

McDonough, 3/9

Scarborough Residential Energy Savings Description template:

Following are some questions and requests for information about the energy upgrades for your home. Please feel free to add any other information that you feel would be useful to a description of the changes.

General:

1. Type of home – i.e. ranch, two-story, etc. An exterior photo would be helpful.
Two story.
2. Year the home was built
1996
3. Square footage of the home, including basement
2600 + 800 unfinished basement
4. Basement used as living space? **No.**
5. Description of construction specifications, if available, such as type of framing, insulation, etc.
Standard stick-built construction, 6" framing, fiberglass insulation when purchased in 2001.

Pre-upgrade utility usage and costs – either monthly or annually for each type of energy used (need 12 months of data)

1. Electricity **7161 kWh, one year, pre-solar. (20 kWh/day)**
2. Heating fuel type, usage and costs **Heating oil. ~1000 gal/year**

What prompted the consideration of making changes?

Well. I went on vacation with my Grandmother in 2003. I pulled up to the cottage in Ohio after two full days on the road with a 5 year old, a 7 year old and a pair of miniature poodles. She met me at the car and said, "Oh good! You did get here in time for the lecture!" She checked the children in at the monitored playground and arranged that we could bring the dogs to the lecture. Over the next five days, the chair of the Oberlin College Environmental Studies Department walked us through the implications of our reliance on fossil fuels.

How did you decide what the most important upgrades should be?

That took four more years. I read about solar electricity, geothermal and wind turbines. I studied insolation maps and wind resource tables. I did lots of math. And then I stumbled on solar thermal. It seemed too good to be true. The technology is reliable and mature, and yet we didn't know anybody who had a solar thermal system. In October 2006, we were able to visit several homes during the National Solar Tour and saw solar thermal systems working here in Maine. Ours was installed in May, 2007.

At about the same time, we learned about energy auditors and hired somebody to evaluate the house. The primary recommendation was to shut down the “chimney effect” in which heated air rises and leaves the house through gaps at the top of the house and is replaced by cold air pulled in through gaps down low. The auditor suggested replacing the fiberglass insulation in the attic with dense pack cellulose and using spray foam to seal the basement.

How did you finance the changes? If through a PACE loan, please describe the experience.

We have chosen to defer other purchases and use the money for efficiency upgrades. Since we expect each of our projects to pay for themselves over time, it seems like the options are to give the money to CMP or the oil company over several years or to give it to the solar contractors in a lump sum.

Describe each energy upgrade including specifically what was done, when it was completed. How long did the process take, from identifying the changes needed to finishing the work?

Spring 2007 – Solar Thermal. 2 x 30 tube evacuated tube solar thermal collectors on the roof, 105 gallon hot water tank in the basement. Plumbing runs routed through the stairwell walls. Contractors were on site two days, one for indoor plumbing, one to install the collectors on the roof. Removed two sections of drywall for plumbing run, each ~2 square feet. One in the back of a closet, the other in the stairwell to the basement.

Summer 2007 – Dense Packed Cellulose in Attic and behind sloped ceiling in home office over the garage. Contractors on site for a full week. Extensive drywall removal in the garage and an attic bedroom. Some dust throughout the house. An accidental hole in the master bedroom ceiling. Quite disruptive. . .

These two projects had similar costs after tax credits and rebates and were each projected to reduce oil usage by ~250 gallons/year. Oil usage 2007/2008 heating season was 500 gallons. Payback ~8 years.

Summer 2008 – Re-insulate rim joists and above ground basement walls with spray foam. Contractors in basement for one day. Minimal disruption. We’d waited a year because we’d had enough the previous year. 2008/2009 heating season we used 455 gallons of oil.

Summer 2009 – 3.4 kW PV array.

A new set of Federal tax credits and dropping panel prices resulted in a payback time that came in under the warranty for PV in Maine. Contractors in the basement for a day, on the roof for a day. Generating ~4000 kWh/year. Payback ~20 years.

Summer 2009 – 2 x 20 tube evacuated tube solar collectors on the back of the house, tilted for winter sun angles. Heated glycol pumped directly through radiant floor in the kitchen during the heating season. Heats an 80 gallon tank in the summer that serves as a pre-heat for the primary hot water tank. Estimated payback ~20 years.

Oh. And we also finally replaced door from basement to cellar stairs. It had been an interior door. We replaced it with an exterior door. We did the work ourselves, and we're procrastinators. . .

2009/2010 heating season: 400 gallons of oil.

**January 2012 – Replaced oil boiler with a wood pellet boiler. Oil tank is gone!
Pellets delivered into a 3-ton hopper, automatic auger feed into boiler, pellets produced in Maine keeping heating dollars in the state. Bulk delivery pellet price is equivalent to oil at \$2/gallon and has historically been much more stable.**

Spring 2012 – Scheduled installation of 19 kW additional PV. Waiting for availability of AC modules (integrated inverters).

Post-upgrade usage and costs – Please provide same type of information as provided above. Following is a greenhouse gas emissions calculator that EPA has developed that might be of interest.

**Umm. . . I tracked the oil decline through the document. Pellet conversion complicates that story.
Electricity: We were averaging 20 kWh/day in the final pre-solar year, 7161 for the year.
Now we make ~4000 kWh, buy ~2000 for a total of ~6000 or 16 kWh/day.
We're thinking that most of the usage reduction was a result of skipping the clothes drier. . .**

http://www.epa.gov/climatechange/emissions/ind_calculator.html

Please include any other information about the energy upgrades to your home that you think might be of interest.

Thanks