

FACILITY SMALL BUILDING TUNE-UP

Sample Administrative Office
123 1st Street
Denver, CO
April 10, 2015



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EXECUTIVE SUMMARY

BUILDING TUNE-UP

To help reduce energy costs and improve building performance, Xcel Energy provided a building tune-up for Sample Administrative Office on March 31, 2015. This is the first step toward developing a long-term energy plan for Sample Administrative Office. This effort was focused on identifying all low- / no-cost energy savings opportunities as well as detailing cost effective capital investment projects. Together, six energy saving opportunities were identified, with a total estimated annual cost savings of \$11,100.

ENERGY EFFICIENCY: A SMART INVESTMENT

By implementing the energy saving opportunities in this report, you **will save an estimated \$11,100 or 30% of the \$37,000 you currently spend on annual energy costs.**

Xcel Energy offers cash incentives to cover 25% of the total implementation costs. In total, these opportunities will require an \$18,550 investment by Sample Administrative Office after an estimated \$6,180 in incentives provided by Xcel Energy.

With a simple payback of 1.7 years after Xcel Energy incentives, the energy efficiency recommendations in this report offer a low-risk, high-reward investment.

With Xcel Energy's technical assistance and incentives, energy efficiency is within reach.

All costs and savings are first order estimates. Please see Recommended Energy Saving Opportunities section for an explanation of estimates and estimate details.

Investment at a Glance

- Improve your Bottom Line
Cost savings of \$11,100 will reduce annual energy costs by 30%
- Big Discount on Efficiency
Cash incentives cover 25% of total costs, saving you \$6,180
- Return on Investment
A 1.7 year simple payback is a low-risk, high-reward investment
- Every \$1 invested
in Energy Efficiency, you will save \$3 over the lifetime of improvements

IMPROVE YOUR BUILDING'S PERFORMANCE



Sample Administrative Office's current energy performance is lower when compared to similar facilities in the U.S. Implementation of the recommendations in this report would increase the Energy Performance Rating from 40 to 65. Buildings with a score over 75 are eligible for Energy Star certification.

TAKE ACTION

For complete information on cost saving opportunities and program next steps:

- See **Recommended Energy Savings Opportunities** for a complete breakdown of implementation costs, cost savings, and incentives for all of the recommended opportunities for Sample Administrative Office.
- See **Xcel Energy Program Options** for next steps, program contact information, and process details.
- **Contact your account rep**, Account Rep Name at 777-777-7777, to determine an energy efficiency strategy that works for you.

RECOMMENDED ENERGY SAVING OPPORTUNITIES SUMMARY

Based on the Building Tune-Up completed on March 31, 2015, we recommend that you implement the following cost-effective, energy saving opportunities to maximize savings for Sample Administrative Office. Recommended opportunities are those that are feasible at your facility and cost effective. Within each of the cost categories below, the opportunities with the highest return on investment are presented first.

All costs and savings are first order estimates. Please see the detailed descriptions in the Recommended Energy Savings Opportunities section for full details and assumptions for each opportunity.

EQUIPMENT CATEGORIES

- Lighting
- Plug Load
- Mechanical Equipment
- Motors and Drives



LOW-COST OPPORTUNITIES (Capital cost less than \$1,000)

| | | | | |
|---|--------------------------|-----------------------|------------------|--|
| | Opportunity 1. | Annual Savings: | \$2,000 | Reduce the daily HVAC schedule for the rooftop units by half an hour in the morning and 2 hours in the evening to 6:00 am – 8:00 pm during the week. |
| | Reschedule Rooftop Units | Cost after Incentive: | \$200 | |
| | | Simple Payback: | 0.1 years | |
| | Opportunity 2. | Annual Savings: | \$100 | Use "Turn Off Monitor", "Sleep" and "Hibernate" PC power management functions |
| | PC Power Management | Cost after Incentive: | \$150 | |
| | | Simple Payback: | 1.5 years | |
| Subtotal: Low-cost Opportunities | | Annual Savings: | \$2,100 | |
| | | Cost after Incentive: | \$350 | |
| | | Simple Payback: | 0.2 years | |




CAPITAL COST OPPORTUNITIES (Payback less than two years and capital cost more than \$1,000)

| | | | | |
|---|-----------------------------|-----------------------|------------------|--|
|  | Opportunity 3. | Annual Savings: | \$2,500 | Retrofit existing 1000 W metal halide (MH) lighting fixtures, 400 W high pressure sodium (HPS) parking lot fixtures and HPS Wall packs with Pulse Start MH fixtures. |
| | Exterior Lighting Retrofits | Cost after Incentive: | \$2,500 | |
| | | Simple Payback: | 1.0 years | |
|  | Opportunity 4. | Annual Savings: | \$600 | Install switch mounted occupancy sensors in areas where employees may forget to turn off lights such as offices, conference rooms, restrooms and break-rooms. |
| | Lighting Controls | Cost after Incentive: | \$1,200 | |
| | | Simple Payback: | 2.0 years | |
| Subtotal: Retrofit Opportunities | | Annual Savings: | \$3,100 | |
| | | Cost after Incentive: | \$3,700 | |
| | | Simple Payback: | 1.2 years | |



