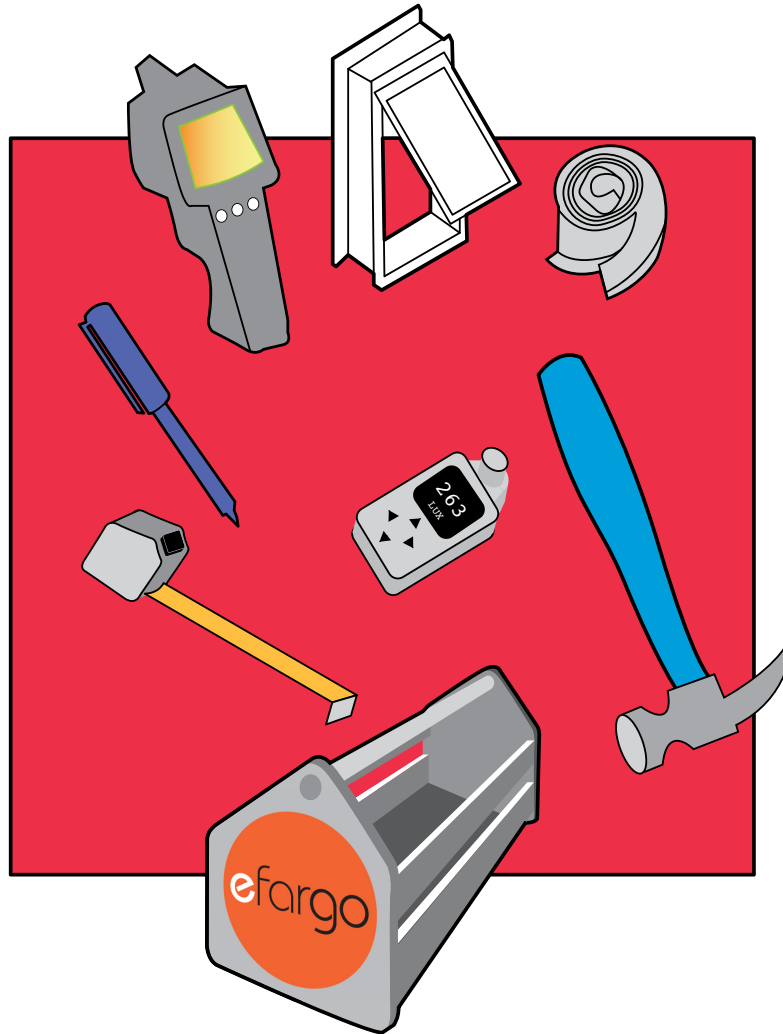
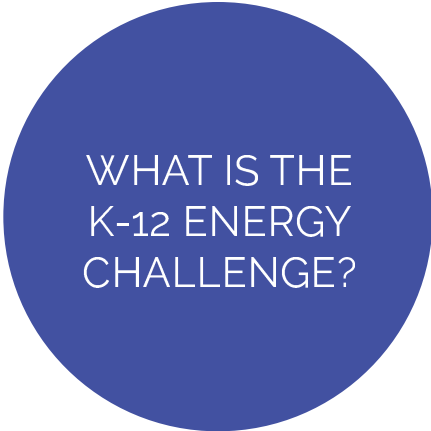


k-12 ENERGY CHALLENGE 2.0



GAME DETAILS



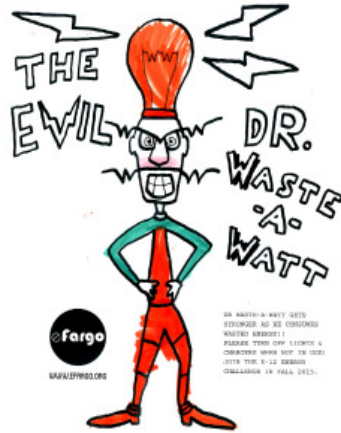
WHAT IS THE K-12 ENERGY CHALLENGE?

efargo is a partnership formed between NDSU efargo research group, the City of Fargo, Cass County Electric Cooperative and Xcel Energy to reduce energy waste and energy consumption in the F-M area.

The K-12 Challenge is part of the efargo effort and was developed by the NDSU efargo research group to educate and empower students, teachers and staff to reduce energy use in area schools through educational projects and actions. Schools are a large part of the municipal energy use in our area.

As a research group at NDSU, efargo does not endorse any company or person selling or otherwise promoting products or services.

Please feel free to contact us with any questions or concerns at malini.srivastava@ndsu.edu or info@efargo.org.



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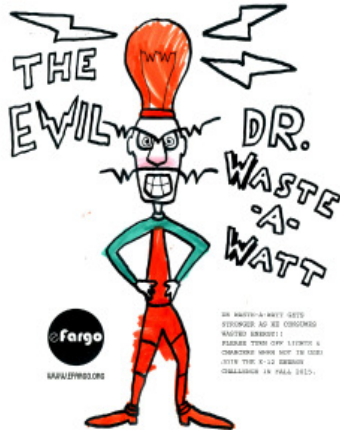


TABLE
OF
CONTENTS



Amusha

CHALLENGE OVERVIEW	6
WHY PLAY?	8
GOAL: DEFEAT WASTE-A-WATT	10
HOW TO PLAY	12
ENERGY-USE BREAKDOWN IN SCHOOLS	16
TOP TEN NO-COST ENERGY SAVING TIPS	17
CLASSROOM EVENTS & ACTIVITIES	20
TOP TEN LONG-TERM SCHOOL IMPROVEMENTS	25
SIMILAR COMPETITIONS	28
LOCAL LEARNING RESOURCES	30



CHALLENGE OVERVIEW

All schools are invited to participate in a six-week energy-saving CHALLENGE organized by efargo to promote energy-efficiency and provide opportunities for the sustainability leaders of tomorrow. efargo challenges you to help defeat the evil Waste-a-Watt by reducing the amount of wasted energy in your school.

- GOALS**
1. Educate K-12 students about the science of energy production, transmission and consumption and resulting impacts.
 2. Empower K-12 students to create and sustain change to their own environments through everyday energy-use practices.
 3. Reduce the impact that our schools have on the environment by reducing energy use in school buildings.
 4. Help Fargo become a more energy efficient community and work toward winning the Energy Prize.

