Leading by Example Energy Reduction Guidance
ZERO- AND LOW-COST STRATEGIES

LEADING BY EXAMPLE

The Leading by Example Program was created in April 2007 by Governor Deval Patrick's Executive Order 484, *Leading by Example—Clean Energy and Efficient Buildings*, which established energy and greenhouse gas reduction targets for state agencies and public higher education campuses, with the goal of reducing overall environmental impacts of state government operations.

With over 64 million square feet of building space, state government consumes more than 1 billion kilowatt hours of electricity, 22 million gallons of heating oil, and 46 million therms of natural gas. In 2007 the Commonwealth spent more than $200 million on energy costs.

To address energy consumption, reduce the state's carbon footprint, and drastically cut energy costs for the Commonwealth, Executive Order 484 sets specific energy efficiency and renewable energy targets including a 20% reduction in energy use by 2012 and 35% by 2020 as well as reductions in greenhouse gas emissions in state operations 25% by 2012, 40% by 2020 and 80% by 2050.

ENERGY REDUCTION GUIDANCE

This document is designed to provide some basic guidance for state agencies as they work to reduce energy and water usage. It provides twenty-five zero- or low-cost energy saving strategies (many of which have other environmental benefits) including simple products, behavioral changes, and building maintenance suggestions. Contacts and detailed procurement information are provided where possible. Statewide contract numbers are listed in the products section, followed by a summary of vendors on state contract. For more information about LBE guidance contact any of the staff below.

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I. ZERO- AND LOW-COST PRODUCTS

Recommendation #1: Replace Incandescent Light Bulbs with Compact Fluorescent Lamps

Energy Benefit: CFLs use 75% less energy than incandescent bulbs and last 10 times longer. Bulb replacements are among the most simple and cost-effective energy-saving measures. Executive Order 484 **requires** state agencies to procure CFLs for lighting needs.

Cost: $1.50 – $14.00 per bulb.

Savings: Payback is less than 1 year. Based on 4 hours of lighting per day and current energy costs, GE Lighting estimates an annual savings of $919.80 and a lifetime savings of $5,040.00 for replacing one hundred 60-watt bulbs with 13-watt CFLs.

To Procure: State Contract # FAC22: Electrical and Lighting Supplies and Equipment
State Contract # FAC27: Building Materials and Supplies
State Contract # FAC28: Industrial/Commercial Supplies

Recommendation #2: Replace Old Exit Signs with LED Exit Signs

Energy Benefit: LED exit signs are more efficient than fluorescent or incandescent signs and last 10 times longer. According to ENERGY STAR, an LED exit sign operates at less than 5 watts and can reduce CO_2 emissions by up to 502 pounds per year per sign.

Cost: $23.00 – $178.00 per LED sign, depending on style.

Savings: Payback can be less than 1 year, and annual operating costs are $7.00-$24.00 cheaper per sign than fluorescent or incandescent signs.

To Procure: State Contract # FAC22: Electrical and Lighting Supplies and Equipment
State Contract # FAC27: Building Materials and Supplies
State Contract # FAC28: Industrial/Commercial Supplies

Recommendation #3: Install VendingMisers and SnackMisers

Energy Benefit: VendingMisers and SnackMisers cut energy usage nearly in half by managing power consumption. A typical vending machine runs 24/7 and uses approximately 3,500 kWh per year. Misers monitor occupancy levels in the vicinity as well as ambient room temperatures to allow only enough power to keep products cold and to have the machine ready to dispense if people are nearby. As a result, energy used for lighting and compressor cycles is kept to a minimum. State agencies should ensure that VendingMisers and SnackMisers are incorporated into all existing contracts with third parties operating vending machines on state property.

Cost: $169 per VendingMiser (for cold drink machines); $149 per SnackMiser (for snack machines).

Savings: Payback is 1-2 years. Conservation Solutions estimates the five-year savings on two machines to be $1,510.00 with a 363% return on investment.

To Procure: This product is currently not available on a statewide contract, but agencies and others can likely purchase it through the incidental, or small procurement process. Vendor contact information is provided at the end of this section.

Recommendation #4: Install Faucet Aerators in All Sinks

Energy Benefit: Faucet aerators reduce energy used for water heating by reducing water flow to as little as .5 gallons of water per minute at normal pressure. Since a significant portion of energy consumption is used to heat and pump water aerators can generate considerable savings. In addition to the local savings itemized below, reduction in costs for water use as well as reductions in energy used by water treatment facilities will also be incurred.