RETROFIT OPPORTUNITIES (PAYBACK 2 - 10+ YEARS)

| | | | | |
|---|--------------------------------------|-----------------------|------------------|--|
|  | Opportunity 5. | Annual Savings: | \$5,000 | When current RTUs and condensing units fail or maintenance costs become excessive, it is recommended that they be replaced with high-efficiency units. |
| | Rooftop Units Retrofit (Incremental) | Cost after Incentive: | \$12,000 | |
| | | Simple Payback: | 2.4 years | |
|  | Opportunity 6. | Annual Savings: | \$900 | Upgrade motors for supply fans, hot water pumps, exhaust fans and roof top unit fans. |
| | Install Premium Efficiency Motors | Cost after Incentive: | \$2,500 | |
| | | Simple Payback: | 2.8 years | |
| Subtotal: Retrofit Opportunities | | Annual Savings: | \$5,900 | |
| | | Cost after Incentive: | \$14,500 | |
| | | Simple Payback: | 2.5 years | |

| | | | | |
|---|--|-----------------------|------------------|--|
| Total: All Recommended Opportunities | | Annual Savings: | \$11,100 | |
| | | Cost after Incentive: | \$18,550 | |
| | | Simple Payback: | 1.7 years | |

DISCLAIMER OF WARRANTIES AND LIMITATION OF LIABILITY

The suggestions in this Building Tune-Up are provided as a service to Xcel Energy customers and are based on a visual analysis of conditions observed at the time of the survey, information provided by the customer and from Xcel Energy, and costs based on the energy assessor's experience on similar projects. The performance guidelines provided in the Building Tune-Up are for informational purposes only and are not to be construed as a design document. Xcel Energy will not benefit in any way from a customer's decision to select a particular contractor or vendor to supply or install the products and measures suggested by the energy assessor.

Xcel Energy and the energy assessor do not guarantee that any specific level of energy or costs savings will result from implementing any energy conservation measures described in this Building Tune-Up. Xcel Energy and the energy assessor shall not, under any circumstances, be liable to the customer in the event that potential energy savings are not achieved.

Xcel Energy advises that customers check with their Xcel Energy Account Manager to determine the estimated value of their rebate (if any) and to verify that the equipment qualifies for Xcel Energy programs prior to implementation of any conservation measure. Some measures identified in this report may qualify for an Xcel Energy Custom Efficiency rebate. Custom Efficiency projects require pre-approval prior to purchase and installation. The customer is responsible for submitting project information to their Xcel Energy Account Manager to obtain pre-approval for Custom Efficiency projects and to determine the eligible custom rebate amount.

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FACILITY OVERVIEW

Located in downtown Denver, the 25,000 square foot, 2 story Sample Administrative Office was constructed in 1980 and is a mixture of general office and medical office leased space. The property is currently managed by Management CO and has been managing the property since 1995. Regular occupancy hours for the building are Monday through Friday from 6:30 am – 8:00 pm.

All lighting is wall switch lighting with no occupancy controls. Lighting is a mixture of T-8 lighting and CFL fixtures in hallways and corridors and offices with metal halide lighting for the exterior of the building, and high-pressure sodium parking lot lighting. Interior lighting is controlled by manual wall switches while the exterior lighting is controlled by photocells with no time clock overrides.

The offices are heated and cooled by the HVAC equipment as listed below. The HVAC equipment is controlled by a building automation system. The office spaces also have a 40 gallon gas fired domestic water heater.

Figure 1: Energy Using Equipment Table

| Equipment ID | Description | Capacity/Size | Area Served |
|--------------|--------------------|------------------|--------------|
| RTU 1 | Rooftop Unit East | 15 ton | Floor 1 |
| RTU 2 | Rooftop Unit West | 15 ton | Floor 2 East |
| RTU 3 | Rooftop Unit North | 5 ton | Floor 2 West |
| AHU 1 | Rooftop Unit East | 3 hp | Floor 1 |
| AHU 2 | Rooftop Unit West | 3 hp | Floor 2 East |
| AHU 3 | Rooftop Unit North | 2 hp | Floor 2 West |
| SF 1 | Supply Fan | 3 hp | Building |
| B1 | Boiler | 2,000,000 BTU/hr | Building |
| B2 | Boiler | 2,000,000 BTU/hr | Building |

ENERGY USE AND BENCHMARKING

Energy Use

- Sample Administrative Office's **annual energy cost** is approximately \$37,000.
- Sample Administrative Office purchases electricity from Xcel Energy under the Secondary General Rate
- Sample Administrative Office purchases natural gas from Xcel Energy under Commercial Gas Rate