- TEAM**
1. School-based teams will include students, teachers, facilities managers and staff, principals, administrators.
 2. CHALLENGE events can be incorporated into a classroom activity or club activity. The important thing is for each school to have at least one **project champion** that is either a teacher, facility manager or administrator. We strongly encourage each school also having a **student champion**.

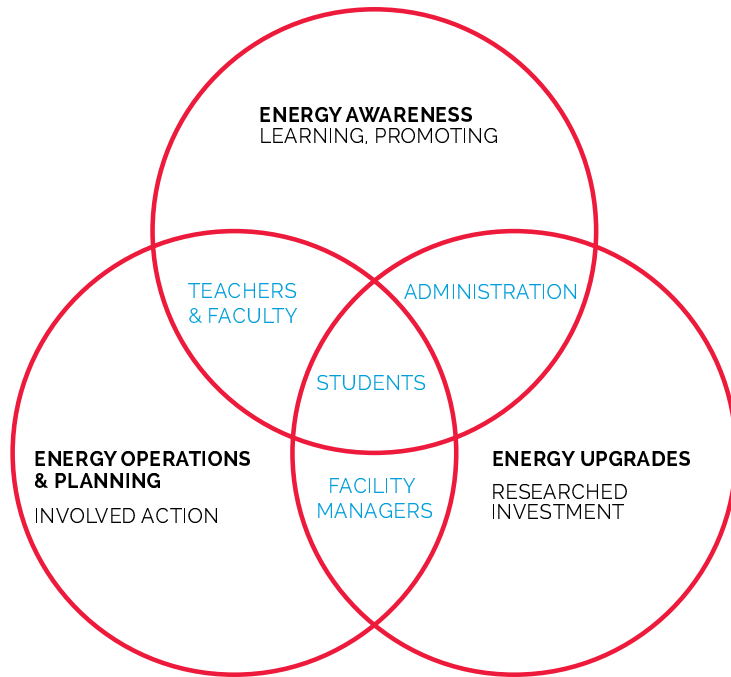


Diagram: According to the USGBC Powering Down Guide, successfully reducing energy in schools requires "three complementary avenues." Listed, they are 1. Awareness, 2. Operations and Planning and 3. Upgrades. Drawing on successful National K12 competitions, when students lead efforts and are partnered with teachers, faculty, facility managers and administration, impact and result can be lasting.

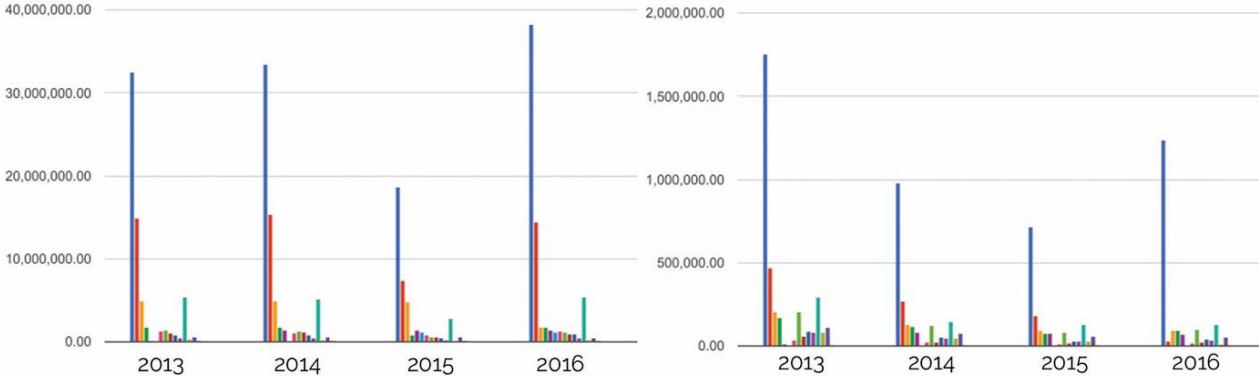
RECOGNITION The school with the greatest energy-use reductions against their own baseline shall be able to choose between one of the following two options:

1. FLIR Thermographic camera
- OR
2. A tree planted on school grounds or a location of the school's choice.

If enough donations are received, then every student who participates in the Challenge shall receive a tree sapling.

WHY PLAY?

Schools constitute a large portion of Municipal energy use. In Fargo schools use 43% of electricity and 49% of gas. This high percentage of energy use gives the schools participating in the K-12 Challenge an opportunity to make an impact by reducing how much energy they use by changing occupant behavior. The goal is to lower energy bills for the school district by preventing energy waste. It also benefits the community by protecting the environment.



Electricity (KwH)

Gas (Therms)

