

## PAOLI RESIDENCE

Paoli, PA (Chester County)

### BUILDING USAGE

Single-Family Residence

### OCCUPANTS

3

### SIZE

2400 sq. ft.

### STORIES

1 1/2

### YEAR BUILT

1957

### START YEAR FOR ENERGY MANAGEMENT

2011

### ENERGY EFFICIENCY TYPOLOGY

Air Sealing and Insulation

### CONTRACTOR INFORMATION

Orange Energy Solutions  
1395 Lawrence Road  
Havertown, PA 19083  
610.449.2444  
orangeenergysolutions.com

## OVERVIEW AND SCOPE

### The Residence

The owners purchased this 3-bedroom, 2-bathroom ranch-style home in Paoli, PA in 2005. The husband and wife live in the house with their son. In this particular home, one of the bedrooms lies between an uninsulated garage and the attic, and as a result, the temperature in the bedroom was often colder or warmer than the rest of the home. The family room was also prone to these temperature differences. The family enlisted the services of Orange Energy Solutions to resolve these comfort issues.

Orange Energy conducted an initial energy assessment of the home that included a blower door test, and used infrared imaging to identify areas of the home where air leakages were occurring. After the energy assessment, Orange Energy presented the homeowners with a comprehensive list of upgrades that could be made to the home, including upgrading insulation, air sealing their home, and sealing duct leaks. The homeowners chose to increase the amount of air sealing and insulation in the attic, which they believed was the most cost-effective way to improve the comfort and energy efficiency of their home.

The homeowners also participated in the region's EnergyWorks program, funded by a grant from the U.S. Department of Energy. EnergyWorks connects home and business owners with rebates, tax credits, and low-interest loans to perform energy-efficiency improvements. Through EnergyWorks, they were able to receive a rebate on their home energy assessment by implementing at least \$1,000 of the improvements recommended. The availability of this rebate encouraged the homeowners to go forward with the work. For more information, visit [EnergyWorksNow.com/](http://EnergyWorksNow.com/).

## PROJECT DETAILS

The initial energy assessment's blower door reading revealed that the home was almost two times leakier than the standard home, which is the equivalent of a 13 by 13 inch hole in the house. Orange Energy aimed to significantly reduce air leakage through insulation and air sealing measures.

## Insulation and Air Sealing

When constructed poorly, a home's attic and knee walls are sources of drafts in the home, so in the process of making energy efficiency improvements, the first step the contractors took was to sheathe the knee walls with rigid foam board. Orange Energy also installed an attic hatch air sealing and insulation kit, weather stripped the attic's second access point, and installed rigid foam board to the back of that panel. Recessed lights can also let air in, so installing light box covers and air sealing above these lights helped to reduce drafts, as well. A chimney balloon was also installed. As its name suggests, this device is an inflatable plug that prevents drafts from coming into your home through the chimney.

## Venting and Air Circulation

When making a house "tighter," it is important to insure there is adequate ventilation to control moisture and humidity. Otherwise, odors, mold, mildew, dust mites, and other indoor air pollutants will stay trapped in the house. To vent out moist and humid air from the bathroom, Orange Energy re-routed the bathroom fan from the attic space to the exterior of the home, in accordance with building code.

## PROJECT OUTCOME

Once the work on the home was complete, Orange Energy conducted a follow up blower door test to verify the reduction in air flow that was achieved. The follow-up reading revealed a 24% reduction in draftiness, which is expected to save the homeowners on heating and on

cooling costs, and considerably improve comfort in the home.

## LESSONS LEARNED

The homeowners felt that the information they received during the home energy assessment was invaluable to their understanding of their home and helped them better appreciate the benefits of energy efficiency improvements. Although the homeowners were initially unsure about undertaking the project, they reported that they were pleased with the results and the first night after the improvements were made, the house felt noticeably more comfortable.

The homeowners' positive experience with the results convinced them to have insulation work done in their garage as well, and they reported that they might do even more energy efficiency work to further increase comfort of their home and save on their monthly bills.

*"We support the goals of the Energy Works program and are glad we could participate. Thanks for making our house a bit cozier. Cutting our energy consumption is good for the environment and we look forward to reaping the savings too!" - Homeowner from Paoli*

### PROJECT OUTCOME

Annual Electricity Savings.....	\$23
Annual Gas Savings.....	\$117
<b>Total Annual Savings (5%).....</b>	<b>\$140</b>

### ENERGY SAVING INVESTMENTS

Install master bathroom exhaust fan.....	\$650
Install hatch insulation, air sealing package, sheath and insulate knee wall, and air seal recessed light covers.....	\$1675
<b>Total .....</b>	<b>\$2325</b>