



# ENERGY STAR® Energy Efficiency Student Toolkit

The simple  
choice for  
energy  
efficiency.



## Introduction to the ENERGY STAR Energy Efficiency Student Toolkit

K-12 schools in the United States spend more than \$8 billion every year on energy. In fact, the energy used to light classrooms and hallways, power computer labs, and heat and cool school buildings costs **more than textbooks and technology combined, and more than teachers' collective salaries.**

Yet as much as 30 percent of energy consumed in schools is wasted!

Schools across the country are turning to energy efficiency to decrease their costs and free up funds for other education-related expenses. Similar to devices like TVs or refrigerators, entire buildings can become ENERGY STAR certified too. More than 10,000 K-12 schools have earned EPA's ENERGY STAR certification signifying superior energy performance.

These schools consume about 35 percent less energy than similar schools across the country – which is good for school budgets and for the environment. More than 50,000 schools are using EPA's ENERGY STAR Portfolio Manager® online tool to benchmark their energy performance against average school energy performance, and track changes in performance over time. With your help, your school can make a big difference, too.

EPA provides no-cost tools and resources for students interested in reducing their schools' utility bills, protecting the environment, and leading the way as the nation's future energy leaders. By improving energy efficiency, your school can reduce greenhouse gas emissions and generate significant savings from lower energy bills. You can even encourage your district administration to use those savings to pay for building upgrades that enhance the health and quality of your learning environment.



Number of schools that  
have earned the  
ENERGY STAR:  
**10,000+\***

View the [latest ENERGY STAR school certification numbers.](#)

\*As of Fall 2017

### Energy Benchmarking Stats

**Energy benchmarking** is the process of reviewing building energy performance over time compared to a baseline period, and/or comparing building energy performance to that of similar buildings.

Number of schools benchmarking  
in Portfolio Manager:  
**Over 50,000**

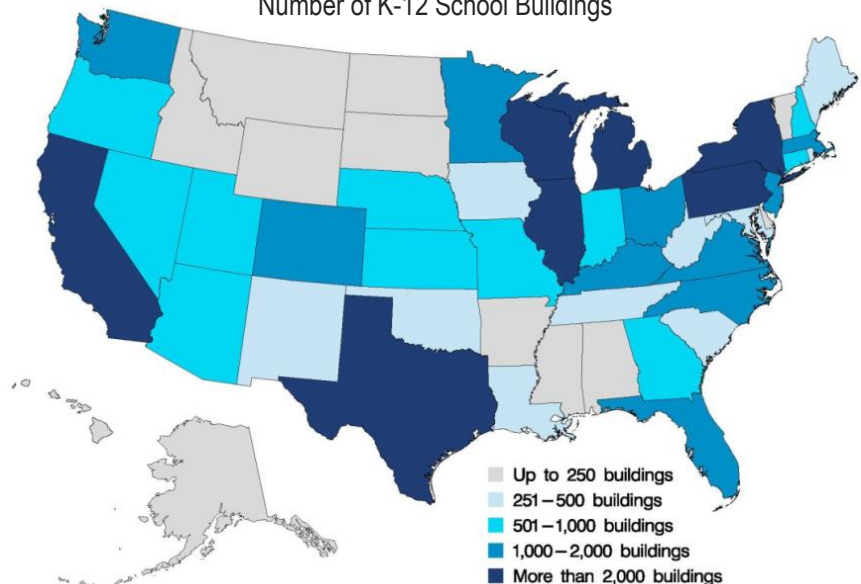
Total square footage  
benchmarking:  
**Over 5.4 billion ft<sup>2</sup>**

Average ENERGY STAR score:  
**64**

Stats are based on the most recent [Data Trends: Energy Use in K-12 Schools](#), published in January 2015. Check back for all the latest [Data Trends](#).

### Energy Benchmarking by State

Number of K-12 School Buildings



# ENERGY STAR® Energy Efficiency Student Toolkit

The ENERGY STAR Energy Efficiency Toolkit is designed to empower you with the tools and resources to jump-start or enhance your school's energy management program. Use this toolkit to learn how to:

- **Benchmark and understand your school's energy use.** Learn how to use EPA's ENERGY STAR measurement and tracking tool, Portfolio Manager, to compare your school to similar schools across the country and track your school's energy performance over time. Discover how energy consumption changes over time in response to changes in weather, occupancy, and usage, and learn how simple changes can significantly reduce your school's carbon footprint and its energy bill. In addition, you can use Portfolio Manager to manage the water use and efficiency of any building.
- **Conduct a school building Energy Efficiency Treasure Hunt.** Team up with your facility manager to walk through your school facilities and pinpoint opportunities for improving energy efficiency at your school. Most schools can improve their energy efficiency by as much as 10 percent with low- or no-cost changes in operations. Learn what to look for and how energy waste can be minimized or even eliminated to create a healthier environment. In addition, in the appendix A, there is a water efficiency treasure hunt that you can use to in your buildings.
- **Encourage your school community to adopt energy-efficient habits.** Take action to eliminate energy waste by launching a behavior change campaign that encourages students and teachers to adopt energy-efficient habits. Your campaign has the potential to transform the energy culture of your school community and make a big difference for the environment.
- **Measure cost reductions and finance energy-efficiency upgrades.** Knowing how energy efficiency impacts operating costs, and how to measure that impact, helps you demonstrate the benefits of energy efficiency to parents, staff, and administrators. Learn about payback periods and other key financial concepts, as well as tools your school can use to help pay for lighting retrofits and other energy-efficiency upgrades.
- **Spread the word.** Once you've learned the ropes, spread the word on energy efficiency to your school board and school district. You can even launch an energy-efficiency competition to get students throughout your school district excited about saving energy and money and protecting the environment through energy efficiency.

## Students Making a Difference

*Mercer County Schools, KY*

EPA has recognized Mercer County Schools as an ENERGY STAR Leader for **improving its energy efficiency by 20 percent** across its portfolio of buildings. Mercer uses ENERGY STAR tools and resources to set achievable goals for energy reduction and to build a culture of active participation and innovation throughout the district. Mercer created **student Energy Teams to focus on building assessment, raising awareness, and promoting energy conservation** strategies in every facility. The energy manager supports the Energy Teams as a mentor, providing teams with assistance on sustainable solutions for schools. Student team members conduct an audit of their schools, evaluating the habits of building occupants. Once baseline tracking is complete, the Energy Teams work to raise awareness of energy efficiency with **energy conservation projects, monthly patrols, in-depth lighting and plug-load studies, lessons to younger students about energy efficiency, and presentations** to faculty, administrators, and the school board.

