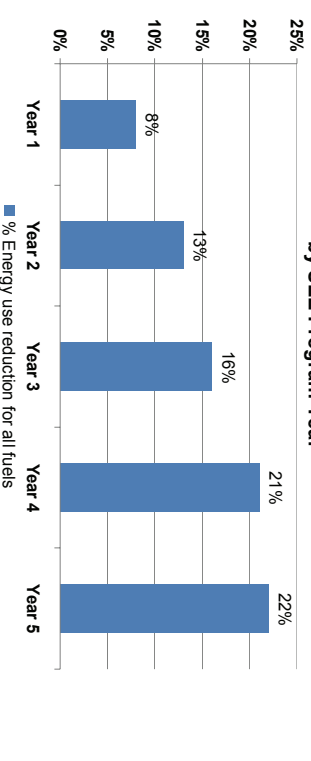




How much can behavior change affect your bottom line?

“At least 10-30% of energy used in schools can be saved by simply changing daily habits and creating a culture of energy awareness” (SEE)

Average Energy Use Reduction by SEE Program Year



The Maine Energy Education Program (MEEP) is introducing an innovative new program to Maine called *Schools for Energy Efficiency (SEE)*. *SEE*'s proven track record has been implemented, tested and revised in more than 700 schools over nine years. Schools that sign on are provided with a proven process for training, empowering occupants and communicating success. *SEE* will help you create a new and sustainable energy culture.

Benchmarking, Technical Assistance & Financial Incentives



Efficiency Maine is an important ally when you're ready to translate energy benchmark information into real savings. Their incentives are designed to absorb the incremental expense of upgrades to high efficiency equipment that reduces energy usage and cuts costs.

Visit www.energycymaine.com - click on *at work* and find the *Business Program cash incentives* or call 866-376-2463. Schools are eligible for these incentives. There are also calculated fixed or *"Prescriptive Incentives"* for certain types of equipment including:

- * Lighting
- * HVAC equipment
- * Variable-speed motor drives
- * Commercial refrigeration
- * Compressed air systems

Custom electricity upgrade applications are accepted. Schools can receive up to \$300,000 combined prescriptive and custom incentives in a calendar year.



This information is brought to you by the Maine Department of Environmental Protection and Efficiency Maine Trust. Maine DEP is directed to prevent, abate and control the pollution of the air, water and land. For more information about the Maine DEP, visit www.maine.gov/dep or call 800-452-1942.

Innovative Technology

Real-time electricity monitoring devices can help you manage electricity use on each individual circuit in a building. Such devices come with an online visual display that allow a building manager to see real time electricity use and better understand where energy savings might exist.

MDEP's School Energy Survey project has enlisted two schools to pilot two *eMonitor* demonstration units later this year. Their online demonstration of these devices and how they work may be available to interested school managers by contacting the facility managers for these schools:

- Brunswick - Beecher Stowe School
- Oxford Hills - Hebron Station School



The **Island Institute** is also supporting use of *eMonitor* technology in a new project. Ten coastal schools are participating in a three-year energy efficiency program engaging students in curriculum and using *eMonitors* in schools, homes and municipal buildings. You can find more information on their project at:

www.islandinstitute.org/energyforME

ENERGY BENCHMARKS BULLETIN

Inside: Ways to Save!
Tips for Energy Tracking
Benchmarked School Results
Energy Advisor Checklist
Innovations & Incentives

Ideas & Inspiration for Maine Schools & Businesses
Autumn 2011



Results of Energy Benchmarking from Over 100 Maine School Buildings

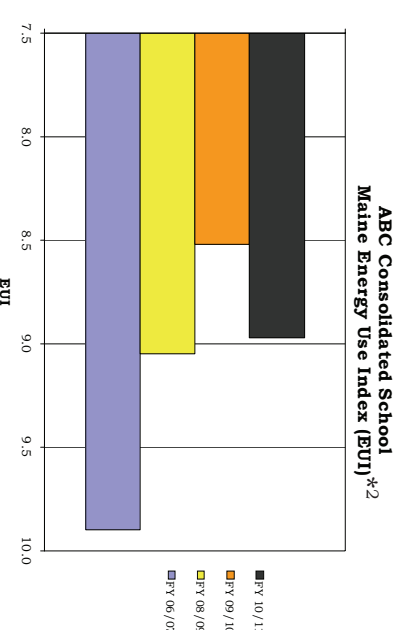
Establishing the baseline of a building's energy use is the first step in improving its performance.



