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START YOUR SAVINGS PLAN TODAY

ENERGY EFFICIENCY GUIDE FOR MINNESOTA K-12 SCHOOLS

ENERGY EFFICIENCY:
HOW BOTTOM LINE SAVINGS ARE PAYING OFF FOR SCHOOLS

Energy efficiency strategies have increasingly become a priority for many school administrators and facility managers.

Even without significant investment, schools that target energy efficiency in their operations and maintenance can **typically reduce bills by 5 to 20 percent**[2] and potentially even more with upgrades.

On top of reducing energy costs, energy-efficient upgrades can often improve the comfort and safety of students while providing a solution to a variety of challenges school administrators face.

Energy efficiency can help with:

- Tight budgets
- Fluctuating energy costs
- Extended operating hours (nights, weekends)
- Aging, inefficient buildings

HOW TO USE THIS GUIDE:

This guide is designed to help Minnesota schools that are Xcel Energy customers find ways to reduce energy use and costs.

1. **Quick fixes**
   No- to low-cost changes and solutions
2. **Maintenance**
   Minimal cost improvements that can improve efficiency
3. **Equipment upgrades**
   Small to large investments that can generate significant savings
4. **Energy assessments**
   Whole building analysis to uncover all energy-saving opportunities
5. **New construction consultations**
   Incorporate energy savings in your renovation or new building plans
6. **Rebate index**
   A listing of rebates we offer to help your school make energy-saving improvements at a lower cost

LEVEL SET:
HOW IS ENERGY USED IN YOUR SCHOOL?

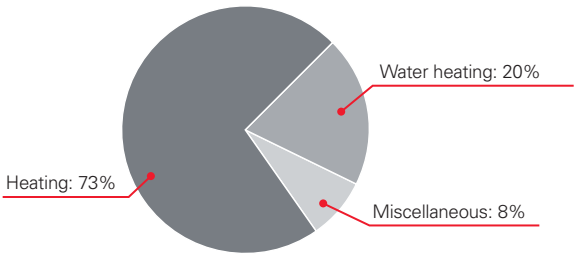
Before considering energy-saving ideas, it's important to take note of how energy is typically used in schools—as the areas that use the most will be your best targets for savings opportunities.

In Minnesota, where we have a broad swing in temperatures between seasons, heating, lighting, cooling and water heating typically consume the greatest amounts of energy. Depending on your school, additional use could be comprised of ventilation, computers, refrigeration, food service, etc.

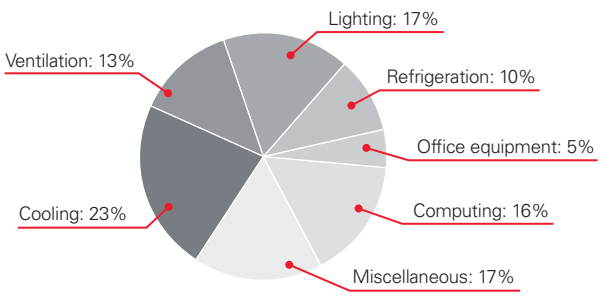
Focus your energy-efficient operations and maintenance strategies in these areas for your best return.

ENERGY CONSUMPTION BY END USE IN K-12 SCHOOLS[2]

NATURAL GAS



ELECTRICITY



Automatically turn down lights and HVAC systems in areas when they're not being used.

1. QUICK FIXES AND SOLUTIONS:
SOME EASY, LOW-COST IMPROVEMENTS

Many schools have tight budgets, so low- or no-cost energy reductions are especially important.

Turning things off may seem too simple to mention. But it's an important step to keep in mind, because when it's done consistently, the savings can really add up.

Lights and HVAC

Automate the "turn off" process by adding occupancy sensors and/or networked lighting controls that turn off lights in rooms when they're not being used. You can use controls to automatically set back the HVAC temperature during closed hours and make sure that areas such as auditoriums, gymnasiums and cafeterias that are only used at specific times are kept at minimum settings when not being used. If some equipment can't be turned off entirely, turning it down to minimum levels when possible can save energy.

Computers and equipment

Add smart power strips with built-in occupancy sensors that shut off plugged-in devices when they're not being used. For more robust savings and higher investment, consider installing a virtual desktop infrastructure (VDI), which centralizes the desktop operating systems and can significantly improve efficiency.

Efficient water use

Installing sink and shower controllers that automatically shut off after a certain time, as well as low-flow faucets and shower heads can help conserve energy used to heat water.

Automatically turn down lights and HVAC systems in areas when they're not being used.

2. MAINTENANCE:
MAKE IT A HABIT

Keeping your existing HVAC systems properly cleaned and maintained can minimize repairs and optimize energy efficiency.