Learn more about ENERGY STAR recognition opportunities at [www.energystar.gov](http://www.energystar.gov)

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Today's students are tomorrow's leaders—that means you! Before you know it, responsible stewardship of the environment will be entirely up to you and your peers. Get a head start by learning how you can make a difference by helping improve energy efficiency in your school.

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Use Portfolio Manager, EPA's ENERGY STAR measurement and tracking tool, to find out how your school's energy efficiency compares to similar schools across the nation. Enter energy use and space information for your school to discover how much energy your school uses and the amount of greenhouse gases your school emits. You can use Portfolio Manager to measure your progress in making your school more energy efficient!

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Work with your teacher or facility manager to present your findings to fellow students, school administrators, parents, and the community. Learn how to make a strong case for saving energy in your school by showcasing the financial, environmental, and health-related benefits of energy efficiency. Jump-start or enhance energy efficiency in your school and school district – plan and launch a district-wide energy-efficiency competition.

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Find out how you can help spread the word to your classmates, teachers, administrators, and community about energy efficiency. Get some ideas for how you can start pursuing energy efficiency for your school, and even earn recognition from the U.S. Environmental Protection Agency!

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Use this treasure hunt checklist to identify water inefficiencies in your buildings.

## Activity 1: Understanding Energy Efficiency

### Why energy efficiency and what is ENERGY STAR?

The buildings where we live, work, learn, and play have a huge impact on the total consumption of energy in the United States. Just like the automotive industry is headed toward better fuel efficiency and fewer greenhouse gas emissions, building owners and managers are finding ways to improve the energy efficiency of buildings in our communities. Read the following explanation of why building energy use matters: [www.energystar.gov/about](http://www.energystar.gov/about)

### Do your own research

Use a search engine like Google or Yahoo! to research the term, “energy efficiency.” Skim the results for some trusted sources, like websites ending in “.gov” or “.edu.” Once you’ve done some reading up on the topic, team up with a classmate who did their own research, and explain to each other what you learned.

### Write down your thoughts!

1. In your own words, what is energy efficiency? Why does it matter – and for whom?

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2. Are there benefits to energy efficiency other than protecting the environment? If so, what are they?

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3. How can you identify a building that is proven to operate efficiently?

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## Activity 2: Getting Started with Benchmarking Your School in Portfolio Manager

### Step 1: Set up your Portfolio Manager account

To begin, you'll either need to use an existing Portfolio Manager account for your school, or create a new account. Ask your teacher about which approach you'll take for this activity.

- Go to [www.energystar.gov/benchmark](http://www.energystar.gov/benchmark).
  - **For users with an account:** Enter your User Name/ Password in the Login box, and click **Log in**.
  - **For new users:** Click the green **Sign Up** button, enter the required information in the boxes, and click **Create My Account** to complete your set up.

### Step 2: Add a property

Follow these instructions to create a property, specify its primary use, and enter basics like location and construction date.

**Add a Property**

- From the “My Portfolio” page, click **Add a Property** to add a building to your portfolio.
- Select K-12 School as the primary function of the property. Indicate the number of buildings at your school. Make sure that “Existing” is selected, and click **Get Started!**
- Enter the facility information and click **Continue**.
- **Tip:** Certain concepts and key terms show up in blue text, which you can hover over for further explanation.

### Step 3: Enter property use details

In this step, you'll tell Portfolio Manager more about how the facilities at your school are normally used.

- Complete the Property Use Details table. For now, it is only required that you complete the fields marked with a red asterisk (\*) as required, but it's a good idea to provide as much detail as possible.
- Once complete, click **Add Property** to continue.

### Step 4: Add an energy meter

An **energy meter** is a piece of equipment that tracks the amount of electricity a building consumes. Buildings can also have submeters, which track energy consumption in spaces within the building.

In this step, you'll tell Portfolio Manager how much and what kind of energy your school consumes. To start, you'll create one energy meter for each fuel type your school uses and enter the data reported in your school's utility bills. This lets Portfolio Manager give you a clear picture of your school's energy performance. Work with your school facility manager to find your school's records for the past 12 months and to select the correct options requested by Portfolio Manager.

**Water Meters:** You can also use Portfolio Manager to benchmark water consumption. After adding an energy meter and meter entries, find the “Water Meters” section on the “Facility Summary” page and follow the same process below.

### K-12 Data Collection Worksheet

Collect this information for use when benchmarking your school in Portfolio Manager.

| Space Attribute                               | Value             |
|---|-------------------|
| Gross Floor Area                              | _____ square feet |
| Gymnasium Floor Area                          | _____ square feet |
| High school?                                  | Yes / No          |
| # of Workers on Main Shift                    | _____ workers     |
| Student Seating Capacity                      | _____ students    |
| Months in Use                                 | _____ months      |
| Weekend Operation                             | Yes / No          |
| Number of PCs                                 | _____ PCs         |
| Cooking Facilities present?                   | Yes / No          |
| Number of walk-in refrigeration/freezer units | _____ units       |
| Percent that can be heated                    | _____ %           |
| Percent that can be cooled                    | _____ %           |

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## Step 4, Part A: Create meters

- Find and click the grey “Meters” tab and then click **Add Another Meter**.
- Indicate how your school uses energy and water. Click **Get Started!**
- Click each meter row to enter the name, units, and first bill date for that meter. Click **Continue**.
- The “Meter Name” field can contain letters, numbers, and can be your utility service agreement number (e.g., Electric, Natural Gas, 10002748, etc.).

## Step 4, Part B: Enter energy data

- All of your entered meters should be displayed. Click the ► or ▼ icons to expand and hide each meter.
- Enter your actual energy consumption data using one of the following methods:
- Click “Click to add an entry” and make a separate entry for each month of utility data.

OR

- Click “spreadsheet template” to download an Excel file you can use to make all entries at once. Complete the template, click “Choose File” and navigate to the file on your hard disk, and click **Upload**.
- Once you have entered meter data for all meters, click **Finish Meter Set up**.
- Check the box next to every meter, and select the appropriate statement to indicate whether the meters cover the total energy consumption for the property, or whether part of the property is not supplied by these meters.
- **Exception:** If you’ve entered submeters, this step might be a little more complicated. [Learn more about configuring meters for performance metrics](#).
- Click Apply Selections.
- Back at the **Facility Summary** page, you should see a summary graph of your school’s energy consumption.

## Now you can track your school’s energy use with Portfolio Manager

Take a step back and look at your “Facility Summary” page. You’ll notice in the “Facility Performance” section that Portfolio Manager has calculated your school’s current energy use intensity (EUI), or energy use per square foot.

It also calculates your school’s **1 – 100 ENERGY STAR score**, which signifies how your school compares to other similar schools nationwide. An ENERGY STAR score of 50 indicates average energy performance, while a score of 75 indicates performance superior to 75 percent of similar schools.