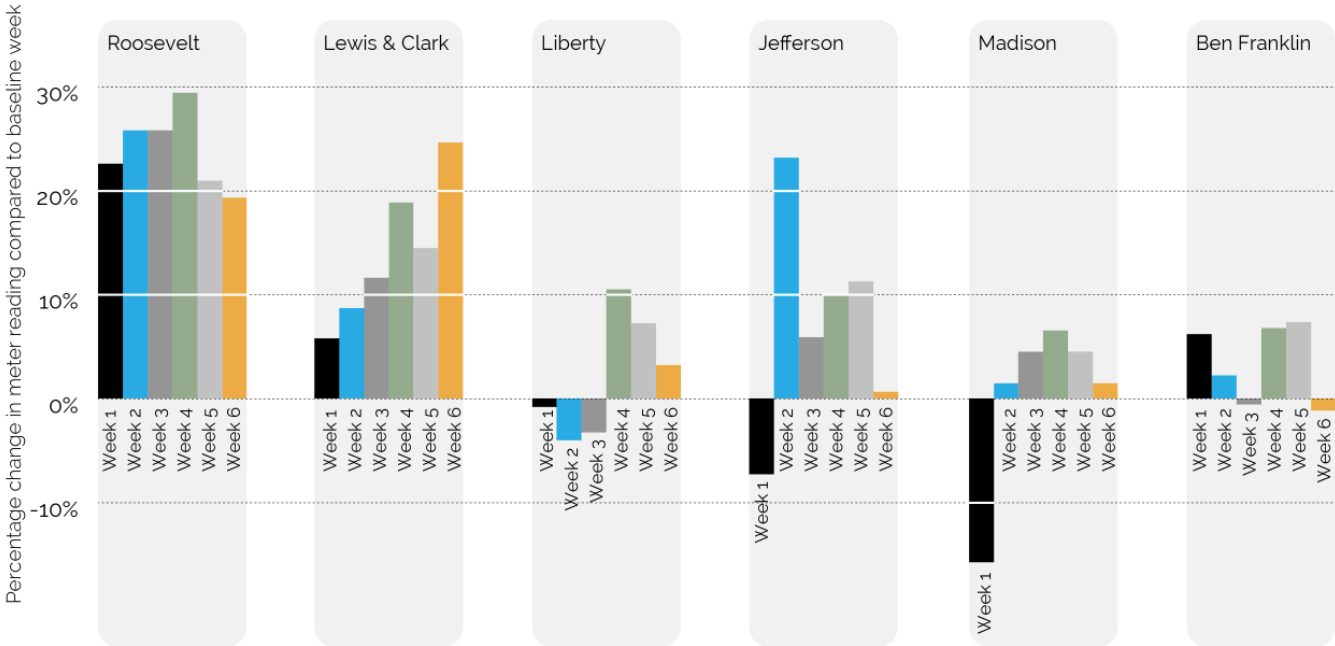
- School
- Water
- Airport
- Civic Center
- Library
- Landfill
- Police
- Storage
- Waste
- Transit
- Offices
- Recreation
- Planning
- Fire

Buildings Top Energy Users

Schools - 43% of electricity and 49% of gas
 Water Facilities - 28% of electricity and 16% of gas
 Airport - 9% of electricity and 7% of gas

*Data sets are not weather normalized or growth normalized.
 *Healthcare typology data in review.

During the first K-12 Challenge (2016), the participating schools showed successful reductions in energy use. Roosevelt and Lewis & Clark participated in the entire 6-week competition and made great strides. Liberty & Jefferson participated for a more limited amount of time and also reduced their energy use. Madison and Ben Franklin did not participate but were tracked to show comparisons between participating and non-participating schools. The following chart shows the percentage of energy reductions (above x-axis) or percentage increase in energy use (below x-axis) over a 6-week period as compared to baseline energy use. The Energy Challenge 2.0 will be a test of whether the positive results of 2016 can be replicated or bettered.





GOAL:
DEFEAT
WASTE-A-WATT

Waste-A-Watt is a greedy villain who gains power from energy that is wasted. His goal is to become super-powerful and take over the city. Luckily, we have the ability to stop him!

With the K-12 Challenge we can stop Waste-A-Watt dead in his tracks before he conquers Fargo. All we need to do is make sure that we are not wasting energy. It can be as simple as turning the lights off when leaving a room or unplugging unused electronics.





HOW TO PLAY

ORGANIZE (PRE-CHALLENGE)

Participants will challenge their schools and others to reach the greatest possible reduction in energy-use. To that end, students and designated energy champions shall plan and design their own activity package to prevent energy waste. Suggested events and activities are provided by efargo.

MAKE A COMMITMENT

Form a planning committee comprised of students, teachers and staff all dedicated to the goal of energy conservation. Collaborate with your team to determine a meeting schedule and location. Assign roles and responsibilities to each team member.

APPOINT A SCHOOL CHAMPION

Every school should have a designated student, teacher, facility manager, or administrator that can help to promote, organize, and lead their schools efforts in the CHALLENGE and act as a liaison between the school and efargo. Champion will be responsible for providing regular weekly updates to efargo team during competition period.

PREPARE & LEARN

Prepare and plan your daily, weekly and optional activities for the CHALLENGE period. Please contact efargo team to discuss your idea and let us know how we may help you prepare.

SET GOALS

Understand how energy is currently being used within your facility and set reasonable goals for the CHALLENGE period.

CREATE AN ENERGY-SAVING PLAN

Plan activities for events for finding, tagging and then fixing energy waste. Remember that some events work best as whole-school initiatives and others work best when incorporated into the classroom.

FIND & TAG THE WASTE (WEEK 1)

Energy waste is all around us. Lights that are left on when rooms are unoccupied; devices and appliances that are left plugged in when not in use; using artificial lighting instead of opening shades to let natural light in; air vents that are blocked by furniture; thermostats settings, ventilation and vending machines with non-perishable items that are left running even when nobody is in the school for long periods such as weekends. These and many other activities consist of unnecessary energy waste. Research how energy gets wasted, **find that waste** in your school and your classrooms, **tag that waste** using the game tiles. Other suggested events and activities are as follows:

TAKE A PLEDGE EVENT Hold a "Take the Pledge" event to get the whole school involved in your energy savings plan. Ask each person about one way in which they intend to reduce their energy use.

POSTER SESSION OR SCHOOL WIDE SIGNAGE Hold an Energy Conservation Poster Session to create signs for the school. Ask students to make a poster or signs that remind fellow students and staff to turn off the lights when leaving a room or unplug electronics that aren't being used. Hang posters up throughout the school.

INTRO FILM OR DEMO VIDEOS Start recording energy-saving activities throughout the 6-week challenge in order to create a film or demo video to show how to save energy to the students, teachers and staff. Share these videos with other students so that everybody can become more aware of ways in which they can conserve energy at school or at home.

DESIGN A SUPER-HEROINE/HERO Have a "Design our Energy Conservation Superheroine/hero" session to help personify Waste-a-Watt's challenger. Come up with a catchy name and drawing. She/he may be assigned superpowers to battle the evil Waste-a-Watt! Have fun and use this to spark interest in the CHALLENGE!

FIX THE WASTE (WEEK 2-6)

Throughout the competition period, implement a variety of events or activities to achieve energy savings.