Energy benchmarks provide a new approach for building managers to track energy use from year to year. It can also be used to compare one building's energy use over time with others of similar uses.

The School Energy Use Survey^{*1} - part of the Maine Green Schools Project over the last four years is wrapping up with this final baseline energy data analysis.

This benchmark energy analysis compares data for Maine school buildings in terms of *energy consumption per square foot*. A correction factor for heating degree days (HDD) was added to normalize the data for local climate differences.



ABC Consolidated School Maine Energy Use Index (EUI)^{*2}

^{*2} The Maine EUI results listed here were based on:

1. One year of electricity data and all fuel consumed on site. Each fuel was converted to British Thermal Units (BTUs). www.mainepublicservice.com/media/3467/fuel%20and%20energy.pdf
2. Total square footage (gross ft²-including mobile classrooms and heated/powered outbuildings).
3. Data was adjusted for heating degree days (HDD). Heating degree days is the accepted method for normalizing the number of days in any region where a building requires heat. Find your HDD @ degreedays.net/

Why is benchmarking important?

An important step in assessing building energy usage is to determine whether the use is reasonable (high, normal, low) by establishing a baseline. Subsequent energy use can easily be tracked annually to identify potential problems and prioritize energy saving investments.

The energy benchmarks shown here are calculated based on the annual energy consumed per square foot, adjusted for the regional climate (BTU/ft²/HDD).

Maine Annual Energy Use Index *2

(Weather Normalized)



The **Maine Annual Energy Use Index (EUI)** offers an indication of where a building falls on a spectrum in comparison to other similar buildings in Maine. The charts in the centerfold show a baseline of energy usage in over 100 Maine school buildings. The percentiles indicate the number of participating schools that fall within low, medium and high energy use rankings.

Next steps for improving building performance:

- 1) Calculate your current annual EUI.
- 2) Explore energy saving opportunities.
- 3) Apply for Efficiency Maine's incentives.

^{*1} The *Maine Green School's Energy Use Survey* was funded by the U.S. EPA. We are grateful to the participating schools for their openness and generosity to share their energy data publicly with other schools and businesses.



ORNL Recommends Benchmarking Energy Use in Schools

In the recent report **“Benchmarking Energy Use in Schools”** by Oak Ridge National Laboratory, benchmarking is identified as an essential tool for schools to reduce costs and improve building performance.

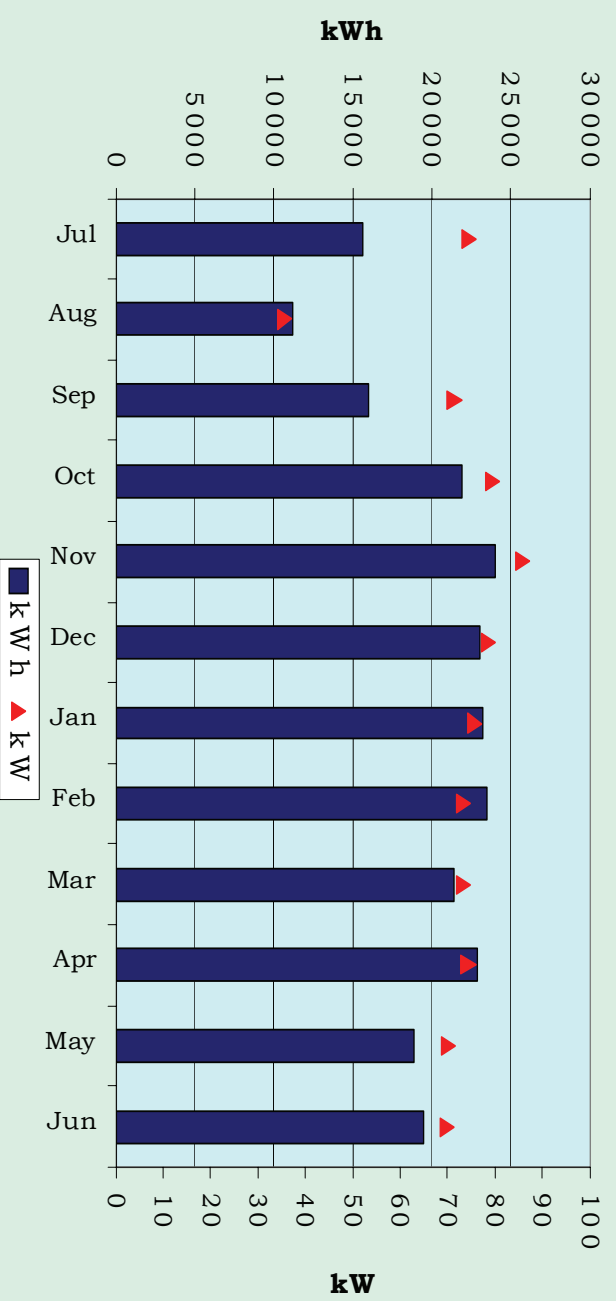
“With energy expenditures by public schools in the U.S. averaging over \$100 million per state in 1992, building systems improvements can result in significant budgetary savings”, according to author Terry Sharp.

