



TEAM UP FOR ENERGY SAVINGS

Heating and Cooling

Saving the environment and saving money can be as easy as checking a thermostat. That means you're on the front line for energy-saving opportunities. Team up with co-workers to spot chances to reduce the energy used by your heating, ventilating and air-conditioning (HVAC) system – it's good for the environment and good for the bottom line.

Circulate ideas to reduce HVAC costs

Check out your HVAC system. After you understand what kind it is, what it does and how it operates, you can identify where energy is wasted and where there are opportunities for greater efficiency. To conserve energy and cut costs, there are three main areas to consider:

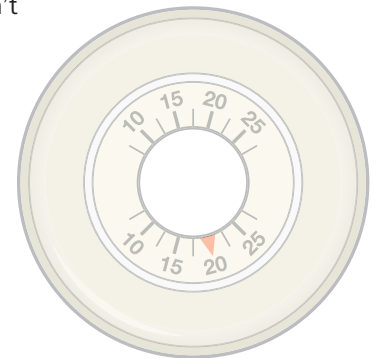
1. Housekeeping

- › Shut down unneeded equipment (install control interlocks to shut down heating or cooling system pumps when no output is required).
- › Shut off unneeded heat producing equipment, such as computers and photocopiers.
- › Check and recalibrate thermostats and air and water temperature controls (use lockable covers on thermostats and automatic controls to prevent tampering).
- › Establish minimum and maximum temperatures.
- › Adjust airflow rates to reflect how the facility is being used (install time clocks to switch to 100 percent recirculation when spaces are unoccupied).
- › Close vents in winter, open them in summer.
- › Adjust and tighten damper links.
- › Check belts and motor drives on fans.
- › Check air system filters.
- › Shut off exhaust and make-up air systems when unneeded (install economizer controls on the central air handling system to use outdoor air to replace refrigerated cooling).

- › Replace damaged or missing insulation on pipes and ducts.
- › Repair crushed or leaky air ducts.
- › Clean heat exchangers, heating units and heating coils.

2. Low-cost opportunities

- › Reduce heat gain in air-conditioned spaces to decrease energy use:
 - › Improve building fabric (e.g. insulation, solar shading).
 - › Shield the building with trees.
 - › Reduce lighting use with upgrades.
 - › Consider increased use of natural light.
 - › Insulate hot surfaces.
 - › Isolate heat-generating equipment and provide local exhaust and make-up air.
 - › Block unneeded windows.
- › Reduce heat loss to save energy and to improve working conditions and productivity:
 - › Improve building insulation.
 - › Insulate cold pipes, ducts and other conduits.
 - › Block unneeded windows.
 - › Upgrade windows and doors.
 - › Control air leaks from the facility.
- › Add automatic control valves at unit heaters and fan-coil heaters to shut off the flow of water or steam when fans aren't running.
- › Consider installing variable-speed drives to a centrifugal chiller – savings of up to 40 percent versus a conventional chiller may be possible.



- › Reduce humidity requirements:
 - › Lower current humidity levels for human comfort and production requirements.
 - › Monitor and clean water used for humidifying.
- › Use a high-pressure water atomizer instead of a compressed-air humidifier (atomizing pumps typically use much less energy than humidifying compressors).
- › Implement an automated control system:
 - › For facilities that don't operate all the time, an automated control system that reduces temperatures and ventilation rates can yield big energy savings. Implementing an automated control system can be as simple as installing programmable thermostats or as complex as installing digital controls.
 - › Use a sequence controller.

3. Retrofits

- › Equipment upgrades that modify or convert inefficient HVAC systems can save significant energy.
- › Upgrade lighting technology.
- › Review loads and equipment sizes.
- › Heat recovery:
 - › Heat recovery is one of the most promising areas in HVAC efficiency. It involves reclaiming heat and using the energy to heat make-up air in winter and to cool make-up air in summer. Waste heat can be recovered from areas such as exhaust air and wastewater.
- › Alternative energy sources:
 - › Solarwall® is a metal collector designed to provide preheated ventilation (make-up air) for buildings that have large south-facing walls. It captures solar energy and provides additional insulation to the building. Paybacks as short as one year are possible.
 - › Ground-source heat pumps allow HVAC systems to use ground water for heating and cooling.