DAILY TASKS

ENERGY PATROL Set-up a patrolling schedule where students or student groups will check energy-use in classrooms or other areas within the school. The Patrol group can ensure that lights and monitors are turned off when not in use. They can also leave gentle reminders where they see energy waste in the school.

ANNOUNCE Begin to promote CHALLENGE to increase student involvement. Make announcements and use your videos, posters, etc. to get the word out about how students can become involved.

RECORD YOUR ENERGY ACTIONS Mark your energy-saving activity on the game tiles by crossing off the appropriate Waste-a-Watt for that particular day. If lights are turned off, cross off the yellow Waste-a-Watt, if devices are unplugged or shut down when not being used, cross off the blue Waste-a-Watt for that day and so on.

WEEKLY TASKS

ENERGY-USE MEASURING During the CHALLENGE energy will be measured and compared against a baseline week of prior use. Check your school's energy meter weekly with the help of your teacher or facility staff to see if you are having an impact.

ANNOUNCE DASHBOARD RANKING **efargo will also be taking weekly meter readings.** On our K-12 Challenge portal of the efargo website (www.efargo.org) there will be a dashboard displaying how your school ranks in comparison to other schools in the race to reduce! Announce your ranking to the school every Friday.

WEEKLY BLACK-OUT Have a "Power Blackout Hour" where the entire school turns off all lights and electronics for an hour every week. Try to do this at a time when natural daylight will provide sufficient lighting levels. Teachers may continue with their normal lesson plan or arrange a special activity during this time. This could be a one-time or recurring event that the school does every Friday during the CHALLENGE period.

WEEKEND UNPLUG Unplug all devices and appliance that do not need to be used over the weekends or holidays. These may include tablets, laptops, computers, smart boards, charging stations, vending machines (non-perishable items), coffee makers, office equipment etc. Unless your school has CO2 sensors, you can also manually turn down the ventilation air if your facility staff think it is appropriate. You can also ask your facility staff to set back the thermostats every weekend

SEND PHOTOS Send the efargo team photos of your game tiles and energy-saving activities that you conducted that week every Friday. Or let us know if you need any help providing this information.

ACTIVITIES

See Page 18 for Tope Ten no-cost energy saving tips and page 20 for classroom activities.

CELEBRATE EARTH DAY (APR 21, 2017)

CELEBRATE & RECOGNIZE YOUR ACHIEVEMENTS Host a celebration for the entire school that celebrates your accomplishments and encourages students and staff to continue their efforts. If your school is the grand prize winner, you will receive your prize of choice (tree or FLIR camera). If adequate donations are received, each participating student shall receive a tree sapling to plant at home.

CONTINUE EFFORTS (APR 21, 2017 onwards)

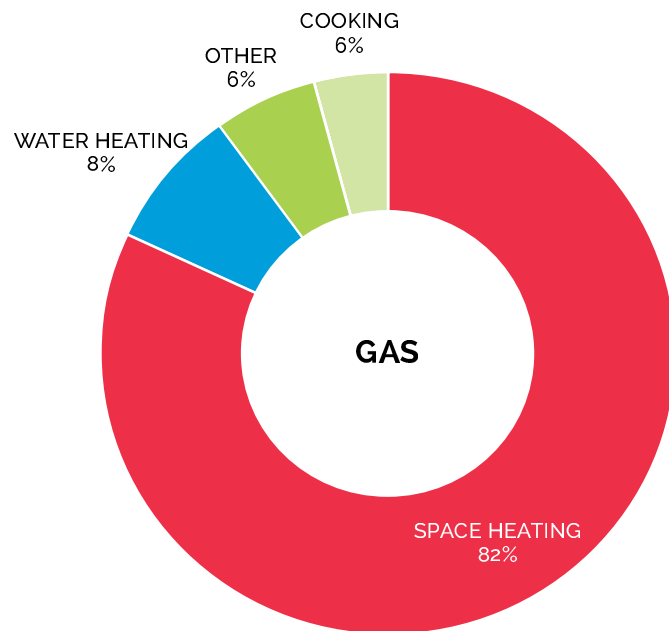
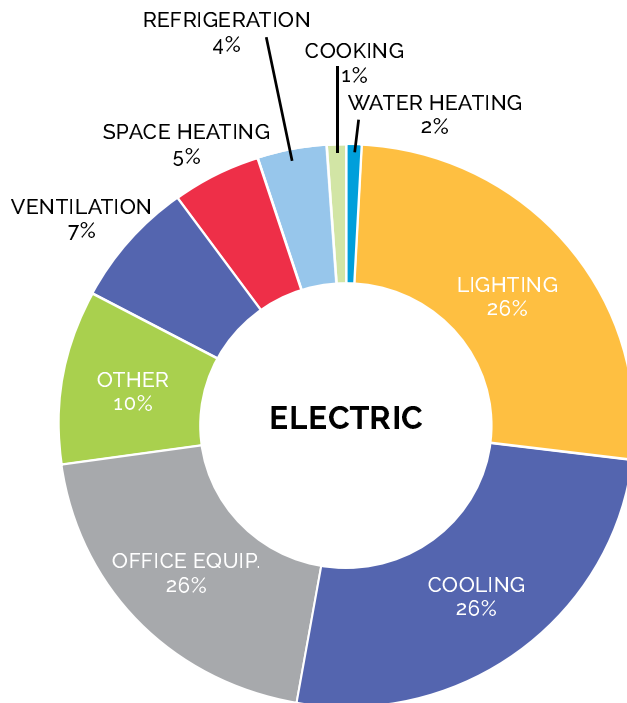
Ask students to create ideas for continuing the momentum. How will efforts continue pick up the following year? What was most successful? What should be done differently next year? Who will be returning and what responsibilities should be passed on?

ENERGY-USE BREAKDOWN IN K12 SCHOOLS BY SOURCE

Heating, Cooling, Lighting and Office Equipment accounts for most of the energy used in K12 schools. Understanding this may help direct efforts in order to maximize potential reduction impact.

