

# water heaters



## taking responsibility

As an individual, your efficient use of energy brings benefits such as lower bills, improved comfort levels in your home and a reduced personal impact on the environment.

Acting together, our individual choices add up—for the benefit of our community, our environment and our energy future. That's the power of working together.

As your community energy company, we are committed to sharing our experience and energy expertise. You can always contact us for:

- Answers to your energy questions.
- Energy efficiency information and advice.
- Help in evaluating energy-saving options.
- Assistance in finding energy-efficient products.

# Natural gas or electric?

If you're shopping for a new water heater, we can help you make a more informed choice. From the advantages of natural gas over electric water heaters to tips on choosing the right size, saving energy and staying safe, this booklet covers it all. For more information, visit [mge.com](http://mge.com) or call us at 252-7117.

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## Put our experience to work

Remodeling? Buying new appliances? Making your home more comfortable? Check with MGE, your community energy company. Get:

- Answers to energy-related questions.
- Information on energy-saving topics.
- Resources for products that save energy.
- Help selecting the right energy-saving products.



## What to buy

Buy a natural gas water heater if possible. Gas heats water at about half the cost of electricity and twice as fast. As of Jan. 1, 2009, water heaters are available with the ENERGY STAR® label. Conventional electric water heaters don't qualify.

MGE offers two rates to consider if you have an electric water

| <b>Natural gas vs. electric</b>   |
|---|
| Water heating for the average household*  |
| Gas saves: <ul style="list-style-type: none"><li>• \$300 per year</li><li>• Over 3,100 lbs. of coal per year</li><li>• Over 6,800 lbs. of carbon dioxide per year</li></ul> |

heater: time-of-use and controlled water heating. These rates may save money if you use a lot of hot water.

*\*Based on analysis by Energy Center of Wisconsin. Gas at \$1.40/therm, electricity at \$0.13/kWh.*

Call the MGE Home Energy Line

at 252-7117 for information on converting from electric to high-efficiency gas water heating.

Focus on Energy has Cash-Back Rewards for certain water heaters and for switching from electric to gas water heating. Call 1-800-762-7077 for more information on these incentives.

## What size to buy

A 40-gallon natural gas water heater often serves a household with four or fewer people. Check the sizing guide below if you use a lot of hot water or if you must buy an electric water heater.



### Sizing guide

Use these charts to determine water heater capacity.

Before buying a new water heater, consider:

- Do you own a whirlpool or oversized tub?
- Do you have more than two full baths in your home?
- Do you plan to add bathrooms in the future?
- Do you have teenagers in your home?

If yes, consider a larger water heater.

| Gas water heater |                          |
|------------------|--------------------------|
| Household size   | Gallon capacity required |
| 5 or more        | 50 to 75                 |
| 1 to 4           | 40                       |

| Electric water heater |                          |
|-----------------------|--------------------------|
| Household size        | Gallon capacity required |
| 5 or more             | 65 to 80                 |
| 1 to 4                | 50                       |

## Look for a high energy factor

The higher the energy factor, the more efficient the water heater. MGE recommends an energy factor of 0.62 or higher for gas tank-style water heaters 50 gallons or smaller.

| <b>The energy factor's effect on life-cycle cost</b> |               |                           |                                  |                                      |
|--|---------------|---------------------------|----------------------------------|--------------------------------------|
| Fuel type  | Energy factor | Estimated price installed | Estimated yearly operating cost* | Estimated life-cycle cost (13 years) |
| Conventional gas (high-efficiency)                   | 0.62          | \$700                     | \$338                            | \$5,094                              |
| Power-vented gas (high-efficiency)                   | 0.62          | \$950                     | \$338                            | \$5,344                              |
| 40-gallon gas (lowest energy factor available)       | 0.59          | \$680                     | \$355                            | \$5,295                              |
| Electric (high-efficiency)                           | 0.93          | \$620                     | \$613                            | \$8,589                              |
| 50-gallon electric (lowest energy factor available)  | 0.90          | \$590                     | \$635                            | \$8,845                              |

| <b>Calculating life-cycle cost</b> |          |   |          |                |          |                 |
|------------------------------------|----------|---|----------|----------------|----------|-----------------|
| Estimated yearly operating costs   | <b>x</b> | Average lifetime of appliance (13 years for a water heater) | <b>+</b> | Purchase price | <b>=</b> | Life-cycle cost |

\*For a four-person household. Based on the following fuel costs: Gas, \$1.40/therm; electric, \$0.13/kWh.

## Warranty

MGE recommends looking for at least a six-year warranty.

## Installation

MGE recommends hiring a licensed installer. Call a plumber or look in the yellow pages under “water heaters.” A licensed installer can obtain a permit, haul away the old heater, and install the correct temperature and pressure-relief valve.

## Install heat traps

Some heaters come with factory-installed heat traps. If not, install these inexpensive energy-saving devices that connect the heater to the water pipes.

