



## Facilitator — February/March 2011



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### “Green” Hot Water

Charles W. Adams

“Green” Hot Water Good for the Environment—and Your Bottom-line

Green” hot water is a good thing—in two different ways. By changing from a standard-efficiency to a high-efficiency gas storage water heater (or a tankless water heater, in the right application), you can take advantage of both ways of being green: the environmental way, by reducing greenhouse gas emissions, and the “cash” way, by keeping more of what you earned.

#### Running Hot

You’re probably already aware of the high usage of hot water in foodservice establishments. The Food Service Technology Center’s Water Heating Design Guide says a reasonable estimate of typical hot water use for quick-service restaurants is around 500 gallons per day. For full-service restaurants, it’s around 2,500 gallons per day. (Larger fullservice restaurants may use up to around 4,000 gallons per day.) The Department of Energy’s Energy Information Administration reports that this translates to natural gas usage of about 560 million therms used every year to meet the hot water needs of the approximately 940,000 food-service establishments in the United States. (One therm is equal to 100,000 BTUs.)

The majority of water heaters installed in commercial kitchens have a thermal efficiency of 80 percent. However, high-efficiency commercial gas water heaters have been on the market for several years, from multiple manufacturers, with thermal efficiencies of 95 percent and higher. Switching from the installed base of 80 percent efficiency to 96 percent efficiency would have a huge impact on individual restaurants’ operating cost, the nation’s energy usage and the environment.

#### Deep Impacts

First, let’s look at an individual restaurant. Consider a full-service restaurant with an 80-percent-efficiency water heater and a daily hot water usage of 2,500 gallons. On a yearly basis, this would translate to a natural gas usage of about 8,800 therms.

Replacing the water heater with a 96-percent-efficiency model would lower the natural gas usage to about 7,330 therms, for a savings of 1,470 therms, or roughly 16 percent (essentially the difference in heater efficiency). At an average natural gas price of \$1 per therm, this translates to a savings of approximately \$1,500 per year on an \$8,800 water heating gas utility bill.

Simple payback on such a changeout, especially when the replacement is due to the old heater reaching end-of-life, can be as short as a year. In a newly built restaurant, because of the lower installation costs for the venting materials of high-efficiency heaters, the payback on a high-efficiency heater instead of a standard-efficiency model can be almost immediate. (The FSTC Water Heating Design Guide has additional details and examples.)

To look at the national impact, let’s do the easy math first: the energy savings. Assuming we could magically change out all of the existing installed heaters at one time, the 560 million therms of natural gas now used would drop by 16 percent, resulting in a new usage of about 470 million therms: a savings of 90 million therms per year. To put that much savings in context, 90 million therms is about the amount of natural gas used by approximately 110,000 residential homes in one year.

Finally, to look at the potential environmental impact of this reduction in natural gas usage, the Environmental Protection Agency provides a handy Greenhouse Gas Equivalency Calculator at [www.epa.gov/cleanenergy/energy-resources/calculator.html](http://www.epa.gov/cleanenergy/energy-resources/calculator.html). By entering the 90 million therms of savings into the calculator,

we see that the emissions reduction is 450,000 metric tons of CO2 equivalent, or the same result as taking 86,000 cars off the road.

#### A Win-Win Proposition

Regardless of whether you believe in global warming, reducing your environmental impact by doing something that saves your business money cannot be a bad thing.

So where does all of this get us? The next time a water heater fails, we should all replace it with a high-efficiency version. If we do, the installed base will be changed out within the next 10 years or so. Best of all, the food-service industry will have had a measurable impact on “greening” the environment, and at \$1 per therm, we will be “greening” our businesses to the tune of \$90 million per year in lower gas bills.

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