Cost: $2.00 – $10.00 per aerator.

Savings: Payback is less than 1 year with a potential annual savings of 35-40kWh per faucet.

To Procure: State Contract # FAC21: Plumbing and Heating Supplies
State Contract # FAC27: Building Materials and Supplies

Recommendation #5: Install Programmable Thermostats and Fans

Energy Benefit: ENERGY STAR estimates that one programmable thermostat can reduce CO_2 emissions by 26,852 lbs over the course of its lifespan, equivalent to removing 2 cars from the road per year. Programmable thermostats should be used instead of manual thermostats in smaller buildings and those without centralized heating and cooling controls. ENERGY STAR rated fans should also be used to reduce the need for air conditioning in the summer. By circulating air they can make room temperatures feel 3-4˚F cooler. In the winter, ceiling fans can be reversed to pull warmer air down from the ceiling, reducing heating needs.

Cost: Thermostat: $38.85; Fan: $13.00 - $150.00.

Savings: Payback is less than 1 year. Home Depot estimates 33% savings on yearly heating and cooling costs with programmable thermostats.

To Procure: State Contract # FAC27: Building Materials and Supplies
State Contract # FAC28: Industrial/Commercial Supplies

Recommendation #6: Install Motion Sensors

Energy Benefit: Motion sensors reduce energy consumption by ensuring that lights are off when common areas are unoccupied. U.S. Department of Energy estimates that consumption for all lighting in the U.S. is about 22% of the total electricity used in the country. Motion sensors are most cost-effective in frequently unoccupied areas such as conference rooms, kitchens, bathrooms.

Cost: $14.00 - $50.00 per sensor.

Savings: Motion sensors can save up to 50% on lighting costs.

To Procure: State Contract # FAC22: Electrical and Lighting Supplies and Equipment
State Contract # FAC27: Building Materials and Supplies
State Contract # FAC28: Industrial/Commercial Supplies

Recommendation #7: Comply with New Commonwealth Computer Power Management Standards

Energy Benefit: Activating computer power management features can reduce a machine's power consumption from 120 to 60 watts per workstation. On September 12, 2008 the Massachusetts Information Technology Division established the Enterprise Desktop Power Management Standards for the state to optimize power consumption of PCs and workstations. All executive department agencies must comply within 120 days of the issuing of the new standards.

Cost: Implementing computer power management can be free using EZ GPO, the open source software available from the U.S. EPA ENERGY STAR program. Agencies can also direct staff to develop customized scripts to accomplish power management.

Savings: Compliance by all state agencies will result in a $2 million reduction in energy costs and up to $60.00 per computer.

Where: Massachusetts Information Technology Division: www.mass.gov/itd (link to new standards)
ENERGY STAR: www.energystar.gov (link to Low Carbon IT Campaign)
EZ GPO: http://www.energystar.gov/index.cfm?c=power_mgt.pr_power_management

Recommendation #8: Purchase ENERGY STAR Appliances, Foodservice Equipment, and Office Equipment

Energy Benefit: ENERGY STAR appliances incorporate advanced technologies that use 10-50% less energy and water than standard models. ENERGY STAR office products power down when not in use. Ensure that all existing contracts require ENERGY STAR rated products. When purchasing new products, always choose ENERGY STAR equipment options. If appliances or office equipment are more than ten years old, consider replacing them with efficient ENERGY STAR models.

Cost: Costs of ENERGY STAR products vary, and although some products are more expensive than conventional models, the long-term savings more than make up for any initial costs.

Savings: Nationwide, ENERGY STAR products that meet its latest standards and specifications will save consumers more than $3 billion over the next five years and avoid greenhouse gas emissions equivalent to 4 million cars. Replacing twenty conventional copy machines with ENERGY STAR copy machines, for example, has an estimated life-time savings of $517 with no initial price difference.