Now, click on the **Select View** drop-down menu and choose “Performance: GHG Emissions.” Portfolio Manager also gives you other types of information – in fact, there are **over 80 different metrics** Portfolio Manager can track for you! Follow these steps each month to track your school’s energy performance over time:

- Log in to Portfolio Manager and click on your building’s name.
- From the “Facility Summary” page of your building, scroll down to the “Energy Meters” section and click on the first meter.
- Click on “Add Meter Entries” and repeat **Step 4: Part B** to enter your energy data for that month.
- Repeat for each meter in the “Energy Meters” section.

### Need Help?

Find the “Help” link at the top-right of any page in Portfolio Manager.

[Log In](#) | [Contact Us](#) | [Help](#) | [Sign Out](#)

## Activity 3: Identifying Energy-Efficiency Opportunities at Your School

Now that you've benchmarked your school's energy consumption, it's time to take a closer look at how your school uses energy on a daily basis.

### Picture this!

Does anything about this graph surprise you?

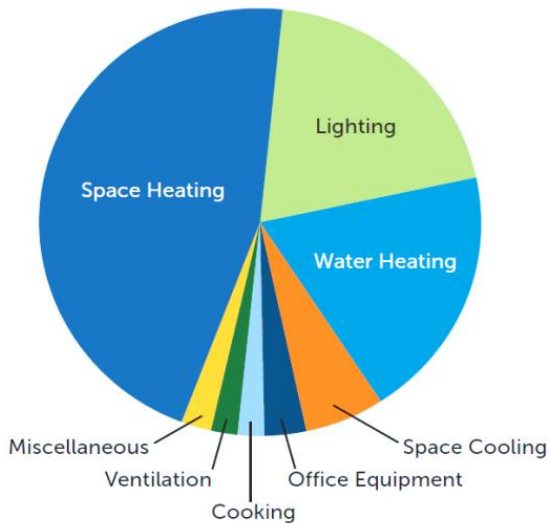


Figure 2: End uses of total energy (electricity, natural gas, etc.) in K-12 Schools. Courtesy: U.S. Department of Energy, *Energy Solutions for School Buildings*, 2006. [https://www.epa.gov/sites/production/files/2015-08/documents/k-12\\_guide.pdf](https://www.epa.gov/sites/production/files/2015-08/documents/k-12_guide.pdf)

While energy varies from school to school, the chart above illustrates the end uses of electricity and natural gas in the average school.

### Energy Management

Luckily, opportunities for improving energy efficiency are everywhere! But smart energy management for an entire building doesn't just happen—it requires a strategic approach.

Improving energy performance relies on having a comprehensive energy management program in place. Specific goals, a plan for improvement, regular evaluation of progress, and a dedicated staff member or team all contribute to a successful energy management program.

Energy management yields the best results when everyone is on board and participates in making the program a success. Your school may already have an energy management program in place. If not, EPA's ENERGY STAR program provides guidance on crafting a successful energy management program based on the **Guidelines for Energy Management** (Figure 1).

Try talking through the figure representing the Guidelines for Energy Management. Do they make sense and

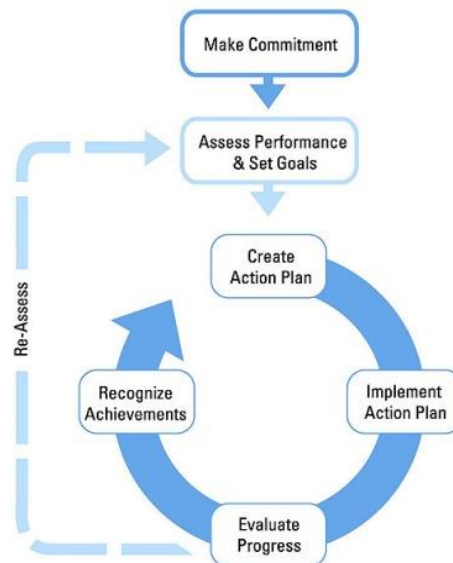


Figure 1: EPA's ENERGY STAR Guidelines for Energy Management. [www.energystar.gov/Guidelines](http://www.energystar.gov/Guidelines)

illustrate how a building can improve in efficiency over time? Is there anything you would change?

Check out the Guidelines online to see if you interpreted them correctly: [www.energystar.gov/guidelines](http://www.energystar.gov/guidelines)

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## Activity 4: Conducting an Energy Efficiency Treasure Hunt at Your School

For more information, view the [ENERGY STAR Building Upgrade Manual, Chapter 10: K-12 Schools](#).

| Energy Management Program   |   |   |                       |                              |
|---|---|---|-----------------------|------------------------------|
| Feature   | Y | N | Room for improvement? | Location (ex. Classroom 101) |
| ★ Energy management program in place  |   |   |                       |                              |
| ★ School has an energy efficiency goal or target  |   |   |                       |                              |
| ★ School is consistently benchmarked in EPA's Portfolio Manager                             |   |   |                       |                              |
| ★ School has a designated staff person responsible for energy management                    |   |   |                       |                              |
| ★ Communication plan in place to promote energy management program                          |   |   |                       |                              |
| ★ Summer shutdown program in place (if school unoccupied during summer)                     |   |   |                       |                              |
| School has an active energy or energy efficiency club or committee                          |   |   |                       |                              |
| Energy efficiency included in science curriculum  |   |   |                       |                              |
| Lighting  |   |   |                       |                              |
| Starting Question(s)  | Y | N | Describe              |                              |
| ★ <i>Has your school implemented a lighting upgrade in the past 5 years?</i>                |   |   |                       |                              |
| Feature   | Y | N | Room for improvement? | Location (ex. Classroom 101) |
| ENERGY STAR qualified lighting in place   |   |   |                       |                              |
| Lights are off in unoccupied rooms, gymnasiums, and at athletic fields                      |   |   |                       |                              |
| Natural light used where possible instead of artificial lighting                            |   |   |                       |                              |
| Window shades in place to regulate light and block excess heat                              |   |   |                       |                              |
| Appropriate lighting levels are used*   |   |   |                       |                              |
| ★ Efficient light fixtures in place (T5, T8, LED, CFLs)*                                    |   |   |                       |                              |
| ★ Electronic ballasts in place (not magnetic)   |   |   |                       |                              |
| Occupancy sensors (if present) set to short turn-off time                                   |   |   |                       |                              |
| LED "Exit" signs installed  |   |   |                       |                              |
| Light fixtures are clean (to allow light through)   |   |   |                       |                              |
| Computers, Copiers, and Printers  |   |   |                       |                              |
| Feature   | Y | N | Room for improvement? | Location (ex. Classroom 101) |
| ENERGY STAR qualified computers, monitors, printers, and copiers in use                     |   |   |                       |                              |
| Computers set to hibernate when not in use, and turned off overnight                        |   |   |                       |                              |
| Computers turned off overnight (not just in sleep or screen saver mode)                     |   |   |                       |                              |
| Monitors, printers, and copiers turned off when not in use                                  |   |   |                       |                              |
| Power save settings activated on computers  |   |   |                       |                              |
| Equipment plugged into power strips for easy disconnect from power source                   |   |   |                       |                              |
| Other Appliances  |   |   |                       |                              |
| Feature   | Y | N | Room for improvement? | Location (ex. Classroom 101) |
| ENERGY STAR qualified appliances, including kitchen equipment, in use                       |   |   |                       |                              |
| Refrigerators seal tightly when closed  |   |   |                       |                              |
| Freezers seal tightly when closed   |   |   |                       |                              |
| Unused appliances are unplugged or on a power strip that is shut off                        |   |   |                       |                              |
| Classrooms free of duplicate appliances in classrooms (e.g., mini-fridges or space heaters) |   |   |                       |                              |
| Rechargeable devices unplugged once charged   |   |   |                       |                              |
| Vending machines turned off or put into sleep mode at end of day                            |   |   |                       |                              |