The report findings indicate that benchmarking offers an improvement over the simple “averaging” of energy use statistics from a group of buildings.

A spreadsheet-based benchmarking tool has been developed for school managers based on the ORNL study. It is downloadable from ORNL’s Buildings Technology Center at: <http://eber.ed.ornl.gov/products.htm>.

Tips for Energy Tracking*

"XYZ" Schools' Electrical Use and Peak Demand 2010



Minimizing your buildings' maximum demand load can save as much as 20% - 30% of school electricity costs.

School electricity bills include a “supply and delivery charge” (total kWh used) and a “demand charge” for the peak kW demand (highest load) of electricity use.

Actual peak demand (red triangles) is the 15 minute period when a building draws (or uses) its highest electricity load each month. The electric use shown here depicts the correlation between kWh use and peak demand (kW).

If the kWh use rises without a corresponding increase in demand, it may indicate that equipment is running for long periods of time, malfunctioning or perhaps not being turned off on nights and weekends.

To reduce demand load:

- * use more efficient lighting and motors;
- * test backup equipment, like an auxiliary fired pump, only when the building is partially shut down;
- * stagger the start up of various pumps and motors that are in use each day at shops or tech schools.

2

Energy Advisor Checklist*6

REFRIGERATION

- Compile a refrigeration inventory (numbers, locations, ratings, use schedule, etc.)
- Log system temperature, performance, and product loading requirements
- Inspect monthly – clean coils - improve air flow around units
- Clean condenser/coil surfaces
- Maintain correct temperature settings
- Monitor/check line filters & door gaskets
- Install suction line insulation
- Check defrost cycle controls & schedule
- Consider floating head pressure controls
- Consider heat recovery systems

Contract a Service Technician to:

- Maintain proper refrigerant levels/ pressures
- Install outside economizer
- Maintain proper operating pressures
- Install glass door heater control

MAXIMIZE DOMESTIC HOT WATER EFFICIENCY

- Compile a water heater inventory and schedule of use
- Lower temperature settings
- Insulate pipes
- Flush tanks to remove sediment quarterly
- Repair leaky faucets
- Install flow restrictors on showers & faucets
- Switch fuel type to meet the need
- Repair leaks
- Install or reset time clocks
- Install point-of-use water heaters to reduce use of a large, costly boiler heating systems in warm weather

MAXIMIZE BUILDING ENVELOPE ENERGY EFFICIENCY

- Caulk around door and window frames
- Repair broken or cracked windows
- Seal building penetrations
- Insulate/increase wall/floor insulation
- Add insulation to attic and proper ventilation
- Double glaze windows
- Construct vestibule entrance
- Add insulation to basement band joist perimeter
- Replace R-2 rated wood doors with R-10 rated foam core, steel clad doors
- Construct and weather-strip an insulated box above attic pull down stairs

7

Ways To Save!



Save up to 40% of electricity costs for running vending machines by installing a vending miser motion sensor. That's as much as \$120 from the typical \$300 electricity cost for each refrigerator, each year.

MAXIMIZE LIGHTING EFFICIENCY

- Do a lighting survey (types/size, location, switches, timers, sensors)
- Clean fixtures
- Reschedule custodial services
- Group relamp rather than spot lamp replacement
- Repaint or clean reflective surfaces
- Reset exterior lighting schedule or install motion sensors
- Reduce wattage
- Relamp incandescent to compact fluorescent (CFL) & cold start CFL
- Install occupancy sensors & photoelectric cells
- Install lighting time clocks & additional controls
- Install LED or electroluminescent/solid state exit signs
- Install electronic ballasts in 8' fixtures
- Install high performance T8 lamps and ballasts
- Replace outside lights with high pressure sodium or metal halide

Ways To Save!