To Procure:
State Contract # FAC27: Building Materials and Supplies
State Contract # GRO24: Foodservice Equipment – Institutional Commercial Grade – Large and Small with Related Maintenance and Repair Services
State Contract # ITC16A: IT Hardware, Computers, Mobile equipment, Servers, Storage and Services
State Contract # OFF07: Document Solutions, Micrographics and Imaging Equipment
State Contract # OFF16: Photocopiers, Printers, Facsimile and Multifunctional Equipment
State Contract # OFF21: Digital Duplicating Equipment
State Contract # OFF22: Multi-State Postage and Mail Processing Equipment, Accessories and Supplies

Recommendation #9: Landscape for Energy-Efficiency

Energy Benefit: Energy-conscious landscaping can reduce heating and cooling costs by controlling light and shading. Evergreen trees should be planted on the north side of buildings to break winds. Deciduous trees should be planted by windows on the south and west sides to provide shade in the summer while allowing light to pass through in the winter. Also, planting shrubs and trees around the AC condenser can improve its operating efficiency.

Consult U.S. Department of Energy's *Landscaping for Energy Efficiency* guidance at: http://www.mass.gov/Eoeea/docs/doer/publications/landscapeee.pdf

Cost: Costs vary.

Savings: Savings vary depending on landscaping needs.

To Procure:
State Contract # FAC24: Outdoor/Landscaping Application Products
State Contract # FAC47: Grounds-Keeping/Landscaping, Irrigation Systems, Tree Trimming, Catch Basin Cleaning and Snow Removal Services

Recommendation #10: Install CO_2 Sensors

Energy Benefit: Demand-controlled ventilation with CO_2 sensors saves energy by regulating the air quality of a facility by measuring the amount of CO_2 present. Most heating and cooling systems are inefficient because they draw in ventilation air by assumed occupancy rather than actual occupancy. By regulating ventilation rates, CO_2 sensors result in a more energy-efficient operation and better air-quality.

Cost: $250.00 - $260.00 per sensor, plus additional installation fees.

Savings: Savings can be more than $1.00 per square foot annually. Higher payback is associated with higher-density areas where occupancy is variable and unpredictable (e.g., auditoriums, schools, meeting areas).

To Procure: State Contract # FAC27: Building Materials and Supplies
State Contract # FAC28: Industrial/Commercial Supplies

Recommendation # 11: Purchase NEMA Premium Efficiency Motors

Energy Benefit: National Electric Manufacturers Association (NEMA) certified motors meet the highest energy-efficiency standards. They are 2%-8% more efficient than standard models because they generate less heat and require less energy for cooling. NEMA certified motors are most cost-effective where annual operation exceeds 2,000 hours, where utility rates are high, or when motor repair costs are high.

Cost: NEMA Premium Motors can range from $290.00 - $3,500.00 depending on specifications.

Savings: Payback is between 1-10 years depending on motor and usage. The U.S. Department of Energy estimates that NEMA Premium motor programs would save 5,800 gigawatts of electricity nationwide and prevent the release of nearly 80 million metric tons of carbon into the atmosphere within 10 years, equivalent to removing 16 million cars from the road.

To Procure: State Contract # FAC28: Industrial/Commercial Supplies

VENDORS ON STATE CONTRACTS:

FAC22: Electrical and Lighting Supplies and Equipment

Standard Electric	Bill Smith, 978-988-3193, wsmith@standardelectric.com
Northeast Electric	Shelley Ballarino, 781-410-8585, sballarino@needco.com
Graybar Electric	Jim Kapuza, 617-625-4700, james.kapuza@gbe.com

FAC24: Outdoor/Landscaping Application Products

Nine vendors through state contract	http://www.comm-pass.com

FAC27: Building Materials and Supplies

Home Depot	Rich Nyberg, 770-384-3772, Richard_nyberg@homedepot.com
A&A Industrial/Albeco Fastener Supply	Ted Morang, 617-965-8840, Ted@4albeco.com
Facility Contract Services/National	Jerry McManus, 781-461-0838, fsc80103@verizon.net
Jackson Lumber & Millwork Co.	Tom Zappala, 978-689-1056, tzappala@jacksonlumber.com

FAC28: Industrial/Commercial Supplies

A&A Industrial Supply/Albeco Fasteners	Ted Morang, 617-965-8840, Ted@4albeco.com
Grainger Industrial Supply	Kevin Fleury, 978-552-1351, Kevin.fleury@grainter.com
MSC Industrial Supply	Mike O'Connor, 781-608-1649, OconnorM@mscdirect.com
Carr Hardware	Bart Raser, 413-443-5611, chardware@rnetworx.com
Kaufman, Co.	Dan Clark, 617-491-5500, danc@kaufmanco.com

