

McKnight Lane Affordable Housing Development

Resilient, Net-Zero, Low-Income Rental Housing in Rural Vermont

PROJECT FACT SHEET



PROJECT DESCRIPTION

The McKnight Lane Affordable Housing Development in Waltham, Vermont will become the first in the nation to provide net-zero affordable rental housing complete with resilient solar plus energy storage systems to low-income tenants in a rural community. This innovative project, which replaces a defunct mobile home park with 14 high-efficiency modular homes, was developed thanks to collaboration between key Vermont community development agencies, industry, philanthropy, government agencies, and clean energy NGOs. This pilot project will showcase zero energy modular homes, constructed by VERMOD, a Vermont company, and demonstrate how energy efficiency, solar PV, and sonnen energy storage systems can bring economic and energy security benefits to tenants while enabling the local utility, Green Mountain Power, to manage peak energy demand and reduce costs for customers.

Project Highlights

- The housing developers are the Addison County Community Trust (ACCT) and Cathedral Square.
- **6kWh/4kW AC smart solar energy storage systems** will be installed in each of the 14 modular home units.
- The smart energy storage systems, supplied by sonnen, will work in conjunction with a **6-kW rooftop solar PV system** to provide resilient power to tenants.
- The energy storage systems in each home are able to automatically disconnect from the grid and enable power from the solar panels to **provide resilient, reliable, and clean electricity to tenants during a grid outage**, such as the widespread outages from severe weather.
- This is the **first resilient zero-energy modular housing development for a rural, low-income community**.

Projected Financial Benefit

- Electricity cost savings to McKnight Lane homes are expected to be 100 percent. In other words, averaged over a year, power from the solar and smart energy storage systems should provide more electricity than is needed by the McKnight Lane residents, resulting in a net energy cost of zero.

Project Implementation

- Construction started in May 2016, and the homes will be ready for occupancy by November 2016.
- The 14 modular homes will be available for rent to qualified low- and middle-income households through the Addison County Community Trust.
- Efficiency Vermont and VERMOD, the manufacturer of the modular home units, have already identified two additional low-income communities in Vermont where this pilot project could be replicated.
- Clean Energy Group and Clean Energy States Alliance will provide technical assistance to analyze and improve upon the clean energy systems in these units, and apply the lessons learned to similar, future projects.

Project Support

To make this zero-energy, low-income housing development possible, funds were needed for the site cleanup, the new infrastructure, and the 14 new VERMOD homes, totaling \$3.6 million. Funding was secured by project developers ACCT and Cathedral Square from many sources, including: Vermont Housing Finance Agency, Vermont Housing and Conservation Board, Vermont Community Development Program, HOME Investment Partnership, People's United Bank, VLITE, Clean Energy Development Fund, Vermont Community Loan Fund, Vermont Department of Environmental

Conservation, Agency of Commerce and Community Development, City of Vergennes, National Association of Realtors, Efficiency Vermont, and in kind support from the Town of Waltham and the City of Vergennes.

Permanent Funding Sources:

- People's United Bank Tax Credit Equity: \$2,135,000
- Vermont Community Development Program: \$498,000
- HOME Investment Partnership: \$440,000
- Vermont Housing & Conservation Board: \$370,000
- Efficiency Vermont: \$119,000
- Clean Energy Development Fund: \$60,480
- VLITE: \$50,000

Smart Solar Energy Storage System Support

Clean Energy Group/Clean Energy States Alliance, Efficiency Vermont, Green Mountain Power, Sonnen, and other partners worked to secure funding to add the smart energy storage systems to these units, thereby providing the tenants with reliable backup power in the event of a grid outage.

- Efficiency Vermont: \$30,000
- Green Mountain Power: \$45,000
- High Meadows Fund and the Vermont Community Foundation Sustainable Future Fund, through Clean Energy Group: \$27,156
- Sonnen has discounted the cost of the smart energy storage systems for this project by 25 percent
- Clean Energy Group, Efficiency Vermont, Green Mountain Power and VerMod will work together to use lessons learned from this project as a template for clean energy resilient power projects at other low-income housing facilities across the state and region.

