Assessment Report

Occupancy-Based Strategic Energy Management

Report to

Consumers Customer LLC

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City, MI 48008

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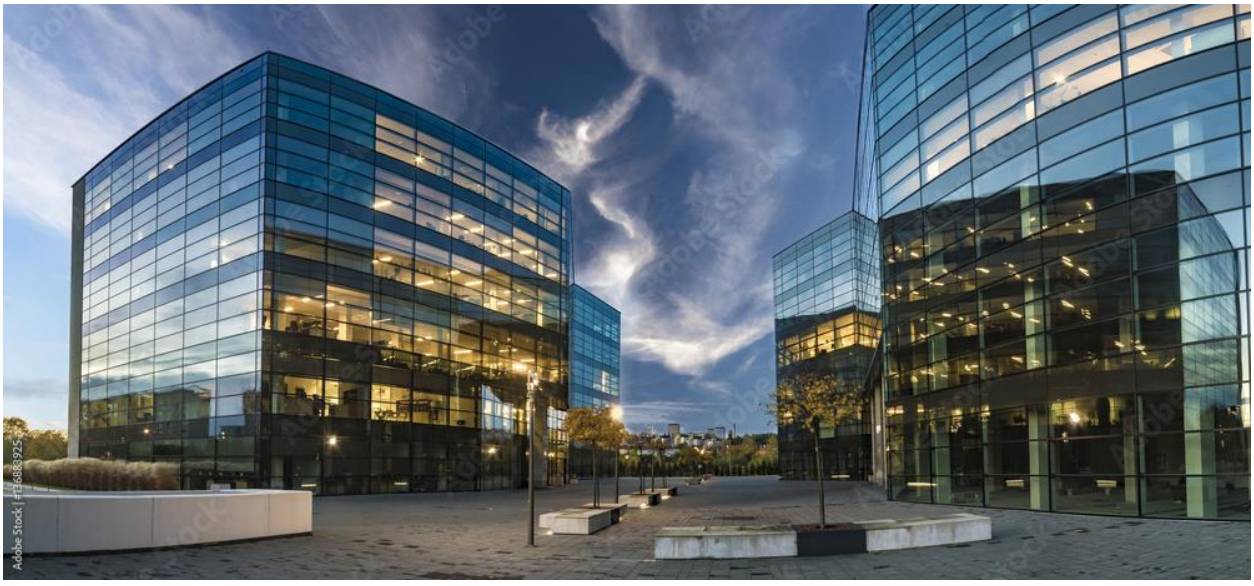

OVERVIEW

Potential Savings Summary

Est. energy savings ≈ **12.5%**

Est. Annual Savings ≈ **$26,683**

Simple Payback ≈ **2.08 Years**

Executive Summary

BUILDING X is a XX story, XXX,XXX square foot (sq. ft.) building constructed in 19XX. It includes XXX,XXX sq. ft. of office space and an X,XXX sq. ft. restaurant located in the 1st floor lobby. Over the past trailing 12 month (T12)[1] period, electric consumption totaled X,XXX,XXX kWh, while electric spend totaled $XXX,XXX. T12 gas consumption totaled X,XXX Mcf, while gas spend totaled $XX,XXX.

To mitigate BUILDING X's substantial energy usage and utility costs, the Occupancy-Based Strategic Energy Management (OB SEM) Program Team has identified areas in which the property can achieve significant energy and cost savings, and improve building energy performance as its business operations expand. If Recommended Incentivized Projects #1-2 are implemented, the property could reduce its annual electric consumption by an estimated 17%, or approximately XXX,XXX kWh per year and XXX Mcf. As such, BUILDING X could save an estimated $XX,XXX annually from these projects alone, which would increase the asset value by $XXX,XXX. Additionally, if these projects are pursued, an estimated $XX,XXX in utility incentives is available to offset the expenses associated with these projects.

Recommended Energy Projects

#1 Replace Space Heating Boiler

#2 Install LED Lighting Fixtures

Project return estimates are provided in Figure 1 below for the Recommended Energy Projects (projects #1 and #X). These preliminary return metrics can be used to identify projects for greater research and feasibility analysis. Actual project costs will vary and should be evaluated in a detailed feasibility study.