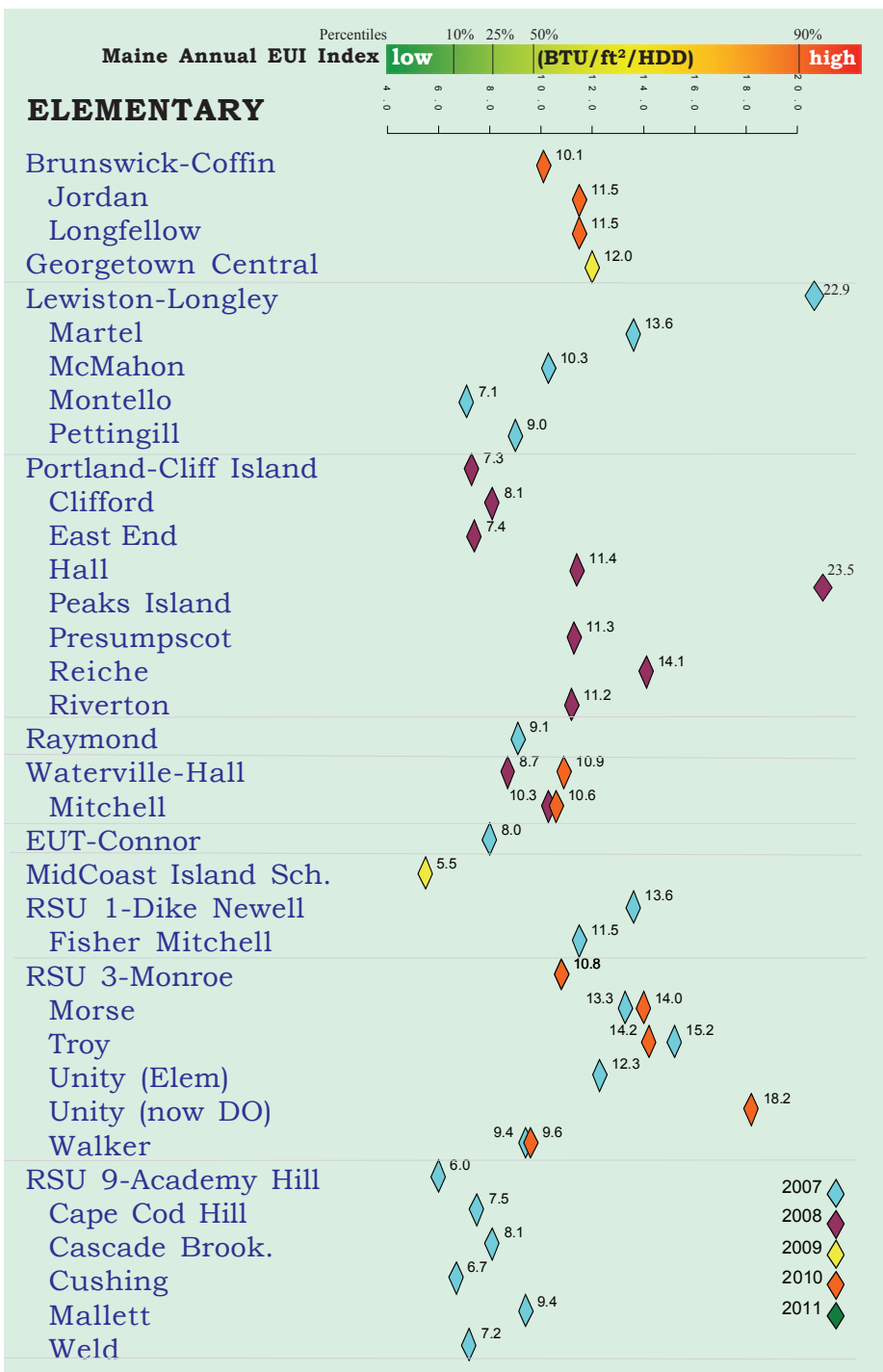
Prevent up to 30% of heat loss through gaps in the building envelope with simple weatherization measures.