Figure 2: Annual Utility Summary

| Fuel | Cost | Cost per ft ² | Consumption | Average Rate |
|--------------|-----------------|--------------------------|--------------|----------------|
| Electricity | \$32,000 | \$1.10 | 280,000 kWh | \$0.07 / kWh |
| Natural Gas | \$5,000 | \$0.14 | 4,000 therms | \$0.84 / therm |
| <i>Total</i> | <i>\$37,000</i> | <i>\$1.24</i> | – | – |

Figure 3: Account Information

| Account Type | Account Number | Premise Number |
|------------------|----------------|----------------|
| Electric and Gas | 12-3456789-0 | 987654321 |

Monthly Electricity Use

Error! Reference source not found. below provides the monthly electric use for the last 12 months. There is an increase in demand and consumption during the summer months due to space cooling from the RTU's. Increases in demand and consumption in the winter months are likely due to terminal reheat.

Figure 4: Monthly Electricity Use: Previous 12 months

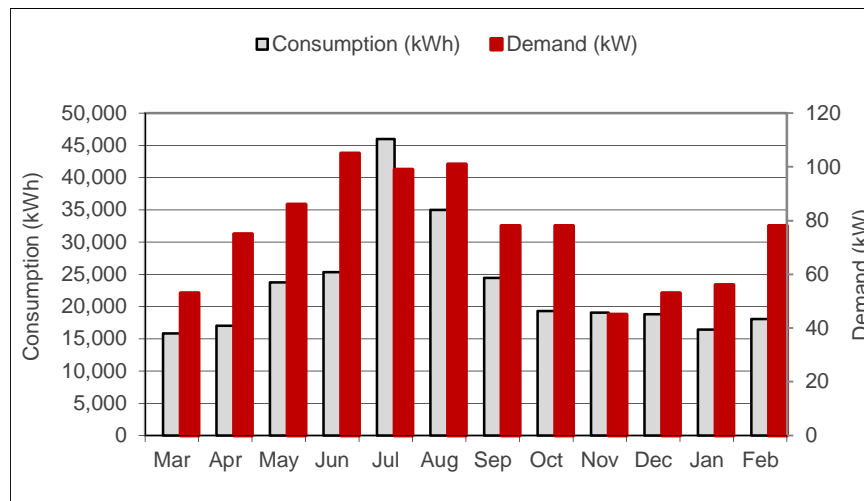
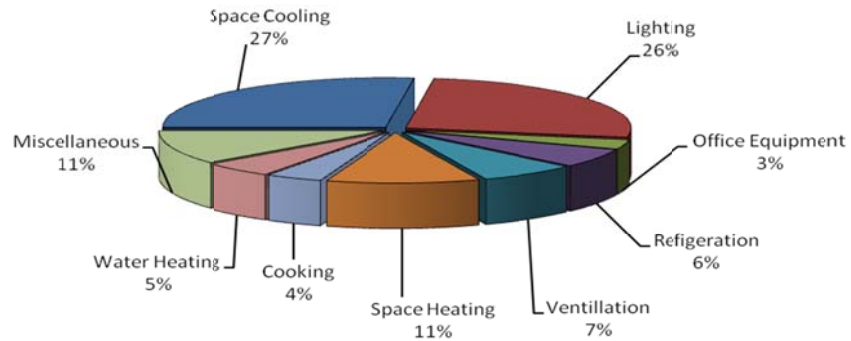


Figure 5: Estimated kWh End-use



Monthly Natural Gas Use

Figure 6 below provides the monthly gas use over the last 12 months. The natural gas consumption is the highest in the winter months due to an increased heating load required during this season. Domestic hot water should only account for at most 4% of the natural gas consumption for the facility; natural gas consumption indicates that the boiler is turning on in the summer months.

Figure 6: Monthly Natural Gas Use: Previous 12 months

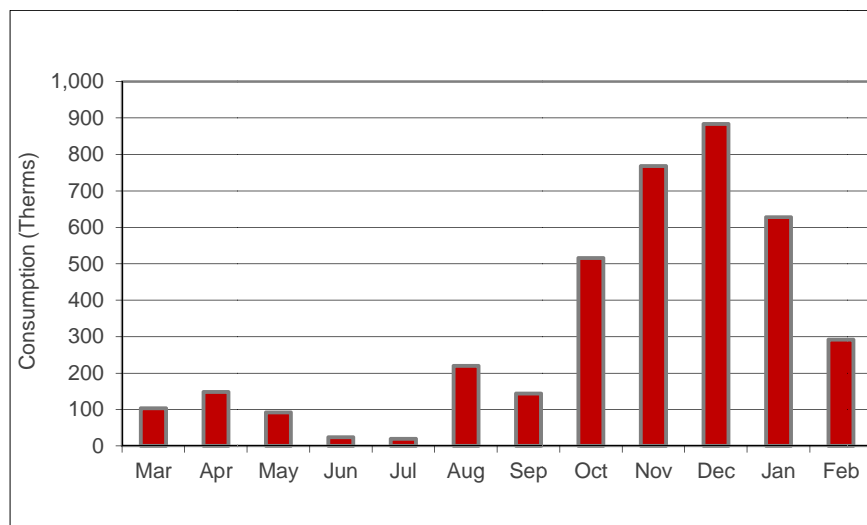
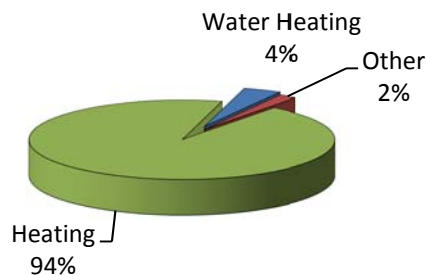