Energy Storage System Partners

- Addison County Community Trust (www.addisontrust.org)
- Cathedral Square (<https://cathedralsquare.org/>)
- Clean Energy Group (www.cleanegroup.org) and Clean Energy States Alliance (www.cesa.org)
- Efficiency Vermont (www.efficiencyvermont.com)
- Green Mountain Power (www.greenmountainpower.com)
- High Meadows Fund (www.highmeadowsfund.org)
- Sonnen (www.sonnen-batterie.com)
- VerMod (<http://vermodhomes.com/>)
- Vermont Community Development Program (<http://accd.vermont.gov/community-development/funding-incentives/vcdp>)
- Vermont Community Foundation Sustainable Future Fund (www.vermontcf.org)
- Vermont Housing and Conservation Board (www.vhcb.org)

Learn More

More information about the McKnight Lane rental homes, including pictures, floor plans, features and amenities, rent costs, and application instructions are available on the Addison County Community Trust website at:

http://www.addisontrust.org/uploads/5/0/0/3/50034487/mcknight_lane_info_sheet.docx.

To learn more about how resilient power systems can benefit your community, contact Clean Energy Group Project Director Todd Olinsky-Paul at todd@cleanegroup.org, or visit www.resilient-power.org.



Energy Storage Systems at McKnight Lane

McKnight Lane rental homes are equipped with the most advanced and resilient clean energy systems.

The tenants of the duplex-modular homes at McKnight Lane Housing Development have access to some of the most energy-efficient, affordable rental housing available. The VERMOD modular homes are so energy efficient that, with the addition of the roof-top solar panels, electricity costs are expected to be zero. That is why they are called zero energy homes.

Tenants will also receive the benefits of resilient power with the inclusion of Sonnen solar energy storage systems installed in each home. The combination of solar PV and the smart energy storage systems will enhance each home's energy performance and provide emergency backup power during a power outage. So, while other homes may be in the dark, McKnight Lane residents will have power to keep them safe.

What Is Energy Storage?

Simply put, energy storage is an electric system that uses high-capacity batteries with other system components to store power generated from the solar PV panels for use when it is needed most, like at night or during a power outage when the electricity grid can no longer supply the home with power. Electricity stored in the batteries can be used to meet the home's daily electricity needs and for backup power, when needed.

How Does It Work?

When the electricity grid is up and running, the solar PV and energy storage (solar+storage) system functions similarly to a regular solar PV system: meeting the home's electricity demand, sending excess electricity generated by the PV panels to the grid, and drawing electricity from the grid, if needed, to power the home.

Unlike most solar-only installations, when there is a power outage, the solar energy storage system can continue to provide power to the home using the solar power stored in the batteries. A solar-only system cannot. The solar+storage system has an automatic transfer switch that allows the system to isolate itself from the grid and continue to power critical loads in the home until utility power is restored. The energy storage system automatically reconnects to the grid when power is restored, without the tenants having to do a thing.

The solar+storage system in each modular home is designed to be fully operational with no action needed from the tenants. The systems will be monitored electronically by Green Mountain Power and Sonnen, and maintained by the Addison County Community Trust (ACCT) property manager. Most of the battery systems will be housed in cabinets in the mechanical room of the rental units, so they will be "out of sight, out of mind." But like any other electrical systems, the battery cabinets need to be kept clean and dry and have access to good ventilation. They also should be kept free and clear of any other items. ACCT property managers will be inspecting the solar+storage systems regularly.

What Happens During a Power Outage?

The solar+storage systems installed at the McKnight properties will provide emergency backup power to the McKnight Lane tenants if the grid power goes out. The electricity stored in the batteries will power essential appliances, the ventilation system, and the heating and cooling systems. And during long power outages, the solar panels can recharge the batteries whenever the sun is shining.

When the automatic transfer switch detects a power outage, the solar+storage system will disconnect from the grid. This is done so that power that might be coming from the PV panels will not enter the grid and cause harm to anyone repairing the power lines.

The system's sensors will know when to use electricity from the PV panels or from the batteries. If the solar panels' power generation drops below what is needed for powering the home, the energy storage system powers the main service panel from energy stored in the batteries. Otherwise, the PV system powers the main service panel and excess power from the PV panels is stored in the batteries.

The solar+storage system can provide up to six hours of backup power to the home, but only to power essential appliances. Tenants must try to conserve as much of the power as possible during that time so that the stored power will last as long as possible.

When the sensors in the automatic transfer switch detect that the grid power has been restored, the solar+storage system reconnects the main service panel to the utility grid after five minutes of stable grid power. All of this will happen automatically.

The McKnight Lane resilient solar+storage systems demonstrate the latest in clean energy innovation, combining energy efficiency, solar, and smart energy storage systems to bring economic benefits and energy security to low-income communities in Vermont and beyond.