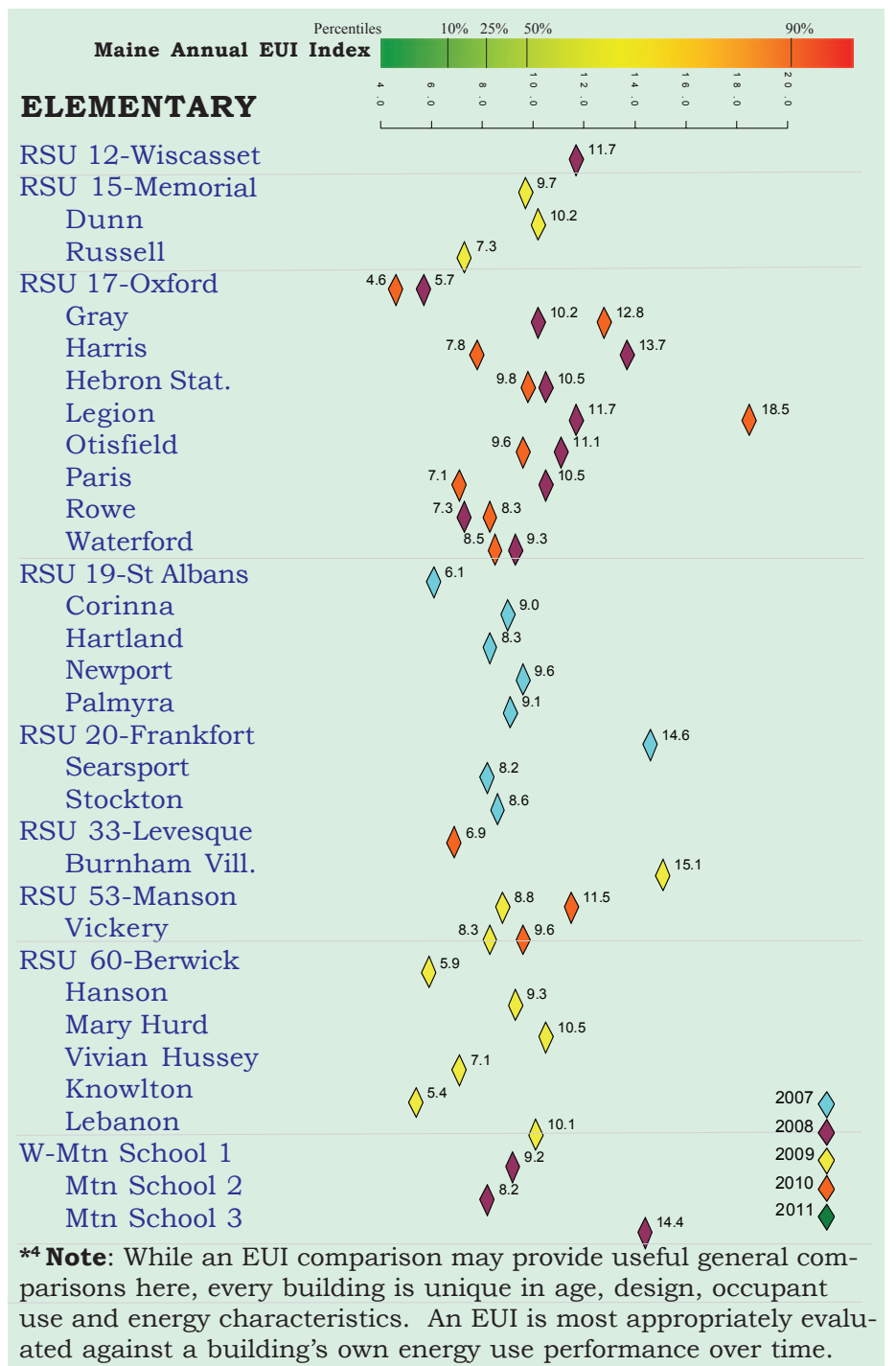
Rewire multiple banks of lighting that can be switched off separately. Better yet, install occupancy sensors that will shut lights off automatically.

*6 The information on these two pages is compiled from Efficiency Maine contracted energy audits of participating Maine Green Schools.

