

# Creating my own 'net-zero energy' home

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As a "green" architect, I've spent my career designing energy-efficient buildings, including my own small home. This past year, though, I was inspired to push my family and me a bit.

I worked with a Northampton client, successfully renovating an old in-town home to be "net-zero energy" — to produce as much energy over a year's time as the house used for heat, ventilation, lighting and other needs and, as I looked at the engineer's calculations, I saw my clients could actually meet the goal — and wondered how easily I could do the same in my own house.

My client's project involved gutting and renovating the whole building, which meant a lot of options for energy improvements. We were able to provide high levels of insulation in the exterior walls by building a second wall toward the inside, and we could easily seal air leaks.

By contrast, my own home was already lived in, with a layout that suited my family's needs. We weren't about to tear everything out and start over, so our strategies would have to be different. But what would we need to do to reduce our energy consumption enough so that we could readily produce all of our home's energy?

We started by analyzing our current energy usage, modeling energy loads for different renovation strategies and then determining how much energy we could produce. In our case, the latter meant how much electricity we could get from solar photovoltaic panels mounted on our roof.

To estimate that number, I pulled out all our old electric and propane bills. Our electricity usage was about 300 kilowatt-hours per month, and we used about 300 gallons of propane a year. I monitored specific appliances using a simple watt-meter (available



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from the Greenfield Solar Store; 772-3122; [www.greenfieldsolarstore.com](http://www.greenfieldsolarstore.com)).

Next, I called the Center for Ecological Technology (CET; 586-7350; [www.cetonline.org](http://www.cetonline.org)) in Northampton, and had them do an energy audit. This included a blower-door test, which shows how leaky your house is. Then our consulting engineer ran some numbers for me.

I was concerned that we'd have to rip off all our siding and install extra insulation or install new, triple-glazed, insulated-fiberglass-frame windows to net-zero energy, but I was relieved. There were some simpler options for us, I learned, as our house was already quite efficient.

We could build some high-performance interior storm windows. (OK, my husband is an inventor and I'm an architect, so that wasn't daunting for us.) Energy consultant Brian Nugent of Athol offers information and assistance to folks who want to make their own storms (978-249-2661; [bnugent@verizon.net](mailto:bnugent@verizon.net); [www.northquabbinenergy.org](http://www.northquabbinenergy.org), click on "Winserts").

We could do some targeted



COURTESY MARY KRAUS

Chris Krezmien of the Center for Ecological Technology in Northampton air seals a smoke alarm. Targeted air sealing is one of the first, most important steps toward a greener home, says architect Mary Kraus.

air sealing. We could lower our electricity consumption. And we could produce enough electricity for our needs by installing solar panels on our available roof space. In the end, we decided to switch our heating system from the current propane-fueled boiler to an electric system (probably an air-source heat pump).

We turned to our appliances next. We researched energy usage for current models (Energy Star; [www.energystar.gov](http://www.energystar.gov)), then went to Manny's, an appliance store in Hadley, and bought a more efficient refrigerator to replace our old one. I called CET and made an appointment for air sealing. We also got a proposal from NorthEast Solar Design in Amherst (259-3750, [www.nesolar.design.com](http://www.nesolar.design.com)) for a 5-kilowatt photovoltaic system to fit our roof. We're on our way now to reaching our net-zero goal, and suddenly it all feels very achievable.

Your household may have different priorities and every home is different. You may apply a whole range of strategies to reach net zero, or you may choose more modest steps that take you toward that goal. But any effort is worth doing. You'll be helping the environment and we'll all learn in the process.



CAROL LOLLIS

Solar panels on the roof of an energy-efficient home in Hadley

Mary Kraus is a partner in Kraus-Fitch Architects, Inc. in Amherst. She recently gave a talk at the Hitchcock Center on net-zero energy homes.

Earth Matters, written by staff and associates of The Hitchcock Center for the Environment, appears every other week. The center's mission is to foster a greater awareness of the environment. It is located at 525 South Pleasant St., Amherst. For more information, visit [www.hitchcockcenter.org](http://www.hitchcockcenter.org), call 256-6006 or write to [columnn@hitchcockcenter.org](mailto:columnn@hitchcockcenter.org).