**[Date]**

**[Tenant Name]**

**[Floor(s), and total square footage]**

**[Building Name/ Address]**

**Tenant Energy Performance Optimization Summary**

***[Note: This tenant space energy modeling template is a framework to be adjusted to the project specific design and existing conditions]***

This report contains information provided as of ***[INSERT DRAWING SET AND DATE],*** and feedback from the architect, engineer *(if model is not being built by project engineer*), lighting designer, tenant operations team. The model analyzes the impact of the following energy performance measures (EPMs) and determines tiers of good, better and best energy performance packages based including the following strategies:

**Energy Performance Measures (EPMs):**

1. Envelope Measure(s)
2. Lighting: LPD to 0.7 W/SF or lower
3. Daylighting: Dimming/ Harvest Controls
4. Plug Load Management: Occupancy sensor strip-plugs, computer software
5. HVAC Optimization
6. IT/ Server Efficiency/ Management
7. other

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Energy Performance Packages |  | Good | Better | Best |
| Envelope/ other EPMs provided by LL |  | **•** | **•** | **•** |
| Lighting: LPD to 0.7 W/SF or lower |  |  | **•** | **•** |
| Daylighting: Dimming/ Harvest Controls |  |  | **•** | **•** |
| Plug Load Management |  |  | **•** | **•** |
| HVAC Optimization |  |  |  | **•** |
| IT/ Server Efficiency/ Management |  |  |  | **•** |

**Energy Model**

An energy model is being developed using the **[eQUEST (DOE2.2, or identify other]** predictive computer modeling software. The features of the baseline building model are determined by the existing base building conditions at [insert building name/ location], and ASHRAE 90.1 2007 code requirements. Improvements to this model are then made to assess energy efficiency design improvements to the leased premises systems.

Describe the tenant design standards or business as usual design as the adjusted baseline.

Describe build-out phases if the project is a multi-floor tenant space and how the design scope differs in each phase if applicable.

**Energy Utility Rates**

Utility rates have been based on ***[note year of collected utility bills, ideally last year full year prior to analysis]***.

**Electric** costs used a blended rate of ***[$0.XX/kWh]***, which includes average annual base rate and demand charges.

**Steam** costs were modeled per ***[note applicable utility company]*** as shown in the table below. Note that any steam savings or penalties have been assumed to be absorbed by the owner, due to the negotiated rate of the steam costs to the tenant (if applicable).

**

**Natural Gas** costs are estimated to be ***[X.XX/therm]***.

**Energy Model Assumptions (to be adjusted/ confirmed by the tenant and/or design team):**

|  |  |
| --- | --- |
| Condition *[Revise as applicable]* | Confirmation / Comment |
| The number of people on the floor is estimated as 200 gross square feet (including storage and corridors, but excluding unconditioned core) per person, a typical value for this type of office space. |  |
| On a typical day, only 95% of the maximum occupancy will be present and working on the floor. Lower occupancy is typically due to offsite meeting, absences, and travel. For example, floor 14 is estimated as having maximum design occupancy of 86 people but a typical day maximum occupancy of 82 people. |  |
| The space ends occupancy at 7PM, with a few people staying until 8PM. |  |
| Most lights are turned on at 7AM and off at 7PM. |  |
| On a typical day, 90% of the installed lighting is turned on (ignoring daylight harvesting controls but including occupancy sensors). |  |

**Preliminary Results**

The design (noted above) was evaluated from the perspective of energy efficiency opportunities. Areas of high efficiency in the current design are noted as well as areas with potential for further increasing the energy efficiency of tenant improvements (TI).

The preliminary energy model estimates that the optimal package will yield approximately ***X%*** in annual tenant space electric energy cost savings relative to the existing baseline conditions at ***[insert building name/ location]***.

Note that savings will also impact the owner for central plant related energy, including chilled water, pumping, and cooling tower fans and are noted in the table below. The tenant savings will primarily correspond to lights, plug‐in equipment loads, and ventilation fans. Any steam related savings or penalties have been assumed to be absorbed by the owner, due to the negotiated rate of the steam costs to the tenant (if applicable).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Phase I  Floor(s)  Tenant | Phase II  Floor(s)  Tenant | Phase III  Floor(s)  Tenant | Building  Owner |
| Baseline Energy Use  (kWh) |  |  |  |  |
| Energy Reduction  (kWh)  (%) |  |  |  |  |
| Energy Use Intensity  (W/ SF) |  |  |  |  |
| Lighting Power Density  (W/ SF) |  |  |  |  |
| Energy Use Per Person  (kWh/person/ yr) |  |  |  |  |

|  |  |
| --- | --- |
| Space Type: | Tenant Premises |
| Project Area | *XX ft2* |
| Conference | 3.6% |
| Corridor | 1.9% |
| Mechanical/Electrical | 6.4% |
| Office | 77.5% |
| Other | 1.1% |
| Restroom | 3.2% |
| Storage | 2.4% |

**Description of Tenant Driven Energy Performance Measures (EPMs):**

**Envelope**

*Note: include all energy capital improvements completed or planned by the building owner for an adjusted baseline*

**Perimeter Wall Insulation**

Adding insulation to the exterior walls reduces thermal heat transfer of the surface, resulting in decreased heat gain in the perimeter spaces of the building. This measure assumes that R-20 insulation will be added to the inside of the perimeter walls. Assume aerogel wall insulation will be added to the premises as prior to the perimeter wall enclosure and finish (whitebox).