Some manufacturers ship their heaters with pieces of pipe insulation rather than heat traps. Heat traps may make a chattering noise or aggravate slow flow problems.

## Types of water heaters

### Gas water heaters

There are several types of gas water heaters:

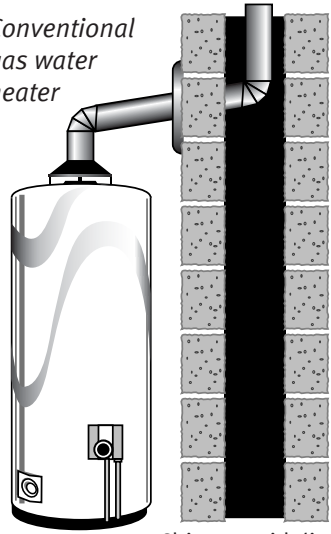
- Conventional
- Side-vented (vented straight out the wall using approved vent piping)
- On-demand (tankless)
- Condensing (similar to high-efficiency condensing furnaces)
- Integrated

## Conventional

Conventional water heaters vent into a chimney, often along with a furnace.

If the water heater is the only appliance vented into the chimney, a chimney liner is often required. It ensures safe venting and prevents chimney damage due to condensation.

*Conventional gas water heater*

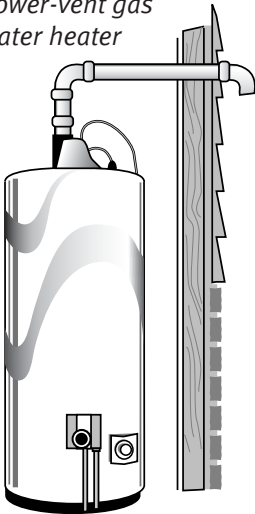


Chimney with liner

## Side-vented

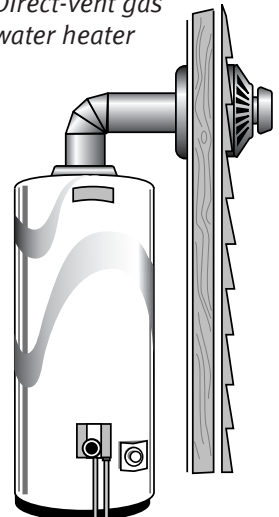
**Power-vent** gas water heaters use a small fan to exhaust flue gases. Some models can be located up to 85 feet from an outside wall. An electrical connection for the exhaust fan is needed. It costs only a few dollars per year for a family of four to run the fan. Power-vent water heaters have safety shutoffs that turn off the burner if the fan fails to operate.

*Power-vent gas water heater*



**Direct-vent**, sealed combustion gas water heaters use outside air for combustion. They don't use an exhaust fan, so no electrical connection is needed. They must be located near an outside wall for venting purposes.

*Direct-vent gas water heater*



Consider side-vented water heaters:

- With a side-vented furnace—Compare the cost of lining and maintaining a chimney versus the cost to install a side-vented water heater.
- When converting to natural gas from electric water heating—Compare the cost of venting the water heater through the chimney to the cost of a side-vented water heater.
- When building a home—Save the cost of installing a chimney.

### **On-demand (tankless)**

On-demand water heaters heat water immediately but don't store it. Savings of about 25% on hot water are possible. They are well-suited for vacation homes and new construction. Lime buildup from hard water can cause problems with on-demand heaters, so a water softener is recommended. For a copy of our in-depth fact sheet about on-demand water heaters, call our Home Energy Line at 252-7117 or read the fact sheet online at [mge.com](http://mge.com).



*On-demand water heater display model*

### **Condensing**

Featuring 90% “thermal efficiency,” condensing water heaters exhaust to the outdoors through plastic pipe and require a condensate drain hose. The technology is similar to high-efficiency condensing furnaces and boilers. Savings of about 25% on hot water are possible.

## Integrated

These units combine both water-heating and space-heating functions into one appliance. Most integrated water heaters provide large amounts of hot water and feature sealed combustion.

If you need to buy:

- Both a furnace and a water heater—Compare the cost and performance of an integrated heater versus separate units.
- A high-efficiency boiler—Companion tanks are available to store hot water made by the boiler. Companion tank water heaters have a very low operating cost and a long life.

## Electric water heaters

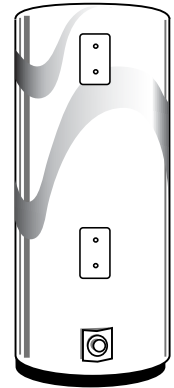
There are two types of electric water heaters to choose from:

- Conventional
- Heat pump

### Conventional

Conventional electric water heaters use an electric heating element located inside the water tank. High-efficiency units feature more insulation to reduce heat loss. Buy a natural gas water heater if possible. Gas heats water at half the cost of electricity and twice as fast. Call the MGE Home Energy line at 252-7117 for information on converting from electric to high-efficiency gas water heating.