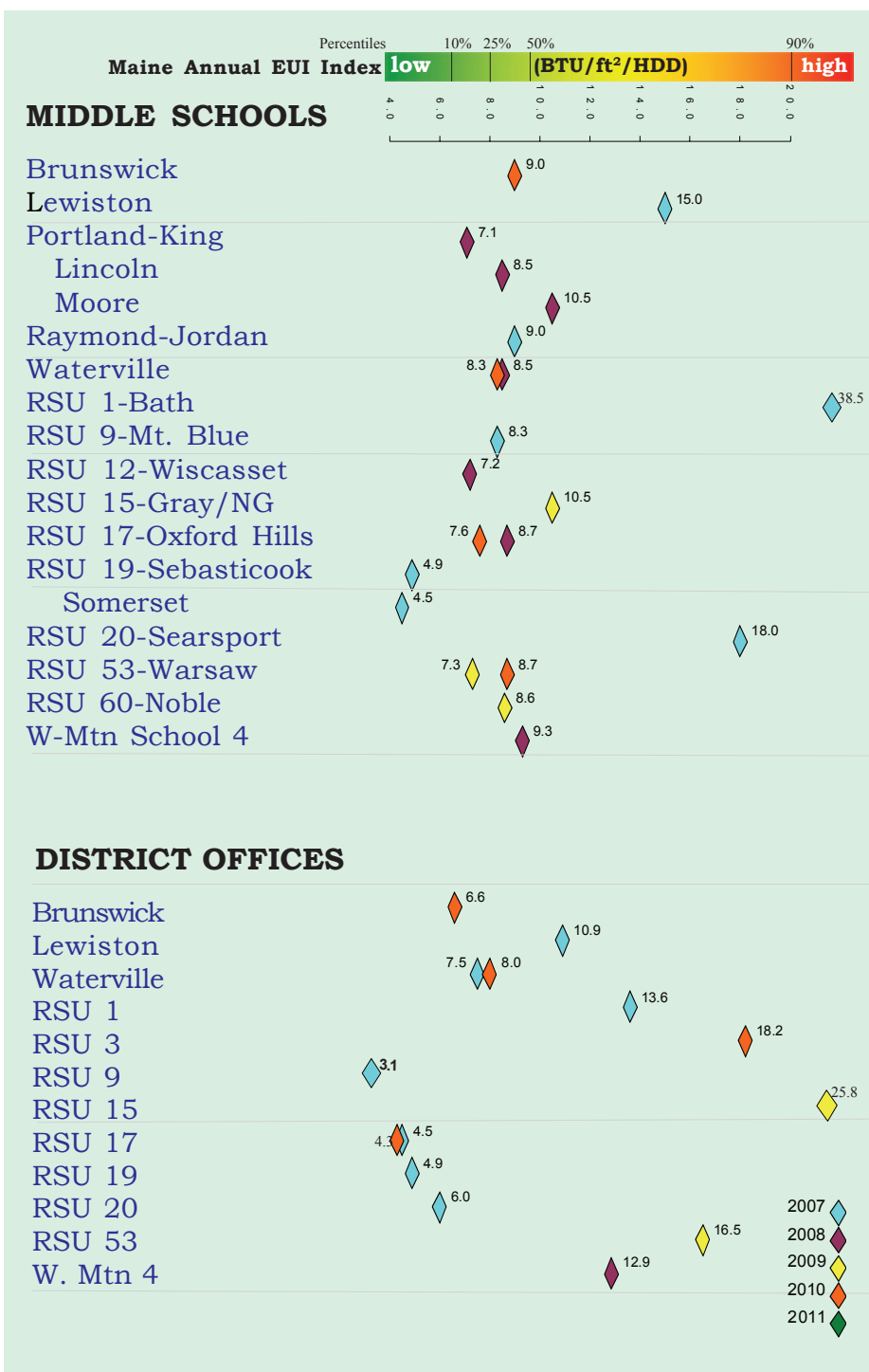
Benchmarked Schools' Results *4,5



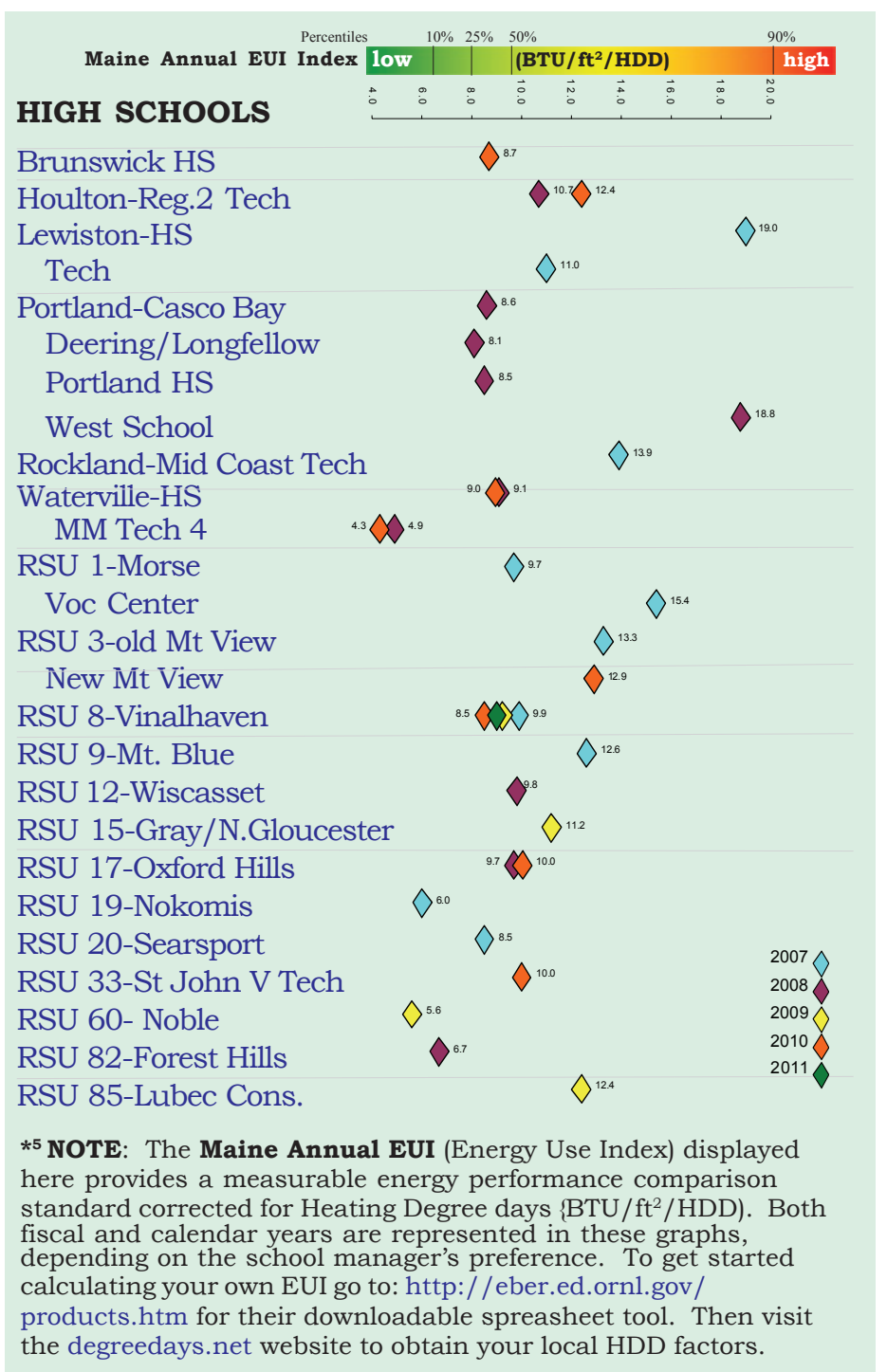
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Benchmarked Schools' Results* 4,5



5



Energy Advisor Checklist*6

Ways To Save!

Reduce phantom loads; electronic equipment continues to draw current when not in use. For extended shut down periods: unplug equipment.



MAXIMIZING MOTORS, PUMPS & AIR COMPRESSOR EFFICIENCY

- Compile an inventory & use schedule
- Lubricate bearings
- Check/replace belts with cog belts
- Clean motor housing

Contract a Service Technician to:

- Evaluate motor efficiency
- Match motor size to loads
- Replace with more efficient model
- Install variable speed drives

AIR COMPRESSORS & HVAC SYSTEMS

- Compile an inventory & use schedule
- Shut down system nights/weekends
- Clean/replace air intake filter
- Periodically check system for air leaks
- Adjust/replace belts with cog belts
- Repair system leaks
- Reduce system pressure
- Duct air intake to outdoors
- Seal leaky air ducts with mastic
- Install new furnace filters as needed
- Insulate pipes/ductwork
- Clean, tune, & evaluate burner annually
- Clean heat exchange surfaces annually
- Install new burner
- Install electronic thermostats
- Service air dampers
- Shut down ventilation system during school vacations

APPLIANCES & ELECTRONIC EQUIPMENT

- Compile an inventory (location, type, size, kWh demand)
- Turn off equipment when possible
- Use smart surge protectors and timers for electronics
- Adjust settings to improve efficiency
- Upgrade to more efficient (Energy Star*7) models