To take next steps, BUILDING X can request quotes from its preferred contractors on the recommended projects to obtain more detailed cost estimates. When seeking a quote, request equipment that is incentive-eligible under the Consumers Energy incentive programs listed in the "Energy Recommendations" section.

[1] The trailing 12 months of energy data (T12) for BUILDING X spans from May 2016 – April 2017.

Financial Overview

Measure	Annual Cost Savings	Project Cost	Incentive	Simple Payback (Years)	Increase in Asset Value
Replace Space Heating Boiler	$8,973	$15,810	$9,000	0.76	$32,000
LED Lighting Replacement	$17,710	$61,600	$18,620	2.08	$186,220
Subtotal	**$26,683**	**$77,410**	**$27,620**	**1.87**	**$218,220**

Program Overview

The Occupancy-Based Strategic Energy Management (OB SEM) Program provides property managers, owners, and tenants with a comprehensive energy performance evaluation as well as guidance on recommended capital and operational energy conservation measures (ECMs) and incentives that can help to maximize building performance and reduce the costs of energy saving equipment. This property was selected by the OB SEM Program for an energy efficiency audit, as a preliminary review of the building indicated a high potential for cost effective energy savings.

As a part of the OB SEM Program, this report provides a summary of building historical electric and natural gas performance, an analysis of property characteristics that affect the feasibility of implementing energy efficiency projects and financial analysis for the recommended investments. The recommendations in this report are intended to help building owners reduce energy costs and improve the performance of their facilities by participating in Consumers Energy energy efficiency programs.

Property Energy Baseline Analysis

This Baseline Analysis describes historical energy performance, identifies opportunities to integrate efficiency in coordination with separately metered tenants, and clarifies the party best positioned to benefit from energy savings. The analysis can be used to support the business case for projects that are recommended in the "Energy Recommendations" section.

Property Description

BUILDING X, located at XX Street in CITY, Michigan, is an XX story XXX,XXX sq. ft. high-rise office building that includes XXX,XXX sq. ft. of office space and an X,XXX sq. ft. leased restaurant located on the 1st floor. The building operates Monday-Friday from 7am-6pm, which totals to 2,860 annual work hours. The building was constructed in 19XX and combines vertical shafts of dark glass with concrete trunks to create the skyscraper. The building also includes a 100-space underground parking lot.

Lighting Systems:

Heating, Ventilation, and Air Conditioning (HVAC) System, Controls:

Other:

Energy Performance

As shown in Table 1, over the past trailing 12 months, the gross annual electric consumption for BUILDING X was approximately X,XXX,XXX kWh, with an electric usage intensity (EUI) of xx.xx kWh/sq. ft. and electric spend per square foot of $x.xx. The gross annual natural gas consumption for BUILDING X was approximately XXX,XXX ccf, with a gas usage intensity of xx.xx ccf/sq. ft. and gas spend per square foot of $x.xx.

Table 1 Energy Usage Information for BUILDING X

T12 Electric Use	Area	Electric Use Intensity	Electric Spend PSF
X,XXX,XXX kWh	XX,XX sq. ft.	XX.XX	$X.XX

Table 2 Gas Usage Information for BUILDING X

T12 Gas Use	Area	Gas Use Intensity	Gas Spend PSF
X,XXX,XXX ccf	XX,XX sq. ft.	XX.XX	$X.XX

Energy Recommendations

Project Selection Methodology

The OB SEM Team recommends energy efficiency projects for commercial buildings based primarily on an evaluation of estimated project paybacks, ease of implementation, and eligibility for Consumers Energy offered incentive programs. Qualitative factors are also considered, such as ease of maintenance of building by facility staff, the staff's receptiveness to projects to reduce energy usage, and tenants' preferences.

