
ENERGY CASE STUDY

49 Maple Street, Bristol



Located at the corner of Maple and West Pleasant Street in Bristol, this home was built in the 1890's. The main house was added on a number of times over the years – kitchen, downstairs bedroom, sun porch, family room, and bathroom.

Bob Donnis' 1890's Bristol home located on Maple Street.

Evaluation:

We had an Energy Audit performed at our house in 2015. The house was depressurized and that showed where the air leaks from outside were occurring. A large fan is placed in an exterior doorway and air is exhausted out of the house. This depressurizes the house and accentuates where the air leaks are. We received a written report from the contractor identifying the “Best bang

for the buck” actions, and what they would cost. We could not afford to do all of them, so focused on the attic space and some in the basement.

As a former Efficiency Vermont Employee, I had learned that attics are the biggest leak points, and that basements were where the most cold "make-up" air comes in from the outside to replace the air leaked out. In the attic, they ripped out all the fiberglass insulation, then sealed all the leaks from below with foam. Warm air rising went through the fiberglass and escaped. I learned that fiberglass does a great job stopping heat through solid surfaces, but not warm rising air. The foam stopped the warm air from getting out of the living space. That escaped air was warming our roof, causing some snow to melt and forming ice on the eaves.

We still needed to stop heat from escaping through the solid flooring of the attic (like the fiberglass did before). A subcontractor blew in about 4 feet of cellulose insulation. Cellulose is ground up recycled newspaper with fire retardant added. As I recall, it gave us an R50 insulation value, very good. They also built a fire-code approved collar around the chimney to seal it up.

Next on the list was the basement, which is the place where most of the make-up air comes in to replace escaping air. Our exterior basement door was sealed. Our basement window was sealed. A few other places were sealed, but, we ran out of money at that point. A few exterior doors were air sealed with flexible tapes. And then we stopped.

In addition to doing the blower door test before work was started, the contractor also did it again once the work was done. Not only could he then tell what the lower rate of air loss was, but also ensure that the furnace and stove are safe to use. If it had been too tight then a heat exchanger system could have been installed. It brings in fresh air as it exhausts stale air, using the heated exhausted air to pre-heat the cold air coming in. But we were far from that point where we might need that.

What have been the benefits?

- Heating cost was reduced by a third. We had in the past burned 4 tons of pellets each winter, and also 3 275 gallon tanks of oil. Now, we burn 3 tons of pellets, sometimes less. We get by with 200 gallons of oil. Yippee!!!! Our house is warmer and less drafty.
- Mid way through the first winter after the work was done, we realized that we had not set up and turned on our humidifier. Our nasal passages were not dry. I figured out that showers, washing dishes, and drying some clothes was enough moisture given the dramatic reduction in “make-up” air coming in. The air coming into the house from the outside (to make up for the loss of air through the attic) was cold and DRY. We no longer needed to add humidity to the inside air. No humidifier was needed. This is another savings both in the lower electricity usage and having to replace it every so often.
- Our cooling costs were reduced to the point where we no longer need to run air-conditioners. In the winter, we keep the heat in the living space. In the summer, we keep the heat out of the living space. In the summer evenings we open windows and let cool air in. We close them during the day. With a few ceiling fans to circulate it, the house stays significantly cooler than the outside.

We no longer have any ACs. Even in those July 2018 90+ days, the house stayed cool. Guests notice it right away, and want to know why.

Was it cost effective?

The cost of the work done and the cellulose was about \$15K. That cost gets reduced each year from the reduction in pellets, oil, and electricity (humidifier, ACs).

- Based on the amount of improvement in air loss, we got a rebate from Efficiency Vermont of about \$2500. Dropped our cost to \$12,500
- We use 1 ton of pellets less each year – that's about \$300/ton
- We use about 500 gallon of oil less each year – that's about \$1300
- So, we save about \$1600 year
- Not counting electrical savings, it will take us about 8 years to pay off the cost of buttoning up our house.
- While paying it off, we are warmer in winter, and cooler in summer.
- After that, it is gravy savings. 8 years after we pay it off, and we will get it back and more.

\$15K is a lot of money. If we did not have that \$15K up front, we still could have done the work. Efficiency Vermont has a Do-it-yourself Program. Under their guidance, I could have done some of the work. I would still want an audit performed which would cost about \$250. And I would still have to pay someone to blow in the cellulose insulation. So, maybe it would cost say \$3,000, some of which Efficiency Vermont would rebate. This is far less costly than using a contractor.

Another option we had was to get a loan from a bank. Many banks now have low interest rates for energy efficiency projects. We, of course, would have to pay back the loan, but it could be structured so that the energy savings could be more than the loan payment, making it a net positive investment. Once paid off, it is gravy savings time. This would be done without using personal funds.

This was a very beneficial project for us. We save money, we are more comfortable in the winter and the summer, and we have reduced our carbon footprint. We are happy that this was done, and we are happy that this will continue to provide these benefits far into the future. If we downsize someday, and go to sell our home, it will be more valuable for this energy efficiency work we have done - another benefit.