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# ASHRAE LEVEL I PRELIMINARY ENERGY USE ANALYSIS

The first step to understanding a building's energy consumption and cost efficiency is to gather and tabulate building information. This information can be used to generate the Energy Utilization Index (EUI) of the building.

The next step is to compare the EUI of the project building to similar buildings located in similar climates. This will allow the project team and building owner to evaluate if the project is above average or below average with respect to energy consumption. Projects that consume more energy than similar buildings should provide more options to reduce energy consumption.

A target EUI must be derived for the project building from a database of similar buildings located within similar climates. More than 50% of the building is designated as office space, and supporting office functions, therefore the online ENERGY STAR® Portfolio Manager has been used to benchmark the facility. The ENERGY SCORE of the project building is 79 (based on SEP generated May 20, 2013 for period ending March 31, 2013). The target Energy Utilization Index was arbitrarily selected by the Energy Auditor. The target EUI was selected to increase the current ENERGY Score up to 84.

Finally a calculation was performed to demonstrate to the owner how much money could be saved each year if the target Energy Utilization Index was achieved by the project team. Costs for electricity has been calculated. (other energy sources – natural gas, fuel oil, purchased chilled water, steam, etc.. - are not supplied to the building). Cost calculations include on-peak, off-peak and demand charges.

The Preliminary Energy Use Analysis performed by this project followed the procedures and forms provided by the "ASHRAE Procedures for Commercial Building Energy Audits 2<sup>nd</sup> Edition".

## TARGET ENERGY SCORE GENERATION

The Statement of Energy Performance Summary calculated the site Energy Utilization Index of the project building to be 81 kBtu/ft<sup>2</sup>/year.

The selected target ENERGY SCORE of 84 correlates to a site Energy Utilization Index of 75 kBtu/ft<sup>2</sup>/year. This would provide an annual reduction of energy consumption by 8% when compared to the current energy consumption.

ANNUAL ENERGY SAVINGS *if target score is achieved:*

$$81 \text{ kBtu/ft}^2/\text{year} - 75 \text{ kBtu/ft}^2/\text{year} = 6 \text{ kBtu/ft}^2/\text{year}$$

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## ANNUAL COST SAVINGS IN ELECTRICITY

$$6 \text{ kBtu/ft}^2/\text{year} \times 45,903\text{ft}^2 = 275,418 \text{ kBtu/year}$$
$$(275,418 \text{ kBtu/year}) \times \text{kwh}/3.413 \text{ kBtu} = 80,697 \text{ kwh/yr}$$

## CONSUMPTION

The building is charged a variable consumption rate based on the amount consumed each month. The average rate is \$0.059 / kwh.

$$80,697 \text{ kwh/yr} \times \$0.059 / \text{kwh.} = \$4,761$$

## DEMAND

$$80,697 \text{ kwh/year} / (52 \text{ weeks} \times 60 \text{ hours})/\text{year} = 26 \text{ KW}$$
$$26 \text{ KW} \times \$3.38/\text{KW}/\text{Billing Period} \times 12 \text{ Billing Periods} / \text{year} = \$1,055$$

$$\begin{aligned} \text{Total annual electricity savings} &= \$4,761 + \$1,055 \\ &= \$5,816 \quad \blacktriangleleft \text{ANNUAL COST SAVINGS} \end{aligned}$$

The ENERGY STAR® Portfolio Manager tool has been used to benchmark the building's energy consumption and perform the comparison of energy use intensity against similar characteristics. Refer to documents uploaded within EAp2; as allowed by the EAp1 LEED Online template the ASHRAE Level I Audit does not explicitly include the following:

1. Energy index / cost index for each fuel or demand type and their combined total
2. Comparison of EUI and cost index of this building against similar buildings

Actual utility rate structures have been used to calculate the total annual savings achieved if the target score is met. Further engineering analysis is not warranted.