1. Recommended Projects – These projects should yield strong returns and are immediately actionable. Projects were selected that meet as many of the following criteria as possible:
    - A simple payback period of less than approximately 5 years
    - No major disruptions to existing tenant spaces to implement projects
    - Building staff can feasibly implement upgrades that are compatible with existing building systems and conditions
    - Availability of Consumers Energy-offered incentive programs to enhance the viability and feasibility of each measure exist

2. Additional Opportunities - These measures either did not initially yield positive economic returns when modeled, or require a deeper analysis of building data (building management system trends, design drawings) than was part of this assessment's scope. However, additional measures may warrant consideration once a more formal analysis is completed after reviewing this data.

The following assumptions are used in the economic analysis for all of the project recommendations:

- Average project lifetime: 10 years based on the building's assumed hold period
- Discount rate: 2.6% per composite 10 year AAA Corporate Bond rates
- Energy price escalation rate: X.X% per 10 year average in Michigan
- Labor cost inflation rate: 2% per U.S. Bureau of Labor Statistics[2]
- Electric cost rate: $X.XX/kWh (per average from customer's Consumers Energy bills MONTH YEAR – MONTH YEAR)
- Natural gas cost rate: $X.XX/Mcf (per average from customer's Consumers Energy bills MONTH YEAR – MONTH YEAR)
- Cap Rate: X.X%

[2] National Compensation Survey – Employment Cost Trends (ECT). http://www.bls.gov/ncs/ect/#tables

Project #1 Replace Space Heating Boiler

Replacing non-condensing water boilers with new condensing water boiler will reduce total natural gas usage by 15.8%, and will not trigger Title 24.

Existing Conditions

There is one roof-mounted atmospheric boiler in a mechanical room that provides hot water to the VAV boxes for the HVAC system:

- AJAX Boiler; Input: 3,750,000 Btu/hr.; Output: 3,000,000 Btu/hr.

During the MONTH DATE site visit, it was observed BUILDING X has:

- one older boiler with no storage tank,
- two "stage" 3 HP water pumps, and
- insulated lines that provide hot water to the coils in the VAV boxes to provide heating for the HVAC system.

Recommendation

Typically, the useful life of a space heating boiler is 20 years, so due to the age of the boiler, the OB SEM Team recommends replacing 1 existing 80% thermal efficiency (calculated from nameplate) non-condensing space heating water boilers with new condensing boilers with a thermal efficiency of 95%.

A vendor should be consulted to determine proper sizing of the new boiler system to ensure that the efficiency of the new system is optimized.

This measure consists of replacing boilers, but will not trigger new Title 24 requirements due to the boiler size.

Payback calculations incorporate the following assumptions:

- Annual Energy Usage: 7,785 Mcf/yr[3]
- Baseline Boiler Cost: $34.71/MBtuh for 82% T.E. condensing boiler[4]
- Proposed Boiler Cost: $39.98/MBtuh for 94% T.E. condensing boiler[5]

  Note: The payback period shown is based on the incremental cost to install a high efficiency boiler versus a standard efficiency boiler.

Project #1 Replace Space Heating Boilers	
Simple Return on Investment (IRR)	129%
Net Present Value (NPV)	$84,178
Simple Payback Period (Years)	0.76
Energy Savings ($/Year)	$8,973
Maintenance Savings ($/Year)	$0.00
Project Cost ($)	$15,810
Estimated Incentive ($)	$9,000
Net Project Cost ($)	$6,810
Peak Demand Savings (kW)	-
Annual Energy Savings (Mcf/Year)	1,229
Change in Asset Value ($)	$32,000

[3] Total billed usage from 12/26/2014-12/28/2015
[4] 2010-2012 WO017 Ex Ante Measure Cost Study Final Report
[5] 2010-2012 WO017 Ex Ante Measure Cost Study Final Report

Project #2 Install LED Lighting

Installing LED lighting fixtures in place of fluorescents will result in up to $17,710 in annual savings and a $158,190 increase in asset value.

Existing Conditions

The lighting in BUILDING X primarily consists of 2-lamp 26-watt recessed and 2x2 u-tube T8 fluorescent fixtures for the main areas and hallways. Offices consisted of 2 and 3 lamp T8 fluorescent fixtures.

