Tinmouth Energy Committee

ENERGY CASE STUDY

142 McNamara Road, Tinmouth

This home was built in 1976 and is 1755 sq. ft with a full sized unfinished basement.

Evaluation:

There was an energy audit done in August of 2018 shortly after purchase of the home. I was interested in upgrading the aged wood stove and learned about the low cost HEAT Squad energy audits when I inquired about their wood stove upgrade incentives. The projected cost to perform air sealing, adding of insulation, upgrading the wood stove, upgrading the water heater, installing bath fans, and upgrading the refrigerator was estimated at $14,500 with contractors performing all of the work with an estimated $1044 of incentives. A minimum of 10% reduction in air loss was required to receive any incentives. The worst place of air leakage was in the attic, where when the access door was opened the leakage almost doubled compared to when it was closed. As I had recently moved in and the house was not inhabited for more than a year prior to purchase we had estimates of wood use, fuel oil use, and electrical usage to base energy savings on.

Work Performed:

I did the majority of the work recommended, which helped decrease project costs. One benefit of using HEAT Squad from typical energy audits is that they recommend contractors for the work so you don't have to get separate bids for the jobs and then choose contractors. This allows projects to be completed more quickly.

The wood stove was upgraded by Rutland Stove & Fireplace Company. The incentives for the wood stove came off the price of the stove and installation so the price I paid was only the remaining portion of the bill.

The water heater was upgraded from an 18-year-old propane water heater to a heat pump water heater. Again the incentive came off of the purchase price saving money up front.

The refrigerator had a leaky gasket and was aged so a replacement was recommended to save money on electric bills and prevent food waste. There was a rebate of $40 from Efficiency Vermont that was received after submission of their form for the purchase of this unit.

A bathroom fan was installed in both bathrooms as part of the work performed by an electrical contractor. This was recommended for humidity control and if the air leakage was reduced far enough, to allow proper air transfer.

To reduce the air leakage and insulate, 1” foil face foam board was installed over existing insulation on basement walls and in the attic space. Additionally, Vermont Foam Insulation was hired to fill in the sill boxes after the existing fiberglass was removed. Weather stripping and caulk was installed on the frame of the basement door to the bilco hatch to reduce air leakage. The insulation and air sealing in the attic allowed the soffit venting to work properly instead of continuing to allow outside air to be introduced into the attic area. All of the windows had caulk added where the window meets the windowsill to minimize air leakage.

The electrical contractor did some other minor work in addition to installing the bathroom ventilation fans including adding some outlets, adding a ceiling fan/light in the living room, and replacing a ceiling fan that had a worn bearing.

Results:

The second blower door test showed a reduction of 23.7% in airflow, much better than the goal of 10%. All of the contractor and equipment costs were ~$14,700. The combined incentives from HEAT Squad and Efficiency Vermont totaled almost $5000. The project did come in around cost but the incentives were much higher than anticipated due to the amount of air leakage reduction and additional incentives available.

Since there was not hard data concerning electrical and fuel costs it is hard to say what the exact reductions as a result of this work. However, it is estimated that the previous occupant used about 1.5 – 275 gallon tanks of fuel oil and supplemented with 4-5 cords of wood. Last winter I did not have a good supply of wood and I used ~3 cords before I ran out. In total I used 1 – 275 gallon tank of fuel oil. Also, the propane tank used for the old water heater was filled up twice between move in and replacement with the heat pump water heater (July thru mid-October). It wasn't filled again until this September. There was no noticeable increase in electrical usage from the heat pump water heater, which also dehumidifies the basement when running.

When removing the fiberglass insulation from the attic space it was readily apparent how much air was leaking in at this spot. I attempted to do this many days before Vermont Foam Insulation came to seal this location but it was windy and just pulling out the insulation from between two of the rafters resulted in a cold draft coming into the attic. It was also very hot in the attic during summer days. It now is much more comfortable with the temperature in that space only varying 10-15F over 24 hours on most days.

If I wasn't able to perform all of this work myself or didn't have the funds available, there are long-term low-payment loans that are available from HEAT Squad.

The estimated annual savings were $967 based on the preliminary blower door test and the improvements would be paid back from savings in about 11 years. Going from ~1.5 to 1 tank of fuel oil saved ~$410 last year. This coming winter I will save more as I have enough better quality wood on hand to use it as my primary heat source all winter. I used only fuel oil to heat the home for approximately four months last heating season, which increased fuel costs. The wood cost savings are negligible as it comes from windfall or dead trees on my property but the stove is more efficient so less will be used compared to the previous wood stove. Propane savings are ~$200 yearly from switching to a heat pump water heater which does use electricity.

This fall I met with someone from HEAT Squad to see what they would recommend for next steps. Their recommendations were upgrading insulation when my roof is replaced, possible upgrade to heat pump(s), or reducing/eliminating electrical bill long term by the addition of solar panels since the house is well insulated and air sealed and most appliances are newer.