	12.141	0.000	1.427	23.994	0.002	0.000	0.000	12.141	5.023	7.191	0.000	0.000	1.410	0.216	0.150	6.679	2.244	10.109	0.000
Mar	11.363	0.000	1.389	22.825	0.001	0.000	0.000	11.363	4.107	7.264	0.000	0.000	1.154	0.171	0.152	6.746	2.080	10.080	0.000
Apr	10.730	0.000	1.353	21.835	0.001	0.000	0.000	10.730	3.472	7.247	0.000	0.000	0.975	0.146	0.151	6.731	1.961	9.987	0.000
May	9.654	0.000	1.278	20.059	0.001	0.000	0.000	9.654	2.600	6.995	0.000	0.000	0.728	0.112	0.147	6.494	1.768	9.543	0.000
Jun	8.845	0.000	1.185	18.470	0.001	0.000	0.034	8.811	1.882	6.841	0.000	0.000	0.525	0.084	0.145	6.346	1.576	9.246	0.000
Jul	8.495	0.000	1.155	17.854	0.000	0.000	0.057	8.438	1.580	6.759	0.000	0.000	0.440	0.070	0.144	6.269	1.507	9.090	0.000
Aug	8.418	0.000	1.147	17.708	0.000	0.000	0.067	8.351	1.586	6.676	0.000	0.000	0.443	0.068	0.143	6.190	1.499	8.968	0.000
Sep	8.374	0.000	1.143	17.632	0.000	0.000	0.067	8.306	1.562	6.656	0.000	0.000	0.436	0.068	0.142	6.171	1.492	8.943	0.000
Oct	9.002	0.000	1.218	18.880	0.000	0.000	0.014	8.988	2.149	6.775	0.000	0.000	0.601	0.091	0.144	6.284	1.647	9.179	0.000
Nov	10.740	0.000	1.370	21.959	0.001	0.000	0.001	10.739	3.986	6.802	0.000	0.000	1.117	0.176	0.144	6.310	2.045	9.473	0.000
Dec	13.494	0.000	1.441	25.685	0.003	0.000	0.000	13.494	6.745	6.955	0.000	0.000	1.882	0.337	0.146	6.456	2.493	10.084	0.000

Treasure Island - District Energy Study

Cashflow Summary - All Phases
Option 3 - Heating and Power (CHP)

Cashflow - District Energy Option 1 - Heating and Cooling

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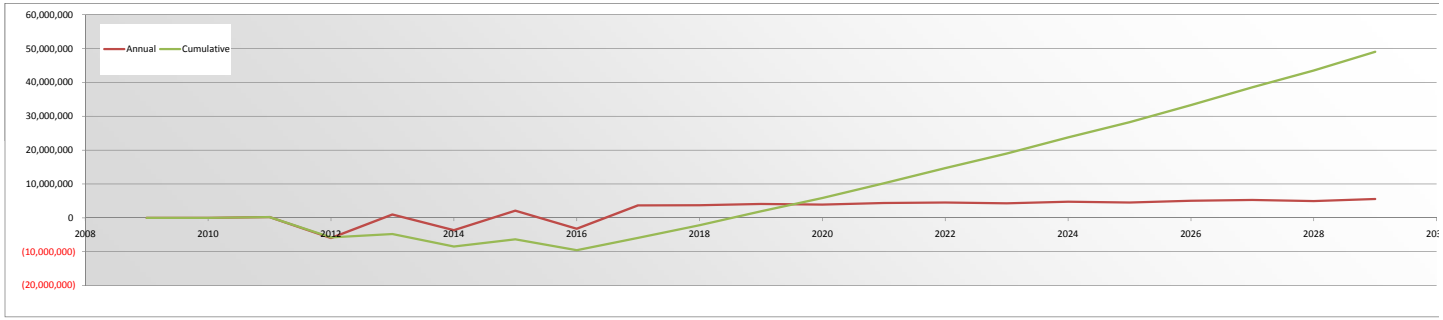


	Cap Ex	OpEx - 1st yr	PV	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21
	(Non-Amortized)	(Non-Amortized)	#REF!	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Plant	5,382,914	358,061	21,810,978	0	0	468,661	2,120,921	145,995	2,210,723	309,618	2,528,905	1,047,601	488,000	1,122,217	522,758	1,202,147	1,302,870	579,591	1,395,667	620,872	1,495,074	1,746,663	688,372	1,814,322	737,401
Total Infrastructure	4,475,000	263,750	11,772,731	0	0	0	2,259,013	128,379	1,424,481	222,803	1,948,178	347,308	359,464	372,045	385,067	398,544	412,493	426,931	441,873	457,339	473,346	564,212	507,060	644,194	543,175
Total	9,857,914	621,811	33,583,708	0	0	468,661	4,379,934	274,374	3,635,204	532,421	4,477,083	1,394,910	847,464	1,494,262	907,825	1,600,691	1,715,364	1,006,521	1,837,540	1,078,211	1,968,419	2,310,876	1,195,432	2,458,517	1,280,576
Administration & Other Operating Costs	0	458,480	11,034,018	0	0	0	36,521	198,775	232,720	395,572	442,499	603,731	624,861	646,731	669,367	692,795	717,043	742,139	768,114	794,998	822,823	851,622	881,428	912,278	944,208
Total Annual	9,857,914	1,080,291	44,617,726	0	0	468,661	4,416,455	473,149	3,867,924	927,993	4,919,582	1,998,640	1,472,325	2,140,994	1,577,192	2,293,486	2,432,406	1,748,661	2,605,654	1,873,209	2,791,242	3,162,498	2,076,860	3,370,795	2,224,785
Design - Soft Costs	492,896	0	303,498	0	0	0	132,205	0	74,588	0	96,706	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction - Soft Costs	492,896	0	303,498	0	0	0	132,205	0	74,588	0	96,706	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	985,791	0	606,997	0	0	0	264,410	0	149,176	0	193,411	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	9,857,914	1,080,291	45,224,723	0	0	468,661	4,680,865	473,149	4,017,100	927,993	5,112,993	1,998,640	1,472,325	2,140,994	1,577,192	2,293,486	2,432,406	1,748,661	2,605,654	1,873,209	2,791,242	3,162,498	2,076,860	3,370,795	2,224,785
Resource Cost	0	1,107,094	21,345,127	0	0	0	0	233,277	476,116	700,578	934,041	1,127,700	1,328,906	1,356,146	1,383,945	1,412,313	1,441,263	1,470,806	1,500,955	1,531,721	1,563,119	1,595,160	1,627,858	1,661,226	1,695,278
Contingency	0	174,991	5,678,322	0	0	74,986	455,723	48,192	449,581	114,561	570,235	271,814	198,864	303,024	209,859	321,373	340,367	227,587	361,172	240,289	383,317	411,233	260,782	435,363	275,474
Loan payment	0	1,073,413	25,526,369	0	0	0	0	473,298	489,864	878,511	909,259	1,413,479	1,462,951	1,514,155	1,567,150	1,622,000	1,678,770	1,737,527	1,798,341	1,861,283	1,926,427	1,993,852	2,063,637	2,135,865	2,210,620
Breakeven	0	3,435,789	95,954,548	0	0	1,012,308	0	1,322,667	1,622,409	2,820,661	3,145,042	5,686,704	4,772,476	6,251,715	5,069,614	6,653,335	6,990,762	5,552,085	7,442,280	5,900,183	7,924,036	8,397,115	6,465,618	8,925,538	6,873,725
Min Profit	0	515,368	14,393,182	0	0	151,846	0	198,400	243,361	423,099	471,756	853,006	715,871	937,757	760,442	998,000	1,048,614	832,813	1,116,342	885,027	1,188,605	1,259,567	969,843	1,338,831	1,031,059
Breakeven+Profit	0	3,951,157	110,347,730	0	0	1,164,154	0	1,521,067	1,865,771	3,243,760	3,616,799	6,539,709	5,488,348	7,189,473	5,830,056	7,651,335	8,039,377	6,384,898	8,558,622	6,785,210	9,112,642	9,656,682	7,435,460	10,264,369	7,904,784
$/MWh	0	0	186,122	0	0	0	0	2,452	1,346	5,406	3,602	16,779	10,663	11,030	11,409	11,801	12,207	12,626	13,061	13,510	13,975	14,854	14,954	16,448	16,002
Conventional customer charges	0	3,051,229	57,118,957	0	0	0	0	657,847	1,339,579	1,943,943	2,569,723	3,068,152	3,583,503	3,648,160	3,713,995	3,781,030	3,849,288	3,918,791	3,989,561	4,061,622	4,134,998	4,209,713	4,285,792	4,363,260	4,442,143
Cashflow	0	0	49,072,813	0	0	226,832	(5,997,467)	953,167	(3,659,773)	2,116,749	(3,213,010)	3,665,999	3,706,593	4,111,082	3,921,396	4,353,687	4,509,014	4,268,732	4,776,809	4,518,320	5,061,469	5,259,812	4,922,119	5,571,284	5,212,430
Cashflow - Cumulative	0	0	225,174,628	0	0	226,832	(5,770,635)	(4,817,468)	(8,477,242)	(6,360,493)	(9,573,503)	(5,907,504)	(2,200,911)	1,910,172	5,831,567	10,185,254	14,694,268	18,963,000	23,739,809	28,258,130	33,319,599	38,579,411	43,501,530	49,072,813	54,285,244
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Resource Use																									
Customers				0%	20%	15%	10%	18%	50%	63%	75%	88%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
natural gas use (Mbtu)		184,420		0	0	0	0	35817.678	71635.356	103303.82	134972.29	159696.13	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97
electricity use (MWh)		10		0	0	0	0	3	6	8	9	9	10	10	10	10	10	10	10	10	10	10	10	10	10
Resource Cost		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
natural gas use ($)		1,106,520	21,334,009	0	0	0	0	233077.69	475711.57	700076.81	933441.11	1127067	1328239.2	1355468.1	1383255.2	1411611.9	1440549.9	1470081.2	1500217.9	1530972.4	1562357.3	1594385.6	1627070.5	1660425.5	1694464.2
electricity use ($)		575	11,118	0	0	0	0	199.12937	404.90966	500.69361	599.56381	632.78223	666.94294	678.08089	689.40484	700.9179	712.62323	724.52404	736.62359	748.9252	761.43225	774.14817	787.07645	800.22062	813.58431
Total		1,107,094	21,345,127	0	0	0	0	233,277	476,116	700,578	934,041	1,127,700	1,328,906	1,356,146	1,383,945	1,412,313	1,441,263	1,470,806	1,500,955	1,531,721	1,563,119	1,595,160	1,627,858	1,661,226	1,695,278
Resource Savings		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
natural gas use (Mbtu)		95,913	0	0	0	0	0	21103.865	42207.729	59121.609	76035.489	85973.995	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501
electricity use (MWh)		16,635	0	0	0	0	0	3,167	6,334	9,125	11,916	14,275	16,635	16,635	16,635	16,635	16,635	16,635	16,635	16,635	16,635	16,635	16,635	16,635	16,635
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
natural gas use ($)		1,055,038	20,610,097	0	0	0	0	251771.59	513865.81	734542.6	964051.18	1112407.4	1266441.1	1292403.1	1318897.4	1345934.8	1373526.4	1401683.7	1430418.2	1459741.8	1489666.5	1520204.7	1551368.9	1583171.9	1615627
electricity use ($)		1,996,191	36,508,860	0	0	0	0	406075.01	825712.94	1209400.1	1605672.1	1955744.5	2317061.5	2355756.4	2395097.5	2435095.7	2475761.8	2517107	2559142.7	2601880.4	2645331.8	2689508.8	2734423.6	2780088.5	2826516
		3,051,229	57,118,957	0	0	0	0	657,847	1,339,579	1,943,943	2,569,723	3,068,152	3,583,503	3,648,160	3,713,995	3,781,030	3,849,288	3,918,791	3,989,561	4,061,622	4,134,998	4,209,713	4,285,792	4,363,260	4,442,143