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Affordable Housing Since 1990



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In Case of an Emergency

The solar+storage systems will automatically shut down if there are any critical errors. The systems have electronic displays that will be monitored remotely at all times, so if there are any problems, many of them can be fixed immediately from a remote location. GMP Energy Services Team will be available to assist tenants with any concerns.

The local fire department has been informed about the solar+storage systems in the building and will know what to do in case of an emergency.



McKnight Lane Waltham, VT

What: McKnight Lane is a new net zero energy, affordable rental housing community under development in Waltham and Vergennes. Opening is anticipated in October 2016. McKnight Lane will offer 14 affordable homes for rent; 12 are two-bedroom homes and two are three-bedroom homes. Rents are below market and will serve households below 60% of Area Median Income. Amenities include new energy efficient appliances including washers and dryers in each home, parking, and location in a nice residential neighborhood. Two homes are fully ADA accessible, and all homes incorporate universal design principles. The homes are manufactured in Vermont, exceed Vermont's High Performance Home standard, and are solar powered. Rent will include heat, air conditioning, hot water, laundry and electricity.



Where: McKnight Lane is located at Maple Street Extension in Waltham.

Who: McKnight Lane is owned by a tax credit limited partnership with Addison County Community Trust (ACCT) as its General Partner. The property will be managed by ACCT. Pill Maharam Architects and Otter Creek Engineering provided architectural and engineering services. Champlain Construction is the site work general contractor, and VERMOD is the home manufacturer.

How: Funding totaling more than \$3.6 million was raised from numerous sources to cover development costs. The Vermont Housing Finance Agency allocated Federal Housing Credits. People's United Bank invested in the Federal Housing Credits and provided the construction financing. Other critical funding came from the Vermont Community Development Program, HOME Investment Partnership, the Vermont Housing and Conservation Board, Efficiency Vermont, the Clean Energy Development Fund, VLITE, and the National Association of Realtors®. Financial and In-kind support was provided by Clean Energy Group and the City of Vergennes, and in kind support was provided by the Town of Waltham. Vermont Community Loan Fund provided pre-development financing, and additional funding for early site-work was provided by the Department of Environmental Conservation and the Agency of Commerce and Community Development.

<i>Permanent Funding Sources</i>	
<i>People's United Bank Tax Credit Equity</i>	<i>\$2,135,000</i>
<i>Vermont Community Development Program</i>	<i>\$498,000</i>
<i>HOME Investment Partnership</i>	<i>\$440,000</i>
<i>Vermont Housing & Conservation Board</i>	<i>\$370,000</i>
<i>Efficiency Vermont</i>	<i>\$119,000</i>
<i>Clean Energy Development Fund</i>	<i>\$60,480</i>
<i>VLITE</i>	<i>\$50,000</i>
<i>TOTAL</i>	<i>\$3,672,480</i>



For information please contact
Addison County Community Trust
(802) 877-2626 - www.addisontrust.org



Cathedral Square
Development Partner



High Performance VERMOD Homes, Made in Vermont

Solar Powered

Each home produces its own electricity with a 6-kW rooftop solar system

Super-insulated

Extra insulation surrounds the home like a thick blanket reducing energy loss

Healthy Materials

Low off-gassing materials keep pollutants out of the air

Fresh Air

Fresh, filtered air keeps the home healthy and reduces pollutants that cause allergies and asthma

Windows

Triple-pane windows are air tight and keep warmth in

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Cold-climate heat pumps use electricity to efficiently heat and cool the home

Appliances & Lighting

ENERGY STAR® certified lighting and appliances are durable and energy efficient

For more information: www.vermodhomes.com

Solar & Battery Storage System

Solar PV System

Each home has a 6-kW rooftop solar photovoltaic (PV) system to power energy needs. The homes are designed to have net zero energy costs.

Smart Solar Energy Storage System

Each home features a sonnen eco 6kWh AC battery for energy storage. During a grid outage, the smart energy storage system automatically disconnects from the grid, allowing the solar panels and batteries to provide resilient power to the home. Solar panels can continue to produce energy to replenish the batteries for continuous backup power. The smart energy storage system automatically reconnects to the grid when grid power is restored and then uses the solar panels to recharge the batteries.

Project Support

This is the first resilient zero-energy housing development in a rural community for low-income residents. Support for the Solar Battery Storage System was provided by: Green Mountain Power; sonnen; Vermont Energy Investment Corporation & Efficiency Vermont; and High Meadows Fund and the Vermont Community Foundation Sustainable Future Fund, through Clean Energy Group.

For more information: www.resilient-power.org and <https://sonnen-batterie.com/>