FAC47: Grounds-Keeping/Landscaping, Irrigation Systems, Tree Trimming, Catch Basin Cleaning and Snow Removal Services

Thirty-six vendors through state contract	http://www.comm-pass.com

GRO24: Foodservice Equipment – Institutional Commercial Grade – Large and Small with Related Maintenance and Repair Services

Eastern Bakers Supply Co.	William Morrissey, 617-523-3045, wjmeasternbakers@aol.com
Kittredge Equipment Company, Inc.	James R. Scott, 413-788-6101, jscott@kittredgeequipment.com
Trimark United East	Alan Goldberg, 800-556-7338x321, agoldberg@Trimarkusa.com

ITC16A: IT Hardware, Computers, Mobile Equipment, Servers, Storage and Services

Apple Computer	408-974-0756, Stephen.glaros@apple.com
CDW Government, Inc.	877-325-8223, wilsgar@cdwg.com
Dell Marketing, LP	800-981-3355 x7247979, kevin_flennikin@dell.com
Gateway	800-211-4952, Linda.urich@gateway.com
GovConnection, Inc.	800-800-0019, kfortier@govconnection.com
Hewlett-Packard Co.	508-533-8470, Charlie.palmer@hp.com
Lenovo	770-863-3063, abiers@us.lenovo.com

OFF07: Document Solutions, Micrographics and Imaging Equipment

Ten vendors through state contract	http://www.comm-pass.com

OFF16: Photocopiers, Printers, Facismile and Multifunctional Equipment

Twelve vendors through state contract	http://www.comm-pass.com

OFF21: Digital Duplicating Equipment

Automated Business Solutions	Alan Albergaria, 800-832-2729, alana@absne.com
Ricoh Americas Corporation	Mike Pallotta, 978-621-1276, mike.pallotta@ricoh-usa.com
Riso, Inc.	Gina Musto, 978-739-3520, gmusto@riso.com

OFF22: Multi-State Postage and Mail Processing Equipment, Accessories and Supplies

Formax, Division of Bescorp, Inc.	Eric Flinton, 800-232-5535 x37, eflinton@formax.com
Francotyp-Postalia, Inc.	Joan Rader, 800-341-6052 x5722, Jrader@fp-usa.com
Hasler, Inc.	Robert Grant, 800-237-9154x13112, rgrant@haslerinc.com
Neopost, Inc.	Jim Leiby, 800-636-7678 x2883, j.leiby@neopost.com
Pitney Bowes Inc.	Robert Mailo, 800-322-8000 x36770, bob.mailo@pb.com

Conservation Solutions

Dan Cook, 888-266-1945, dcook@conservationsolutions.com

*Agencies can procure VendingMisers and SnackMisers from Conservation Solutions but there is no current state contract.

II. NO-COST BEHAVIORAL CHANGES

Recommendation #1: Encourage Behavioral Changes

Energy Benefit: It is easy to forget to be energy-conscious at work. Remind employees that saving energy is important every day and to make an effort to adopt sustainable practices. Small, individual changes in daily behavior can result in huge savings on operational costs. These actions reduce costs, returning savings to program appropriations.

How:

- Have agency head send out energy-saving reminders via email to staff regularly. Instruct staff to reduce energy usage whenever possible. See page 11 for sample email.
- Post LBE office guidance document in common area. http://www.mass.gov/Eoeea/docs/eea/lbe/lbe_officegreen-ez-tips.pdf
- Allow employees to turn off computers and other office equipment when not in use.
- Minimize use of personal electronics and appliances.

Recommendation #2: Sign Up for Demand Response with ISO New England

Energy Benefit: Not only can you reduce your energy consumption during peak times for the electrical grid – thus saving on your bill and preventing regional blackouts – but you can also get paid for it. ISO-New England pays facilities for participating in its Demand Response Program. Payment is based on amount of load shed, length of time the load was shed, and the value of electricity at the time. Find out more at: http://www.isone.com/genrtion_resrcs/dr/index.html

How:

- Determine if you can shed at least 100 kW of power within 30 minutes of notification and keep it shed for 4-5 hours. You may do this using emergency power generation or curtailment (shutting things down) or both.
- Contact Mark Nelson at DCAM mark.nelson@dcp.state.ma.us (617)727-4030 x237 to use the state contract with energy aggregators who will enroll you with ISO at no charge. You may also be able to participate via your electric utility.
- You will earn revenue monthly as long as you perform when called upon, i.e. are able to shed the load you agree to shed within the time limits.