*Electric water heater*



## Heat pump

Heat pump units remove heat from the surrounding air to heat water. They cost more to buy but save electricity over the life of the heater.

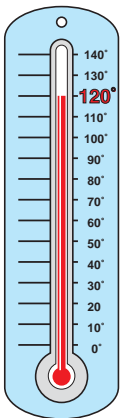
## Solar water heating

Solar energy can provide a majority of a home's hot water, reducing the fuel required for water heating by as much as two-thirds.

For more information on solar water heating, call Focus in Energy at 1-800-762-7077 or visit [focusonenergy.com](http://focusonenergy.com).

## Softening

Proper softening can make water heaters last longer. Over-softening can shorten the life of a water heater. Over-softening also wastes water and salt and puts excess salt into the watershed. MGE recommends softeners that regenerate when needed rather than those that use a timer. If possible, have the existing timer control replaced with a "demand-initiated regeneration" control. If not, have the control adjusted so excess salt is not used each time the softener regenerates.



## Safety

For safety and efficiency, set the water temperature at 120°F to 125°F. Use a thermometer to measure the temperature at the tub faucet. Antiscald valves can be installed that limit water temperature and prevent burns.

To adjust the temperature on an electric water heater, turn off the electricity to the heater before removing cover plates.

Don't use hot water from the tap for cooking or drinking. It can have higher levels of dissolved metals such as lead. Be especially careful not to use this short cut when mixing infant formula.

Don't use or store flammable products such as gasoline, paint thinner or adhesives in the same room as a furnace or water heater.

For more details on the dangers of scalding and flammable vapors, read the warning labels on the water heater.

## Energy-saving tips

- **Should I insulate my water heater?**

Pre-1990 water heaters (especially electric heaters) benefit most from tank insulation. Follow safety instructions that come with the insulation kit, especially for gas heaters.

Don't cover warning labels on newer water heaters.

- **Should I insulate my water pipes?**

Yes. We recommend insulating the first five feet of the cold water pipes and all of the hot water pipes. Avoid placing insulation near the hot flue pipe. Check your local building code for more information.



- **Will it cost less to operate a water heater at a lower setting?**

Yes. MGE recommends setting the water temperature at 120°F to 125°F for safety and energy savings. The best way to measure water temperature is with a kitchen thermometer at the faucet nearest to the water heater.

- **Are low-flow devices worth installing?**

Yes. Low-flow showerheads and aerators can pay for themselves with the hot water saved. However, compare the gallons per minute (GPM) rating on the new vs. old showerhead. Usually the GPM rating is stamped on the showerhead. The new showerhead needs to use fewer GPM, otherwise you won't see any savings.

- **Will I reduce my water-heating costs if I wash my clothes in cold water?**

Yes. A cold-water wash is one-third the cost of a warm-water wash.

- **Should I drain my water heater every month?**

Follow the manufacturer's directions for draining a new water heater. This can remove lime sediment which can shorten the life of the water heater. It may be best not to drain an older water heater that has not been drained regularly. Sediment may become lodged in the drain valve, making it difficult to close.

## Resources and references

### Rebate information

Focus on Energy 1-800-762-7077 or [focusonenergy.com](http://focusonenergy.com)

### Hot water burn prevention

<http://tinyurl.com/2abupu9>

### Consumers' Directory of Certified Efficiency Ratings for Heating and Water Heating Equipment

<http://tinyurl.com/26m6b42>

### Books

*The Water Heater Workbook*, Larry and Suzanne Weingarten  
Available at Madison Public Library

### On-demand water heaters

<http://tinyurl.com/a8ze3> (Department of Energy fact sheet)

<http://tinyurl.com/246sex> (MGE fact sheet)

## Look for this symbol when you shop

ENERGY STAR® labeled products use less energy than other products. They reduce your energy costs and help to protect the



environment. Water heaters were ENERGY STAR labeled in 2009, but conventional electric heaters don't qualify. We're an ENERGY STAR partner. Learn more about qualifying products at [www.energystar.gov](http://www.energystar.gov) or call MGE at 252-7117.

## listening. learning.

MGE takes responsibility to provide information and education to serve our customers and stakeholders. We educate customers today to help inform their decision making. We educate tomorrow's stakeholders so they can help plan our energy future.

If every homeowner with an electric water heater converted to a natural gas water heater, we could save 36 million pounds of coal per year. *Working together we can make a difference.*

Contact us for information about:


- Heating/Air-conditioning.
- Insulating/Weatherizing.
- Lighting.
- Windows/Doors.
- Appliances.
- Water heating.

Get more home energy information at:

- [mge.com/home](http://mge.com/home).
- Home Energy Line 608-252-7117.
- 800-245-1125.

Questions about billing? Call:

- 608-252-7222.
- 800-245-1125.

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