Treasure Island - District Energy Study

Technology Summary - All Phases
Option 3-2 - Heating and Power

Gas-Fired Boiler (Heating Hot Water)

Performamnce Summary

Phase		1	2	3	4
Peak Design Heating Demand	MBH	0	12.797	9.589	8.886
Proposed Case					
Operation		heat follow	heat follow	heat follow	heat follow
Percent of Demand		0%	44%	30%	33%
Boiler Efficiency Formula	`	0	0	0	0
Typical Boiler Size	Mbtu	10	10	10	10
Number of Boilers	boilers	0	1	1	1
Total Boiler Capacity	Mbtu	0	5.688524495	2.911428426	2.900649401
	HP	0	169.9142292	86.96334476	86.64137906
Boiler Natural Gas Use Efficiency	%	85%	85%	85%	85%
Boiler Electrical Use Efficiency	kW/Mbtu	0.703	0.703	0.703	0.703
Heating Distribution and Infrastructure					
Area served	sf	0	3.92800675	4.39676675	3.40419675
Customers Served	qty	0	20	30	30
Total Length of Piping	lf	0	10500	4500	6000
Average Pipe Diameter	in.	0	0	0	0
Average Pressure Drop	ft hd / 100 ft	0.75	0.75	0.75	0.75
Design Delta T	degF	40	40	40	40
Peak Flow	gpm	0	284.4262248	145.5714213	145.0324701
Equivalent Length Factor		10	10	10	10
Pump Efficiency		65%	65%	65%	65%
Pump Motor Efficiency		90%	90%	90%	90%
Total Pressure Drop	ft hd	0	787.5	337.5	450
Average Pump Capacity	hp	0	45.15882474	9.905407143	13.15831227
Number of Pumps	pumps	0	2	2	2
Average Pump Capcity	hp per pump	#DIV/0!	22.57941237	4.952703571	6.579156136

Treasure Island - District Energy Study

Technology Summary - All Phases
Option 3-2 - Heating and Power

Gas Fired Turbine (Heat Recovery)

Performamnce Summary

Phase		1	2	3	4
Heat Recovery	y/n	y	y	y	y
Absorption Cooling	y/n	y	n	n	n

Combined Heat and Power					
Type		Gas Turbine	Gas Turbine	Gas Turbine	Gas Turbine
Electrical Capacity	kW-e	0	500	500	500
Electrical Efficiency (HHV)	%	23%	23%	23%	23%
Fuel HHV (Nat Gas)	Btu/scf	1000	1000	1000	1000
Power to Heat Ratio		0.5	0.5	0.5	0.5
Thermal Heat Rate	Mbtu/kWh	0	3.412	3.412	3.412
Max Operating Point	%	100%	100%	100%	100%
Max Turndown	%	50%	50%	50%	50%

Heating Distribution					
Auxillary Boiler Gas Efficiency	%	80%	80%	80%	80%
Auxillary Boiler Elec Efficiency	kW/Mbtu	0.70339977	0.70339977	0.70339977	0.70339977

Cooling Plant					
Absorption Chiller Performance	COP	0.6	0.6	0.6	0.6
Chiller Electrical Performance	kW/Mbtu	1.31887456	1.31887456	1.31887456	1.31887456
Heat Rejection Rate	Btu-heat_ reje	1.5	1.5	1.5	1.5

Treasure Island - District Energy Study

Technology Summary - All Phases
Option 3-2 - Heating and Power

Electric Cooling

Performamnce Summary

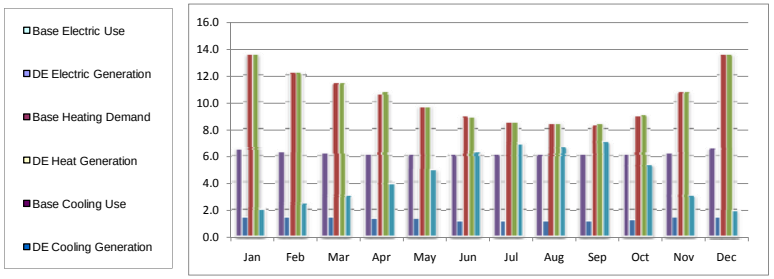
Phase		1	2	3	4
Phase Cooling Peak Demand Increase	Mbtuh	0.000	23.343	7.103	1.459
	tons	0	1,945	592	122
Proposed Case					
Operation		load follow	load follow	load follow	load follow
Percent of Demand		0%	0%	0%	0%
Typical Cooling Plant Size	Mbtu	9	9	9	9
	tons	750	750	750	750
Number of Chillers	chiller	0	0	0	0
Total Cooling Capacity	Mbtuh	0.000	0.000	0.000	0.000
	tons	0	0	0	0
Chiller Electrical Use Efficiency	COP	4.00	4.00	4.00	4.00
Chiller Natural Gas Use Efficiency	therm/Mbtu	0%	0%	0%	0%
Heat Rejection Rate	Btu/ton	15,000	15,000	15,000	15,000
Cooling Distribution and Infrastructure					
Area served	sf	0.00	0.00	0.00	0.00
Customers Served	qty	-	-	-	-
Total Length of Piping	lf	0	0	0	0
Average Pipe Diameter	in.	0	0	0	0
Average Pressure Drop	ft hd / 100 ft	0.75	0.75	0.75	0.75
Design Delta T	degF	14	14	14	14
Peak Flow	gpm	0	0	0	0
Equivalent Length Factor		10	10	10	10
Pump Efficiency		65%	65%	65%	65%
Pump Motor Efficiency		90%	90%	90%	90%
Total Pressure Drop	ft hd	0	0	0	0
Average Pump Capacity	hp	0	0	0	0
Number of Pumps	pumps	0	0	0	0
Average Pump Capcity	hp per pump	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Treasure Island - District Energy Study