Recommendation #3: Maximize Office Equipment Efficiency

Energy Benefit: Nationally, office equipment (primarily PCs and monitors) consumes between 5% and 10% of the total annual electricity consumption in commercial buildings, consumption that grows with the increased cooling demand due to waste heat from equipment.

How:

- Avoid screensavers, which can sometimes use more energy.
- Turn down the brightness setting on monitors.
- Plug all electronics into one power strip and turn it off at the end of the day.
- Use laptops instead of desktops when possible.

- Close unused applications and turn off the monitor when not in use.
- Activate power management features for copy machines and printers.

Recommendation #4: Reduce Lighting Associated with Cleaning Activities

Energy Benefit: Cleaning during working hours will save energy by allowing building systems to shut down earlier. Aim to schedule all other after-hours activities during the day as well.

How:

- Direct agency staff to start cleaning earlier in the day.
- Negotiate with private contractors to adjust schedule.
- Add schedule change to new contracts.
- Train cleaning crews to ensure all but emergency lights are kept off during nights and weekends.

Recommendation #5: Reduce Energy Used for Heating and Cooling

Energy Benefit: Heating and cooling systems are the largest single consumers of energy in buildings. One third of a building's cooling load is due to solar heat gain through windows. Seasonally adjusting temperatures one degree can save 1% - 3% of heating and cooling costs.

How:

- Reduce temperature settings incrementally in the summer and lower settings incrementally in the winter where possible while maintaining employee comfort and mandatory standards.
- Minimize use of space heaters.
- Consider modifying dress code in hot and humid weather to allow for slightly higher interior temperatures.
- Encourage use of small fans instead of air conditioning.
- Open blinds in the winter to let in natural light; close blinds in the summer to prevent heat gain.

Recommendation #6: Minimize Vehicle Use

Energy Benefit: According to the American Public Transportation Association, the transportation sector produces one-third of all greenhouse gas emissions in the United States. Estimated CO_2 emissions from vehicles are 19.4 pounds per gallon for gasoline and 22.2 pounds per gallon for diesel. The EPA estimates that on average, one passenger car in the U.S. emits 0.916 pounds of CO_2 per mile.

How:

- Hold phone or web conferences when possible.
- Carpool or take public transportation when traveling to meetings.
- If driving is necessary, maintaining a speed of 55-65mph optimizes gasoline use.
- Refer to Eco-Driving Tips at www.mass.gov/gastips for more suggestions.

Recommendation #7: Minimize and Improve Lighting

Energy Benefit: Lighting makes up a significant portion of building energy costs. Many areas in buildings are unoccupied for the majority of the day, yet lights are kept on throughout the day. By optimizing day lighting and reducing inside lighting where possible, buildings can significantly reduce energy costs.

How:

- Reduce or turn off lighting wherever possible while still following safety codes and regulations.
- Ensure that all lights, except those necessary for safety, are shut off by the end of the day either through energy management systems, timers, or manually.
- Open blinds in the winter to let in natural light; close blinds in the summer to prevent heat gain.

Recommendation #8: Reduce Hot Water Usage

Energy Benefit: For each 10°F reduction in water temperature, you can save between 3%–5% in energy costs. Reducing water temperatures also slows mineral build-up and corrosion in water heaters and pipes. This helps water heaters last longer and operate more efficiently.

How:

- If hot water is needed just for general use, like hand washing, reduce the temperature setting on the hot water tank to 120° F or lower.
- If a higher temperature is needed for a specific piece of equipment, consider a booster heater.
- Install heat traps on water heater tank. They require professional installation.

Sample Email Reminder from Agency Head:

To all staff,

As you know, energy costs for the state are high and rising. Governor Patrick has issued Executive Order 484, requiring the state to take measures to reduce energy consumption and associated costs. Please remember to save energy throughout the day by turning off lights in unoccupied areas, unplugging equipment when no longer in use, and activating computer power management features. Consult the Leading by Example Energy Guidance for more ways to save energy.

Thank you!

