

## Comparative Analysis of Residential Heating Systems Study

1 of 2

### Overview

Evaluating 14 different heating systems in 16 locations across the United States in both new and existing homes, this study measured each system's comparative equipment and installation cost, annual operating cost, carbon dioxide (CO<sub>2</sub>) emissions, and return on investment (ROI). The study did not consider equipment maintenance costs, or cash or tax rebates available to homeowners or construction professionals.

### Overall findings

The study revealed the superior performance of propane-fueled heating systems when comparing several factors, including faster ROI, lower CO<sub>2</sub> emissions, and efficacy as a backup system to air-source heat pumps (ASHPs) in moderate to warm climate zones.

### Northeast Region overview

Fuel oil is the predominant energy source for home heating in the Northeast. In Burlington, Vt., and Buffalo, N.Y., the two Northeast markets sampled in the study, roughly 40% of households use fuel oil to heat their homes, typically with a boiler unit in the basement.

The Northeast was shaken by a fuel oil shortage in 2000, which left many households without heat for days, triggered some of the highest electricity rates in the country, and prompted federal intervention. Natural gas is not widely available to homes in the region. The demand for a reliable, cost-efficient, and cleaner alternative is on the rise. Per-gallon propane rates in Burlington and Buffalo were 19% and 29% lower, respectively, than fuel-oil rates in those cities at the time of the study.

### Northeast Region findings: cost

Based on a comparative review of heating systems in both new and existing homes, the study found the following in the Northeast:

- A high-efficiency, 95% Annual Fuel Utilization Efficiency (AFUE) propane furnace is less expensive to install as a replacement system compared to a standard-efficiency (78% AFUE) fuel-oil furnace. Additionally, a propane furnace has lower operating costs.
- For forced-air furnace systems in new homes, a high-efficiency (95% AFUE) propane-fueled furnace costs about \$2,100 less to install and nearly \$100 a year less to operate versus a high-efficiency (95% AFUE) oil-fueled furnace.
- In new or existing homes, high-efficiency propane furnaces offer payback periods from immediate to less than 1 year, compared to a standard-efficiency fuel-oil furnace.

**\$1,500**  
federal tax credit  
for high-efficiency  
appliances  
through 2010

These comparative costs and resulting ROI calculations don't include the increasing number of federal, state, and local financial incentives, and low-interest loan programs being offered to encourage home energy savings. For instance, in addition to earning a \$1,500 federal tax credit through 2010, builders or homeowners who install a new, 95% AFUE heating system — including those fueled by propane — can benefit from rebates and loan programs offered by the state of Vermont and its primary utilities. New York's list of similar incentives is even longer.

### **Northeast Region findings: environment**

Highlights from the study's findings on the environmental performance of propane versus competitive fuels include:

- A new, high-efficiency propane furnace emits 4,000 fewer pounds of CO<sub>2</sub> into the atmosphere annually than a new, high-efficiency fuel-oil furnace.
- A new, high-efficiency propane furnace emits 10,000 fewer pounds of CO<sub>2</sub> into the atmosphere annually than a standard-efficiency or existing fuel-oil system.

### **Conclusion**

Energy-conscious homeowners shopping for a home heating system almost always ask a construction professional: "Which system costs the least to operate and is the cheapest to install?" This study shows how that question warrants a careful answer, one that covers first costs as well as fuel costs.

For eco-conscious homeowners asking "Which system has the lowest carbon emissions footprint?" it's clear that propane systems outperform fuel-oil systems in the Northeast.

Because residential heating systems are generally replaced every 12 to 18 years, construction professionals have ongoing opportunities to improve the energy and environmental performance of residential heating systems across the United States.

### **About the author of the study**

Newport Partners LLC, a market research firm based in Davidsonville, Md., conducted this study in 2008. Newport Partners specializes in the analysis of building systems' energy performance.

### **For more information**

Download the full heating analysis study at [buildwithpropane.com](http://buildwithpropane.com).

Access information on tax incentives and credits at [buildwithpropane.com/stimulus](http://buildwithpropane.com/stimulus).

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