Figure 7: Estimated Natural Gas End-use



Energy Benchmarking Results

WHAT IS ENERGY BENCHMARKING?

Energy benchmarking is a process of comparing the energy performance of one building to industry standards. Benchmarking your building gives you a sense of its energy performance relative to similar buildings, and therefore provides an indication of the potential energy savings from implementing energy efficiency projects. This report uses energy use intensity (EUI) and portfolio manager’s Energy Performance Rating as a benchmark metrics.

PORTFOLIO MANAGER

Portfolio Manager is a free online energy benchmarking tool created by the Environmental Protection Agency. It allows users to track and assess energy consumption across your entire portfolio of buildings.

Portfolio manager rates a building’s energy performance on a scale of 1 (worst performance) to 100 (best performance) relative to similar buildings nationwide. (To make the comparison accurately, a building’s energy consumption is normalized for several significant factors such as the building’s size, function, geographical location, and occupancy.) An Energy Performance Rating of 50 indicates that about half of similar facilities in the United States are less energy intensive than the rated facility, and half are more energy intensive. A facility that scores 75 or higher is eligible to receive the ENERGY STAR label.

BENCHMARKING RESULTS

Sample Administrative Office’s current energy use intensity (EUI), energy use by square foot, is 65 kBtu/ft², which is higher than similar facilities. A lower EUI indicates better energy performance.¹

Sample Administrative Office received an Energy Performance Rating of 40 which indicates that the facility’s energy performance is low as compared to similar building types across the nation. Implementing the energy efficiency opportunities recommended in this report could increase the Energy Performance Rating to 65.

Figure 8: Energy Use Intensity

| | ENERGY USE INTENSITY (KBTU/FT ²) |
|------------------|--|
| National Average | 62 |
| Current | 65 |
| Improved | 47 |

Figure 9: Energy Star Facility Performance

| 12 Months Ending | Current Site Energy Intensity (kBtu/ft ²) | Actual Energy Cost | Current Rating (1-100) | Target Rating (1-100) |
|------------------|---|--------------------|------------------------|-----------------------|
| February 2015 | 65 | \$37,000 | 40 | 65 |

TRACK YOUR PROGRESS

It is recommended that Sample Administrative Office maintain the Portfolio Manager account created for the building by entering the building’s monthly energy consumption data into the online database. This continued tracking of energy performance will show the impact of energy efficiency projects implemented at your building.

¹ Energy use intensity numbers reported here are site energy intensities. Site energy represents all energy consumed on site, as recorded in utility bills. Source energy represents all raw fuel required to operate the building, including all transmission, delivery, and production losses. Source energy intensity is higher than site energy intensity because source energy intensity accounts for energy wasted in conversion from source fuel to site energy (such as conversion of coal, gas, or other fuels to electricity). Energy Performance Ratings are based on source energy intensity. Portfolio Manager uses an average electricity conversion factor for the entire United States of 3.34, which indicates that source energy required for generation of electricity is 3.34 times the actual electrical energy consumed on site.

RECOMMENDED ENERGY SAVING OPPORTUNITIES

CRITERIA FOR RECOMMENDATIONS

The recommended energy savings opportunities are organized into the three categories listed below. Within each category, the opportunities with the highest return on investment are presented first.



Low-Cost Opportunities (Capital cost less than \$1,000)



Capital Cost Opportunities (Payback less than two years and capital cost more than \$1000)



Retrofit Opportunities (Payback two years to ten or more years)



Detailed Study Opportunities (In-depth investigation of potential energy efficiency opportunities)



Strategic Opportunities (Additional opportunities that warrant further investigation)

Energy savings opportunities were recommended because they:

- Reduce electric demand and electricity and gas usage
- Are low cost and have very attractive paybacks or are capital investment opportunities that Sample Administrative Office has a strong interest in pursuing
- Appear feasible at your facility

Additional energy saving opportunities that were identified and may warrant further investigation are listed in the Strategic Opportunities section.