III. MAINTENANCE PRACTICES FOR MAXIMIZING EFFICIENCY

Recommendation #1: Evaluate Building Systems Together

Energy Benefits: In addition to maintaining individual systems, it is important to look at the building as a whole to ensure that the building is functioning properly at optimum efficiency. Even if a system is running efficiently, it may be unnecessary and therefore wasting energy.

How:

- Fully utilize control system capabilities, making sure the building is operating as built.
- Correct system overrides.
- Adjust reset temperatures and temperature settings periodically.
- Control time use by only operating systems when necessary and avoiding excess operation during nights, weekends, and holidays.
- Eliminate simultaneous heating and cooling.
- Stage/sequence boilers, chillers, and air-handling units.
- Use an Energy Management System (EMS) to control and monitor building operations and provide reports of options regarding energy usage for all systems. An EMS can be used for multiple buildings. The EMS should be reviewed and refreshed for set-points and timers.

Recommendation #2: Consult DCAM's Facilities Maintenance Manual

Energy Benefits: Office of Facilities Maintenance studies have shown that many state facilities staff do not have facility maintenance backgrounds and may have little guidance or technical support. The Facilities Maintenance Manual was compiled to provide basic guidelines for all state buildings. All of these suggestions are important for meeting health, safety, and efficiency standards, and many are directly related to cost savings achieved through optimizing energy efficiency.

How:

- Find Manual at: http://www.mass.gov/cam/MAFMA/Manuals/DCAM_Facilities_Maintenance_Manual_06_08.pdf
- Provide the Facilities Maintenance Manual to facilities staff.
- Make energy-efficiency a maintenance priority.

Recommendation #3: Conduct Regular Maintenance on HVAC Systems

Energy Benefits: HVAC systems comprise a huge portion of building energy consumption. Systems that are not maintained well will require more energy and will have a shorter lifespan. There are many simple maintenance practices that will keep the system running at maximum efficiency, allowing buildings to save on energy costs.

How:

- Air Conditioning
  - Check and change air filters.
  - Clean condenser and evaporator coils.
  - Lubricate fan motors and bearings and check fan blade for cracks and balance.

  - Check pressures and temperatures, amperage and voltages.
  - Check electric contacts for loose wiring connections and burnt contacts.
  - Check condensate drain pan and line for proper drainage.
- Air Filters
  - Use efficient filters and change as often as needed. Since the cost of energy to push air through the filter generally exceeds filter costs, delaying filter maintenance can increase energy production and CO_2 emissions.
  - Eliminate sources of contaminants before seeking filtering solutions.
- Furnace
  - Replace furnace filters twice a year and use High-Efficiency Particulate Air (HEPA) filters.
- Boilers
  - Maintain proper water treatment.
  - Lubricate and inspect/adjust draft fans.
  - Inspect air vents.
  - Lubricate pumps.
  - Inspect temperature across steam traps to ensure steam separation from condensate line.
  - Check the chimney base for dirt or obstructions
  - Check motors, bearings, and couplers and lubricate as necessary
  - Do not over lubricate.
  - Run at full capacity, reduce excess air, clean heat transfer surfaces and upgrade insulation and insulate steam lines.
- Chillers
  - Monitor and record additions of refrigerants to any chiller in an operating log.
  - Establish a baseline of refrigerant use for the equipment & compare to the manufacturer specification. Inspect for leaks if more refrigerant is being used.
  - Check and clean the chiller condenser tubes.
  - Clean evaporator tubes every three years.
  - Check flows and pump service.
  - Check compressor oil.
  - Improve chiller performance by raising CW temperatures or reducing condenser water temperature. For each degree, a 1% improvement in efficiency is gained.
- Exhaust Vents
  - Make sure that exhaust vents are always cleared and clean as frequently as needed. Check them after snowstorms for blockages.
- Heat Pumps
  - Check unit cooling cycle in the spring and heating cycle in fall.
  - Clean inside and outside coils.
  - Check fans, motors and bearings for wear and lubrication.
  - Check refrigeration pressures and temperatures.
  - Check compressor oil.
  - Check thermostat and discharge air temperatures.
  - Check condensate drain pan and line for proper drainage.

- Repair dampers and economizers.

Recommendation #4: Maintain Weatherization of Windows and Doors

Energy Benefits: Leaks and cracks allow hot or cool air to escape, causing heating and cooling systems to work harder to maintain set temperatures. Maintaining properly sealed windows and doors can significantly reduce heating and cooling costs.