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## Heating, Ventilation, and Air Conditioning (HVAC)

| Starting Question(s)  | Answers |   |                       |                              |
|---|---------|---|-----------------------|------------------------------|
| ★ <i>What type of heating and cooling does your school use?</i>   |         |   |                       |                              |
| ★ <i>How old is your school's HVAC equipment?</i>   |         |   |                       |                              |
| ★ <i>Has it ever been retrofitted?</i>  |         |   |                       |                              |
| ★ <i>How regularly is maintenance conducted on the equipment?</i>   |         |   |                       |                              |
| Feature   | Y       | N | Room for improvement? | Location (ex. Classroom 101) |
| Ventilation units are not blocked by books/papers/other materials   |         |   |                       |                              |
| Windows and doors are closed when heating/cooling equipment is on   |         |   |                       |                              |
| Windows and doors have adequate weather stripping to avoid air leaks  |         |   |                       |                              |
| Windows are operable  |         |   |                       |                              |
| ★ Thermostat is set to an appropriate temperature based on season, local weather conditions and humidity, and current occupancy |         |   |                       |                              |
| ★ Temperature setback policy in place   |         |   |                       |                              |
| ★ Supply pipes* are insulated   |         |   |                       |                              |
| Classrooms are free of space heaters  |         |   |                       |                              |
| Electronics are located away from thermostats   |         |   |                       |                              |
| ★ Building Automation System (BAS) in place   |         |   |                       |                              |
| ★ BAS trend logs are available  |         |   |                       |                              |

Activities that are marked with ★ may require support from your district's Energy Manager.

### Assessing your results

Visit [www.energystar.gov/products](http://www.energystar.gov/products) to learn more about the benefits of ENERGY STAR qualified products and appliances.

### Discussion questions

Were the problems you identified mostly due to equipment (inefficient lighting), or behaviors (lights on in empty classrooms)? Review your checklist, then record your answer:

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Record any other trends you noticed about energy-efficiency problems in your school. For example, were they mostly lighting related? Did one area of your school have more problems than others?

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# ENERGY STAR® Energy Efficiency Student Toolkit

## Activity 5: Start a Behavior Change Campaign to Improve Energy Efficiency at Your School

On the road to energy efficiency, the first step is often behavior change. Encouraging building occupants — like students, teachers, and staff members — to adopt energy-efficient habits can amount to significant savings. Turning off lights in unoccupied rooms, clearing vents of papers and debris, and swapping space heaters for sweaters are examples of “low-hanging fruit” that take a little effort, but add up to big savings.

As students, you can have a big impact on the behaviors of your peers — use this activity to get started!

### Review your energy efficiency treasure hunt results

What problems or “bad habits” did you notice based on your walkthrough audit? What would a better habit look like? Use the table below to record each bad habit you frequently noticed, and a better habit to replace it.

| Bad Habit  | Better Habit   |
|--|--|
| <i>Example:</i> Leaving lights on in empty classrooms, gymnasiums, or outdoor areas during daylight hours. | Turn off the lights when leaving a room, or turn off the lights when passing an empty room with the lights on. |
|  |  |
|  |  |
|  |  |

Based on your findings, decide which habits you want to try and change. Next you’ll formulate a strategy for encouraging better habits.

### Get your message out

There are many ways to spread the word about energy efficiency and encourage better habits.

**Display reminders:** One simple way to encourage better habits is to post prominent reminders in common areas like hallways and cafeterias — you can either design your own posters and signs, or download and customize existing resources from the [ENERGY STAR Communications Toolkit](#).



**Share tips & tricks:** If your school has a daily or weekly newsletter, or a daily announcement, add a regularly updated tip or trick to improving energy efficiency, like opening the blinds on cool sunny days to maximize daylight, or shutting them on warmer days to prevent excess heat and minimize the need for air conditioning.

**Share the message in-person:** If your school convenes regularly for all-school presentations, ask the organizer if you can deliver a quick message about energy efficiency and its importance for the environment and for your school. Explain how each person can make a difference, and share one or two tips for improving energy efficiency.

### Reward better habits

Find little ways to acknowledge and reward occupants who make the right choice. For example, leave a special sign on classroom doors where the lights are off during lunch, recess, or after school. Give each class an energy-efficiency checklist with key improvements listed (e.g., activate computer power settings, remove debris from vents, etc.) and create a “Hall of Fame” type display in a common area, showing which classrooms have completed the checklist. There are many ways to reward good behavior, and doing so will help reinforce better habits and make them a permanent part of your school culture!

Learn more about influencing your school community in **Activity 8: Spreading the Word and Bringing Change**.

## Activity 6: Calculating Savings and Financing Energy Efficiency

### Set an energy performance target in Portfolio Manager

Following the directions below, use Portfolio Manager to estimate the amount of money your school could save by improving its energy performance.

**Step 1.** Log in to your Portfolio Manager account at [www.energystar.gov/benchmark](http://www.energystar.gov/benchmark).

In the “My Properties” box, locate your facility and in the drop-down menu to the right of your building name, select “Set Goals.” If you’re already viewing your facility, switch from the “Summary” tab to the “Goals” tab.