Within categories powered by electricity, it is apparent that reducing energy use of computers will have an affect on 26 percent of electric usage. Similarly, reducing energy used in space heating will affect 82 percent of all natural gas usage. We recommend acting on areas that use the most energy first.

www.energystar.gov/sites/default/files/buildings/tools/EPA_BUM_CH10_Schools.pdf



TOP TEN
NO-COST
SCHOOL ENERGY-
SAVING TIPS

Primarily focused on energy-awareness and energy-use planning, the strategies above describe simple ways energy can be saved without incurring additional operating costs or investments. The ten tips are listed along with the percentage of energy use they affect. For example, turning off unused lights affects electricity use, which for lighting averages 26 percent. These actions involve raising awareness and creating and following-up with an energy plan.

	ACTION	CURRENT USE		ACTION	CURRENT USE
1	shading devices		6	sleep mode on	26% elec.
2	close openings		7	off for holidays	
3	special-use rooms	34% gas 5% elec.	8	turn off lights	26% elec.
4	clear vented areas		9	use natural daylight	
5	HVAC settings		10	reduce water-heater temp on wknds	8% gas 2% elec.

TOP TEN NO-COST ENERGY SAVING TIPS

- 1. SHADING DEVICES** Use shading devices to help control heat loss and gain through building windows. Open blinds at the beginning of the school day to allow the sun to help heat the building. After the school day is over, close blinds to avoid heat loss through the windows.
http://www.nrel.gov/tech_deployment/pdfs/commercial_building_checklists.pdf
- 2. CLOSE OPENINGS** Make sure that all windows and doors remain closed when the HVAC system is running. By allowing conditioned air to escape the building, energy and money are being lost. For some systems, this can also negatively impact the temperature of other spaces.
<http://www.coolcalifornia.org/article/save-energy-schools>
- 3. SPECIAL USE ROOMS** Some spaces of school buildings are only used during specific hours of the day; such as the cafeteria, auditorium and gymnasium. Ensure that your HVAC system is programmed around this schedule so that it is not heating or cooling an unused space.
<http://www.ase.org/resources/energy-saving-tips-schools>
- 4. CLEAR VENTED AREAS** Ensure that all airflow is left unblocked. Keep bulky furniture as well as personal items away from the vents so that spaces can be properly heated or cooled.
<http://www.ase.org/resources/energy-saving-tips-schools>
- 5. HVAC SETTINGS** Have building maintenance personnel adjust HVAC temperature settings outside of regular school hours to save energy on space heating and cooling. The high percentage of energy used for heating and cooling can be greatly impacted by making this small change.
<http://www.eere.energy.gov/buildings/info/schools/index.html>
www.cacx.org/resources/documents/CA_Commissioning_Guide_Existing.pdf
- 6. DISCARD EXTRAS** If certain equipment or electronics are being under-utilized, perhaps it's time for them to go. It can be expensive and wasteful to power equipment even when in standby or off mode. For example, if there are certain areas of the building which have excessive lighting, it would be within your best interest to remove the unused bulbs.
<http://syroy/businessCustomers/saveEnergy/smallBusiness/noCostTips.html>

7. SLEEP MODE ON Computers are left untouched for several hours a day in K-12 schools, so it is important to make sure they aren't drawing energy when unused. Make sure that computers are set to enter sleep mode when not in use. Screens should be set to power down after 10 minutes of use, and another goal is to maximize power down time especially during evenings and weekends.
<http://www.usgbc.org/articles/how-much-could-your-school-save>

8. OFF FOR THE HOLIDAYS Make sure that all electronic devices are turned off and unplugged over the weekends and holidays so that unused energy isn't being wasted. Many electronics still use energy when they are turned off – this energy use is called a vampire load. Heating water requires a tremendous amount of energy. If possible, turning down the water heater temperature over the weekend can lead to savings.
<http://www.ase.org/resources/energy-saving-tips-schools>
www.nationalgridus.com/non_html/shared_energyeff_schools.pdf

9. TURN OFF LIGHTS This may seem simple, but for every 1,000 kWh of unused electricity you save nearly \$85 on your electricity bill. Lighting accounts for an average 26% of a schools electricity use, so by turning off unused or unnecessary lights you can save large amounts of energy.
<http://www.eere.energy.gov/buildings/info/schools/index.html>
www.centerforgreenschools.org/sites/default/files/resource-files/Behavior-based-Efficiency.pdf

10. USE NATURAL DAY-LIGHT Utilize natural day-lighting when and where it is sufficient for the activity. Not only will you save energy on lighting, but you can also help to improve student performance. According to a study conducted by the California Board of Energy Efficiency, students were found to test 15-26% better in classrooms with natural day-lighting. Optimal light levels for classrooms vary based on activity, and can be found on page 7 here: https://www.energystar.gov/ia/business/EPA_BUM_CH10_Schools.pdf
<https://www.xcelenergy.com/staticfiles/xcel/Marketing/Managing-Energy-Costs-Schools.pdf>



CLASSROOM EVENTS & ACTIVITIES

SHADE SETTING PLAN Properly using the shades at night to retain heat, and opening them during the day to allow warm sunshine can impact energy use. Develop a plan for operating the schools shading systems, and follow-up throughout the competition. The Classroom Energy Patrol could potentially perform the shade setting actions.

KILL-A-WATT METERS Measure the amount of electricity is being used by electronics when turned on and off. You may be surprised by the amount of energy being used even when in standby mode. Students can use this information to determine where vampire loads exist (energy being used when in the off position) and where power-strips should be used.

LIGHT BULB COMPARISONS Compare incandescent, CFL, and LED bulbs along with their respective lighting values, heat output, energy use, costs, longevity and carbon emissions. What light bulbs are used in different areas of the school? This activity would pair great with one measuring light levels in rooms, while learning about optimum lighting for different activities and how to maximize natural day-lighting.

ENERGY ACTION REMINDERS Discuss with students the different energy action items as a way to reinforce weekly CHALLENGE plans.

ENERGY ACTION ILLUSTRATIONS What does energy reduction look like? Encourage student creativity in thinking this through in the act of illustrating a part of their daily life or another aspect of energy use.

