



Furnace Retrofit – Residential Building

Sample Scenario

The DOE Buildings Performance Database is a decision-support platform comprised of a database and data analysis tools that enables financial and engineering practitioners to evaluate energy efficiency products and services in commercial and residential buildings.

The scenario described below highlight the Database's ability to evaluate residential energy efficiency projects. They are based on the residential building data currently contained in the Database and will demonstrate the capabilities of the energy performance and financial forecasting tools. As more building performance data is added to the Database, additional scenarios will be developed to assist users in making informed investment decisions in energy efficiency projects.

Retrofit Inputs

Select the following input parameters to generate an energy usage forecast and financial forecast analysis on a residential furnace retrofit.

Classification Screen Selection

Energy Usage Forecast

Financial Risk Management Analysis

Location Screen Selection

Zone: 5A (1607)

Building Information Selection

Square Footage

Residence Type	Single Family
Square Footage (Sq. Ft.)	Min. 1,700 Max 2,000
Heating Fuel Type	Natural Gas
Heating System Type	Furnace

Retrofits Page Selection

Heating Efficiency

Retrofit Type	Heating Efficiency
Pre-Retrofit Characteristics	Min. 0.6 Max. 0.61
Post-Retrofit Characteristics	Min. 0.75 Max. 0.78

Financial Information Page Selection

Investment Amount (USD)	500*
Investment Date	January 2013
Time Horizon (# of Years)	15
Construction Duration (Mos.)	1
Discount Rate (%)	5

Energy Price Page Selection

Electricity Pricing Model	EIA Price Prediction
Electricity Pricing Region	East North Central

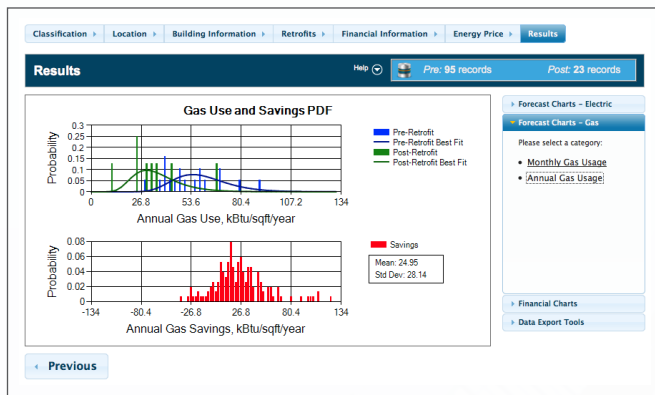
Retrofit Results

After selecting the designated inputs, the Results tab displays a series of helpful charts based on your search parameters and building specifications. Here we examine Annual Gas Usage and Rate of Return Distribution results.

Energy Savings—Annual Gas Usage

The charts below show the annual gas use and savings. The top chart shows the probability distribution of the energy use intensity (kBtu/sf/year) for the pre-retrofit consumption (blue line) and post-retrofit consumption (green line). The bottom chart shows the net savings—the difference between the pre- and post-consumption probability distributions. The results show a mean savings of about 25 kBtu/sf/year and a relatively large standard deviation of about 28 kBtu/sf/year. The wide range is likely because the analysis is based on very few parameters – just climate, building type, and size. The energy use of each building is affected by a number of other parameters such as wall and roof insulation. If the analysis controlled for these additional parameters, the savings estimates will become more accurate and have lower uncertainty. This will be possible as more and richer data are added to the Database.

Energy Savings—Annual Gas Usage



For more information visit:

<http://www.commercialbuildings.energy.gov/bpd.html>

Rate of Return Distribution

The Rate of Return chart shows the distribution of the return from this retrofit based on the investment parameters and energy savings distribution. The blue line shows the probability that each rate of return will be achieved, while the yellow line is a cumulative return graph. The results indicate that there is a 30% probability that the rate of return will be less than 5.4% and a 20% probability that it will be greater than 10.8%.

Rate of Return Distribution