Recommendation

The OB SEM team recommends that the property owner install LED lighting for all interior fixtures. Installing fixtures at this facility should result in a reduction in lighting energy use by approximately 50% through overall reduced fixture wattages. This would result in 9.9% decrease in overall building energy consumption resulting in significant cost savings. In addition to using less energy, LED fixtures have several benefits over standard fluorescent equipment including:

- Reduced load on cooling equipment for interior fixtures
- Reduced maintenance cost
  - Average life of Fluorescent fixtures: ~10,000 – 30,000 hours
  - Average life of LED fixtures: ~50,000 – 100,000 hours
- Greater flexibility to control individual light fixtures especially dimming
- Easier integration with advanced control systems.
- Improved and more uniform lighting levels
- Better color rendering and light distribution

Project #2 Install LED Lighting	
Simple Return on Investment (IRR)	46%
Net Present Value (NPV)	$158,190
Simple Payback Period (Years)	2.08
Energy Savings ($/Year)	$17,710
Maintenance Savings ($/Year)	$2,980
Project Cost ($)	$61,600
Estimated Incentive ($)	$18,620
Net Project Cost ($)	$42,980
Peak Demand Savings (kW)	-
Annual Energy Savings (kWh/Year)	275,810
Change in Asset Value ($)	$186,220

Payback calculations incorporate the following assumptions:

- Baseline light power density (LPD) is 1 watt/ft^2 as required by IECC 2006 and proposed LPD is 0.5 watt/ft^2 for interior fixtures
- Average annual runtime is 2,860 hours (11 hours per day, 5 days per week) for interior fixtures
- Interior fixture costs are for lamp replacements only rather than full fixture replacements

Next Steps

1. Find a Contractor: https://www.consumersenergy.com/business/energy-efficiency/select-a-contractor
2. Reserve your rebate with the Pre-Notification Application before work begins
3. Complete your upgrade and file your Final Application to receive rebates within 6-8 weeks.

Note: Please verify utility rebate eligibility requirements, rebate amount, and process at the time of the replacement to determine if the above process is still accurate.

Applicable Incentive: Consumers Energy Business Energy Efficiency Program

The rebate guide and application is available at:
https://www.consumersenergy.com/~/media/CE/Documents/Energy%20Efficiency/business/business-incentive-all.ashx

More information on HVAC and Mechanical rebate programs can be found here:
https://www.consumersenergy.com/business/energy-efficiency/rebates-and-programs/hvac-and-mechanical

Contact a CRE Program representative for assistance in submitting this rebate.

Appendix A. Glossary of Project Returns and Savings Metrics

The financial analyses and metrics presented in this report are discussed in further detail below.

Internal Rate of Return (IRR)

An IRR represents the annualized effective compound rate of return generated by the cash flow of a project. To calculate the IRR of a project, it is necessary to solve for the discount rate that causes the NPV of a project to equal zero. This calculation is difficult to do manually, so it is best to use a computational tool that has a feature for calculating NPVs and IRRs to easily solve for this metric.

The IRR represents an effective rate of return generated by a flow of costs and benefits over time; thus, the higher a project's IRR, the more financially attractive it is. In general, a company may want to pursue any investment in which the IRR exceeds the firm's cost of capital, when accounting for the risk of pursuing a project.

$$In\ the\ NPV\ equation,\ solve\ for\ d, when\ NPV = 0,$$

$$0 = \frac{C_{rtu\ replacement} + B_{energy\ savings\ in\ first\ year} + B_{other\ benefits\ in\ first\ year}}{(1+d)^0} + \frac{B_{energy\ savings\ in\ year\ t} + B_{other\ benefits\ in\ year\ t}}{(1+d)^t} \ldots$$

Net Present Value (NPV)

NPV is based on the net value of cash flows generated by an investment, when cash flows are discounted to reflect the time value of money, risk, and the opportunity cost of capital. Calculating an NPV requires estimates of the costs and benefits of an investment, but it also takes into consideration when those costs and benefits occur by applying a discount rate to future costs or revenues. To calculate the NPV a financial manager will need to use a discount rate that accurately reflects the organization's conditions. A discount rate may be an organization's weighted average cost of capital, or it may be the opportunity cost of capital adjusted for the level of perceived risk of a project. Discount rates will vary based on the company's risk, amount of debt, risk of the project and what the baseline risk free rate risk is (typically a 10-year treasury bill).

