

HOME ENERGY GUIDE

REPLACING A BOILER

Most boilers have a useful life of 20-30 years, depending on conditions. Boilers in buildings that are leaky and poorly insulated will run more frequently than those in tighter homes—and will have a shortened expected life or higher repair costs. Other circumstances (including poor maintenance) can cause early failures in boilers.

When to replace?

As with a furnace, the boiler may be the most expensive piece of equipment in a home, and deciding when to replace it is a significant decision for homeowners. To avoid a surprise replacement, do your research in advance, based on:

- **Age.** As your boiler approaches the end of its expected life, start planning your replacement strategy.
- **Expensive repairs.** Even if the boiler may have more years of expected life, spending 25% or more of the cost of a new boiler on repairs may indicate replacement rather than repair.
- **Poor energy efficiency.** Boilers that deliver 70% AFUE (annual fuel utilization efficiency) or less efficiency are costing you real dollars in fuel use. An increase in efficiency may easily pay for itself during the life of the new boiler.

What to look for in a new boiler

There are several things to consider when shopping for a new boiler:

Efficiency

Higher efficiency boilers will provide ongoing benefits, including lower energy bills and reduced environmental emissions. The minimum AFUE rating for a gas-fired hot water boiler is 82% and for an oil-fired hot water boiler is 84%.

Going from a 70% efficient boiler to a 98% efficient one could save significant dollars in fuel costs and the attendant environmental costs of using the fuel.

High efficiency gas-fired boilers cannot have a constant burning pilot, and must have an automatic means for adjusting the water temperature to match the heating load.

Proper sizing

It is important to determine the proper size of a new boiler for a given home. Be wary of being sold a unit that is larger than the previous boiler—oversized boilers cycle more frequently, causing extra wear and actually lowering the

comfort level—and will be more expensive to purchase. If significant improvements to the building (additional insulation, air-sealing, new windows) have been made, a smaller boiler might be appropriate. The building code requires a heat-loss calculation based on the size of the house, the insulation levels, the number windows, previous energy bills, etc. Insist on a heat-loss calculation worksheet as part of any contract.

Sealed combustion

New high efficiency boilers no longer take room air for combustion or allow exhaust gasses to rise naturally up a chimney. A sealed combustion boiler keeps the airflow of combustion completely separated from the interior air of the house. This accomplishes several things essential to the safety and efficiency of the boiler:

- **No backdrafting.** Fresh air is drawn in through a plastic PVC pipe and delivered to the combustion chamber; the fuel is burned and the exhaust gasses are vented directly to the outside through a similar plastic PVC pipe with the aid of a fan. As the connections in this system are tightly sealed, the dangers of backdrafting as a result of the operation of the boiler are essentially eliminated.
- **Increased efficiency.** Because the airflow to and from the boiler can be tightly controlled, the ability to provide maximum efficiency in the combustion process is enhanced.
- **Lower flue gas temperatures.** Because more heat is being extracted from the combustion process (through a secondary condensing heat exchanger), less heat is going out the exhaust. This lowers the flue gas temperature, allowing it to be vented through the PVC piping. This lower temperature also reduces risks associated with hotter flue gasses.

Additionally, high efficiency boilers use electronic ignition (rather than a pilot flame) to initiate combustion. Further electronics manage the air/fuel mixture and ensure efficient and safe operation under a wide range of conditions.

When it comes time to replace a boiler it must be matched to the distribution system. A sealed combustion boiler, for example, may not operate efficiently with radiators. In some cases, a higher efficiency boiler may also require an upgraded distribution system.