ASSUMPTIONS AND CALCULATIONS

For each opportunity, we present first order estimates of energy savings, project costs, and potential incentives from Xcel Energy. Lifetime savings estimates are based on net present value of energy savings over the estimated useful life of the opportunities. These first-order estimates should not be used to justify capital investment without further consideration; rather, they are provided as a guide for selecting energy saving opportunities for further review.

The opportunities, savings estimates, cost estimates, and incentives estimates are based on the best information available at the time of the assessment including:

- Observations made by auditor during the on-site energy assessment
- Information provided by Administrative Office
- Energy use history provided by Xcel Energy

DETERMINATION OF INCENTIVES

The final incentives paid by Xcel Energy will depend on:

- Chosen Energy Efficiency Program: Incentives detailed below are those available through Xcel Energy. Incentives vary across Xcel Energy's suite of energy efficiency programs, and some require preapproval prior to installation. Recommended opportunities in this report are not

automatically pre-approved for incentives through any of Xcel Energy's energy efficiency programs.

- **Final scope and cost:** The key inputs and assumptions used for calculating energy savings and incentive amounts are included with the description of each opportunity in this report. If an opportunity is selected for implementation, any of these values may be refined and could impact the incentive amount.
- **Eligibility Requirements:** All projects must meet Xcel Energy eligibility and cost effectiveness guidelines before they can be approved for incentives



Low-Cost Opportunities

Opportunity 1: Reschedule Rooftop Units

OVERVIEW

Update the schedule for the rooftop units (RTUs) in the building automation system in order to reduce equipment operating hours.

ENERGY SAVINGS

| | | |
|----------------------------|---------|--------|
| Annual Cost Savings | \$2,000 | |
| Electrical Savings | 50,000 | kWh |
| Demand Reduction | 0.0 | kW |
| Steam Savings | 400 | Therms |

ECONOMIC SUMMARY

| | |
|------------------------------|------------------|
| Simple Payback | 0.1 years |
| Estimated Project Cost | \$200 |
| Estimated Xcel Energy Rebate | - \$0 |
| Net Cost | \$200 |

CURRENT CONDITIONS

The current HVAC schedule for the RTUs at Sample Administrative Office, on average, is from 5:30 am – 10:00 pm, Monday through Friday. Regular occupancy hours for the building are Monday through Friday from 6:30 am – 8:00 pm.

RECOMMENDATION

Reduce the daily HVAC schedule for the RTUs by half an hour in the morning and 2 hours in the evening to 6:00 am – 8:00 pm during the week. Rescheduling based on these hours would result in significant energy savings.

IMPLEMENTATION DETAILS

This schedule could be easily programmed using the existing BAS. For work that may be done after hours it is recommended to install override timers for each zone that will automatically revert back to unoccupied mode after a set amount of time (e.g., 1 or 2 hours). Override timers should be mounted in a central location that building occupants have access to and the occupants are educated on their location and purpose. This will ensure that only the spaces being used will receive heating or cooling.

IMPACT ON OPERATIONS

Facilities staff will have to coordinate with tenants in the future to ensure that special events which require longer hours of operation are entered into the BAS as one-time events and not permanent schedule changes.

Opportunity 2: PC Power Management

OVERVIEW

Implement power management strategies on the existing computer's and monitors.

ENERGY SAVINGS

| | | | |
|----------------------------|-------|--------|--|
| Annual Cost Savings | \$100 | | |
| Electrical Savings | 3,000 | kWh | |
| Demand Reduction | 0.2 | kW | |
| Steam Savings | 0 | Therms | |

ECONOMIC SUMMARY

| | | |
|------------------------------|------------------|--------------|
| Simple Payback | 1.5 years | |
| Estimated Project Cost | | \$150 |
| Estimated Xcel Energy Rebate | - | \$0 |
| Net Cost | | \$150 |

CURRENT CONDITIONS

It was noted during the building tune-up that several computers and monitors were left on while not in use. This is indicative of the power settings on the computer's and monitors not having power settings in place that reduce energy consumption when these computing systems are not in use.

RECOMMENDATION

Computers are large energy users in buildings today. There are many things that can be done to reduce the energy consumption of computers during the day. One of the simplest energy savings measures is using the "Turn Off Monitor", "Sleep" and "Hibernate" functions during the day and shutting down the computer at night (it should be noted that a screen saver is not an energy saver as the monitor is still operating). These settings are designed to reduce the energy usage while users are either out of the office or doing something else. Having all of the employees use these settings will reduce the energy consumption during the day. If it is difficult to implement this throughout the office, there are also network software programs that can monitor and control the energy usage of a computer and reduce energy consumption for a low cost and typically a fast payback.

IMPLEMENTATION DETAILS

Having all of the employees use updated energy settings will reduce the energy consumption during the day and at night. If it is difficult to implement this update on a per-computer basis throughout the building, there are also network software programs that can monitor and control the energy usage of a computer and reduce energy consumption for a low cost and typically a fast payback.