**Step 2.** On the “Set Performance Baseline & Target” page, in the “Current Baselines & Targets” box, click on the blue “Set Baseline or Target” button.

| Current Baselines & Targets  |                       |                      |
|--|-----------------------|----------------------|
| <b>Selected Baselines:</b>   | Energy: Not Available | Water: Not Available |
| <b>Earliest Baselines:</b><br><small>(calculated by Portfolio Manager)</small> | Energy: Not Available | Water: Not Available |
| <b>Target:</b>   | Not Set               |                      |
| <b>Design Target:</b>  | Not Set               |                      |

**Step 2**

[Set Baselines or Target](#)

**Step 3.** If you have not added your meter information, you must add this data before setting a target. To set a baseline, in the “Baselines” box, associate your meter by clicking the “associate your meter” hyperlink. Select the meters you would like to use to set your baseline.

**Property Totals**

**Energy Meters**

Check the boxes for the meters that should be included in the energy metrics:

| <input type="checkbox"/> | Meter Name |
|--------------------------|------------|
| <input type="checkbox"/> | E Grid 1   |

**Step 3**

Total of 0 energy meter(s). Tell us what these meter(s) measure:

These meter(s) account for the total energy consumption for this property.

These meter(s) do not account for the total energy consumption for this property.

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**Step 4.** Once the correct meters have been associated, select a baseline date from within the “Baselines” box.

**Baselines**

Energy Baseline:

- Select a baseline: 12/31/2012
- Let Portfolio Manager automatically set my baselines

Water Baseline:

You must have at least one water meter to select water baselines. After you [add a meter](#), don't forget to [associate your meter](#) as well.

**Step 5.** In the “Target” box, in the dropdown menu to the right of “Target Metric”, select your target ENERGY STAR Score, target percentage better than the baseline, or target percentage better than the median. Click the blue “Save & Calculate Other Metrics” button at the bottom of the box.

**Target**

Target Metric:

- No Target
- Target ENERGY STAR Score
- Target % Better than Baseline
- Target % Better than Median

Target Value:

25 % (whole numbers)

[Save & Calculate Other Metrics](#)

**Step 6.** The table at the bottom of the page will now show your targets and potential savings.

| Metric                                    | Baseline (Dec 2012) | Current (Dec 2012) | Target*     | Median Property* |
|---|---------------------|--------------------|-------------|------------------|
| ENERGY STAR score (1-100)                 | 75                  | 75                 | 92          | 50               |
| Source EUI (kBtu/ft <sup>2</sup> )        | 83.6                | 83.6               | 62.7        | 107.2            |
| Site EUI (kBtu/ft <sup>2</sup> )          | 26.6                | 26.6               | 20.0        | 34.1             |
| Source Energy Use (kBtu)                  | 8,356,670.8         | 8,356,670.8        | 6,267,503.1 | 10,720,000.0     |
| Site Energy Use (kBtu)                    | 2,661,360.1         | 2,661,360.1        | 1,996,020.1 | 3,410,000.0      |
| Energy Cost (\$)                          | 78,000.00           | 78,000.00          | 58,500.00   | 99,941.40        |
| Total GHG Emissions (MtCO <sub>2</sub> e) | 368.6               | 368.6              | 276.4       | 472.3            |

## Review the results

In this sample, a 25% improvement in energy efficiency from the baseline could save nearly **\$20,000** in utility costs! How much could your school save?

## Calculating simple payback periods: Does your energy-efficiency project pay for itself?

Energy-efficiency upgrades require some upfront investment, but they reduce energy use and save money on utility bills. How quickly can an energy-efficiency upgrade pay for itself? Use the table on the following page to find out! Complete the calculations and record the resulting values.