Evaluate your HVAC system

1. Is equipment running in vacant areas?

- Yes Shut down unneeded equipment.
Install timer controls to turn equipment off after business hours.

No Recheck periodically.

Done by: _____

Date: _____

2. Are temperatures appropriate (21°C in winter / 24°C in summer)?

Yes Calibrate thermostats at the beginning of the spring and fall.

No Set the thermostats at the lowest acceptable setting in winter and the highest acceptable setting in summer.

Done by: _____

Date: _____

3. Can thermostats be turned down at night?

Yes Check that temperatures are lower at night than in daytime (winter 2–3°C lower / summer 2–3°C higher).

No Install set-back thermostats in areas that are unoccupied overnight and on weekends.

Done by: _____

Date: _____

4. Are fan and pump belts properly aligned?

Yes Recheck monthly.

No Adjust belt tension and align couplings.

Done by: _____

Date: _____

5. Are vents closed? Do dampers close tightly?

Yes Recheck at least once a season.

No Repair or replace links and dampers.

Done by: _____

Date: _____

6. Is the building under negative pressure?

Yes Check for an imbalance between exhaust and make-up air (consider installing a make-up air system to correct the imbalance).

No Check for stratification.

Done by: _____

Date: _____

7. Is too much cold or hot air getting in?

Yes Find the leaks and close them with caulking or weatherstripping.

Consider installing low-leak dampers or air curtains.

No Recheck at least annually.

Done by: _____

Date: _____

8. Is the intake of outdoor air more than what the American Society of Heating, Refrigerating and Air-Conditioning Engineers recommends or more than required for the process of dilution of contaminants?

Yes Consider steps to reduce the intake of outdoor air.

No No action required.

Done by: _____

Date: _____

9. Are insulation and solar shading adequate? Are all windows needed?

Yes No action required.

No Consider upgrading insulation, improving shading of windows and blocking unneeded windows.

Done by: _____

Date: _____

10. Are surfaces hot? Does any equipment generate enough heat to feel it?

Yes Add insulation.

Consider isolating heat-generating equipment and exhausting air.

No No action required.

Done by: _____

Date: _____

11. Is there high-volume exhaust at room temperature or higher?

Yes Consider a heat recovery system to preheat and pre-cool make-up air.

No No action required.

Done by: _____

Date: _____

12. Does the air-conditioning consume a lot of energy?

Yes Consider obtaining advice on using a ground-source heat pump for space cooling and heating.

No No action required.

Done by: _____

Date: _____

13. Is electric space heating widely used? Are large quantities of energy used to heat intake air?

Yes Consider natural gas heating.

Consider all of the following to warm intake air:

- ground-source heat pump
- solar heating
- waste heat recovery
- off-peak thermal storage

No No action required, but recheck when fuel or equipment costs change.

Done by: _____

Date: _____



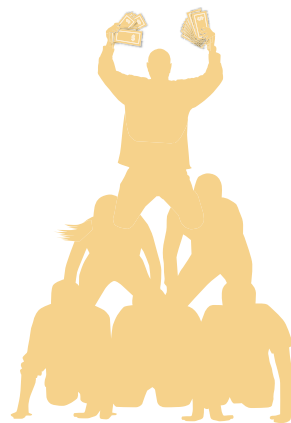


Recycled paper © Her Majesty the Queen in Right of Canada, 2009

Cat. No. M4-76/4-2009E (Print)
ISBN 978-1-100-11658-7

Cat. No. M4-76/4-2009E-PDF (On-line)
ISBN 978-1-100-11659-4

Aussi disponible en français sous le titre : ENSEMBLE, ÉCONOMISONS
L'ÉNERGIE! Le chauffage et la climatisation



For more information: oee.nrcan.gc.ca/industrial