CHECKLIST

- ☑ **Service economizers.** Many air conditioning systems use a damper vent, or economizer, to draw in cool outside air when it's available to reduce the need for mechanically cooled air. If not regularly checked, the linkage on the damper can seize up or break. If it's stuck in the fully-opened position, it can significantly increase energy costs by allowing in hot air during the air conditioning season and cold air during the heating season. Have a licensed technician check, clean and lubricate your economizer about once a year and repair it if necessary.
- ☑ **Check air conditioning temperatures.** With a thermometer, check the temperature of the return air going to your air conditioner and then check the temperature of the air coming out of the register nearest the air conditioning unit. If the temperature difference is lower than 14 degrees or higher than 22 degrees, have a licensed technician inspect your air conditioning system.
- ☑ **Change filters.** Filters should be changed on a monthly basis, or more often if you are located next to a highway or construction site where the air is much dirtier.
- ☑ **Check cabinet panels.** On a quarterly basis, make sure the panels to your rooftop air conditioning unit are fully attached with all screws in place, and verify that gaskets are intact so no air leaks out of the cabinet. Chilled air leaking out can result in wasted energy.
- ☑ **Clean condenser coils.** Check condenser coils quarterly for either man-made or natural debris that can collect there. At the beginning and end of each loading season, thoroughly wash the coils.
- ☑ **Check for airflow.** Hold your hand up to air registers to ensure that there is adequate airflow. If there is little airflow or if dirt and dust are found at the register, have a technician inspect your unit and ductwork.
- ☑ **Add pipe insulation.** Insulation can reduce energy loss and help ensure proper steam pressure. Any surface over 120 °F should be insulated, including boiler surfaces, steam and condensate return piping, and fittings.
- ☑ **Schedule boiler tune-ups.** If you're noticing your gas consumption is unusually high compared to previous years, this could be a sign your boiler needs a tune-up. Regular tune-ups are one of the most effective ways to maintain the efficiency of your boiler.

Keep systems running efficiently with regular maintenance.

3. EQUIPMENT UPGRADES:
REAP RETURNS ON YOUR INVESTMENT

Upgrading to high-efficiency equipment can provide significant year-over-year energy savings and some can pay for themselves in a short period of time.

Lighting

Is the lighting technology in your school up to date? Lighting efficiency wasn't a major priority when most schools were being built, and the very same inefficient lighting system that was originally installed may still be in use today. Even if the lighting has been upgraded within the last five to 10 years, the technology that's available today can offer a wide range of added benefits, including low maintenance costs. Lighting upgrades are one of the easiest types of efficiency projects to take on, and are often known for short paybacks and long-term savings.

In recent years, the quality of LED technology has gone up, while prices have come down. We're now seeing many schools in our service territory installing LED troffers, high-bays and linear tubes in classrooms, gymnasiums and offices. In addition to contributing to lower energy bills, schools have reported that LEDs provide a better quality of light which has helped create a better learning environment.

Food service and refrigeration

There's a lot that goes on behind the scenes to provide students with a nutritious lunch throughout the week. And from an energy perspective, the demand can add up when you consider what's involved—from refrigeration to cooking, heating and dishwashing.

Upgrading to energy-efficient gas and electric appliances and ovens can help you save in the long term. In today's market, there are many types of energy-saving options to keep in mind when you are ready for a replacement.

Eligible Minnesota schools can receive a free refrigeration assessment from us to help determine what types of upgrades can have the greatest impact on reducing energy use. (Schools must have a peak demand of 400 kW or less to qualify.)

Lighting upgrades can often pay for themselves in a short period of time.

Cooling/ventilation

As year-round use of school buildings has grown, so has the use of air conditioning. And as use has grown, so have energy bills. If you're using an older cooling system, it could be expensive to maintain and use significantly more electricity than newer models.

Cut down on your cooling costs by installing a high-efficiency DX unit or chiller, and set up savings for the long term. If you're not ready to replace your equipment, you can consider increasing the efficiency of your existing system by adding economizers, heat exchangers and heat pumps.

Proper ventilation is essential for maintaining good indoor air quality, but it can place a big burden on your heating and cooling equipment and increase energy use. Energy recovery ventilators (ERVs) can provide an effective solution. By recycling the exhaust air stream and using it to precondition the outdoor air, ERVs reduce the energy needed for your HVAC systems to sustain optimal indoor environments. They're most effective in areas which have climates with extreme heating and cooling needs, such as Minnesota.

