

HIGH-EFFICIENCY RESIDENTIAL GAS HEATING



Overview: CEE's High-Efficiency Residential Gas Heating Initiative was launched in January 1998 to encourage the purchase and proper installation of high-efficiency gas furnaces and boilers. Initiative participants promote common performance levels for efficient equipment and work with manufacturers and contractors to encourage proper installation practices.

When the initiative began, just 12 percent of furnaces available in the market met CEE's high-efficiency specifications. By 2005, nearly 30 percent of available models qualified for CEE's initiative. Mirroring this increase in availability, high-efficiency furnaces now represent almost one-third of national furnace shipments, a 40 percent increase since 1998. Due to this steady and marked advance in the availability and popularity of energy-efficient equipment, CEE revised the fuel performance levels for gas furnaces in 2002 and added an electricity component to address air-handling efficiency in furnaces in 2003.

CEE is also exploring the opportunity to save gas through energy-efficient water heating.

About This Market: There are approximately 35 million gas furnaces currently operating in U.S. homes. Two million gas furnaces are replaced each year. Since 1990, gas furnaces have experienced an increase in popularity and now represent about 73 percent of all central heating equipment sold. The equipment life of a gas furnace is 15-18 years.

Although boilers are used to heat only 15 percent of the homes in the United States, they represent nearly half of the heating systems in the Northeast and are very durable, usually lasting 30-40 years. Two-thirds of the boilers sold are gas-fired; the rest are oil-heated.

How CEE's Gas Heating Initiative Works: Energy-efficiency programs are the driving force behind this initiative. Participating utilities and other energy-efficiency program administrators promote high-efficiency heating equipment that meets the CEE specifications (see next page). Market acceptance is fostered through financial incentives, educational activities, and industry stakeholder training. CEE assists initiative participants by monitoring program activities and market changes, and facilitating communication between efficiency programs and industry stakeholders.

In addition, CEE maintains a list of CEE-qualified furnaces and boilers on its Web site (www.cee1.org) to help identify efficient equipment. To obtain a copy of the qualifying products list, download a copy from the Residential Gas Heating page on the CEE Web site.

Furnaces and boilers are rated by an Annual Fuel Utilization Efficiency (AFUE). The minimum-efficiency standards, as established by the U.S. Department of Energy, are 78 percent AFUE for furnaces and 80 percent AFUE for hot-water boilers. CEE's efficiency level for gas boilers is 85 percent AFUE, equivalent to the ENERGY STAR[®] level.

In recognizing that different areas of the country have varying heating requirements, the furnace specification consists of three tiers for fuel efficiency as shown on the next page. Tier 1 is set at the current ENERGY STAR level.

FACT SHEET

In November 2003, CEE added an optional specification for electricity use by gas furnaces. Power use for air handling (moving the heated air through the ducts into the house) represents 70-80 percent of the electricity drawn by furnaces. Efficient air-handling systems can include motors with greater efficiency and fans that are aerodynamically more efficient. The optional air-handling performance level specifies that the annual energy use must be less than or equal to 2 percent of the total energy use by the furnace. This specification applies only to furnaces that meet at least the Tier 1 fuel efficiency specification (90 percent AFUE).

CEE's High-Efficiency Residential Gas Heating Initiative Specifications

(See CEE Web site for Terms of Usage)

Annual Fuel Utilization Efficiency (AFUE) performance levels

Technology	CEE specifications (%)	Federal minimum (%)
Gas-fired furnaces	Tier 1: 90 Tier 2: 92 Tier 3: 94	78
Gas-fired boilers	85	80

Air Handling (Electricity Use) performance level*

Technology	CEE specification
Gas-fired furnaces, minimum of 90% AFUE	$3.412 * E_{AE}$
	$3.412 * E_{AE} + 1000 * E_F$
	$\leq 2.0\%$

*There is no Federal minimum for furnace electricity use. E_{AE} (Annual Electricity Use) and E_F (Annual Fuel Energy Use) are outputs of the US Department of Energy test procedure for residential gas furnaces. Both E_{AE} and E_F are listed in the Gas Appliance Manufacturers Association's *Consumers' Directory of Certified Efficiency Ratings for Heating and Water Heating Equipment*.

Quality Installation Specification: This initiative also promotes proper sizing and system installation through utility education programs and installation evaluations. Such measures can reduce system efficiency losses by as much as 35 percent. CEE's Residential Quality Installation Specification, released in 2000 and available on the CEE Web site (www.cee1.org), is a comprehensive guide to the selection, sizing, installation, and maintenance of residential HVAC equipment. CEE is currently working with industry stakeholders in pursuit of a national approach to quality installation.

Expected Energy Savings: Energy savings vary greatly, depending on locale and usage patterns in heating system operations. Investing in high-efficiency heating equipment is generally most cost effective in cooler climates where equipment is used more frequently. In general, consumers can expect to save 12 percent of their heating bills with energy-efficient furnace equipment (compared to equipment meeting minimum federal standards). Investing in an energy-efficient boiler can result in approximately 6 percent energy savings over standard-efficiency equipment. A quality installation can save up to 35 percent of energy losses in furnace heating systems.

For further information about CEE's Residential Gas Heating Initiative, as well as other CEE natural gas programs, contact Kara Rodgers at krodgers@cee1.org or 617-589-3949, ext. 202.