



# Zero Energy Now Case Study

Alger-Miller Case Study (Spring 2022)



Living in a contemporary style house, the Alger-Miller family wanted to get off fossil fuels. Faced with an aging propane boiler and drafty garage door located near their main living space, they wanted a more comfortable and energy efficient home using renewable energy. Their contractor, Chuck Reiss of Reiss Building & Renovation (RBR) suggested they participate in the Zero Energy Now (ZEN) program.

Developed in 2015 by the Building Performance Professionals Association of Vermont (BPPA-VT), the ZEN program is a comprehensive energy retrofit program providing weatherization, efficient heating solutions, and solar photovoltaics (PV) to Vermont homes, resulting in drastically reduced energy costs and greenhouse gas emissions.

Before starting installation work, the ZEN program involves a customized comprehensive review, modeling, and consultation regarding energy options to assist homeowners and contractors in optimizing their investment to achieve the most cost-effective energy solution for their house. This approach with ZEN incentives and low-cost financing options, helped the Alger-Miller family land on the best approach for their home.

With the assistance of RBR and program administrator, Energy Futures Group (EFG), the Alger-Miller's ZEN project involved upgrading to an energy efficient sliding door and installing a heat pump hot water heater, heat pumps with transfer fans to distribute heat throughout the house, a wood stove, an energy recovery ventilation system, and solar panels. They also weatherized the attic through air-sealing and insulation. Having completed the five-month ZEN project in 2021, the Alger-Miller home is now "cozy and warm in the winter, and cool and comfortable in the summer." They feel secure and sleep better knowing that their wood stove will keep the house warm if the power goes out.

"Seeing the results of the model gave us confidence that we'd achieve our goals."

## Energy Usage and Cost

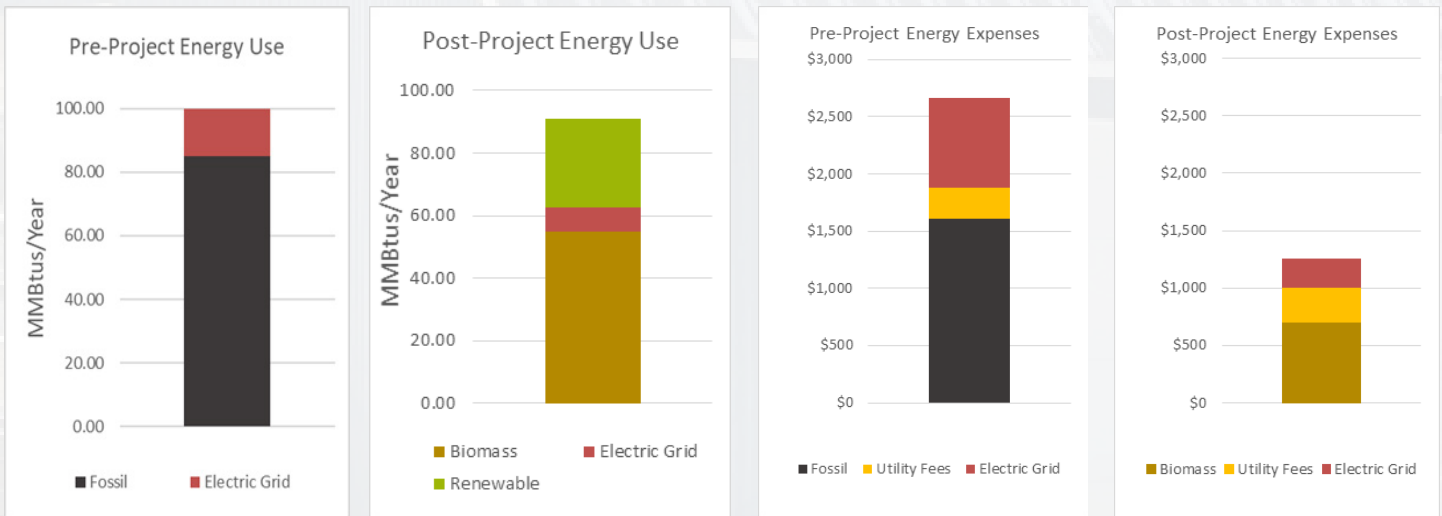
Before improvements, the Alger-Miller household consumed about 100 MMBtus<sup>1</sup> of total energy a year, with 85 percent from fossil fuels and 15 percent from the electric grid.

After completing the deep energy retrofit, their energy use includes 60 percent from wood heat (biomass), 31 percent from solar (renewable), and nine percent from the electric grid. As a result of

these improvements, the Alger-Miller household was able to reduce emissions from fossil fuel use to just about zero.

The Alger-Miller household reduced annual energy costs by an impressive 53 percent. Before the renovations, the family spent ~\$2,660 per year on energy; 60 percent of costs went towards fossil fuels, 40 percent towards electricity and monthly meter fees.

After switching to renewable energy and weatherizing their home through ZEN, they drastically decreased their energy costs. They currently spend \$1,255 annually on their energy bills with 56 percent for biomass and 44 percent for electricity and monthly meter fees, achieving \$1,405 in savings.



## Project Financing

Through the Home Energy Loan, the Alger-Millers ended up paying about the same each month for the new loan and reduced energy costs as they had been paying previously just for energy. Once the loan is paid off, their energy bills will be about one-third of what they were before the ZEN upgrades. This is the goal of the ZEN program: redirect energy payments into paying for the renovations and end up with a significantly improved home.

For more information, visit [zeroenergynowvt.com](http://zeroenergynowvt.com) and/or e-mail [info@zeroenergynowvt.com](mailto:info@zeroenergynowvt.com).

<sup>1</sup>MMBtu is acronym for one Million British Thermal Unit, and it is a unit traditionally used to measure heat content or energy value. One Btu is about the energy in a wooden match burned end-to-end one MMBtu is about one million matches.

Energy projections and graphs were developed using the Clean Energy and Assessment and Reinvestment Analysis tool (CLEAR) owned and copyrighted by New Leaf Design, LLC, of Hinesburg, Vermont. Used here by permission.

Support received from Barr Foundation, Building Performance Association, BPPA-VT, Efficiency Vermont, Energy Foundation, Energy Innovation LLC, Green Mountain Power Heising-Simons Foundation, The John Merck Fund, MFF, U.S. Department of Energy, The Vermont Community Foundation, VLITE