Heating

Proper space and water heating are integral to creating a comfortable learning environment. Often, this can be a challenge, given the sub-zero temperatures Minnesota winters can deliver. If you're in the position to buy new equipment, installing a high-efficiency boiler, furnace and water heater will allow you to provide adequate heating at a lower cost, even on the coldest days.

If replacing your heating systems is not an option due to budget constraints, consider adding electronically commutated motors (ECMs) to your furnace to reduce energy use. If your school uses a boiler, which typically has a long life span, keep it running efficiently with regular tune-ups and servicing (e.g., replace faulty steam-traps).

Proper heating is essential to student comfort—do it efficiently.

4. ENERGY ASSESSMENTS:
GET THE BIG PICTURE

If you want to get to the bottom of all the energy-saving opportunities available at your school, or are not quite sure where to start, consider getting an on-site energy assessment. We subsidize many types of assessments, making them available to our customers at a low cost. Two types that are requested most frequently for schools are listed below, and they can potentially identify significant savings opportunities that often go unnoticed.

- **Recommissioning study:** Ideal for school buildings, this program is designed to identify existing functional systems that can be 'tuned up' to run as efficiently as possible through low- or no-cost improvements.
- **Turn key assessment:** Used for all types of buildings and offices, this program will provide an ASHRAE Level 1 assessment that identifies low- and no-cost improvements as well as rebate-eligible upgrades. Free implementation services are available, and many of the improvements identified are eligible for bonus rebates if completed within one year of the assessment.

Uncover savings opportunities throughout your entire school with an energy assessment.

5. NEW CONSTRUCTION:
GET EFFICIENCY RIGHT FROM THE START

If you're considering a new construction project, expansion, or major renovation at your school, investing in energy efficiency right from the start can pay off in a big way. Take advantage of our free design consultation services, which can help you evaluate and incorporate potential energy efficiency opportunities and rebates into your plans before you start building.

- **Energy Efficiency Buildings Program (EEB):** Perfect for buildings with square footage of less than 20,000, this service can help you identify energy savings opportunities and rebates early in the design process to optimize short- and long-term savings.
- **Energy Design Assistance (EDA):** Often used for large new construction or renovation projects with square footage of 20,000 or more, this service offers a comprehensive approach to energy and cost savings, including predictive energy modeling, goal setting, daylighting analysis and more. Plus, you can save on up-front costs by earning rebates based on whole-building energy opportunities.

Take advantage of our free design services to integrate energy savings and rebates into your plans before you build.

6. REBATE GUIDE:
EARN CASH BACK ON YOUR IMPROVEMENTS

We offer rebates for many energy efficiency improvements which can lower your up-front costs and increase the return on your investment.

REBATE INDEX FOR MINNESOTA SCHOOLS

Rebate category	Rebate-eligible products popular with schools
Computer efficiency	Virtual desktop infrastructure
Commercial Refrigeration Efficiency	Free refrigeration assessments for eligible schools + rebates for qualifying upgrades.
Cooling efficiency	Chillers
	DX units
	Economizers
	Energy recovery ventilator
	Heat exchangers
	Heat pumps
Efficiency controls	Controls for lighting and HVAC systems
Energy assessments	Recommissioning
	Turn key services
Food service	Broilers
	Charbroilers
	Combination ovens
	Convection ovens
	Conveyor ovens
	Demand controlled ventilation
	Dishwashers
	Hot food holding cabinets
Heating efficiency	Boilers
	Boiler tune-ups
	EC motors for furnaces
	Furnaces
	Pipe insulation
	Steam traps
	Water heaters
Lighting efficiency	LED exterior area lighting
	LED high-bay fixtures
	LED linear tubes
	LED parking lot fixtures
	LED troffers
	Occupancy sensors, networked lighting controls
New construction	Energy Efficient Buildings (EEB)
	Energy Design Assistance (EDA)

Note: Rebates are subject to full program eligibility, participation requirements and restrictions available at xcelenergy.com/Rebates.

CONTACT US TODAY TO START YOUR SAVINGS PLAN

If you're interested in making energy-saving improvements at your school, contact your account manager or an energy efficiency specialist at **855.839.8862**.

If you're not sure about what steps to take, we can provide you with recommendations tailored for your facility and guide you through the process of earning rebates.

For more information about our wide range of rebate programs, visit **xcelenergy.com/Schools.**

References

1. U.S. Environmental Protection Agency, Facility and Efficiency Improvements Concerning Energy Efficiency for Healthy School Environments (last updated Oct. 13, 2015) http://www.epa.gov/schools-healthy-buildings/facility-and-efficiency-improvements-concerning-energy-efficiency-healthy.
2. ESource, K-12 Schools Sector Snapshot, by Essie Snell, Devin Fink. Pgs. 6-7. July 24, 2018.

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