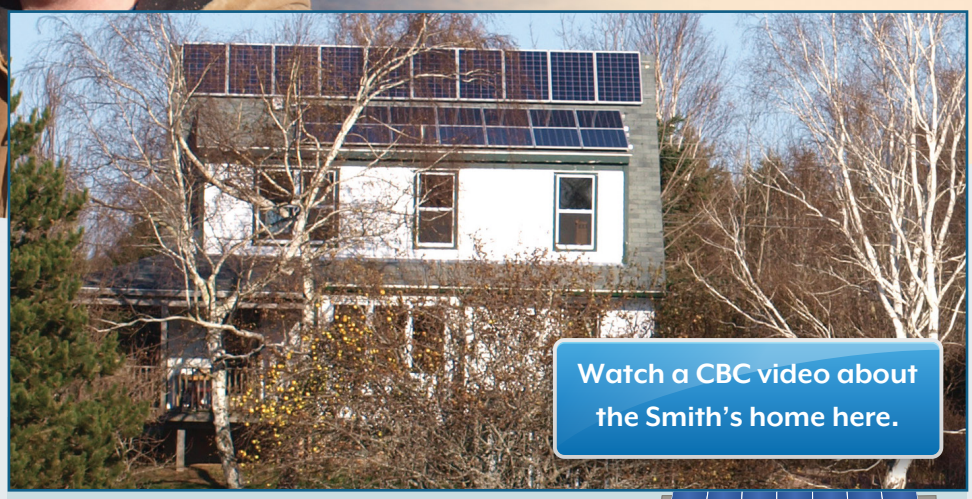
The Value of Energy Efficiency:

Audits, retrofitting and renewables

Heather and Blane Smith

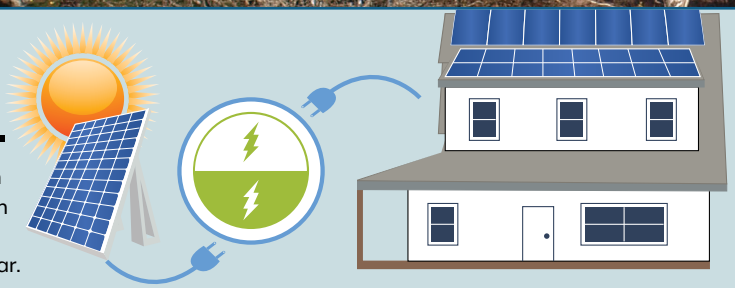


Watch a CBC video about the Smith's home here.

The Smiths home is

Net-Zero.

It produces as much energy from its clean energy sources as it consumes over a year.



For many years, Heather and Blane Smith had been renovating rental properties to make them more energy-efficient. Although they'd built their own well-insulated home in Sackville, N.B. 25 years previously, in 2013 they realized it was both practical and cost-effective to retrofit the house to reap the same benefits they'd been helping their tenants achieve.

The result is a power bill of between $30 and $35 per month – a fee that covers only service charges and HST. Those solid savings compare to the $95 per month they used to pay.

The lightbulb went on for the Smiths, who also run a seasonal greenhouse, when they attended an energy-efficiency workshop that ***Efficiency New Brunswick*** conducted. After hearing about incentives offered at that time for people upgrading and renovating their homes, the Smiths took the first step: they scheduled an energy audit through what's now called **New Brunswick Power's Home Insulation Energy Savings Program**.

Under the new NB Power program, homeowners pay $210 plus HST to have auditors assess and then assign it an energy-efficiency rating. The auditors who assessed Heather and Blane's two-story home provided a list of upgrades and renovations that could improve their efficiency score. For each potential upgrade, the auditors provided information about a government incentive that would give the Smiths money back through a rebate program, once they had registered in the program and completed the work.

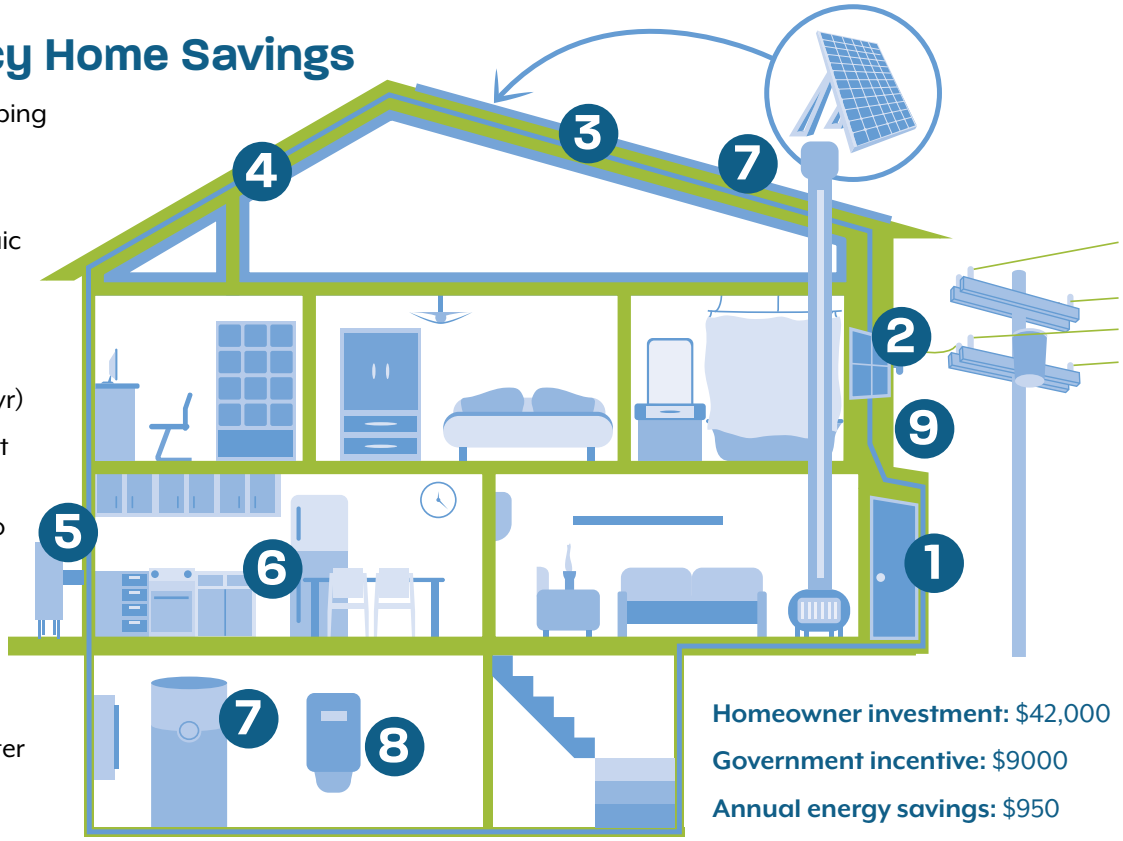
Heather and Blane decided to invest in several upgrades in their 1,800-square-foot home – not just because they would pay off financially, but also because conserving energy and reducing their dependence on power from oil, gas and large hydro projects is important to them.