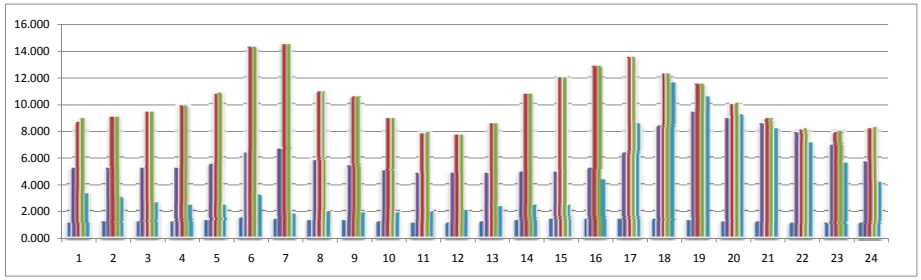
Cashflow Summary - All Phases

Option 3-2 - Heating and Power

Annual Profiles



Hourly Profiles



Total

	Generation			Generation Resource Use		End Use Energy Savings											Resource Use Savings		Impacts
	Heat Generation	Cool Generation	Electric Generation	Natural Gas Use	Electric Use	Cooling Use	Heat Rejection	Heating Use	Space Heat	DHW Heat	Elec Cool	Gas Cool	Elec Space Heat	Gas Space Heat	Elec DHW	Gas DHW	Electric Use	Natural Gas Use	CO2 Emissions
	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg
Hour	Mbtuh	Mbtuh	MW	Mbtuh	MW	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	MW	Mbtuh	MW	Mbtuh	MW	Mbtuh	MW	Mbtuh	Tons CO2
1	9.005	0.000	1.192	18.709	0.001	0.000	0.057	8.949	5.769	3.714	0.000	0.000	1.639	0.182	0.077	3.449	2.082	5.470	0.323
2	9.152	0.000	1.213	19.022	0.001	0.000	0.024	9.127	6.056	3.595	0.000	0.000	1.722	0.184	0.076	3.337	2.143	5.314	0.330
3	9.520	0.000	1.248	19.697	0.001	0.000	0.005	9.515	6.492	3.577	0.000	0.000	1.846	0.199	0.075	3.318	2.241	5.338	0.339
4	9.922	0.000	1.282	20.402	0.001	0.000	0.000	9.922	6.908	3.592	0.000	0.000	1.965	0.209	0.075	3.334	2.336	5.392	0.346
5	10.880	0.000	1.383	22.211	0.001	0.000	0.000	10.880	7.014	4.367	0.000	0.000	1.995	0.214	0.090	4.057	2.468	6.432	0.368
6	14.341	0.000	1.500	27.081	0.003	0.000	0.000	14.341	6.515	7.912	0.000	0.000	1.851	0.206	0.162	7.358	2.585	11.080	0.303
7	14.581	0.000	1.445	26.991	0.003	0.000	0.000	14.581	4.523	9.814	0.000	0.000	1.271	0.189	0.200	9.131	2.280	13.538	0.258
8	10.962	0.000	1.385	22.325	0.001	0.000	0.000	10.962	1.862	8.800	0.000	0.000	0.499	0.158	0.180	8.185	1.777	12.085	0.327
9	10.649	0.000	1.339	21.640	0.001	0.000	0.000	10.649	2.382	8.082	0.000	0.000	0.599	0.345	0.168	7.508	1.731	11.444	0.322
10	9.034	0.000	1.221	18.940	0.000	0.000	0.000	9.034	1.781	7.131	0.000	0.000	0.459	0.216	0.151	6.615	1.545	9.908	0.319
11	7.933	0.000	1.150	17.163	0.000	0.000	0.019	7.913	1.557	6.308	0.000	0.000	0.409	0.160	0.141	5.827	1.452	8.669	0.323
12	7.771	0.000	1.137	16.882	0.000	0.000	0.007	7.764	1.465	6.250	0.000	0.000	0.388	0.138	0.144	5.758	1.438	8.515	0.322
13	8.622	0.000	1.237	18.562	0.000	0.000	0.000	8.622	1.382	7.094	0.000	0.000	0.369	0.119	0.163	6.540	1.552	9.578	0.342
14	10.830	0.000	1.375	22.099	0.001	0.000	0.000	10.830	1.347	9.117	0.000	0.000	0.362	0.105	0.204	8.422	1.732	12.211	0.322
15	12.074	0.000	1.428	23.921	0.002	0.000	0.000	12.074	1.319	10.262	0.000	0.000	0.357	0.095	0.224	9.499	1.805	13.718	0.297
16	12.926	0.000	1.462	25.158	0.002	0.000	0.000	12.926	1.310	11.039	0.000	0.000	0.355	0.093	0.235	10.240	1.850	14.767	0.277
17	13.554	0.000	1.478	26.003	0.002	0.000	0.000	13.554	1.620	11.345	0.000	0.000	0.443	0.105	0.237	10.537	1.912	15.228	0.262
18	12.364	0.000	1.391	24.016	0.002	0.000	0.000	12.364	2.522	9.507	0.000	0.000	0.704	0.115	0.196	8.839	1.914	12.857	0.283
19	11.569	0.000	1.376	22.974	0.002	0.000	0.000	11.569	3.327	8.109	0.000	0.000	0.940	0.116	0.166	7.541	1.978	11.022	0.319
20	10.104	0.000	1.259	20.458	0.001	0.000	0.011	10.093	3.204	6.881	0.000	0.000	0.902	0.125	0.140	6.405	1.799	9.439	0.309
21	9.010	0.000	1.201	18.773	0.001	0.000	0.022	8.987	3.160	5.920	0.000	0.000	0.877	0.168	0.119	5.513	1.722	8.266	0.319
22	8.270	0.000	1.132	17.436	0.000	0.000	0.126	8.145	3.026	5.271	0.000	0.000	0.850	0.121	0.106	4.909	1.654	7.337	0.306
23	8.082	0.000	1.125	17.167	0.000	0.000	0.110	7.971	3.577	4.648	0.000	0.000	1.009	0.132	0.094	4.326	1.713	6.547	0.310
24	8.380	0.000	1.142	17.632	0.000	0.000	0.100	8.280	4.575	4.083	0.000	0.000	1.296	0.154	0.084	3.795	1.864	5.865	0.312
Annual	91,080	0	11,352	184,420	10	0	176	90,881	30,183	60,743	0	0	8,434	1,405	1,281	56,371	16,635	83,956	2,751
Avg	10.397	0.000	1.296	21.053	0.001	0.000	0.020	10.377	3.445	6.934	0.000	0.000	0.963	0.160	0.146	6.435	1.899	9.584	0.314
Max	14.581	0.000	1.500	27.081	0.003	0.000	0.126	14.581	7.014	11.345	0.000	0.000	1.995	0.345	0.237	10.537	2.585	15.228	0.368
Min	7.771	0.000	1.125	16.882	0.000	0.000	0.000	7.764	1.310	3.577	0.000	0.000	0.355	0.093	0.075	3.318	1.438	5.314	0.258
Jan	13.518	0.000	1.446	25.745	0.003	0.000	0.000	13.518	6.661	7.049	0.000	0.000	1.844	0.385	0.147	6.547	2.476	10.309	0.000
Feb	12.141	0.000	1.427	23.994	0.002	0.000	0.000	12.141	5.023	7.191	0.000	0.000	1.410	0.216	0.150	6.679	2.244	10.109	0.000
Mar	11.363	0.000	1.389	22.825	0.001	0.000	0.000	11.363	4.107	7.264	0.000	0.000	1.154	0.171	0.152	6.746	2.080	10.080	0.000
Apr	10.730	0.000	1.353	21.835	0.001	0.000	0.000	10.730	3.472	7.247	0.000	0.000	0.975	0.146	0.151	6.731	1.961	9.987	0.000
May	9.654	0.000	1.278	20.059	0.001	0.000	0.000	9.654	2.600	6.995	0.000	0.000	0.728	0.112	0.147	6.494	1.768	9.543	0.000
Jun	8.845	0.000	1.185	18.470	0.001	0.000	0.034	8.811	1.882	6.841	0.000	0.000	0.525	0.084	0.145	6.346	1.576	9.246	0.000
Jul	8.495	0.000	1.155	17.854	0.000	0.000	0.057	8.438	1.580	6.759	0.000	0.000	0.440	0.070	0.144	6.269	1.507	9.090	0.000
Aug	8.418	0.000	1.147	17.708	0.000	0.000	0.067	8.351	1.586	6.676	0.000	0.000	0.443	0.068	0.143	6.190	1.499	8.968	0.000
Sep	8.374	0.000	1.143	17.632	0.000	0.000	0.067	8.306	1.562	6.656	0.000	0.000	0.436	0.068	0.142	6.171	1.492	8.943	0.000
Oct	9.002	0.000	1.218	18.880	0.000	0.000	0.014	8.988	2.149	6.775	0.000	0.000	0.601	0.091	0.144	6.284	1.647	9.179	0.000
Nov	10.740	0.000	1.370	21.959	0.001	0.000	0.001	10.739	3.986	6.802	0.000	0.000	1.117	0.176	0.144	6.310	2.045	9.473	0.000
Dec	13.494	0.000	1.441	25.685	0.003	0.000	0.000	13.494	6.745	6.955	0.000	0.000	1.882	0.337	0.146	6.456	2.493	10.084	0.000

