



Natural Resources
Canada

Ressources naturelles
Canada



ecoENERGY
an ecoACTION initiative

TEAM UP FOR ENERGY SAVINGS

Boilers

Saving the environment and saving money are possible when you keep your boiler system clean. Team up with co-workers to spot ways to reduce the energy your boiler system uses – it's good for the environment and good for the bottom line.

Boiling it down for energy savings

Check out your boiler system to improve its energy efficiency. A boiler system audit will reveal losses and inefficiencies. Natural Resources Canada's (NRCan's) Boiler Efficiency Calculator can also help you decide whether to upgrade control systems or install extra heat exchangers, economizers or air heaters. You might even be able to conserve energy and cut costs by replacing your systems with more efficient equipment. Consider three main areas:

1. Housekeeping

- › Keep boiler tubes clean.
- › Maintain good steam or water quality with regular water chemical treatment and optimal blowdown.
- › Maintain the boiler, heat distribution and condensate collection systems.
- › Keep unwanted air out of the boiler and flue gas exhaust system.
- › Minimize load swings and schedule demand where possible to maximize boiler efficiencies.
- › Operate at the lowest steam parameters (or heating fluid temperature) needed to meet demand.
- › Regularly maintain steam traps and process equipment that use downstream steam (or heating fluid) so they run efficiently.
- › Operate process equipment at capacity, and shut it down when not needed.

2. Low-cost opportunities

- › Install performance-monitoring equipment.
- › Make sure sensors and control devices can be accessed easily for control and maintenance.
- › Repair, replace or add air vents (e.g. thermostatic air vents).
- › Improve insulation on boiler, pipes, flanges, fittings and other equipment.
- › Reduce excess air by adjusting the burner and combustion air dampers.
- › Find out if any combustible by-products (e.g. waste hydrogen, oxygen, carbon monoxide, biogas or hydrocarbon streams, or biomass) could be used as no- or low-cost boiler fuel supplements.

3. Retrofits

- › Replace obsolete boilers with high-efficiency, low-emission units fitted with new burner technology and heat recovery. The new boilers should also fit the demand to avoid part-load operation.
- › Use the correct pipe size. In heating fluid systems, consider the economics of larger pipes versus pumping costs and pressure losses.
- › Consider converting from steam to heating fluid when retrofitting the process or the heating system.
- › If a waste product is flared off in the operations, consider using it to preheat boiler combustion air or to operate a micro-turbine generator.
- › If there is an application for latent heat recovery, install an economizer, a combustion air preheater or a flue gas condenser to recover heat from flue gas.
- › Use the remaining heat in the flue gas for space heating, process or drying the product or biomass fuel.



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Aussi disponible en français sous le titre : ENSEMBLE, ÉCONOMISONS L'ÉNERGIE! Chaudières

Evaluate your boiler system

1. Analyse the flue gas. Is the content of oxygen (O₂), carbon monoxide (CO) and nitrogen oxide (NO_x) of excess air within an acceptable range?

- Yes Check monthly to maintain standard.
- No Consult a burner technician to determine whether the burner can be adjusted to reduce excess air. Prevent unwanted air from entering through cover leaks, observation ports or faulty gaskets.

Done by: _____

Date: _____

2. Is the flue gas free of combustibles?

- Yes Check monthly to maintain standard.
- No Have a burner technician adjust the burner to eliminate combustibles.

Done by: _____

Date: _____

3. Does the system use an economizer or air heater?

- Yes At next shutdown
 - › make sure the unit is operating and not bypassed;
 - › calculate the heat recovered and compare with design;
 - › check fins and tubes for damage, especially from corrosion; and
 - › remove accumulated soot.
- No Investigate the benefits of recovering flue gas heat by installing an economizer.

Done by: _____

Date: _____

4. Is there potential for recovering heat from blowdown water?

- Yes Consult an engineer.
- No No action required.

Done by: _____

Date: _____

5. Is the blowdown rate at the level recommended by water treatment specialists?

- Yes No action required.
- No Adjust the blowdown rate and frequency.

Done by: _____

Date: _____

6. Is less than 80 percent of the condensate returned to boilers?

- Yes Determine whether the condensate is within acceptable chemical parameters and whether returning it to the boiler would be economical. Consider options for returning more condensate to the boiler system.
- No Check periodically to see if the situation improves.

Done by: _____

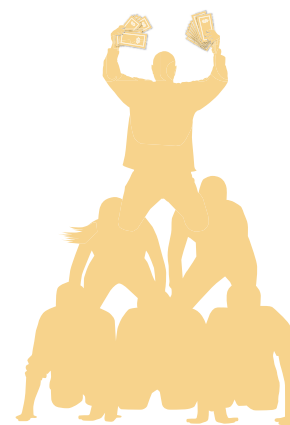
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7. Use NRCan's Boiler Efficiency Calculator.

It will help you decide whether to upgrade control systems or install equipment to recover heat. You will find the Calculator at oee.nrcan.gc.ca/industrial/technical-info/tools/boilers/index.cfm?attr=24.

Done by: _____

Date: _____



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