How:

- Doors
  - Check exterior doors for air leaks. Sweeps should be replaced when worn.
  - Check weather-stripping and auto closers for doors annually.

- Windows
  - Windows should be properly caulked and sealed.
  - Window panes, frames and glazed and caulked joints should be intact.
  - Weather-stripping should be intact.
  - Check and repair shading devices as needed.

Recommendation #5: Repair Leaking Faucets, Toilets, and Pipes

Energy Benefits: In just one month, a leaking faucet can waste hundreds of gallons of water. Hot water use can be reduced by simply repairing leaky fixtures. A leak of one drip per second can cost $1.00 per month.

How:

- Regularly check toilets, faucets, and pipes for leaks.

Recommendation #6: Maintain Refrigerator Efficiency

Energy Benefits: If not maintained, refrigerators can be a huge energy drain on buildings with kitchens. Quick, simple maintenance can significantly improve efficiency.

How:

- Keep refrigerator and freezer settings at maximum recommended temperatures. Aim for 40°F for refrigerators and 0°F for freezers. Use inexpensive thermometers to monitor temperatures.
- Use refrigerators with hot gas defrost and evaporative condensers.
- Check gaskets and closing mechanisms on refrigerator doors frequently. Close a dollar bill in the refrigerator door and then pull. If it comes out easily, check for worn gaskets or out-of-adjustment closing mechanisms.
- Clean all refrigerator coils regularly. Keep refrigerator coils free of dust to optimize efficiency.
- Clean the drain hole and drip pan.
- Regularly change water filters.
- Defrost refrigerators and freezers regularly since frost buildup decreases efficiency.
- Consult the refrigerator owner's manual to find out if there are any other maintenance

practices specific to the refrigerator model.

Recommendation #7: Regularly Maintain Vending Machines

Energy Benefits: Vending machines consume considerable amounts of energy. Cleaning them is essential for achieving optimum efficiency.

How:

- Minimize the number of vending machines in each building.
- Without significantly reducing revenue generated from purchases, consider placing vending machines in areas that are less-frequented so that they will be able to shut down when not in use. This will allow for maximum savings from VendingMisers and SnackMisers.
- Clean beverage and snack vending machines at least twice a year to remove sticky surfaces and crumbs.
- Ask vendor to disconnect internal lights to save energy if a WattMiser is not used.

Recommendation #8: Set Timers on Water Heating Circulator Pump

Energy Benefits: Circulator pumps run all day, even when hot water is not needed during unoccupied building hours. Shutting down the pump at night and during weekends and holidays can reduce electricity used by the pump and significantly reduces energy for water heating.

How:

- Use electro-mechanical timers for controlling hot water circulator pumps.
- If the pump plugs directly into a wall outlet it is better to use a 24-hour plug-in timer.

Leading by Example Energy Tip Sheet

PRODUCTS

1. Replace Incandescent Lights with Compact Fluorescent Lamps
2. Replace Old Exit Signs with LED Exit Signs
3. Install VendingMisers and SnackMisers
4. Install Faucet Aerators in All Sinks
5. Install Programmable Thermostats and Fans
6. Install Motion Sensors
7. Comply with New Commonwealth Computer Power Management Standards
8. Purchase ENERGY STAR Appliances, Foodservice Equipment, Office Equipment
9. Landscape for Energy Efficiency
10. Install CO_2 Sensors
11. Purchase NEMA Premium Efficiency Motors

BEHAVIORS

1. Encourage Behavioral Changes
2. Sign Up for Demand Response with ISO-New England
3. Maximum Office Equipment Efficiency
4. Reduce Lighting Associated with Cleaning Activities
5. Reduce Energy Used for Heating and Cooling
6. Minimize Vehicle Use
7. Minimize and Improve Lighting
8. Reduce Hot Water Usage

MAINTENANCE

1. Evaluate Building Systems Together
2. Consult DCAM's Facilities Maintenance Manual
3. Conduct Regular Maintenance on HVAC Systems
4. Maintain Weatherization of Windows and Doors
5. Repair Leaking Faucets, Toilets, and Pipes
6. Maintain Refrigerator Efficiency
7. Regularly Maintain Vending Machines
8. Set Timers on Water Heating Circulator Pump