Treasure Island - District Energy Study

Cashflow Summary - All Phases
Option 3-2 - Heating and Power

Cashflow - Option 3-2 - Heating and Power

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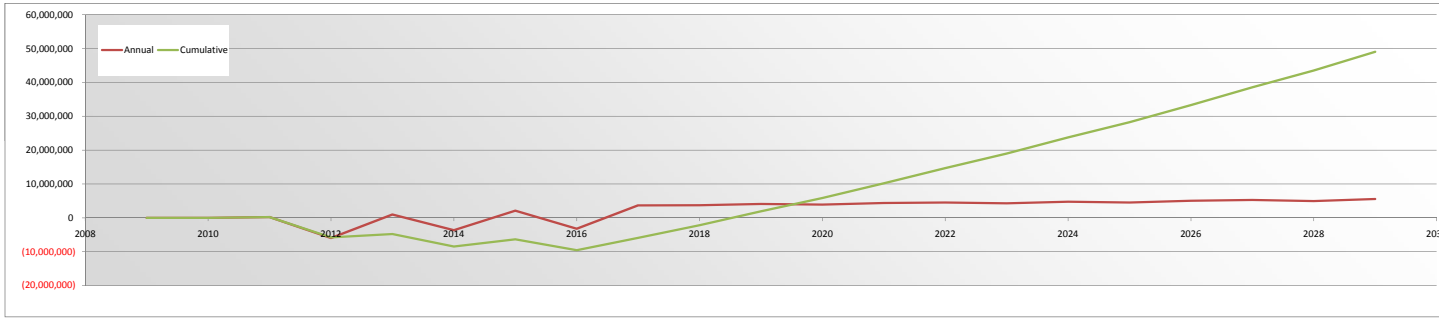


	Cap Ex	OpEx - 1st yr	PV	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21
	(Non-Amortized)	(Non-Amortized)	#REF!	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Plant	5,382,914	358,061	21,810,978	0	0	468,661	2,120,921	145,995	2,210,723	309,618	2,528,905	1,047,601	488,000	1,122,217	522,758	1,202,147	1,302,870	579,591	1,395,667	620,872	1,495,074	1,746,663	688,372	1,814,322	737,401
Total Infrastructure	4,475,000	263,750	11,772,731	0	0	0	2,259,013	128,379	1,424,481	222,803	1,948,178	347,308	359,464	372,045	385,067	398,544	412,493	426,931	441,873	457,339	473,346	564,212	507,060	644,194	543,175
Total	9,857,914	621,811	33,583,708	0	0	468,661	4,379,934	274,374	3,635,204	532,421	4,477,083	1,394,910	847,464	1,494,262	907,825	1,600,691	1,715,364	1,006,521	1,837,540	1,078,211	1,968,419	2,310,876	1,195,432	2,458,517	1,280,576
Administration & Other Operating Costs	0	458,480	11,034,018	0	0	0	36,521	198,775	232,720	395,572	442,499	603,731	624,861	646,731	669,367	692,795	717,043	742,139	768,114	794,998	822,823	851,622	881,428	912,278	944,208
Total Annual	9,857,914	1,080,291	44,617,726	0	0	468,661	4,416,455	473,149	3,867,924	927,993	4,919,582	1,998,640	1,472,325	2,140,994	1,577,192	2,293,486	2,432,406	1,748,661	2,605,654	1,873,209	2,791,242	3,162,498	2,076,860	3,370,795	2,224,785
Design - Soft Costs	492,896	0	303,498	0	0	0	132,205	0	74,588	0	96,706	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction - Soft Costs	492,896	0	303,498	0	0	0	132,205	0	74,588	0	96,706	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	985,791	0	606,997	0	0	0	264,410	0	149,176	0	193,411	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	9,857,914	1,080,291	45,224,723	0	0	468,661	4,680,865	473,149	4,017,100	927,993	5,112,993	1,998,640	1,472,325	2,140,994	1,577,192	2,293,486	2,432,406	1,748,661	2,605,654	1,873,209	2,791,242	3,162,498	2,076,860	3,370,795	2,224,785
Resource Cost	0	1,107,094	21,345,127	0	0	0	0	233,277	476,116	700,578	934,041	1,127,700	1,328,906	1,356,146	1,383,945	1,412,313	1,441,263	1,470,806	1,500,955	1,531,721	1,563,119	1,595,160	1,627,858	1,661,226	1,695,278
Contingency	0	174,991	5,678,322	0	0	74,986	455,723	48,192	449,581	114,561	570,235	271,814	198,864	303,024	209,859	321,373	340,367	227,587	361,172	240,289	383,317	411,233	260,782	435,363	275,474
Loan payment	0	1,073,413	25,526,369	0	0	0	0	473,298	489,864	878,511	909,259	1,413,479	1,462,951	1,514,155	1,567,150	1,622,000	1,678,770	1,737,527	1,798,341	1,861,283	1,926,427	1,993,852	2,063,637	2,135,865	2,210,620
Breakeven	0	3,435,789	95,954,548	0	0	1,012,308	0	1,322,667	1,622,409	2,820,661	3,145,042	5,686,704	4,772,476	6,251,715	5,069,614	6,653,335	6,990,762	5,552,085	7,442,280	5,900,183	7,924,036	8,397,115	6,465,618	8,925,538	6,873,725
Min Profit	0	515,368	14,393,182	0	0	151,846	0	198,400	243,361	423,099	471,756	853,006	715,871	937,757	760,442	998,000	1,048,614	832,813	1,116,342	885,027	1,188,605	1,259,567	969,843	1,338,831	1,031,059
Breakeven+Profit	0	3,951,157	110,347,730	0	0	1,164,154	0	1,521,067	1,865,771	3,243,760	3,616,799	6,539,709	5,488,348	7,189,473	5,830,056	7,651,335	8,039,377	6,384,898	8,558,622	6,785,210	9,112,642	9,656,682	7,435,460	10,264,369	7,904,784
$/MWh	0	0	186,122	0	0	0	0	2,452	1,346	5,406	3,602	16,779	10,663	11,030	11,409	11,801	12,207	12,626	13,061	13,510	13,975	14,854	14,954	16,448	16,002
Conventional customer charges	0	3,051,229	57,118,957	0	0	0	0	657,847	1,339,579	1,943,943	2,569,723	3,068,152	3,583,503	3,648,160	3,713,995	3,781,030	3,849,288	3,918,791	3,989,561	4,061,622	4,134,998	4,209,713	4,285,792	4,363,260	4,442,143
Cashflow	0	0	49,072,813	0	0	226,832	(5,997,467)	953,167	(3,659,773)	2,116,749	(3,213,010)	3,665,999	3,706,593	4,111,082	3,921,396	4,353,687	4,509,014	4,268,732	4,776,809	4,518,320	5,061,469	5,259,812	4,922,119	5,571,284	5,212,430
Cashflow - Cumulative	0	0	225,174,628	0	0	226,832	(5,770,635)	(4,817,468)	(8,477,242)	(6,360,493)	(9,573,503)	(5,907,504)	(2,200,911)	1,910,172	5,831,567	10,185,254	14,694,268	18,963,000	23,739,809	28,258,130	33,319,599	38,579,411	43,501,530	49,072,813	54,285,244
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Resource Use																									
Customers				0%	20%	15%	10%	18%	50%	63%	75%	88%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
natural gas use (Mbtu)		184,420		0	0	0	0	35817.678	71635.356	103303.82	134972.29	159696.13	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97
electricity use (MWh)		10		0	0	0	0	3	6	8	9	9	10	10	10	10	10	10	10	10	10	10	10	10	10
Resource Cost		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
natural gas use ($)		1,106,520	21,334,009	0	0	0	0	233077.69	475711.57	700076.81	933441.11	1127067	1328239.2	1355468.1	1383255.2	1411611.9	1440549.9	1470081.2	1500217.9	1530972.4	1562357.3	1594385.6	1627070.5	1660425.5	1694464.2
electricity use ($)		575	11,118	0	0	0	0	199.12937	404.90966	500.69361	599.56381	632.78223	666.94294	678.08089	689.40484	700.9179	712.62323	724.52404	736.62359	748.9252	761.43225	774.14817	787.07645	800.22062	813.58431
Total		1,107,094	21,345,127	0	0	0	0	233,277	476,116	700,578	934,041	1,127,700	1,328,906	1,356,146	1,383,945	1,412,313	1,441,263	1,470,806	1,500,955	1,531,721	1,563,119	1,595,160	1,627,858	1,661,226	1,695,278
Resource Savings		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
natural gas use (Mbtu)		95,913	0	0	0	0	0	21103.865	42207.729	59121.609	76035.489	85973.995	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501
electricity use (MWh)		16,635	0	0	0	0	0	3,167	6,334	9,125	11,916	14,275	16,635	16,635	16,635	16,635	16,635	16,635	16,635	16,635	16,635	16,635	16,635	16,635	16,635
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
natural gas use ($)		1,055,038	20,610,097	0	0	0	0	251771.59	513865.81	734542.6	964051.18	1112407.4	1266441.1	1292403.1	1318897.4	1345934.8	1373526.4	1401683.7	1430418.2	1459741.8	1489666.5	1520204.7	1551368.9	1583171.9	1615627
electricity use ($)		1,996,191	36,508,860	0	0	0	0	406075.01	825712.94	1209400.1	1605672.1	1955744.5	2317061.5	2355756.4	2395097.5	2435095.7	2475761.8	2517107	2559142.7	2601880.4	2645331.8	2689508.8	2734423.6	2780088.5	2826516
		3,051,229	57,118,957	0	0	0	0	657,847	1,339,579	1,943,943	2,569,723	3,068,152	3,583,503	3,648,160	3,713,995	3,781,030	3,849,288	3,918,791	3,989,561	4,061,622	4,134,998	4,209,713	4,285,792	4,363,260	4,442,143