The assumptions and values used in this analysis are:

- Savings are for an estimated 35 PC's, and 35 LCD screens
- Implementation cost for programming of \$18.55/unit

IMPACT ON OPERATIONS

There should not be an impact upon operations as the computer will immediately become accessible once the mouse is moved at a computer or a keystroke is made.



Capital Cost Opportunities

Opportunity 3: Exterior Lighting Retrofits

OVERVIEW

Reduce energy usage with the installation of pulse start metal halide fixtures.

| ENERGY SAVINGS | | | ECONOMIC SUMMARY | |
|---------------------|---------|--------|------------------------------|-----------|
| Annual Cost Savings | \$2,500 | | Simple Payback | 1.0 years |
| Electrical Savings | 15,000 | kWh | Estimated Project Cost | \$4,000 |
| Demand Reduction | 5.0 | kW | Estimated Xcel Energy Rebate | - \$1,500 |
| Steam Savings | 0 | Therms | Net Cost | \$2,500 |

CURRENT CONDITIONS

Exterior lighting includes a mixture of 1000 W Metal Halides (MH) area lighting fixtures and High Pressure Sodium (HPS) fixtures in the parking lot.

RECOMMENDATION

The exterior lighting around the building should be replaced with higher efficiency lighting. The most cost effective route to achieve this would be retrofitting existing 1000 W metal halide area lighting fixtures and 400 HPS parking lot fixtures and HPS Wall packs with Pulse Start MH fixtures. The assumptions that were included in this analysis include:

- 3,400 annual operating hours for exterior lighting controlled by an existing photosensor
- Installed cost of \$360 per 750W pulse start MH; \$244 per 320W MH

IMPLEMENTATION DETAILS

It is recommended that this retrofit be conducted as a group re-lamping project instead of a batch replacement upon failure. A group re-lamping ensures light quality consistency throughout the building and that all available rebate dollars are accessed by making this upgrade.

This project would be best implemented through qualified facility maintenance staff or a local lighting contractor. The steps would be as follows:

- The contractor should be consulted for assistance in equipment recommendation and selection.
- The contractor will provide a quote for the upgrade and a specific scope of work, including specifications for the equipment selected.
- If multiple bids are requested, determine the most appropriate and proceed with installation.

Scope of Lighting Retrofit

| Qty | Existing Fixture Description | Proposed Fixture Description | Annual Savings kWh | Annual Cost Savings | Xcel Energy Rebate | Net Cost | Simple Payback |
|-----|------------------------------|--|--------------------|---------------------|--------------------|----------|----------------|
| 5 | 1000 W Metal Halide | Pulse Start Metal Halide, 750W Mag Ballast | 7,000 | \$1,200 | \$600.00 | \$1,200 | 0.6 years |
| 9 | Parking Lot Lamps 400W HPS | Pulse Start Metal Halide, 320W Mag Ballast | 8,000 | \$1,300 | \$900.00 | \$1,300 | 1.6 years |

IMPACT ON OPERATIONS

This project should not affect lighting levels for exterior. However since Pulse Start metal halides have a longer life and superior lumen maintenance will reduce maintenance costs for replacement over the lamp life. In addition, pulse start metal halides have better cold starting abilities which will allow use of the lamps under extremely cold temperatures that may be seen in Colorado.

Opportunity 4: Lighting Controls

OVERVIEW

Install occupancy sensors on the lighting fixtures in offices, conference rooms, and restrooms.

ENERGY SAVINGS

| | |
|----------------------------|------------|
| Annual Cost Savings | \$600 |
| Electrical Savings | 15,000 kWh |
| Demand Reduction | 0 kW |
| Steam Savings | 0 Therms |

ECONOMIC SUMMARY

| | |
|------------------------------|------------------|
| Simple Payback | 2.0 years |
| Estimated Project Cost | \$1,680 |
| Estimated Xcel Energy Rebate | <u>- \$480</u> |
| Net Cost | \$1,200 |

CURRENT CONDITIONS

It was observed during the building tune-up that nearly all lighting circuits are controlled by manual switches.

RECOMMENDATION

It is recommended that switch mounted occupancy sensors be installed in areas where employees may forget to turn off lights such as offices, conference rooms, restrooms, and break-rooms. Occupancy sensors automatically turn on lights when occupancy is detected and shut them off after a pre-programmed period of inactivity. Infrared sensors, which detect emitted heat sources, are recommended for the offices, conference rooms, and break-rooms where switches have 'line-of-sight' visibility to occupants. In rooms where occupants may be obscured from the occupancy sensor, such as restrooms, dual technology sensors are recommended. Dual technology sensors rely on both infrared and ultrasonic sensors to determine space occupancy. The assumptions that were included in this analysis include:

- 30% reduction annual operating hours
- Interactive heating and cooling gas and electricity savings were included

IMPLEMENTATION DETAILS

Scope of Lighting Retrofit

| Qty | Location Type | Controlled Fixtures | Fixtures per Room |
|-----|---------------|---------------------------|-------------------|
| 2 | Restrooms | Compact Florescent | 1 |
| 10 | Area 1 | Fluorescent, (3) 48", T-8 | 1 |
| 10 | Area 2 | Fluorescent, (3) 48", T-8 | 1 |
| 10 | Office | Compact Florescent | 1 |

Xcel Energy offers a prescriptive rebate of \$15 per wall-mounted occupancy sensor or photocell and \$30 for each ceiling-mounted occupancy sensor.