DRAFT-METERS	Have students determine the areas where air is being supplied to the building and also where air is escaping the building (door, windows, etc.). "Draft-meters" can be made by attaching string or ribbon to the top of a pencil. This activity will show students where energy is being wasted in the building due to heat loss. Have students brainstorm solutions for these problem areas within the school.
CONSERVING ENERGY SURVEY	Conduct surveys that ask students to consider their own energy use. Gather data and report findings in a visually compelling and engaging way.
ELECTRONICS-USE ACTION PLAN	Plug load from devices and electronics can account for twenty percent of electricity use in schools. What electronics are used in the school? How can they be monitored and used most efficiently? Take advantage of computers sleep options, and shut them down after a certain time period. Figure out a way to consistently power-down for nights and weekends.
MATERIAL/ENERGY RE-USE PROJECT	Conduct a project to measure embodied energy of different materials. Find creative ways to re-use existing materials, and create a report explaining how waste-energy was prevented through material sourcing/choices. What happens to energy when a material is recycled into a different use or form?
HOME SOLAR ANALYSIS	What potential does your home have for using solar energy? Conduct a thorough investigation that proposes a robust photovoltaic system for powering your homes energy.
ENERGY PRIORITIES	What does energy use look like at a larger scale? How do others and the school itself interact with energy? What systems are in place that use energy?
SHOWER/BATH COMPARISONS	Determine how to measure the difference in water usage in both an average shower and bath. This can involve real-life measurements or calculations. How much energy can be saved with the more efficient option?

- WATER/ENERGY ASSESSMENT** Assess your own home water use or that of the schools. What are the associated systems? In what ways is energy used? How does water compare with the overall of home/school energy usage? What measures could be taken to reduce water energy use? How might a water energy use plan look?
- LIGHT METERS** Use light-meters from your local library to measure lighting levels; consider optimal lighting levels, and determine a plan for adjusting the light to match optimal functional use. Plan energy-use reductions with lighting. Another exercise could be to design a classroom to be lit naturally.
- SOLAR USB CHARGER PROJECT** Design and build a solar-powered USB charger. Alternate may be designing a system to capture energy from a bicycle. How would regular use affect plug-load?
- SCHOOL SOLAR-ENERGY ANALYSIS** Research solar energy and systems and conduct a study on your school detailing how much solar energy would be required to reduce non-renewable energy use by 5, 10, 20 and 50 percent. Provide cost/benefit analysis and report findings.
- ENERGY-USE JOURNALING** Keep a journal recording when you use energy, for how long, and how often. This will provide the basis for finding ways to eliminate energy waste.
- INSULATION EXPERIMENTS** Create an experiment by which materials can be investigated for their insulating properties. Either use ice or hot water in a container wrapped by the different materials. By measuring change of temperature over time, what can be revealed about a materials inherent properties? How does this relate to our climate region?
- HOME ENERGY ASSESSMENT** Conduct a thorough investigation of how your home uses energy. What systems are in place? What are the seasonal and yearly use trends? What appliances use the most energy?
- OCCUPANT COMFORT** Have students conduct an experiment to measure occupant comfort at different lighting levels. Start by having all of the lights in the room on, and ask student to complete a series of tasks including reading,

writing, drawing etc. Slowly begin to turn off different banks of lights and ask students to complete the same tasks at each level. After students have completed the tasks with all lights off, ask them which lighting level was easiest and most difficult to work in. Pair this activity with the use of light meters, which measure the amount of light in lumens.

**POTENTIAL SAVINGS
AUDIT, PLAN** Ask students to perform a potential savings audit on different pieces of equipment throughout the building (lights, computers, faucets, HVAC, vending machine, etc.). Start by calculating current energy usage of this equipment, and then identify energy efficient alternatives and calculate their energy use. Students can also look into the payback period and total savings over the lifespan of the new equipment. Each student can prepare a short presentation about their findings to present to your school's administration. It has potential to influence future equipment purchase decisions.

SOLAR COOKERS Have student create solar cookers to learn about the power of solar energy. Students will create a dome shaped with cardboard that is covered in a reflective surface, and then attach a stick at the very center. When faced towards the sun, solar rays will bounce off of the reflective surface and hit the stick at the center providing a significant amount of heat. On a nice day, take students outside to test out their solar cookers for a cookout!

**ILLUSTRATE FAMILY
CONSERVATION** Encourage students to think about energy in relation to their own home. What does family energy conservation look like?

**ROOM-BY-ROOM
ENERGY SURVEYS** Take an inventory of a series of rooms either at school or at home, considering how energy is used and how the elements within the room affect different ways in which energy is wasted and might be saved.

ENERGY QUIZ Test knowledge on energy conservation with a quiz.



TOP TEN
LONG-TERM
 SCHOOL FACILITIES
 IMPROVEMENTS

Students, teachers, staff, facility managers and school districts may participate in these efforts. The costs vary but can bring return on investment with savings over time. The ten concepts presented here are intended to encourage thinking and educate about different ways that energy is used in schools and on school-grounds.

	ACTION	CURRENT USE		ACTION	CURRENT USE
1	south facade		6	lighting retrofits	
2	seal leaks		7	motion sensors	26% elec.
3	deter winds		8	bulb dimmers	
4	replace filters		9	aerators	8% gas 2% elec.
5	power strips	26% elec.		xeriscaping	10% elec.

TOP TEN LONG-TERM SCHOOL IMPROVEMENTS

1. SOUTH FACADE There are a variety of ways to reduce the amount of heat gain received on the South façade of your building. Deciduous trees can provide shade in the warmer months, and allow the sun to heat the building during winter months. Installing shades in southern windows can also be very helpful in avoiding unwanted heat gain.
http://www.nrel.gov/tech_deployment/pdfs/commercial_building_checklists.pdf

2. SEAL LEAKS Use a thermal imaging camera to identify areas of you building where heat may be escaping. Use caulk or weather-stripping to seal these leaks and avoid heat transfer. This will lessen the work that your HVAC system needs to do to reach optimal thermal comfort.
http://www.nrel.gov/tech_deployment/pdfs/commercial_building_checklists.pdf

3. DETER WINDS Coniferous trees and shrubs can be planted along the north, west and east sides of the site to deter winds away from your building. According to the Department of Energy, this can reduce your buildings heating bills by up to 33%.
<http://energy.gov/energysaver/articles/landscaping-shade>