Treasure Island - District Energy Study

Technology Summary - All Phases

Option 4 - Heating, Cooling and Power

Gas-Fired Boiler (Heating Hot Water)

Performamnce Summary

Phase		1	2	3	4
Peak Design Heating Demand	MBH	0	12.797	9.589	8.886
Proposed Case					
Operation		heat follow	heat follow	heat follow	heat follow
Percent of Demand		0%	44%	30%	33%
Boiler Efficiency Formula	`	0	0	0	0
Typical Boiler Size	Mbtu	10	10	10	10
Number of Boilers	boilers	0	1	1	1
Total Boiler Capacity	Mbtu	0	5.688524495	2.911428426	2.900649401
	HP	0	169.9142292	86.96334476	86.64137906
Boiler Natural Gas Use Efficiency	%	85%	85%	85%	85%
Boiler Electrical Use Efficiency	kW/Mbtu	0.703	0.703	0.703	0.703
Heating Distribution and Infrastructure					
Area served	sf	0	3.92800675	4.39676675	3.40419675
Customers Served	qty	0	20	30	30
Total Length of Piping	lf	0	10500	4500	6000
Average Pipe Diameter	in.	0	0	0	0
Average Pressure Drop	ft hd / 100 ft	0.75	0.75	0.75	0.75
Design Delta T	degF	40	40	40	40
Peak Flow	gpm	0	284.4262248	145.5714213	145.0324701
Equivalent Length Factor		10	10	10	10
Pump Efficiency		65%	65%	65%	65%
Pump Motor Efficiency		90%	90%	90%	90%
Total Pressure Drop	ft hd	0	787.5	337.5	450
Average Pump Capacity	hp	0	45.15882474	9.905407143	13.15831227
Number of Pumps	pumps	0	2	2	2
Average Pump Capcity	hp per pump	#DIV/0!	22.57941237	4.952703571	6.579156136

Treasure Island - District Energy Study

Technology Summary - All Phases

Option 4 - Heating, Cooling and Power

Electric Cooling

Performamnce Summary

Phase		1	2	3	4
Phase Cooling Peak Demand Increase	Mbtuh	0.000	23.343	7.103	1.459
	tons	0	1,945	592	122
Proposed Case					
Operation		load follow	load follow	load follow	load follow
Percent of Demand		0%	87%	61%	33%
Typical Cooling Plant Size	Mbtu	9	9	9	9
	tons	750	750	750	750
Number of Chillers	chiller	0	3	1	1
Total Cooling Capacity	Mbtuh	0.000	20.420	4.334	0.488
	tons	0	1,702	361	41
Chiller Electrical Use Efficiency	COP	4.00	4.00	4.00	4.00
Chiller Natural Gas Use Efficiency	therm/Mbtu	0%	0%	0%	0%
Heat Rejection Rate	Btu/ton	15,000	15,000	15,000	15,000
Cooling Distribution and Infrastructure					
Area served	sf	0.00	1.45	1.10	0.08
Customers Served	qty	-	10	8	2
Total Length of Piping	lf	0	6000	0	0
Average Pipe Diameter	in.	0	0	0	0
Average Pressure Drop	ft hd / 100 ft	0.75	0.75	0.75	0.75
Design Delta T	degF	14	14	14	14
Peak Flow	gpm	0	2917	619	70
Equivalent Length Factor		10	10	10	10
Pump Efficiency		65%	65%	65%	65%
Pump Motor Efficiency		90%	90%	90%	90%
Total Pressure Drop	ft hd	0	450	0	0
Average Pump Capacity	hp	0	265	0	0
Number of Pumps	pumps	0	6	2	2
Average Pump Capcity	hp per pump	#DIV/0!	44	0	0

Treasure Island - District Energy Study

Technology Summary - All Phases

Option 4 - Heating, Cooling and Power

Gas Fired Turbine (Heat Recovery)

Performamnce Summary

Phase		1	2	3	4
Heat Recovery	y/n	y	y	y	y
Absorption Cooling	y/n	y	n	n	n

Combined Heat and Power					
Type		Gas Turbine	Gas Turbine	Gas Turbine	Gas Turbine
Electrical Capacity	kW-e	0	500	500	500
Electrical Efficiency (HHV)	%	23%	23%	23%	23%
Fuel HHV (Nat Gas)	Btu/scf	1000	1000	1000	1000
Power to Heat Ratio		0.5	0.5	0.5	0.5
Thermal Heat Rate	Mbtu/kWh	0	3.412	3.412	3.412
Max Operating Point	%	100%	100%	100%	100%
Max Turndown	%	50%	50%	50%	50%

Heating Distribution					
Auxillary Boiler Gas Efficiency	%	80%	80%	80%	80%
Auxillary Boiler Elec Efficiency	kW/Mbtu	0.70339977	0.70339977	0.70339977	0.70339977

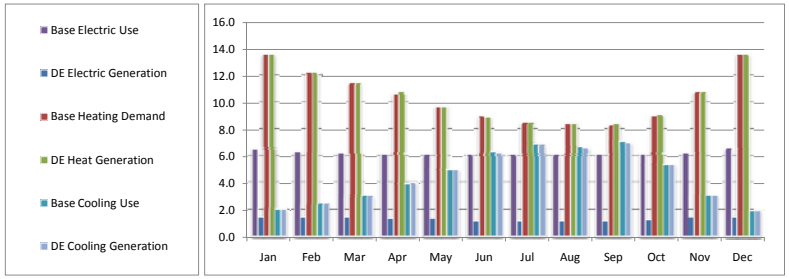
Cooling Plant					
Absorption Chiller Performance	COP	0.6	0.6	0.6	0.6
Chiller Electrical Performance	kW/Mbtu	1.31887456	1.31887456	1.31887456	1.31887456
Heat Rejection Rate	Btu-heat_ reje	1.5	1.5	1.5	1.5