A positive NPV represents an investment that returns positive value after the time value of money, opportunity cost of capital, and risk have been considered. In general, a positive NPV is interpreted as an investment that should be undertaken. A negative NPV represents an investment that does not recover its cost during the time period considered for the economic analysis. A typical analysis period may be five to seven years due to too many unknowns beyond this period.

To calculate a simple NPV, estimate the costs and the value of benefits that will occur each year over the lifetime of the investment project. Then sum the costs and benefits for each year to create a cash flow series for a period of economic analysis. Finally, discount the value of each cash flow according to how far out in the future it is, and sum the cash flows to get the NPV.

For a discount rate *d*, costs *C*, value of benefits *B*, and year *t*, calculate the NPV as follows:

$$NPV = \frac{C_{rtu\ replacement} + B_{energy\ savings\ in\ first\ year} + B_{other\ benefits\ in\ first\ year}}{(1+d)^0} + \frac{B_{energy\ savings\ in\ year\ t} + B_{other\ benefits\ in\ year\ t}}{(1+d)^t} \ldots$$

Each year over the life of the investment should have its own phrase in this equation. For example, a 5-year investment would be represented with five phrases, with values of t ranging from 0 to 4.

A NPV can be calculated manually with the equation above; however, a computational tool such as spreadsheet software or a financial calculator can simplify this task.

Simple Payback Period (Years)

A payback period is a measure of the time required for the benefits of an investment to pay off the costs of an initial investment. This metric is calculated by dividing the cost of an investment by the value created by the investment over a period of time, generally per year. The result is the number of years that will be required for the initial investment to pay for itself. Benefits generated after the payback period represent the net benefits of the investment.

Knowing the payback period of an energy project will allow management to compare this use of funds to the payback of other investments. If the payback of an energy project is competitive with other uses of capital available to the organization, replacement should be a very sensible investment.

To calculate the payback period of an energy project considering the energy cost savings and average maintenance savings, divide the cost of replacement by the energy saved annually.

$$Simple\ Payback\ Period = \frac{Project\ Cost}{Annual\ Energy\ Cost\ Savings + Annual\ Average\ Mainteance\ Savings}$$

Energy Cost Savings ($/Year)

Reducing energy use through an energy conservation measure reduces energy costs and may result in a financial cost saving if the energy savings offset any additional costs of implementing the project.

Average Maintenance Savings ($/Year)

The estimated savings that result from an energy conservation measure that reduces the costs incurred to keep an asset in good condition and/or good working order.

Project Cost ($)

The total estimated cost required to complete an energy conservation measure.

Estimated Incentive ($)

The estimated utility incentive, such as a deemed rebated or customized retrofit incentive, received by the utility customer for implementing the energy project.

Net Project Cost ($)

The estimated cost required to complete an energy conservation measure after subtracting incentives.

Peak Demand Savings (kW)

The Peak Demand Savings are expressed here as the average energy savings during a building's peak period during an average given day.

Annual Energy Savings (kWh/yr. or Mcf/yr.)

The annual energy savings (in kWh or Mcf) is the energy savings occurring in a single year from the energy project implemented.

Appendix B. Financing Strategies

The OB SEM Team successfully identifies attractive energy retrofits for the buildings it serves, but the next step of financing these measures remains the most significant barrier to implementation for property owners. In overcoming this barrier, there are several different routes ownership may take: Green Leases, Capital Budget Expenditure, Commercial Property-Assessed Clean Energy, an Energy Performance Contract or financing through Michigan Saves. The differences in financing options provide varying value/benefits depending on the financial situation and preferences of the property owner.