4. REPLACE FILTERS Air Handling Unit filters should be replaced every 1-3 months so that the equipment can work efficiently. Dirty filters will force your HVAC system to work much harder which in turn uses a lot more energy. In a climate where schools need to be heated for the majority of the year, this can make a huge impact upon your utility bill.
http://www.nrel.gov/tech_deployment/pdfs/commercial_building_checklists.pdf

5. POWER STRIPS Power strips should be used to reduce the impact of plug loads. Even when electronics are turned off, they can still be consuming energy. Power strips will allow you to completely cut off power to equipment when it's not in use. Occupancy sensors can ensure power strips are turned off whenever the room is unoccupied.
http://www.nrel.gov/tech_deployment/pdfs/commercial_building_checklists.pdf

6. LIGHTING Replace incandescent bulbs with energy efficient lighting options. We recommend either LED or CFL bulbs. By upgrading your lighting system, you can see significant reductions in your electricity bill. According to the USGBC, lighting in schools can account for up to 50% of the school's total energy use.
http://www.epa.gov/statelocalclimate/documents/pdf/k-12_guide.pdf
<http://www.eere.energy.gov/buildings/info/schools/index.html>

7. MOTION SENSORS Although it's best to have occupants turn off lights when they aren't in use, it can be hard to remember to do so. Install lighting controls into your lighting system so that energy isn't being wasted on unoccupied spaces. Sensors that measure motion and lighting can help curb excess lighting use.
<http://energy.gov/energysaver/articles/lighting-controls>

8. BULB DIMMERS By installing dimmable lights into your school, you can more easily control lighting levels and reduce energy use. Our lighting needs change throughout the day, so by using dimmable lights we can better address our lighting level needs. When lights are dimmed, it also reduces their wattage, adding to energy savings.
<http://energy.gov/energysaver/articles/lighting-controls>

9. AERATORS It takes a lot of energy to heat water; by adding aerators to your faucets, you can decrease the amount of warm water used each time. Users will still be able to efficiently wash their hands while additionally saving energy used by the water heater and reducing water consumption.
http://www.nrel.gov/tech_deployment/pdfs/commercial_building_checklists.pdf

10. XERISCAPING To reduce the amount of water needed to maintain your school's landscaping, use native plants that thrive in your climate. You should also try to reduce the amount of turf areas to what is necessary, because they often require not only a lot of summer watering but additional energy with regular maintenance work.
<http://energy.gov/energysaver/articles/landscaping-water-conservation>



SIMILAR COMPETITIONS

CAMPUS CONSERVATION NATIONALS

WHAT?

The world's largest electricity and water reduction competition for universities and colleges.

WHERE?

Colleges and universities all throughout North America.

HOW?

Each school holds a 3-week competition to see how much they can conserve energy and water-use compared to a baseline reading. Schools have the option of hosting an individual competition between buildings on their campus or participating in a group competition to compete against other schools. Each school has an organizing team that is responsible for planning all events and recording energy or water use throughout the competition period. Most efforts are geared towards behavior change solutions. <http://www.competetoreduce.org/>

SAN DIEGO SCHOOL ENERGY CONSERVATION COMPETITION

WHAT?

Energy conservation competition to save money and reduce impact on the environment.

WHERE?

San Diego School Districts - 35 schools in total

HOW?

Schools compete against each other to see who can save the most energy over a 3 week competition period. Some strategies employed include turning everything off over weekends, setting thermostats at 78 degrees, removing extraneous light bulbs or hosting a school-wide blackout.

<http://www.energizeschools-sd.org/energy-competition.html>

**IGNITING CREATIVE
ENERGY CHALLENGE**

WHAT?

Contest for students to share their ideas about energy and the environment

WHERE?

Students all throughout North America are welcome to participate

HOW?

Students share their ideas about how individuals, families or communities can help to conserve energy and promote environmental stewardship. They may do so through any means they see appropriate. In the past students have prepared artwork, science projects, essays, music, videos, service projects, website, etc. <http://www.ignitingcreativeenergy.org/>

**BATTLE OF THE BUILDINGS
2014**

WHAT?

Annual competition related to buildings and their impact on the environment.

WHERE?

District 191 Schools in Burnsville, Eagan and Savage, MN.

HOW?

In 2014, schools were challenged to see who could reduce their energy use by the greatest percentage. The winning school was able to reduce their energy use by 29.1% in just 5 short weeks. Some of the strategies used include turning off lights, unplugging unused appliances, and setting building temperature a little lower. <http://www.isd191.org/news-calendars/go-green-sustainability-isd-191#.VUrQMvVhBc>

THE SPRINT TO SAVINGS WHAT?

Energy conservation competition to catalyze energy savings and provide educational experiences for students.

WHERE?

All DC public schools are welcome to participate.

HOW?

Schools assemble "Green Teams" to plan and implement energy saving efforts. A series of "energy monsters" are created to help teach younger students about how energy is wasted. Older students can complete an energy audit to understand where energy can be saved within their school. Throughout the competition, Green Teams are encouraged to issue tickets to energy wasters, so they can understand their impact on the school. <http://www.dcgreenschoolschallenge.com/#dgsc>

GLOBAL GREEN CUP ENERGY CHALLENGE WHAT?

Challenge to raise awareness about climate change and resource conservation.

WHERE?

Schools all across the country are invited to participate to help save energy

HOW?

Schools are invited to join the challenge to save energy and bring positive change to the world. In 2013, 300 schools participated to help save over 1.5 gigawatts of electricity within 4 weeks.

<http://www.greenschoolsalliance.org/energy-challenge>

U.S. ARMY'S ECYBERMISSION WHAT?

A state, regional and national Science, Technology, Engineering and Mathematics (STEM) competition for 6th-9th grade teams that propose a solution to a real problem in their community.

WHERE?

Web-based competition for students throughout the United States

HOW?

Three to four students and one advisor in the same state form a team and register with a mission challenge using science, technology, engineering or mathematics to solve a problem in their community. The team will conduct research and experiments to find a solution in 8-weeks and submit a mission folder answering all questions, attach photographs, survey questions and any additional documents from the teams competition.