Treasure Island - District Energy Study

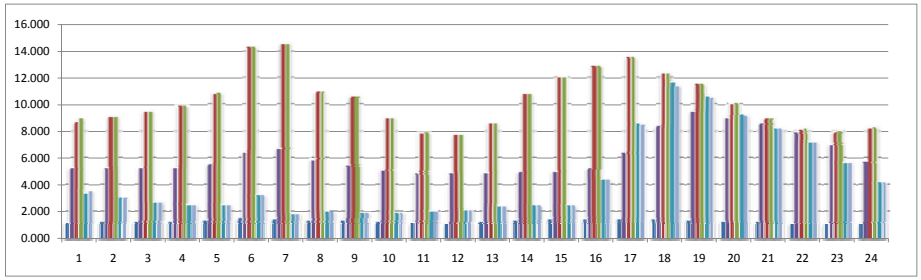
Cashflow Summary - All Phases

Option 4 - Heating, Cooling and Power

Annual Profiles



Hourly Profiles



Total

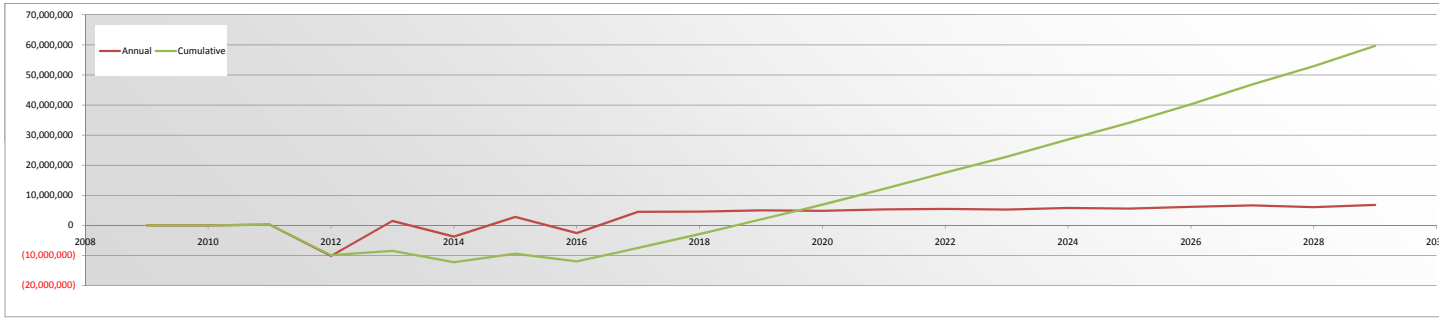
	Generation			Generation Resource Use		End Use Energy Savings											Resource Use Savings		Impacts
	Heat Generation	Cool Generation	Electric Generation	Natural Gas Use	Electric Use	Cooling Use	Heat Rejection	Heating Use	Space Heat	DHW Heat	Elec Cool	Gas Cool	Elec Space Heat	Gas Space Heat	Elec DHW	Gas DHW	Electric Use	Natural Gas Use	CO2 Emissions
	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg
Hour	Mbtuh	Mbtuh	MW	Mbtuh	MW	Mbtuh	Mbtuh	Mbtuh	Mbtuh	Mbtuh	MW	Mbtuh	MW	Mbtuh	MW	Mbtuh	MW	Mbtuh	Tons CO2
1	9.005	3.554	1.192	18.709	0.261	3.554	4.499	8.949	5.769	3.714	1.042	0.000	1.639	0.182	0.077	3.449	2.302	5.470	0.508
2	9.152	3.001	1.213	19.022	0.220	3.001	3.776	9.127	6.056	3.595	0.880	0.000	1.722	0.184	0.076	3.337	2.330	5.314	0.486
3	9.520	2.723	1.248	19.697	0.200	2.723	3.408	9.515	6.492	3.577	0.798	0.000	1.846	0.199	0.075	3.318	2.412	5.338	0.480
4	9.922	2.511	1.282	20.402	0.185	2.511	3.139	9.922	6.908	3.592	0.736	0.000	1.965	0.209	0.075	3.334	2.495	5.392	0.477
5	10.880	2.501	1.383	22.211	0.184	2.501	3.126	10.880	7.014	4.367	0.733	0.000	1.995	0.214	0.090	4.057	2.626	6.432	0.498
6	14.341	3.250	1.500	27.081	0.241	3.250	4.063	14.341	6.515	7.912	0.953	0.000	1.851	0.206	0.162	7.358	2.786	11.080	0.473
7	14.581	1.821	1.445	26.991	0.137	1.821	2.276	14.581	4.523	9.814	0.534	0.000	1.271	0.189	0.200	9.131	2.405	13.538	0.353
8	10.962	2.007	1.385	22.325	0.148	2.007	2.509	10.962	1.862	8.800	0.588	0.000	0.499	0.158	0.180	8.185	1.918	12.085	0.431
9	10.649	1.921	1.339	21.640	0.142	1.921	2.401	10.649	2.382	8.082	0.563	0.000	0.599	0.345	0.168	7.508	1.874	11.444	0.422
10	9.034	1.932	1.221	18.940	0.142	1.932	2.415	9.034	1.781	7.131	0.566	0.000	0.459	0.216	0.151	6.615	1.690	9.908	0.419
11	7.933	2.034	1.150	17.163	0.149	2.034	2.562	7.913	1.557	6.308	0.596	0.000	0.409	0.160	0.141	5.827	1.606	8.669	0.429
12	7.771	2.172	1.137	16.882	0.159	2.172	2.722	7.764	1.465	6.250	0.636	0.000	0.388	0.138	0.144	5.758	1.603	8.515	0.435
13	8.622	2.404	1.237	18.562	0.176	2.404	3.004	8.622	1.382	7.094	0.704	0.000	0.369	0.119	0.163	6.540	1.736	9.578	0.468
14	10.830	2.451	1.375	22.099	0.181	2.451	3.063	10.830	1.347	9.117	0.718	0.000	0.362	0.105	0.204	8.422	1.920	12.211	0.450
15	12.074	2.468	1.428	23.921	0.182	2.468	3.085	12.074	1.319	10.262	0.723	0.000	0.357	0.095	0.224	9.499	1.994	13.718	0.426
16	12.926	4.438	1.462	25.158	0.327	4.438	5.548	12.926	1.310	11.039	1.301	0.000	0.355	0.093	0.235	10.240	2.146	14.767	0.508
17	13.554	8.492	1.478	26.003	0.625	8.492	10.615	13.554	1.620	11.345	2.489	0.000	0.443	0.105	0.237	10.537	2.424	15.228	0.705
18	12.364	11.443	1.391	24.016	0.840	11.443	14.303	12.364	2.522	9.507	3.354	0.000	0.704	0.115	0.196	8.839	2.584	12.857	0.879
19	11.569	10.532	1.376	22.974	0.773	10.532	13.165	11.569	3.327	8.109	3.087	0.000	0.940	0.116	0.166	7.541	2.594	11.022	0.867
20	10.104	9.210	1.259	20.458	0.676	9.210	11.523	10.093	3.204	6.881	2.699	0.000	0.902	0.125	0.140	6.405	2.341	9.439	0.789
21	9.010	8.233	1.201	18.773	0.604	8.233	10.313	8.987	3.160	5.920	2.413	0.000	0.877	0.168	0.119	5.513	2.206	8.266	0.748
22	8.270	7.192	1.132	17.436	0.527	7.192	9.115	8.145	3.026	5.271	2.108	0.000	0.850	0.121	0.106	4.909	2.078	7.337	0.681
23	8.082	5.685	1.125	17.167	0.417	5.685	7.217	7.971	3.577	4.648	1.666	0.000	1.009	0.132	0.094	4.326	2.054	6.547	0.606
24	8.380	4.182	1.142	17.632	0.307	4.182	5.327	8.280	4.575	4.083	1.226	0.000	1.296	0.154	0.084	3.795	2.120	5.865	0.530
Annual	91,080	38,746	11,352	184,420	2,849	38,746	48,609	90,881	30,183	60,743	11,356	0	8,434	1,405	1,281	56,371	19,069	83,956	4,770
Avg	10.397	4.423	1.296	21.053	0.325	4.423	5.549	10.377	3.445	6.934	1.296	0.000	0.963	0.160	0.146	6.435	2.177	9.584	0.544
Max	14.581	11.443	1.500	27.081	0.840	11.443	14.303	14.581	7.014	11.345	3.354	0.000	1.995	0.345	0.237	10.537	2.786	15.228	0.879
Min	7.771	1.821	1.125	16.882	0.137	1.821	2.276	7.764	1.310	3.577	0.534	0.000	0.355	0.093	0.075	3.318	1.603	5.314	0.353
Jan	13.518	2.011	1.446	25.745	0.150	2.011	2.513	13.518	6.661	7.049	0.589	0.000	1.844	0.385	0.147	6.547	2.613	10.309	0.000
Feb	12.141	2.421	1.427	23.994	0.179	2.421	3.027	12.141	5.023	7.191	0.710	0.000	1.410	0.216	0.150	6.679	2.406	10.109	0.000
Mar	11.363	2.984	1.389	22.825	0.220	2.984	3.730	11.363	4.107	7.264	0.875	0.000	1.154	0.171	0.152	6.746	2.275	10.080	0.000
Apr	10.730	3.966	1.353	21.835	0.292	3.966	4.958	10.730	3.472	7.247	1.162	0.000	0.975	0.146	0.151	6.731	2.212	9.987	0.000
May	9.654	4.940	1.278	20.059	0.363	4.940	6.175	9.654	2.600	6.995	1.448	0.000	0.728	0.112	0.147	6.494	2.076	9.543	0.000
Jun	8.845	6.219	1.185	18.470	0.456	6.219	7.808	8.811	1.882	6.841	1.823	0.000	0.525	0.084	0.145	6.346	1.959	9.246	0.000
Jul	8.495	6.845	1.155	17.854	0.502	6.845	8.614	8.438	1.580	6.759	2.006	0.000	0.440	0.070	0.144	6.269	1.926	9.090	0.000
Aug	8.418	6.546	1.147	17.708	0.480	6.546	8.249	8.351	1.586	6.676	1.919	0.000	0.443	0.068	0.143	6.190	1.902	8.968	0.000
Sep	8.374	6.940	1.143	17.632	0.509	6.940	8.743	8.306	1.562	6.656	2.034	0.000	0.436	0.068	0.142	6.171	1.916	8.943	0.000
Oct	9.002	5.298	1.218	18.880	0.389	5.298	6.636	8.988	2.149	6.775	1.553	0.000	0.601	0.091	0.144	6.284	1.977	9.179	0.000
Nov	10.740	3.009	1.370	21.959	0.221	3.009	3.762	10.739	3.986	6.802	0.882	0.000	1.117	0.176	0.144	6.310	2.240	9.473	0.000
Dec	13.494	1.888	1.441	25.685	0.141	1.888	2.359	13.494	6.745	6.955	0.553	0.000	1.882	0.337	0.146	6.456	2.623	10.084	0.000