# ENERGY STAR® Energy Efficiency Student Toolkit

| Term   | Calculation/Estimation  | #   | Value                                     |                |   |            |             |          |              |    |  |    |    |        |                                  |
|--|---|---|---|----------------|---|------------|-------------|----------|--------------|----|--|----|----|--------|----------------------------------|
| <b>Total Project Cost (\$)</b><br>The total cost of implementing the project.  | The approximate cost of a lighting upgrade is <b>XX</b> .   | A   | \$ <b>XX</b>                              |                |   |            |             |          |              |    |  |    |    |        |                                  |
| <b>Incentives (\$)</b><br>Rebates, grants, discounts, coupons, incentives, tax credits or anything helping to cover the cost of the project.     | Sum up all incentives available in your area for school lighting upgrades, and record the total dollar amount.<br><br><i>Tip: Check for rebates available in your area: <a href="http://www.energystar.gov/rebatefinder">www.energystar.gov/rebatefinder</a></i>  | B   | \$ _____                                  |                |   |            |             |          |              |    |  |    |    |        |                                  |
| <b>Net Project Cost (\$)</b><br>The amount that must still be paid after incentives (i.e. Total Project Cost minus Incentives).                  | <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Total Project Cost</td> <td style="width: 30%; text-align: center;">Incentives</td> <td style="width: 40%;"></td> <td style="width: 10%; text-align: right;">Net Project Cost</td> </tr> <tr> <td style="text-align: center;">\$ _____</td> <td style="text-align: center;">-</td> <td style="text-align: center;">\$ _____</td> <td style="text-align: center;">= \$ _____</td> </tr> <tr> <td style="text-align: center;">A</td> <td></td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> </tr> </table>  | Total Project Cost  | Incentives                                |                | Net Project Cost                                    | \$ _____   | -           | \$ _____ | = \$ _____   | A  |  | B  | C  | C      | \$ _____                         |
| Total Project Cost   | Incentives  |   | Net Project Cost                          |                |   |            |             |          |              |    |  |    |    |        |                                  |
| \$ _____   | -   | \$ _____  | = \$ _____                                |                |   |            |             |          |              |    |  |    |    |        |                                  |
| A  |   | B   | C   |                |   |            |             |          |              |    |  |    |    |        |                                  |
| <b>Current Annual Cost of Electricity (\$/yr)</b><br>The amount currently spent on electricity in one year.                                      | Ask your facilities manager for an estimate of how much money your school currently spends on electricity total, and record the amount (d1).  | d<br>1  | Total electricity cost:<br><br>\$ ____/yr |                |   |            |             |          |              |    |  |    |    |        |                                  |
| <b>Current Annual Cost of Lighting (\$/yr)</b><br>The approximate amount currently spent on lighting in one year.                                | In U.S. schools, roughly 26 percent of electricity use is spent on lighting. Calculate the approximate total cost of lighting:<br><br><table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Total annual electricity cost</td> <td style="width: 30%; text-align: center;">%Lighting</td> <td style="width: 40%;"></td> <td style="width: 10%; text-align: right;">Lighting cost</td> </tr> <tr> <td style="text-align: center;">\$ ____/yr</td> <td style="text-align: center;">x</td> <td style="text-align: center;">26%</td> <td style="text-align: center;">= \$ ____/yr</td> </tr> <tr> <td style="text-align: center;">d1</td> <td></td> <td></td> <td style="text-align: center;">d2</td> </tr> </table> | Total annual electricity cost   | %Lighting                                 |                | Lighting cost                                       | \$ ____/yr | x           | 26%      | = \$ ____/yr | d1 |  |    | d2 | d<br>2 | Lighting cost:<br><br>\$ ____/yr |
| Total annual electricity cost  | %Lighting   |   | Lighting cost                             |                |   |            |             |          |              |    |  |    |    |        |                                  |
| \$ ____/yr   | x   | 26%   | = \$ ____/yr                              |                |   |            |             |          |              |    |  |    |    |        |                                  |
| d1   |   |   | d2  |                |   |            |             |          |              |    |  |    |    |        |                                  |
| <b>Percent Reduction (%)</b><br>The estimated amount by which an energy efficiency upgrade will reduce electricity spent on lighting.            | A lighting upgrade can reduce lighting energy use by about 30–50%. For the purposes of this calculation, let's assume a 40% reduction in the electricity spent on lighting.<br><br><i>No calculation needed.</i><br>= Simple Payback (E)<br>\$ _____ = _____ years  | d<br>3  | 40%                                       |                |   |            |             |          |              |    |  |    |    |        |                                  |
| <b>Annual savings potential (\$/yr)</b><br>Amount of money the project is expected to save each year through reduced energy use and maintenance. | <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Current Lighting Cost</td> <td style="width: 30%; text-align: center;">%Reduction</td> <td style="width: 40%;"></td> <td style="width: 10%; text-align: right;">Annual Savings</td> </tr> <tr> <td style="text-align: center;">\$ ____/yr</td> <td style="text-align: center;">x</td> <td style="text-align: center;">40%</td> <td style="text-align: center;">= \$ ____/yr</td> </tr> <tr> <td style="text-align: center;">d2</td> <td></td> <td style="text-align: center;">d3</td> <td style="text-align: center;">D</td> </tr> </table>  | Current Lighting Cost   | %Reduction                                |                | Annual Savings                                      | \$ ____/yr | x           | 40%      | = \$ ____/yr | d2 |  | d3 | D  | D      | \$ ____/yr                       |
| Current Lighting Cost  | %Reduction  |   | Annual Savings                            |                |   |            |             |          |              |    |  |    |    |        |                                  |
| \$ ____/yr   | x   | 40%   | = \$ ____/yr                              |                |   |            |             |          |              |    |  |    |    |        |                                  |
| d2   |   | d3  | D   |                |   |            |             |          |              |    |  |    |    |        |                                  |
| <b>Simple payback (yrs)</b><br>The number of years it will take for an investment to pay for itself.   | <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%; text-align: center;"> <math display="block">\frac{\text{Net Project Cost (C)}}{\text{Annual Savings Potential (D)}}</math> </td> <td style="width: 5%; text-align: center;">=</td> <td style="width: 35%; text-align: center;">Simple Payback</td> </tr> <tr> <td style="text-align: center;"> <math display="block">\frac{\\$ \text{ _____ (C)}}{\\$ \text{ _____ (D)}}</math> </td> <td></td> <td style="text-align: center;">_____ years</td> </tr> </table>   | $\frac{\text{Net Project Cost (C)}}{\text{Annual Savings Potential (D)}}$ | =   | Simple Payback | $\frac{\$ \text{ _____ (C)}}{\$ \text{ _____ (D)}}$ |            | _____ years | E        | _____ yrs    |    |  |    |    |        |                                  |
| $\frac{\text{Net Project Cost (C)}}{\text{Annual Savings Potential (D)}}$  | =   | Simple Payback  |   |                |   |            |             |          |              |    |  |    |    |        |                                  |
| $\frac{\$ \text{ _____ (C)}}{\$ \text{ _____ (D)}}$  |   | _____ years   |   |                |   |            |             |          |              |    |  |    |    |        |                                  |

\* This exercise is for educational purposes; it is not intended for investment decisions.

**Discussion question:** How long would the upgrade take to pay for itself? Is it worth the investment?

# ENERGY STAR® Energy Efficiency Student Toolkit

## Activity 7: Presenting Results and Spreading the Word about Energy Efficiency

### Step 1. Summarize what you've learned

From the Facility Summary page in Portfolio Manager, use the “Select View” drop-down box to locate and record the following metrics:

| Metric   | Value | Units               | View                       | Explanation   |
|--|-------|---------------------|----------------------------|---|
| Current Score (1–100)                              |       | N/A                 | Summary: Energy Use        | This number is 1 – 100 <b>ENERGY STAR score</b> , which reflects how your school compares to similar schools nationwide. A school with a score of 75 or above is eligible to earn the ENERGY STAR for superior energy performance!  |
| Current Site Energy Intensity                      |       | kBtu/sf             | Summary: Energy Use        | <b>Energy intensity</b> is energy use per square foot. <b>Site</b> energy is the amount of heat and electricity consumed by a building as reflected in utility bills.   |
| Current Weather-Normalized Source Energy Intensity |       | kBtu/sf             | Summary: Energy Use        | <b>Source</b> energy is the total amount of raw fuel used to operate a building. This calculation includes the energy that is lost during production and transmission from the power plant to your school. <b>Weather normalization</b> adjusts actual energy data to accurately represent typical annual energy use given your location and climate. |
| Current Total GHG Emissions                        |       | MtCO <sub>2</sub> e | Performance: GHG Emissions | <b>Greenhouse Gas (GHG) Emissions</b> are emitted during energy production and contribute to climate change. <b>MtCO<sub>2</sub>e</b> refers to metric tons of <a href="#">carbon dioxide equivalent</a> .  |

Is your school already eligible to earn the ENERGY STAR? Do you need to improve energy efficiency at your school before you can earn certification? You can use this information to frame your argument.

| ENERGY STAR 1 – 100 score | Eligible to Earn the ENERGY STAR? | Next Steps  |
|---------------------------|-----------------------------------|---|
| 75 or higher              | Yes!                              | A school with an ENERGY STAR score of 75 or above is eligible to earn the ENERGY STAR! Visit <a href="http://www.energystar.gov/eslabel">www.energystar.gov/eslabel</a> to learn how to apply for certification.  |
| 50–74                     | Not yet                           | You have some work to do, but the ENERGY STAR is within reach if you can improve the energy efficiency of your school. This portion of the <b>ENERGY STAR Student Toolkit</b> is designed to help you make the case for superior energy management get everyone at your school involved in energy efficiency.                                   |
| 1–49                      | Not yet                           | The good news is that the potential for energy savings at your school is huge. Some schools have improved their energy efficiency by as much as 40, 50, and even 60 percent. Your school may benefit from a more thorough energy audit conducted by a professional, in order to identify the precise causes of inefficiency in your facilities. |