AIR CONDITIONING

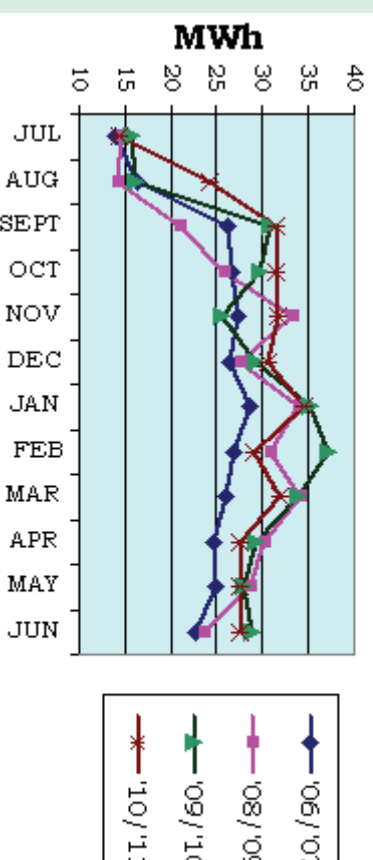
- Evaluate system efficiency - replace with Energy Star Model*7
- Clean outside air & return grilles
- Service air dampers
- Clean or replace air filters as needed
- Shut down ventilation system during unoccupied times
- Raise cooling temperatures
- Clean cooling coil surfaces
- Install tinted shades on south-facing windows
- Complete scheduled maintenance window improvements

Contract a Service Technician to:

- Seal leaky air ducts
- Reduce ventilation rates
- Vent bathroom to outdoors
- Replace outside air dampers
- Improve controls
- Improve pipe/duct insulation
- Evaluate system efficiency
- Repair leaks

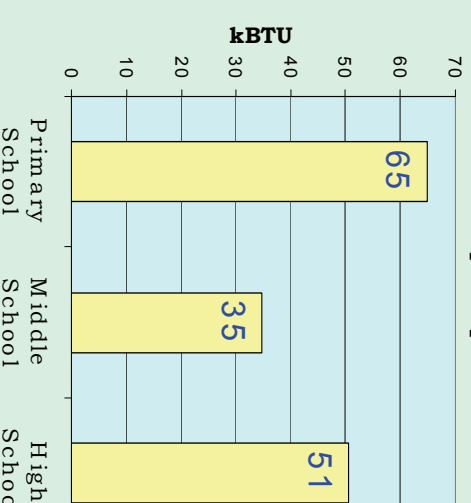
Tips for Energy Tracking*3

"ABC" Consolidated School 4 Year Comparison



The graph above depicts "ABC" Consolidated School's monthly electrical usage for four years. Notice the dramatic drops in the 08/09 data - during months where school vacation weeks occurred. Conscientious attention to shutting down unneeded equipment during vacation weeks can result in significant energy savings. Also watch for anomalies or unusual changes in electrical usage that could indicate malfunctioning equipment or changes in building user behaviors.

"Example 1" School Heating Fuel
kBtUs per square foot

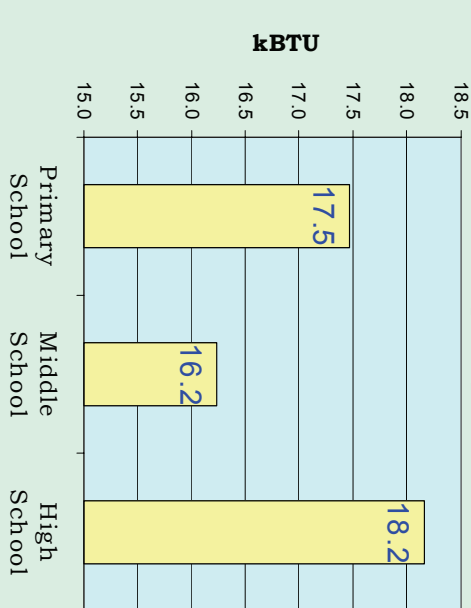


In 2008, this school system's EUI rankings were 11.7, 7.2 and 9.8 respectively.

By separating out each schools' electricity and heating fuel use in the graphs above, the facility manager may be able to begin prioritizing which buildings to examine first for energy saving improvements.

*3 Tips compiled from Efficiency Maine energy audits of participating Maine Green Schools.

"Example 2" School Electricity Use
kBtUs per square foot



In the Example 1 heating fuel graph, the primary school stands out as comparatively highest. So a first step might be to examine that building's heating system and building envelope for potential energy savings.

In Example 2, the high electric use at the elementary and high schools may prompt the facility manager to look for potential electrical use reductions at those schools.

Ways To Save!



For every degree the average building temperature is reduced you can expect about 2% savings on your heating system. Depending on humidity levels in the building, thermostats set between 68 and 72 result in comfortable classrooms. You can save another 5% with nightly set backs.

*7 ENERGY STAR is a nationally recognized label used on products that use less energy, save money, and help to protect the environment.

Find out more by visiting: www.energystar.gov. Portfolio Manager, a free energy management tool used to help track energy and water usage in buildings, can also be found on the website.