<http://www.ecybermission.com>





LOCAL
LEARNING
RESOURCES

METHANE ENERGY CAPTURE & WIND AND SOLAR ENERGY PRODUCTION City action helped turn the smelly gas emitted from the landfill into a viable energy source, saving the city millions of dollars. Additionally, the Landfill uses wind and solar energy to supplement its energy supply.

<http://apps.cityoffargo.com/solidwaste/energyproduction/>

LED RETROFIT All 5,400 incandescent traffic lights have been replaced with LED's, and 85% of the city's 2,400 pedestrian lights have been replaced. This saves the city \$30,000 annually.

MATBUS GENERATOR AND BIODIESEL MATBUS uses 20% blended biodiesel fuel during the summer, and the Metro Transit Garage utilizes a power generator during peak energy-use times to reduce costs and power-grid loads.

WASTEWATER RECYCLING Up to two million gallons of wastewater are sold daily to a nearby ethanol plant, producing an effect that is equivalent of taking 28,000 vehicles off the road each year. The city earns \$800,000 while eliminating the need for using natural river and ground water sources.

<http://www.cityoffargo.com/CityInfo/Mayor/FargoEnergyUse/>

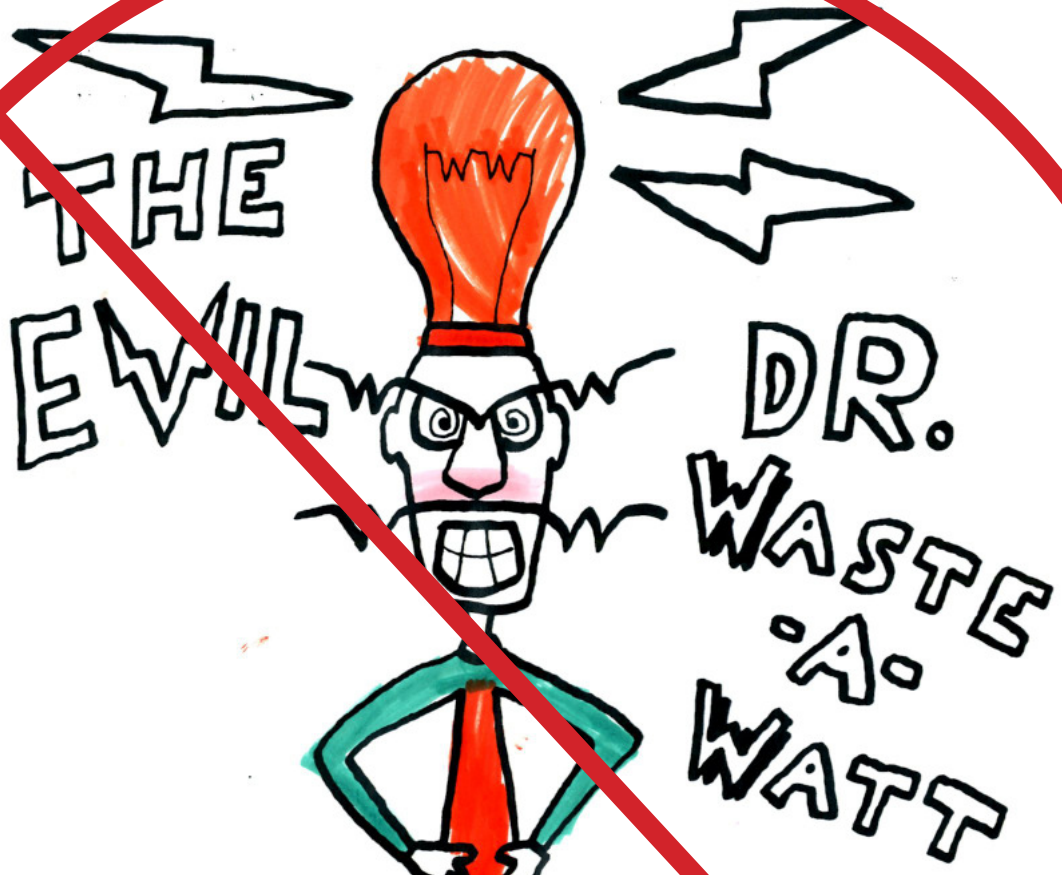
BICYCLES Great Rides Bike Share program was initiated by NDSU students and has quickly grown to be a successful alternate transportation option.

CCEC'S ENERGY PRODUCING BIKE Solar-powered bike stations populate downtown and the NDSU campus where students and the public may use the bicycles free-of-charge for short trips.

ENERGY BIKE Cass County Electric Coop has an energy bike that provides an opportunity to demonstrate an energy concept in a visual way. It allows riders energy to be transformed into light. The bike promotes energy conservation and teaches lighting technology as it compares to LED (light emitting diode) and CFL (compact fluorescent) light bulbs to incandescent light bulbs. It takes more pedal power to run the incandescent light bulbs than it takes to run one of the bulbs that uses less energy. Hands-on demonstration and presentations available that last 30-60 minutes.

BLOWER-DOOR DEMONSTRATION An effective way to test a buildings energy performance is to use a blower door to measure how well the building retains warm or cool air. Workshops may be arranged to demonstrate an energy performance test.

NDSU STUDENT GROUPS efargo is has partnered with with various NDSU Student Organizations including USGBC-NDSU and the Society of Women Engineers who have prepared lessons and workshops to share with students in schools. Other student organizations such as Tau Beta Pi and NDSU USGBC will assist by volunteering time where needed in schools.



WWW.EFARGO.ORG

DR WASTE-A-WATT GETS STRONGER AS HE CONSUMES WASTED ENERGY!! PLEASE TURN OFF LIGHTS & CHARGERS WHEN NOT IN USE! JOIN THE K-12 ENERGY CHALLENGE IN FALL 2015.

CONTACT Contact us at info@efargo.org or visit www.efargo.org/k12challenge to learn more. You may also email Malini at malini.srivastava@ndsu.edu for more information.