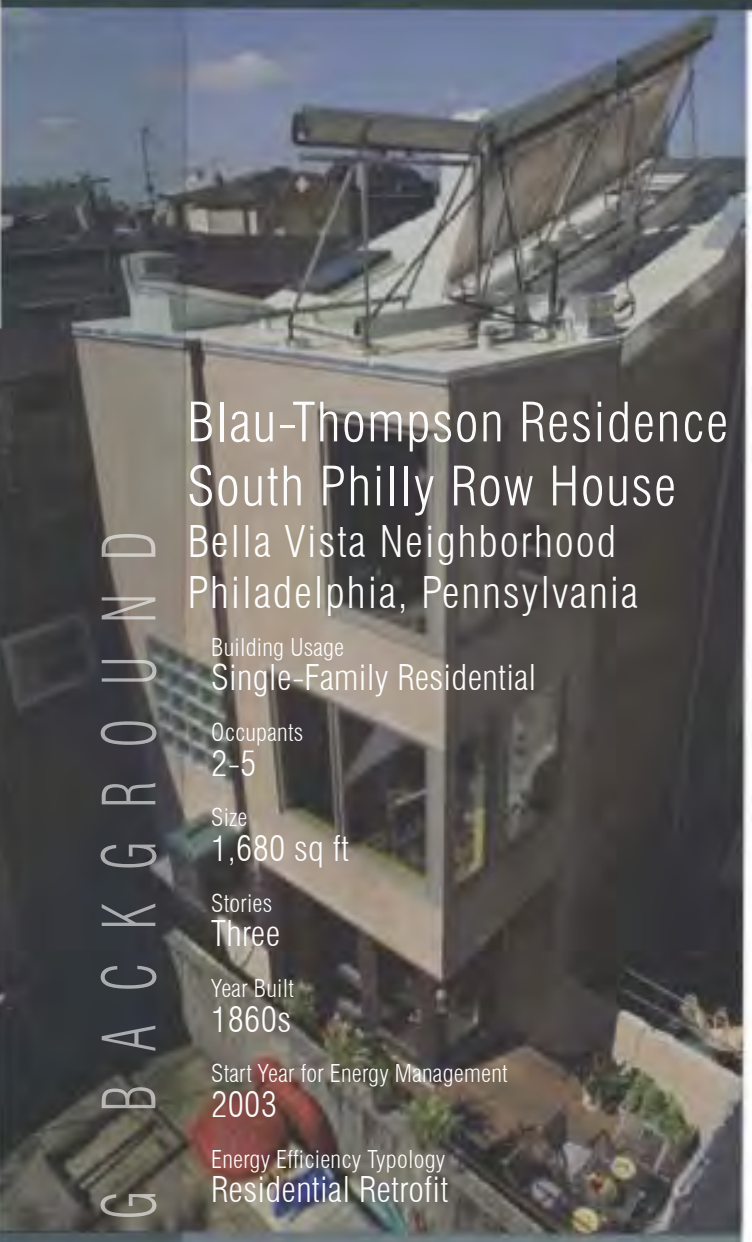
ENERGY EFFICENCY CASE STUDIES
GREATER PHILADELPHIA REGION

BLAU-THOMPSON RESIDENCE

Philadelphia, PA



BUILDING BACKGROUND

Blau-Thompson Residence
South Philly Row House
Bella Vista Neighborhood
Philadelphia, Pennsylvania

Building Usage
Single-Family Residential

Occupants
2-5

Size
1,680 sq ft

Stories
Three

Year Built
1860s

Start Year for Energy Management
2003

Energy Efficiency Typology
Residential Retrofit

retrofit at a glance

- Radiant Heat System
- Temperature Control Systems
- Energy Efficient Windows
- Reflective Roof Coating
- Ceiling Fans
- Rain Water Harvesting System

Overview & Scope

The Blau-Thompson residence is a Civil War- era 1,680 SF 3-story row house located on a 830 SF lot in the Bella Vista neighborhood of South Philadelphia. In 2003, the current owners purchased the building, formerly a luncheonette with two apartments above, to convert it into a single-family home.