Capital Budget Expenditures (CapEx)

Capital budgeting for energy efficiency measures is one route for any property owner to finance its projects. A positive aspect of this is that it does not require monthly payments (or interest) going forward after the measure has been paid. This does require the property to have enough capital funds to incorporate the measure into its capital budgeting cycle. The timing for incorporating these projects into capital budgeting is worth noting as capital budgeting begins in the Spring and ends in the Fall for projects that will be implemented in the following calendar year. The financial metrics in the business case tables for each energy measure in this Report provide a strong start for justifying the capital expenses for these efficiency projects. If the project is small enough, a property may be able to fund it through its annual operations & maintenance (O&M) expense budget, but many energy projects will be a higher cost and require funding via capital expenditures (CapEx).

Commercial Property Assessed Clean Energy (C-PACE) Financing

Commercial Property-Assessed Clean Energy (C-PACE) financing is a unique, off-balance financing option for commercial building owners who are considering implementing clean energy projects, and is available in Michigan. Through the C-PACE program, local and state governments can fund 100% of the up-front costs of building upgrades. Building owners and tenants have the opportunity to completely avoid the high upfront costs of these projects, and owners pay back these costs through their property tax bills over a period of 5 to 30 years. Owners can utilize their energy savings from their new projects to pay back the investment each month. Once the value of the investment is covered, owners are free to capture their energy cost savings entirely.

Unlike traditional loans from a bank, C-PACE financing does not incur debt on behalf of the property owner, and therefore the balance sheet and credit level are not altered. This is because the financing process is categorized as a “debt of property” meaning the debt from the investment is tied to the property, not the owner. For example, if a commercial property owner installs a new, efficient HVAC system via C-PACE financing and decides to sell the property before the HVAC investment is paid back in full, the monthly charges stay with the property and transfer to the new owner. This eliminates the disincentive to implement projects if the owners don’t plan to hold a building long enough to experience savings that cover the project costs. Project types are limited to energy efficiency retrofits, renewable energy and water conservation.

Energy Performance Contract (EPC)

Offered by Energy Service Companies (ESCOs), energy service contracts are another opportunity to have an energy efficiency project financed up-front. Instead of repaying the loan via monthly payments with interest, owners pay their same monthly utility expenses as before the efficiency project was completed, and the difference between the original utility expenses and the new, lower utility expenses (due to the project's energy savings) goes to the ESCO to repay the initial costs. Therefore, there is no real change in expenses for the owner until the loan is paid off, when the owner is then free to capture all the savings.

This model helps building owners navigate the complexities of energy performance contracts and provide transparency in pricing and performance expectations of new energy measures. In turn, owners have higher confidence in the project(s) they are deciding to pursue. The Building Owners and Managers Association (BOMA) recommends its EPC model (BEPC) as a route for building owners. More details on EPCs and BOMA's support for them can be found here http://www.boma.org/sustainability/info-resources/Pages/boma-energy.aspx/.

Green Leases

Green leases align incentives between tenants and owners to minimize the split incentive issue. They range in complexity from basic sustainability clauses (e.g., recycling) to cost pass-through clauses.

PlaNYC, an effort from the New York City Mayor's office, developed energy-aligned leasing language to solve the split incentive issue. The leasing language is applicable for typical modified gross commercial leases and generally for multi-tenant net office leases. The language includes several key features[6]:

- Base owners' cost recovery on predicted savings but limit owners' capital expense pass through to 80% of such predicted savings in any given year. This is called the 20% "Performance Buffer".
- The predicted savings are determined by an energy specialist agreed upon by both parties.
- Owners are paid back in full, but the payback period is extended by 25%.

Leasing language and additional green lease resources are available at http://www.greenleaselibrary.com/.

Michigan Saves

Michigan Saves created the Business Energy Financing Program with special financing rates for custom and prescriptive projects. Consumers Energy commercial customers are currently offered 0% APR financing for 36 months for amounts up to $75,000. Here is the 3-step financing process:

1. Select a Michigan Saves authorized contractor to get an estimate on qualifying energy improvements.
2. Apply for Financing. The contractor will provide the application.
3. Once the financing is approved, your contractor installs the upgrades and is paid directly by the lender – after the work is completed to your satisfaction.

[6] http://www.nyc.gov/html/planyc2030/downloads/pdf/111213_eal_presentation.pdf