"It's a worthwhile thing to do, in and of itself," says Heather. "You have to start with what you can do ... and know that every little bit you do, does make a difference."

The Smiths bought triple-glazed glass for their south and east-facing windows to eliminate drafts and retain heat. They also installed new weather-stripping around their doors, added insulation in the attic, and replaced their old electric furnace with an air-to-air heat pump. Then Heather and Blane hired Fundy Solar to install 24 photovoltaic solar panels on the roof, as well as two thermal panels that generate heat for their hot water system. The photovoltaic and solar thermal panels generate enough energy annually to cover all the Smiths' needs, with the exception of about two cords of wood they burn in a wood stove.

Energy Efficiency Home Savings

1. **Doors:** Added weather stripping
2. **Windows:** Installed triple glazed windows
3. **Solar Panels**: 24 photovoltaic panels
4. **Insulation:** R60 into attic
5. **Heating:** Heat pump and wood stove (burns 2 cords/yr)
6. **Appliances:** Energy-efficient electric appliances
7. **Hot water:** Heated from two solar panels on the roof
8. **Solar power inverter**: Converts solar energy from a direct current (DC) to an alternating current (AC).
9. **Power meter:** Two-way meter to record energy as it either leaves or enters the home.



Homeowner investment: $42,000

Government incentive: $9000

Annual energy savings: $950

Thanks to the two-way meter installed by NB Power, the couple can send any excess electricity generated by their solar panels back into the province's power grid through NB Power's net metering program. The inverter is connected, via a cable, to the solar panels and converts the direct current (DC) the rooftop panels produce into the alternating current (AC) that the electrical grid (and most appliances) requires. "Right now, on a sunny day, our house is more than likely running only on the solar electricity alone," says Blane. "It's interesting. It's fun. And it's so easy."

The Smiths spent about $42,000 on their renovations, upgrades, and renewable energy installations. The most expensive items were the solar panels and inverter, which cost $16,000, and the heat pump, at $12,500. Thanks to the government incentives available at that time, they recovered $9,000 – including a $4,000-bonus for becoming "net-zero" energy producers. That means that over the course of a year, they produce the same amount of energy on site as they consume – roughly 6,460 kWh. Once the systems were up and running, the Smith's home climbed to an energy efficiency rating of 90, up from 76 before they started the work.

The Smiths' up-front costs may seem steep. They did the calculations, though, and realized that it was worth it to them to add the cost of the investment to their mortgage. Their savings on electricity and heating costs will pay off their investment over 20 years. "Because it's spread out over so many years, the monthly story is that your energy savings more than cover the additional mortgage payment," Blane says.

When the Smiths completed their upgrades and renovations, they contacted the auditors to inspect the work and confirm that they were now a net-zero home. That post-upgrade inspection did not cost the Smiths anything, and it triggered the government rebates. Today's NB Power efficiency program works similarly: NB Power pays for the post-retrofit audit that is needed to confirm efficiency improvements. The post-audit and copies of bills are used to determine the level of grant available for insulation or heat pumps.

Four years after they began their journey, the Smiths are happy about the path they chose.

"It's been very satisfying to see what an individual can do," says Heather. Her husband marvels at the relative ease with which they changed from consumers of energy that contributes to greenhouse gases, into self-sufficient renewable energy producers.

And Blane believes the average person with a small house and a little bit of sunshine will be pleased to know they too can make some electricity.

Questions?

Most of us have questions about the energy we already use, and where to find information if we want to know more. We'd like to spend less money for the power we need, but we're unsure about how to sort out the options. We're curious about the different kinds of energy that could power our homes, like solar or wind or other forms of renewable energy. Many of us don't know which energy source would work for us, what steps we should take first, or whether changing the type of energy we rely on would mean we'd have to change our lifestyle.

To learn more your energy choices and to find a list of resources in New Brunswick, visit:
www.conservationcouncil.ca

Conservation Council *of* New Brunswick
Conseil de conservation *du* Nouveau-Brunswick

/conservationcouncil @cc_nb