The interior was completely gutted and a small rear extension was added to provide room for a new kitchen on the first floor, and bathrooms on the second and third floors. The house has two bedrooms, two bathrooms, a family room, an office, and a small rear garden. It also served as the office for BluPath Design until January 2009, with three workers and five computers at its peak.

Project Details

HVAC

Most improvements to the house focus on reducing the heating and cooling demand. To take advantage of its east-west orientation, roof-mounted solar collectors were installed to provide hot water for domestic use. The collectors were connected to a computerized monitoring system that automatically feeds any excess hot water generated into the new radiant floor heating system. This radiant floor heating system uses an efficient natural gas-fired hot water heater instead of a boiler. Radiant heating is more energy efficient because it distributes heat more evenly, reduces heat loss through ducts, and minimizes electricity use, while allowing for temperature control in each room. The effectiveness of the heating system is further enhanced by the use of automated exterior sensors that respond to fluctuations of temperature outside. This helps to maintain the home at the desired temperature and creates a more comfortable living environment.

Building

Several measures were taken to improve the envelope of the home. Double-paned, Energy Star-qualified windows were installed to reduce heat gain in the summer and heat loss in the winter. Roof sheathing and batt insulation on the brick exterior walls also enhance the insulation of the home. A heat-reflective white coating was applied to the rubber roof, greatly reducing the home's cooling load during the summer months. This feature provides an estimated 20% reduction in electric costs. As a result, the cooling load is

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met by a single air conditioning unit, complemented by ceiling fans in each room. Additional energy improvements include the use of large windows mounted close to the ceiling and skylights to bring light deep into the house and thus reduce the need for electric lighting.

Non-Energy Improvements

A number of non-energy improvements were made during the renovation as well. A grey water system harvests rainwater and air conditioner condensation water to irrigate the garden, while low flow water fixtures and toilets help reduce water use. In the rear yard, a wood decking rests above permeable gravel, reducing load on the storm-sewer system and recharging ground water. In addition, the owners opted to use low VOC paint that reduces toxic emissions and local craftsman to fabricate their cabinets.

Performance

The remodeling work has led to significant reductions in water use, energy demand and utility costs. From 2005 to 2009, the water usage and cost at the Blau-Thompson Residence decreased by 53 percent and 12 percent respectively. Meanwhile, gas usage and cost fell by 15 percent and 4 percent over the same period. The most dramatic utilities savings are in electricity. The home experienced a decrease of 64 percent in electricity usage and 68% in cost. Also, the white roof coating was the most cost effective of all features. A minimal cost of about $500 led to a 20 percent savings on energy consumption.

Lessons Learned

The owners of the residence, both architects, have learned a great deal about energy-efficient remodeling practices through the evolving knowledge base of energy efficient design and technology. One lesson the owners learned from this experience was that they should have air sealed the leaks in the house first. Since some of the leaks are now hidden behind the new walls, air sealing is hard to do retrospectively. Air sealing prevents air from entering into and leaking out of the house, which can potentially lead to 30 percent savings on heating and cooling costs.

The owners had difficulty finding contractors with the knowledge and experience to properly install the various energy efficient features and design elements. For instance, one of the contractors mistakenly installed the wall insulation backwards. Fortunately, the owners discovered the problem and ordered were able to fix it. It is critical for property owners to ensure energy-efficient features are property installed in order to achieve the maximum level of energy savings.

Some energy savings measures are very simple to implement; they often involve minimal cost or small adjustments to operation and maintenance of the homes. These small investments can result in significant savings in the later years, while contributing to a more comfortable and sustainable living environment.

Their design of a more environmental-friendly and sustainable home has earned this property an Honorable Mention for Sustainability and Energy Efficiency from the International Interior Design Association (IIDA) Philadelphia City Center Chapter in 2007 and Bronze for the Commonwealth Design Award from 10thousand Friends of Pennsylvania in 2006.

Economic Analysis

Energy Savings Investments	
Solar Collectors	$ 11,320
Radiant Floor Heating	$ 13,700
Energy Efficient Windows	$ 15,000
Heat-Reflective Roof	$ 500
Water Catch System	$ 1,125

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