Treasure Island - District Energy Study

Cashflow Summary - All Phases
Option 4 - Heating, Cooling and Power

Cashflow - Option 4 - Heating, Cooling and Power

ARUP



	Cap Ex	OpEx - 1st yr	PV	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21
	(Non-Amortized)	(Non-Amortized)	#REF!	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Plant	6,827,064	455,261	26,406,068	0	0	468,661	3,439,098	210,027	2,549,444	404,763	2,660,248	1,175,595	620,474	1,259,327	664,667	1,349,023	1,454,887	736,928	1,558,511	789,416	1,669,516	2,452,332	875,239	2,067,913	937,578
Total Infrastructure	5,725,000	336,250	19,241,729	0	0	0	4,812,848	260,125	1,926,334	396,313	2,184,107	557,878	575,435	593,607	612,415	631,881	652,028	672,881	694,463	716,801	739,921	1,400,419	788,616	1,025,657	840,780
Total	12,552,064	791,511	45,647,797	0	0	468,661	8,251,946	470,152	4,475,778	801,076	4,844,355	1,733,473	1,195,909	1,852,934	1,277,082	1,980,904	2,106,915	1,409,809	2,252,975	1,506,217	2,409,437	3,852,751	1,663,855	3,093,570	1,778,358
Administration & Other Operating Costs	0	543,330	13,205,976	0	0	0	69,312	266,651	311,761	486,476	543,518	715,462	740,503	766,421	793,245	821,009	849,744	879,485	910,267	942,127	975,101	1,009,230	1,044,553	1,081,112	1,118,951
Total Annual	12,552,064	1,334,841	58,853,773	0	0	468,661	8,321,258	736,803	4,787,539	1,287,551	5,387,873	2,448,935	1,936,412	2,619,355	2,070,327	2,801,913	2,956,659	2,289,294	3,163,242	2,448,344	3,384,538	4,861,981	2,708,408	4,174,682	2,897,309
Design - Soft Costs	627,603	0	454,447	0	0	0	261,865	0	92,961	0	99,621	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction - Soft Costs	627,603	0	454,447	0	0	0	261,865	0	92,961	0	99,621	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	1,255,206	0	908,895	0	0	0	523,730	0	185,922	0	199,243	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	9,857,914	1,334,841	59,762,668	0	0	468,661	8,844,988	736,803	4,973,461	1,287,551	5,587,116	2,448,935	1,936,412	2,619,355	2,070,327	2,801,913	2,956,659	2,289,294	3,163,242	2,448,344	3,384,538	4,861,981	2,708,408	4,174,682	2,897,309
Resource Cost	0	1,277,433	24,659,398	0	0	0	0	293,511	598,596	853,545	1,118,480	1,318,695	1,526,625	1,557,167	1,588,323	1,620,104	1,652,524	1,685,595	1,719,331	1,753,745	1,788,850	1,824,660	1,861,191	1,898,456	1,936,470
Contingency	0	208,982	6,908,591	0	0	74,986	765,484	68,673	526,626	148,291	614,372	314,179	242,557	347,800	255,750	368,414	388,592	277,033	411,877	292,291	436,657	552,943	316,922	505,145	334,592
Loan payment	0	1,387,798	33,598,793	0	0	0	0	783,183	810,594	1,257,506	1,301,518	1,827,465	1,891,426	1,957,626	2,026,143	2,097,058	2,170,455	2,246,421	2,325,045	2,406,422	2,490,647	2,577,819	2,668,043	2,761,424	2,858,074
Breakeven	0	4,209,053	117,787,689	0	0	1,012,308	0	1,976,920	2,362,384	3,745,911	4,128,758	6,784,343	5,906,449	7,419,344	6,272,011	7,891,650	8,266,186	6,865,848	8,795,654	7,294,482	9,360,622	11,051,775	7,991,045	10,661,998	8,494,014
Min Profit	0	631,358	17,668,153	0	0	151,846	0	296,538	354,358	561,887	619,314	1,017,652	885,967	1,112,902	940,802	1,183,748	1,239,928	1,029,877	1,319,348	1,094,172	1,404,093	1,657,766	1,198,657	1,599,300	1,274,102
Breakeven+Profit	0	4,840,411	135,455,842	0	0	1,164,154	0	2,273,458	2,716,742	4,307,797	4,748,071	7,801,995	6,792,417	8,532,246	7,212,812	9,075,398	9,506,114	7,895,725	10,115,002	8,388,654	10,764,716	12,709,542	9,189,702	12,261,297	9,768,116
$/MWh	0	0	228,042	0	0	0	0	3,518	1,948	6,424	4,483	20,303	13,009	13,450	13,906	14,378	14,866	15,371	15,894	16,434	16,993	18,926	18,170	19,969	19,430
Conventional customer charges	0	3,343,334	62,753,785	0	0	0	0	748,377	1,523,663	2,193,868	2,887,638	3,396,508	3,922,561	3,992,880	4,064,472	4,137,361	4,211,569	4,287,122	4,364,043	4,442,358	4,522,093	4,603,273	4,685,924	4,770,074	4,855,750
Cashflow	0	0	59,642,980	0	0	226,832	##########	1,441,905	(3,765,163)	2,821,228	(2,555,860)	4,477,990	4,546,576	4,975,494	4,811,017	5,269,323	5,451,498	5,238,926	5,775,601	5,546,630	6,120,247	6,613,189	6,044,813	6,764,325	6,403,238
Cashflow - Cumulative	0	0	261,090,348	0	0	226,832	(9,934,759)	(8,492,854)	##########	(9,436,789)	##########	(7,514,659)	(2,968,083)	2,007,411	6,818,428	12,087,751	17,539,249	22,778,175	28,553,776	34,100,406	40,220,653	46,833,842	52,878,655	59,642,980	66,046,218
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Resource Use																									
Customers				0%	20%	15%	10%	18%	50%	63%	75%	88%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
natural gas use (Mbtu)		184,420		0	0	0	0	35817.678	71635.356	103303.82	134972.29	159696.13	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97	184419.97
electricity use (MWh)		2,849		0	0	0	0	943	1,885	2,316	2,746	2,797	2,849	2,849	2,849	2,849	2,849	2,849	2,849	2,849	2,849	2,849	2,849	2,849	2,849
Resource Cost		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
natural gas use ($)		1,106,520	21,334,009	0	0	0	0	233077.69	475711.57	700076.81	933441.11	1127067	1328239.2	1355468.1	1383255.2	1411611.9	1440549.9	1470081.2	1500217.9	1530972.4	1562357.3	1594385.6	1627070.5	1660425.5	1694464.2
electricity use ($)		170,913	3,325,389	0	0	0	0	60433.182	122884.83	153468.2	185038.78	191628.18	198386.06	201699.1	205067.48	208492.11	211973.92	215513.89	219112.97	222772.16	226492.45	230274.88	234120.47	238030.28	242005.38
Total		1,277,433	24,659,398	0	0	0	0	293,511	598,596	853,545	1,118,480	1,318,695	1,526,625	1,557,167	1,588,323	1,620,104	1,652,524	1,685,595	1,719,331	1,753,745	1,788,850	1,824,660	1,861,191	1,898,456	1,936,470
Resource Savings		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
natural gas use (Mbtu)		95,913	0	0	0	0	0	21103.865	42207.729	59121.609	76035.489	85973.995	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501	95912.501
electricity use (MWh)		19,069	0	0	0	0	0	3,873	7,746	11,011	14,275	16,672	19,069	19,069	19,069	19,069	19,069	19,069	19,069	19,069	19,069	19,069	19,069	19,069	19,069
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
natural gas use ($)		1,055,038	20,610,097	0	0	0	0	251771.59	513865.81	734542.6	964051.18	1112407.4	1266441.1	1292403.1	1318897.4	1345934.8	1373526.4	1401683.7	1430418.2	1459741.8	1489666.5	1520204.7	1551368.9	1583171.9	1615627
electricity use ($)		2,288,296	42,143,688	0	0	0	0	496605.31	1009797.2	1459325.6	1923586.6	2284100.9	2656119.9	2700477.1	2745575.1	2791426.2	2838043	2885438.3	2933625.1	2982616.7	3032426.4	3083067.9	3134555.1	3186902.2	3240123.4
		3,343,334	62,753,785	0	0	0	0	748,377	1,523,663	2,193,868	2,887,638	3,396,508	3,922,561	3,992,880	4,064,472	4,137,361	4,211,569	4,287,122	4,364,043	4,442,358	4,522,093	4,603,273	4,685,924	4,770,074	4,855,750

