



OVERVIEW AND SCOPE

The Residence

Jeff Price and Avery Rome purchased their two-story home in Wayne (Delaware County) in 1992. The Price-Romes were experiencing discomfort issues with the temperature inside their home. To address these issues, the Price-Romes contacted Orange Energy Solutions.

The homeowners participated in EnergyWorks, a US Department of Energy funded program that connects home and business owners in southeastern Pennsylvania with available rebates, tax credits and very low-interest loans. The residential portion of EnergyWorks is administered by Philadelphia's Energy Coordinating Agency. Through EnergyWorks, the Price-Romes were able to receive a \$300 rebate on their home energy assessment by implementing up to \$1,000 of the energy efficiency improvements recommended. For more information, visit <http://ecasavesenergy.org/>.

PROJECT DETAILS

The Price-Romes decided to have extensive air sealing and insulation done. The initial blower door reading was 0.61 air changes per hour (ach). Orange Energy's goal was to seal the house down to 0.45 ach with a blower door reading of 2500 CFM50, which would reduce the drafts in the home without making it too stuffy. For reference, 0.80 ach is considered drafty, 0.24 is considered tight, and 0.35 ach is considered a healthy level of air flow for a home.

Air Sealing and Insulation

Air sealing and insulation were installed throughout the house, including the attics, garage ceiling, basement, den ceiling, and living room. Rigid foam board was installed in the attics over the bedrooms, the front and rear attics above the offices, on the back of the attic panels above the bedrooms, and on the back of the rear and front attic doors. All attic doors were also weather

BUILDING BACKGROUND

PRICE-ROME RESIDENCE

Wayne, PA

BUILDING USAGE

Single Family Residence

SIZE

1600 sq ft

STORIES

2

YEAR BUILT

1982

START YEAR FOR ENERGY MANAGEMENT

2011

ENERGY EFFICIENCY TYPOLOGY

Air Sealing and Insulation, Ventilation, Mold Issue Resolution

CONTRACTOR INFORMATION

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PRICE-ROME RESIDENCE

Wayne, PA

stripped. In the attics above the bedrooms, cellulose was blown in to improve the R-Value from 19 to 49. Further insulation was installed in the attic above the office and den to increase the R-Value to R-49, in the den to increase the R-value to R-49, and in the garage ceiling. The air sealing package conducted in the living space focused on leaks around windows.

Orange Energy installed a chimney top-damper, which provided a better seal than their previous, drafty damper. Orange Energy also installed recessed light covers in the attic above the bedrooms, and air sealed around them, which also helped to reduce drafts.

Ventilation and Mold Issues

The Price-Rome home had developed mold issues because gaps in the duct and HVAC system resulted in warm air meeting cold surfaces, causing condensation and buildup of moisture. Orange Energy repaired holes and gaps in ducts with duct mastic and clear caulk, and replaced leaky HVAC boots in order to remediate the mold issue. In order to prevent mold from developing in bathrooms in the future, Orange Energy installed ENERGY STAR rated fans and ducts in bathrooms to draw out moisture and humidity and vented these fans outside the house.

Orange Energy also installed cardboard wind wash baffles in the attic to ensure insulation did not cover areas where ventilation should be occurring. When air sealing and insulating a home, it is important to ensure

proper ventilation so that indoor air pollutants can be drawn out of the home.

Lighting

The Price-Romes also switched over from conventional light bulbs to compact fluorescents. These bulbs use 75% less energy than incandescent bulbs and need to be replaced less often.

PROJECT OUTCOME

After these measures were installed, Orange Energy conducted a follow up blower door test to verify the reduction in air flow that was achieved. Orange Energy was able to reduce the CFM50 to 2248, a 34% improvement in draftiness in the home. The ach was also improved to 0.42 ach, which exceeded Orange Energy's goal.

LESSONS LEARNED

As a result of the energy assessment and the work they had done, the Price-Romes experienced first hand the value of proper air sealing and insulation when making improvements to the home. When windows are installed, or other work is done on the home that affects its outer shell, it is critical to make sure that the areas around these openings are properly sealed. Otherwise, air will be leaking freely into and out of the home. The Price-Romes also realized that these measures are key to increasing the comfort of their home.

ENERGY AND COST SAVINGS ESTIMATES

Blower Door (Draftiness) Reduction: 34%
 Natural Gas Cost Savings/ Year: \$24.84/yr
 Natural Gas Savings/ Year: 63.94 therms
 Natural Gas Use Savings: 6.08%

ENERGY SAVING INVESTMENTS

Cover and seal recessed lights, air seal, insulate , and hard duct to existing vent locations in attic over bedrooms, replace exhaust fans..... \$2900
 Sheathe knee walls, remove decking, insulate and air seal doors, draft block floor- ceiling cavity, insulate garage ceiling in attics around office \$3250
 Air seal living space, air seal and insulate perimeter of basement, and duct work \$2350
 Total \$8500