IMPACT ON OPERATIONS

None

Opportunity 5: Rooftop Unit Retrofit

OVERVIEW

Install higher efficiency RTUs when replacing the existing RTUs which have exceeded their expected service life.

ENERGY SAVINGS

| | | |
|----------------------------|---------|--------|
| Annual Cost Savings | \$5,000 | |
| Electrical Savings | 16,000 | kWh |
| Demand Reduction | 9.0 | kW |
| Steam Savings | 0 | Therms |

ECONOMIC SUMMARY

| | |
|------------------------------|------------------|
| Simple Payback | 2.4 years |
| Estimated Project Cost | \$13,500 |
| Estimated Xcel Energy Rebate | <u>- \$1,500</u> |
| Net Cost | \$12,000 |

CURRENT CONDITIONS

The majority of the rooftop units (RTUs) serving the facility were manufactured in 1997. While they are still meeting the demands of the facility, they may be nearing the end of their expected life. The expected service life of a RTU is 15 years.

RECOMMENDATION

When the current RTUs fail or maintenance costs become excessive, it is recommended that they be replaced with high-efficiency units rather than standard-efficiency units.

The cooling efficiency of RTUs is rated with the Energy Efficiency Ratio (EER). The EER reflects the efficiency of the unit during steady state, full load conditions. The data for this ECO is given in Table 5.

IMPLEMENTATION DETAILS

Xcel Energy offers rebates for RTUs that meet or exceed a specified EER value based on the cooling capacity of the unit. Table 5 shows the assumptions included in this analysis.

Table 5: Scope of RTU Retrofit

| Qty | Size (Tons) | Standard Efficiency | Proposed Efficiency | Xcel Energy Incentives |
|-----|-------------|---------------------|---------------------|------------------------|
| 2 | 15 | 10.8 EER | 15 EER | \$3,600 |
| 1 | 5.4 | 11 EER | 15 EER | \$1,296 |

IMPACT ON OPERATIONS

None

Opportunity 6: High Efficiency Motor Upgrade

OVERVIEW

Upgrade existing motors to high efficiency units.

ENERGY SAVINGS

| | | |
|----------------------------|-------|--------|
| Annual Cost Savings | \$900 | |
| Electrical Savings | 8,500 | kWh |
| Demand Reduction | 1.8 | kW |
| Steam Savings | 0 | Therms |

ECONOMIC SUMMARY

| | |
|------------------------------|------------------|
| Simple Payback | 2.8 years |
| Estimated Project Cost | \$5,200 |
| Estimated Xcel Energy Rebate | <u>- \$2,700</u> |
| Net Cost | \$2,500 |

CURRENT CONDITIONS

Most of the motors in use at Sample Administrative Office are of standard efficiency or lower based on current standards for motor efficiency. Upgrading these motors could result in an electrical savings of equal to or greater than 8,500 kWh and demand savings of 1.8 kW depending on the actual efficiency of the current motors.

RECOMMENDATION

An immediate outright replacement of the specified motors is recommended due to the efficiency of the current motors, and the structure of Xcel Energy's Motor Rebate Program. When directly replacing functional equipment the project qualifies for an increased rebate under Xcel Energy's Motor Efficiency "Upgrade" category. The project savings detailed above represents the payback of the replacements that are directly installed upon receipt. Individual motor retrofit payback varies due to the difference in operating hours.

IMPLEMENTATION DETAILS

Table 6: Premium Efficiency Motor Upgrade

| Qty. | Motor Description | Motor Size in HP | Premium Efficiency Motor Costs | Xcel Rebate | Direct Replacement (Y/N) | Premium Efficiency |
|------|-------------------|------------------|--------------------------------|-------------|--------------------------|--------------------|
| 1 | Supply Fan | 7.5 | \$700 | \$450 | Y | 91% |
| 2 | Hot Water Pumps | 3 | \$900 | \$450 | Y | 89.5% |
| 1 | Exhaust Hood | 1 | \$400 | \$200 | Y | 85.5% |
| 1 | Hot Water Pump | 2 | \$500 | \$200 | Y | 86.5% |
| 2 | RTU Fan | 5 | \$1,200 | \$600 | Y | 89.5% |
| 4 | RTU Fan | 1 | \$1,500 | \$800 | Y | 85.5% |

The summary of the costs, savings, rebates, and paybacks for this ECO are given in Table 6. The assumptions that were included in this analysis include:

- Supply fan motor annual operating hours: 3,000 hours
- Hot waters pump motor annual operating hours: 2,500 hours
- Exhaust fan motor annual operating hours: 500 hours
- RTU fan motors annual operating hours: 3,000 hours

IMPACT ON OPERATIONS

None



Strategic Opportunities

Additional opportunities that warrant further investigation were identified during the building tune-up.