# ENERGY STAR® Energy Efficiency Student Toolkit

**Your energy efficiency treasure hunt results:** Revisit the results of your walkthrough audit and summarize your findings using the table below. Try to simplify and combine your checklist into a few simple items.

| Current Energy Efficiency Measures   |
|--|
| <b>Example:</b> All computers are ENERGY STAR qualified and power saving settings are activated. |
|  |
|  |
|  |
|  |
|  |

| Opportunities for Improvement                            |
|--|
| <b>Example:</b> Turn off lights and computers overnight. |
|  |
|  |
|  |
|  |
|  |

**Your school's potential savings:** Refer back to the savings figure you calculated by entering your utility and cost data in Portfolio Manager and setting an energy performance target. Complete the chart below to summarize the savings potential associated with an improvement in energy efficiency.

| Baseline ENERGY STAR Score | Target Score | Energy Reduction (%) | Potential Savings (\$) |
|----------------------------|--------------|----------------------|------------------------|
|                            |              |                      |                        |
|                            |              |                      |                        |
|                            |              |                      |                        |

**The case for investing in energy efficiency:** Use the results of your Simple Payback Period calculations to complete the following table (or tables if you are proposing two projects) to capture the key figures for demonstrating the financial benefit of energy efficiency.

| Project 1:<br>(example: replace T-12 lighting fixtures with T-5s) |               |
|---|---------------|
| Description   | Dollars/Years |
| Total Project Cost  | \$            |
| Incentives  | \$            |
| Net Project Cost  | \$            |
| Potential Annual Savings  | \$            |
| Simple Payback Period   | years         |

| Project 2:               |         |
|--------------------------|---------|
| Description              | Dollars |
| Total Project Cost       | \$      |
| Incentives               | \$      |
| Net Project Cost         | \$      |
| Potential Annual Savings | \$      |
| Simple Payback Period    | years   |

# ENERGY STAR® Energy Efficiency Student Toolkit

## Step 2. Share your findings

Once you've compiled the information you'd like to present, distribute your findings to your classmates and teachers, as well as to school staff members and administrators. Consider one or more of the following options for getting the word out about what you've discovered:

**Deliver a presentation.** Present your findings at a schoolwide event to start the conversation about energy efficiency. Work with your school's administrative office to determine appropriate ways to advertise your event. Ask your school's facility manager to join you to help answer questions from your classmates and teachers. See the appendix for a presentation template.

**Distribute a factsheet.** Create a factsheet to circulate throughout your school that highlights the results of your work. To avoid unnecessary paper waste, send your factsheet to your school's administrative office to distribute via email. If you print hard copies, keep everything on a single sheet and only print a limited number of copies.

**Make a morning announcement:** Get the attention of your classmates and teachers by making a brief morning announcement about your findings. Consider making monthly announcements to share the latest energy consumption data and steps your school is taking to improve energy efficiency.

**Display posters on campus:** Design, print, and display posters highlighting your results and the importance of energy efficiency. Print resources are provided at [www.energystar.gov](http://www.energystar.gov) (see Communicate and Educate).

**Educate younger classmates:** If your school includes K-8 students, visit [www.energystar.gov/kids](http://www.energystar.gov/kids) to access no-cost, kid-friendly activities to help your younger classmates understand and appreciate energy efficiency, too!

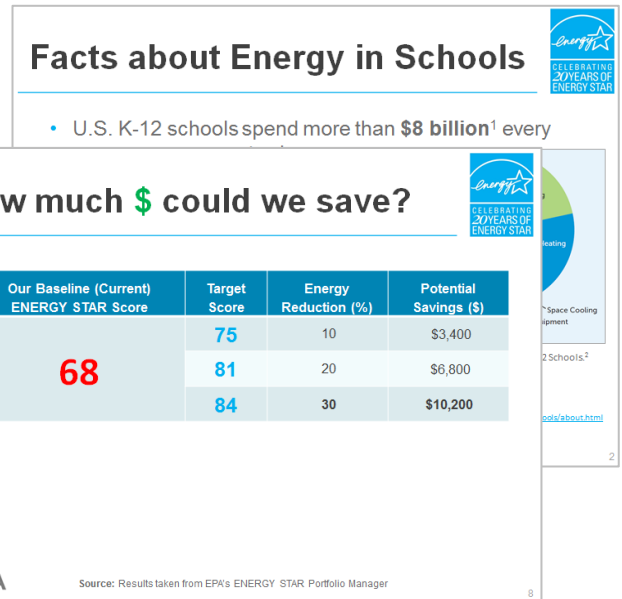
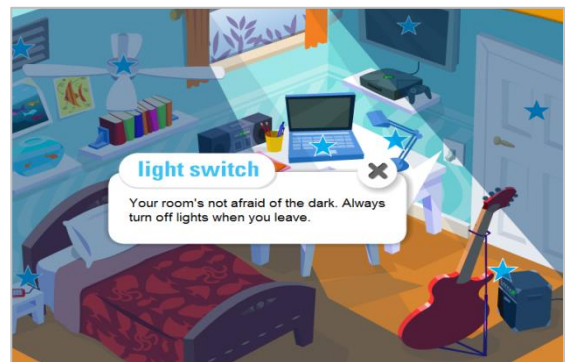


Figure 3: Use the PowerPoint presentation template included with this toolkit to deliver your findings to students, teachers, and even school administrators.

Figure 4: Check out the ENERGY STAR Kids website. If your school includes younger students in grades K-8, plan a presentation to teach them about the basics of climate change and why energy matters.





## Activity 8: Spreading the Word and Bringing Change

### Jumpstart or improve energy efficiency at your school

Once you've learned the ropes, spread the word about energy efficiency to your school board and school district. Host an ENERGY STAR Energy Vampire Event, or even launch an ENERGY STAR energy efficiency competition to get students throughout your school district excited about saving energy and money and protecting the environment through energy efficiency.

#### Organize an ENERGY STAR Energy Vampire Event

Standby power, or "Vampire Power," is the energy used by some products when they are turned off but remain plugged in to a power outlet. For example, a cell phone charger will continue to use a small amount of electricity even when it is not actively charging a cell phone.

By hosting an Energy Vampire Event at your school (perfect for Halloween!) you can teach fellow students about what vampire energy is, how to minimize vampire energy, and how using less energy can protect the environment.



#### Host an energy-efficiency competition

Work with teachers, staff members, and your school principal to initiate an energy efficiency competition in your school or school district. Pit classrooms against each other, or even schools in your district! Holding an energy-efficiency competition is a great way to get everyone excited about saving energy. Follow the seven steps laid out in the [ENERGY STAR Guide to Energy Efficiency Competitions](#) to plan, launch, and run your energy efficiency competition.



