

Savings Analysis Worksheet

Water Heating

Opportunity

Hot water is used in a variety of ways in commercial buildings, ranging from hot water for a bathroom sink in an office building, to heavy use, such as dish or clothes washing in restaurants, health care facilities and laundromats. Significant energy cost savings can be realized by improving the efficiency of water heating or reducing the need for hot water, where it is in heavy use.

Actions

- 1. Replace old tank water heater with high efficiency natural gas water heater.** Newer systems, such as sealed combustion condensing units or an indirect system that heats water with high efficiency condensing modules and then stores the heated water in tanks, can be 90 percent more efficient. Use the worksheet on the other side of this page to estimate the savings you would realize by installing a high efficiency natural gas water heater.
- 2. Insulate any non-insulated hot water pipes.** Hot water pipes that are not insulated allow heat to be lost more rapidly from the water. This results in a need for a higher temperature set point at the heater, in order to achieve a satisfactory temperature where the water is being used.
- 3. Install low-flow aerators on sinks.** Low-flow aerators reduce the amount of water used when someone turns on the faucet. This translates into reduced hot water costs.
- 4. Install high efficiency natural gas booster heaters to achieve a higher temperature for dish washing, instead of maintaining a higher tank temperature.** If you are required to wash dishes with 140 degree Fahrenheit or higher water, and you have a tank style water heater, it makes more sense to heat the water to 120 degrees Fahrenheit, and then boost it to the desired temperature at the dishwasher or conversion from electric booster heaters.
- 5. Consider a tankless water heater.** Hot water stored in tanks is wasteful because heat is lost through the walls of the tank during periods of low demand, and then the water must be reheated. Tankless water heaters (also called on demand or instantaneous water heaters) heat water only when there is a demand for it, eliminating losses from the tank.

More Information

You can use the worksheet to gain an understanding of the savings potential. Consult your water heater dealer for a more precise estimate on prices and savings for your situation. For names of dealers in your area, fact sheets on other energy saving opportunities and more information on the Focus on Energy Program, call 800.762.7077. Information in this fact sheet was derived from the ENERGY STAR® Small Business Guide published by EPA and other sources. For further information on the ENERGY STAR Small Business Program, visit energystar.gov or call Focus on Energy.



Estimate Your Savings

Estimate the savings from installing a high efficiency natural gas water heater by completing the worksheet below.

- A. Enter your current estimated daily hot water use. You can use Table 1 to help you estimate this based on the function of your building.
- B. Enter the number of days of typical building operation per year.
- C. Enter the set point heat factor based on your water heater set point temperature from Table 2. The heat factor is a thermodynamic function of the water at the set point temperature expressed in Btu per pound of water.
- D. Enter the efficiency of the old water heater from Table 3 based on the age of the unit.
- E. Calculate your current annual cost of water heating based on the formula in the chart below.
- F. Enter your estimated daily hot water use.
- G. Enter the number of days of typical building operation per year.
- H. Enter the set point heat factor based on your proposed water heater set point temperature from Table 2.
- I. Enter the efficiency of the new water heater from Table 3.
- J. Calculate your current annual operating cost based on the formula in the chart below.
- K. Calculate your proposed annual energy cost by subtracting J from E.

EXISTING SYSTEM CALCULATION AREA

A. Gallons per day		Pounds per gallon		B. Days per year		C. Set point heat factor		Cold water heat factor		D. Old unit efficiency		Btu/therm		Gas rate		E.
	x	8.33	x		x	(-	28)	+		+	100,000	x	\$.71	=	

Table 1
Typical Hot Water Use

Function	Gallons per Day	Notes
Office	1.0	Per person
School	1.0	Per student
Restaurant	2.4	Per meal
Nursing home	18.4	Per bed
Motel	15.0	Per unit
Salon	80.0	Per basin
Laundromat	50.0	Per top-loading washer
	30.0	Per front-loading washer

Table 2
Water Heat Temperature Setting

Temperature Degrees Fahrenheit	Heat Factor (Btu/pound)
100	68
110	78
120	88
130	98
140	108
150	118
160	128

Table 3
Approximate Efficiency Based on Age

Approximate Age	Without Tank Storage	With Tank Storage*
5-10	75%	60%
10-20	65%	50%

*Such as a typical residential unit.

PROPOSED SYSTEM CALCULATION AREA

F. Gallons per day		Pounds per gallon		G. Days per year		H. Set point heat factor		Cold water heat factor		I. New unit efficiency		Btu/therm		Gas rate		J.
	x	8.33	x		x	(-	28)	+		+	100,000	x	\$.71	=	

K. Annual savings = E - J = \$ _____

Focus on Energy is a public-private partnership offering energy information and services to energy utility customers throughout Wisconsin. The goals of this program are to encourage energy efficiency and use of renewable energy, enhance the environment, and ensure the future supply of energy for Wisconsin. **800.762.7077. focusonenergy.com**