Opportunity 7: Install Energy Star Appliances

One step towards reducing energy usage in the offices and throughout the building would be to upgrade the existing appliances and office equipment to high-efficiency models. The U.S. Environmental Protection Agency's Energy Star program provides guidelines for energy efficient technologies. Energy Star qualifying equipment is typically 10% to 20% more efficient than standard equipment. Energy Star provides specifications for high-efficiency refrigerators, dishwashers, computers, printers, copiers and many other appliances. Replacing the existing appliances and office equipment with Energy Star qualifying equipment will help Sample Administrative Offices save energy and reduce its electricity bills. More information can be found at the Energy Star website at www.energystar.gov.

Opportunity 8: Familiarization with Rebate Programs

It is recommended that staff at Sample Administrative Office familiarize themselves with all of the rebate programs available to them through Xcel Energy. These rebate programs are designed to reduce the capital cost required to install high-efficiency equipment, reduce paybacks, and make energy-efficiency a more attractive proposition. Additionally, changes in market forces cause rebate programs to constantly shift their requirements and incentive levels. It is recommended that Sample Administrative Office keep up to date with current program offerings so that economic and purchasing decisions can be made in an educated manner. More information about programs offered by Xcel Energy can be found on their website at: www.xcelenergy.com

XCEL ENERGY PROGRAM OPTIONS

WORKING TOGETHER FOR ENERGY EFFICIENCY

Xcel Energy is committed to serving your energy needs. The building tune-up for Sample Administrative Office is one of the ways that Xcel Energy is working to help Sample Administrative Office manage its energy use and costs. This building tune-up, conducted on March 31, 2015, and report are intended to provide clear documentation of the cost effective opportunities to save energy for Sample Administrative Office. The identification of these opportunities is the first step in making your building more energy efficient.

TAKE ADVANTAGE OF CASH REBATES

In addition to providing this low cost Energy Assessment, Xcel Energy also provides cash rebates to assist you in reaching your energy efficiency goals. Xcel Energy provides a suite of energy efficiency programs to meet diverse customer needs. For addition information and program materials, please visit http://www.xcelenergy.com/Save_Money_&_Energy/Find_a_Rebate.

ENERGY EFFICIENCY FINANCING

Xcel Energy, in partnership with the following local organizations and independent financial institutions, helps offer financial solutions for business customers.

Elevations Credit Union Energy Loan: These Energy Loans work directly with Energy Advisors from Boulder County and the City and County of Denver so you can be sure you are taking advantage of all available rebates. With a 70+% conversion rate from enrollments, the EnergySmart and Denver Energy Challenge Energy Advisors are an advocate for your business, and with loans starting at 2.75%, we can help you get to “yes” more often. For more information on energy loans offered through Elevations Credit Union please visit: elevationscu.com/energyloans/ or call at 800-429-7626 to speak with a lending representative.

- EnergySmart (Boulder County) energysmartyes.com | 303.544.1000 (Home) 303.441.1300 (Business)
- Denver Energy Challenge (City & County of Denver) denverenergy.org | 720.865.5520

A WINNING STRATEGY

Sample Administrative Office is committed to becoming more energy efficient throughout its organization. This commitment has been demonstrated through pursuit of an energy assessment. This report details cost effective opportunities to save energy and reduce operating expenses, and describes how Sample Administrative Office can take full advantage of the resources available through Xcel Energy's rebate programs.

Xcel Energy suggests the following strategy and goals:

- Achieve over 25% cost savings by implementing energy saving opportunities.
- Recommissioning Study – Sample Administrative Office can save up to 20% on their building energy costs by improving the efficiency of building systems and reducing facility operations costs. Nexant can perform a recommissioning study and provide further recommendations on how you can tune up your building. With Recommissioning, you can reduce your building energy costs through various measures including:
 - Optimize HVAC equipment operations.
 - Fine-tune time of day schedules.
 - Suggest new and advanced equipment control strategies.
- Custom Efficiency Rebates - Help your business be more profitable by improving your energy efficiency. Our Custom Efficiency program gives you rebates to help offset your costs for almost

any type of energy-saving project from equipment installation to process improvements. Potential Custom Efficiency projects are detailed in the Other Opportunities section.

Your Xcel Energy account representative will work with you to determine your next steps and help guide you through the process of applying for and receiving cash incentives from Xcel Energy.

REBATE PROCESS