**Window Film**

Utilizing a film on the existing glazing is one way to control solar heat gain through the glass. The baseline glass has a U-Value of 0.60, and a Solar Heat Gain Coefficient of 0.70. Using a film would reduce the SHGC to 0.50. This run in the analysis has assumed that film would be utilized for Levels 16-21 as part of the tenant fit-out.

**Window Replacement / Retrofit**

Replacing the existing glass with a higher efficiency glass would also provide energy savings associated with the reduced solar load and increased glazing insulation. The baseline glass has a U-Value of 0.60, and a Solar Heat Gain Coefficient of 0.70. The replacement glass has been assumed to have a U-Value of 0.167 and a SHGC of 0.40.

**Lighting Load Reduction**

**Daylighting Dimming/ Harvesting Controls**

Total Annual Energy Savings: XX kWh

Tenant Annual Energy Savings: XX kWh (X %)

Building Owner Annual Energy Savings: XX kWh (X %)

**High Efficiency LED Lighting**

The use of high efficiency lighting layout with occupancy sensors in the open office plan areas for future tenants will provide energy savings relative to a baseline whole building allowance of 1.1 W/sf.

Total Annual Energy Savings: XX kWh

Tenant Annual Energy Savings: XX kWh (X %)

Building Owner Annual Energy Savings: XX kWh (X %)

**Plug-In Equipment Load Reduction**

**Plug Load Control - Computer Software**

Specialized computer software automatically backs up computers and shuts down computers to save energy during unoccupied periods. This analysis assumes that the use of the computer power control software combined with the off hours plug load control the plug-in equipment loads will be reduced by 50% during unoccupied hours.

Total Annual Energy Savings: XX kWh

Tenant Annual Energy Savings: XX kWh (X %)

Building Owner Annual Energy Savings: XX kWh (X %)

**Plug Load Control - Occupancy Sensors**

Typically, plug loads are reduced at night but not to zero. Many plug loads continue to draw power, at a reduced rate, when they are in sleep or off mode. One approach to minimizing these phantom loads is to provide some number of outlets with active control that turns off power completely when the space is unoccupied. This analysis assumes that plug‐in equipment will be reduced by 10% during occupied hours, and combined with the Night Watchman controls will reduce plug-in equipment loads by 50% during unoccupied hours.

Total Annual Energy Savings: XX kWh

Tenant Annual Energy Savings: XX kWh (X %)

Building Owner Annual Energy Savings: XX kWh (X %)

**Plug Load Control- Kill Switch**

Total Annual Energy Savings: XX kWh

Tenant Annual Energy Savings: XX kWh (X %)

Building Owner Annual Energy Savings: XX kWh (X %)

**Server Equipment/ IT Network Optimization**

The implementation of the measure may be a combination of specifying Energy Star servers, right sizing server equipment, virtualization and data distribution technologies such as a passive optical network (PON). The reduction in electrical use would result in savings from the equipment power load and as well as reduced computer room air conditioning and cooling load. A comprehensive design study would be needed to investigate the design and implications of the measure.

**High Efficiency Servers**

Existing building server and IT loads have been estimated for the IDF/MDF rooms as 30-50 W/sf. Use of high efficiency server equipment could reduce these loads significantly. This analysis assumes that IT loads have been reduced by 50% as part of the tenant fit-out.

Total Annual Energy Savings: XX kWh

Tenant Annual Energy Savings: XX kWh (X %)

Building Owner Annual Energy Savings: XX kWh (X %)

**Heating/ Ventilation/ Air Conditioning (HVAC) Optimization**

Right sizing variable air volume (VAV) air handling units (AHUs)

Low velocity AHUs

Variable frequency drives (VFDs) on AHUs

Noise filter elimination on AHUs

Air distribution duct layout (may include bridged after hours supplemental cooling, air resistance reduction with elbows)

Total Annual Energy Savings: XX kWh

Tenant Annual Energy Savings: XX kWh (X %)

Building Owner Annual Energy Savings: XX kWh (X %)

**Appendix A.1: Whole Building Model Results**

***[Insert eQUEST output summary, sample below is illustrative]***



**Appendix A.2: Tenant Model Results**

***[Insert eQUEST output summary, sample below is illustrative]***

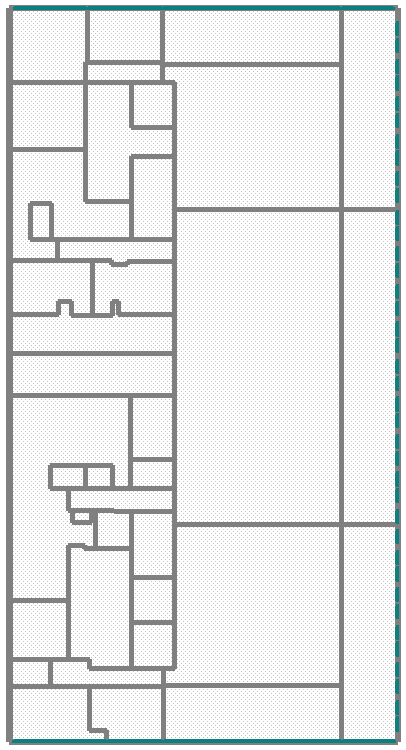
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**Appendix B: Preliminary Model Assumptions**

***[Insert eQUEST output summary, samples below is illustrative]***





 **Appendix C: Model Typical Zoning *[Insert project floor plan and model zones]***