U.S. Environmental Protection Agency  
**ENERGY STAR® Guide to Energy Efficiency  
Competitions for Buildings & Plants**



Figure 5: EPA's ENERGY STAR Competition Guide provides a step-by-step guide to planning and launching an energy efficiency competition.

# ENERGY STAR® Energy Efficiency Student Toolkit

## Aim for recognition

Team up to share your findings with school administrators and make the case for becoming an ENERGY STAR partner, pursuing ENERGY STAR certification, or earning top honors as an ENERGY STAR Partner of the Year.

## Become an ENERGY STAR Partner

Join ENERGY STAR to demonstrate your schools' commitment to improving energy efficiency. ENERGY STAR Partners gain access to industry-leading tools, resources, and training and networking opportunities to support smart energy management. Learn more at: [www.energystar.gov/joinbuildings](http://www.energystar.gov/joinbuildings)



## ENERGY STAR certification

To date, more than 10,000 schools have earned the ENERGY STAR, the nationally recognized symbol of superior energy management. If you have an ENERGY STAR 1 – 100 score of 75 or above, you can start the application process today! Learn more at: [www.energystar.gov/eslabel](http://www.energystar.gov/eslabel)

If your score is below 75, set certification as a goal for your school and use the tools you've learned in this toolkit to improve energy efficiency and get the score you need to certify. Check out the many other resources available at [www.energystar.gov/buildings](http://www.energystar.gov/buildings) to help you out.

## ENERGY STAR Partner of the Year

Earning an ENERGY STAR Partner of the Year Award distinguishes corporate energy management programs. It is the highest level of EPA recognition. Partners must perform at a superior level of energy management and meet the following criteria:

- Demonstrate best practices across the organization
- Prove organization-wide energy savings
- Participate actively and communicate the benefits of ENERGY STAR



# ENERGY STAR® Energy Efficiency Student Toolkit

## APPENDIX A: Conduct a Water Efficiency Treasure Hunt

| Water Management Program   |   |   |                       |                              |
|--|---|---|-----------------------|------------------------------|
| Feature  | Y | N | Room for improvement? | Location (ex. Classroom 101) |
| ★ Water management or reduction program in place   |   |   |                       |                              |
| ★ A facility water use assessment has been performed   |   |   |                       |                              |
| ★ Whole building and major water uses are submetered and tracked                                 |   |   |                       |                              |
| ★ School has a water efficiency goal or target   |   |   |                       |                              |
| ★ School's water use is consistently benchmarked in EPA's Portfolio Manager and results analyzed |   |   |                       |                              |
| ★ School has a designated staff person responsible for water management                          |   |   |                       |                              |
| Communication plan in place to promote water management program                                  |   |   |                       |                              |
| ★ Summer shutdown program in place (if school unoccupied during summer)                          |   |   |                       |                              |
| ★ A regularly scheduled walkthrough audit is performed in places water is used                   |   |   |                       |                              |
| ★ Low- and no-cost water-saving measures are considered (waterless urinals, etc.)                |   |   |                       |                              |
| ★ School has an active water or water efficiency club or committee                               |   |   |                       |                              |
| Water efficiency included in science curriculum  |   |   |                       |                              |
| Outdoor Water Use  |   |   |                       |                              |
| Feature  | Y | N | Room for improvement? | Location (ex. Classroom 101) |
| Sprinkler heads are regularly inspected for malfunction  |   |   |                       |                              |
| Irrigation system is free from visible leaks   |   |   |                       |                              |
| Leaks or malfunctions are repaired quickly   |   |   |                       |                              |
| Landscaping includes native and low-water plants and grasses                                     |   |   |                       |                              |
| Turf grass only present on sports or activity fields   |   |   |                       |                              |
| ★ Irrigation system installed or audited by WaterSense labeled provider                          |   |   |                       |                              |
| Products (e.g., irrigation controllers) used on premises are WaterSense-qualified                |   |   |                       |                              |
| Drip irrigation is installed   |   |   |                       |                              |
| ★ Irrigation on a controller with moisture sensors   |   |   |                       |                              |
| A regularly scheduled walkthrough audit is performed in places water is used                     |   |   |                       |                              |
| Watering occurs at night or early morning, not in the heat of the day                            |   |   |                       |                              |
| Irrigation doesn't water sidewalks or walls, only plants   |   |   |                       |                              |
| ★ Outdoor water is metered separately and usage tracked  |   |   |                       |                              |
| ★ Greywater, captured rainwater, or other reused water is used                                   |   |   |                       |                              |
| ★ Water features recirculate water   |   |   |                       |                              |
| Pools are covered to reduce water loss   |   |   |                       |                              |
| Indoor Water Use   |   |   |                       |                              |
| Feature  | Y | N | Room for improvement? | Location (ex. Classroom 101) |
| ★ Watersense or other efficient fixtures installed in toilets/urinals                            |   |   |                       |                              |
| ★ Watersense or other efficient fixtures installed in breakroom and restroom                     |   |   |                       |                              |
| ★ Automatic sensors are regularly inspected for malfunction                                      |   |   |                       |                              |
| Leaks or malfunctions are repaired quickly   |   |   |                       |                              |
| There are no drippy faucets or showers, or running toilets                                       |   |   |                       |                              |
| School is free from visible leaks  |   |   |                       |                              |
| Staff are reminded to wash only full loads of dishes   |   |   |                       |                              |
| Food is handscraped from dishes, rather than rinsed  |   |   |                       |                              |

# ENERGY STAR® Energy Efficiency Student Toolkit

## Process Water Use

| Feature  | Y | N | Room for improvement? | Location (ex. Classroom 101) |
|--|---|---|-----------------------|------------------------------|
| ★ Cooling/heating needs are reduced through energy-efficiency measures |   |   |                       |                              |
| ★ Cooling system uses graywater or other reused water                  |   |   |                       |                              |
| ★ Cooling system water is monitored regularly                          |   |   |                       |                              |
| ★ Cooling equipment is properly maintained                             |   |   |                       |                              |
| ★ Leaks or malfunctions are repaired quickly                           |   |   |                       |                              |

Activities that are marked with ★ may require support from your district's facilities department.

Sources:

- WaterSense Best Management Practices: <https://www.epa.gov/watersense/best-management-practices>
- Saving Water in Educational Facilities: <https://www.epa.gov/sites/production/files/2017-01/documents/ws-commercial-factsheet-educational-facilities.pdf>

For more information about energy efficiency and ENERGY STAR K-12 Toolkit, please contact us through Ask a Question portal at [www.energystar.gov/buildingshelp](http://www.energystar.gov/buildingshelp).