Appendix K

District Energy Infrastructure Diagram

K1 District Energy Infrastructure Diagram

- Graphical representation of proposed heating and cooling distribution infrastructure used in the district energy analysis.

TREASURE ISLAND
DISTRICT ENERGY (DE) INFRASTRUCTURE DIAGRAM

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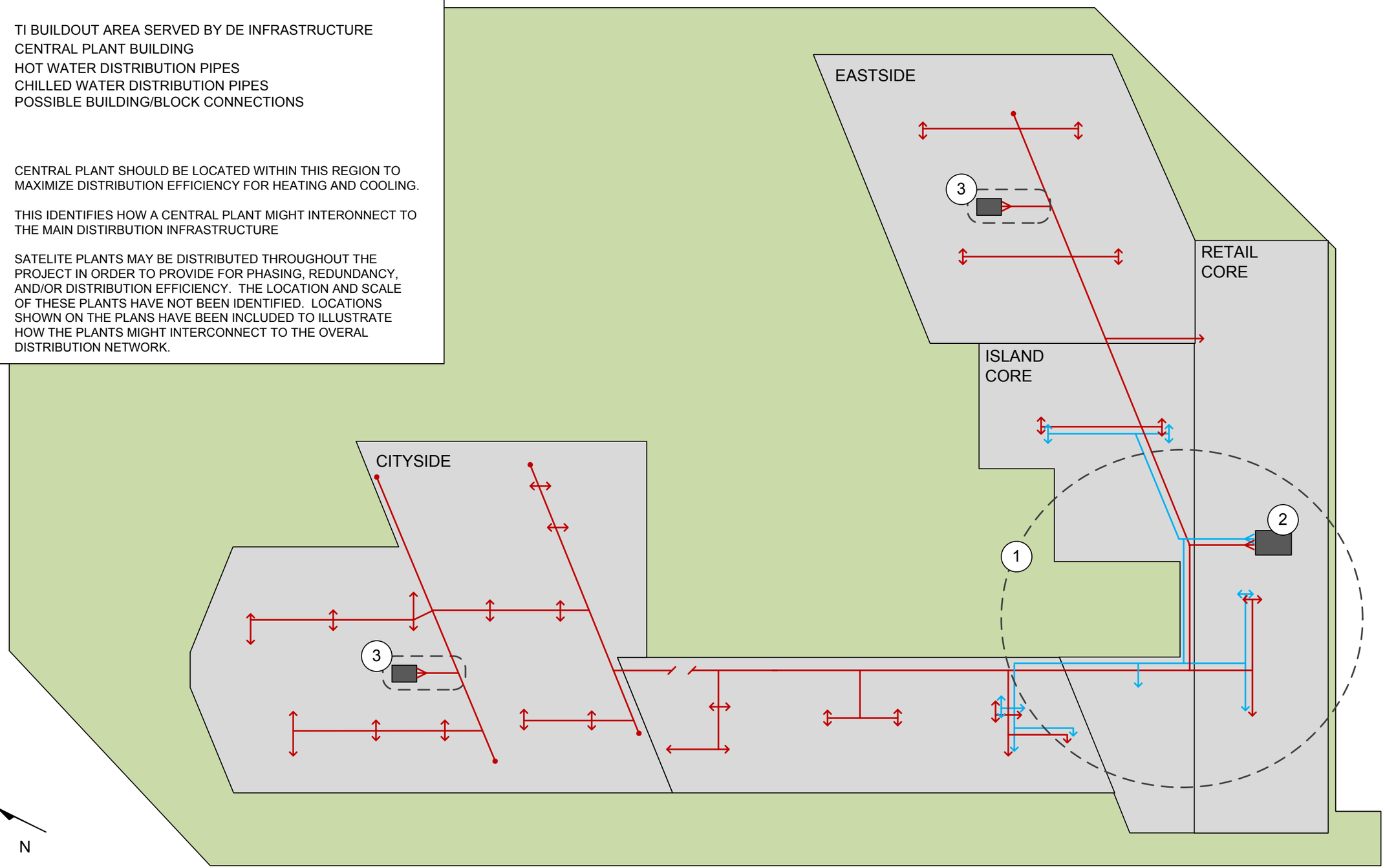
LEGEND:

- TI BUILDOUT AREA SERVED BY DE INFRASTRUCTURE
- CENTRAL PLANT BUILDING
- HOT WATER DISTRIBUTION PIPES
- CHILLED WATER DISTRIBUTION PIPES
- POSSIBLE BUILDING/BLOCK CONNECTIONS

NOTES:

1. CENTRAL PLANT SHOULD BE LOCATED WITHIN THIS REGION TO MAXIMIZE DISTRIBUTION EFFICIENCY FOR HEATING AND COOLING.
2. THIS IDENTIFIES HOW A CENTRAL PLANT MIGHT INTERONNECT TO THE MAIN DISTIRBUTION INFRASTRUCTURE
3. SATELITE PLANTS MAY BE DISTRIBUTED THROUGHOUT THE PROJECT IN ORDER TO PROVIDE FOR PHASING, REDUNDANCY, AND/OR DISTRIBUTION EFFICIENCY. THE LOCATION AND SCALE OF THESE PLANTS HAVE NOT BEEN IDENTIFIED. LOCATIONS SHOWN ON THE PLANS HAVE BEEN INCLUDED TO ILLUSTRATE HOW THE PLANTS MIGHT INTERCONNECT TO THE OVERAL DISTRIBUTION NETWORK.