



Vermont
Housing &
Conservation
Board

ENERGY EFFICIENCY and AFFORDABLE HOUSING

Senate Natural Resources and Energy Committee

March 21, 2017



Wood pellet silo and solar panels at Armory Lane Senior Housing, Vergennes

Energy Efficiency, Renewables & Carbon Savings

- Energy retrofits to 3,641 apartments; average 30% reduction in fuel use
- 978 new and adaptive reuse units built above energy code standards
- Solar thermal systems installed in 82 buildings with 1,446 apartments
- Biomass heating systems in 35 buildings with 868 apartments
- Photovoltaic systems installed in 41 buildings with 413 apartments
- 650 KW of community solar PV provide net metering credits to 12 properties with 480 apartments



Converting Heating Systems to Biomass

- 35 biomass boiler installations are providing heat and domestic hot water to 868 apartments
- Biomass installations are replacing approximately 147,000 gallons of fuel oil annually.
- Reducing energy costs by an additional 1/3 on top of project energy efficiency upgrades.



Above:
Wood pellet boiler at Montpelier Senior Housing;
Wood pellet silo at Applegate, Bennington



Lakebridge,
Newport



Carbon Saved by Efficiency Upgrades

More than 11,500,000 lbs. of carbon saved annually from energy efficiency upgrades in 3,641 apartments and enhanced new construction energy efficiency standards in 978 new apartments.



Modular Housing Innovation Program

- Partnership with VerMod High Performance Modular Homes, Wilder
- 55 new net-zero-capable homes delivered
- 2 mobile home parks with 27 net-zero-capable VerMod rental units under development
- Homes consume 1/3 the fuel of traditional manufactured homes
- Net-zero performance with solar package



**Left: Opening Event;
Above: Aerial View**

McKnight Lane, Waltham

- Redeveloping an abandoned mobile home park into a resilient, net-zero, affordable housing community.
- 7 net-zero modular duplex buildings (14 homes) powered entirely by on site solar photovoltaics.
- Participant in on-site battery storage pilot with Green Mountain Power, making cutting-edge efficiency technology available to low-income Vermonters.

**2015 AIA/HUD Secretary's Housing and
Community Design Award:
Creating Community Connection**

2013 EPA Award for Smart Growth



Canal and Main Housing and Brattleboro Co-op

- Pioneering innovative design approaches to maximize savings and operating performance.
- 24 new apartments in Brattleboro in downtown site that utilizes waste heat from Co-op refrigeration compressors.
- Fuel savings to project of an additional 30-40%.
Operating at approx. \$27/month per apartment for fuel.



St. Stanislaus Housing, Rutland

- Adaptable reuse: creating 17 new apartments in Rutland in old school building and former convent.
- High performance building envelope with R25 walls, R99 in the ceiling, tight air sealing, heat recovery ventilation, triple pane R5 windows, pellet boiler and solar hot water system.



Elm Place, Milton
30 affordable,
senior apartments

- Vermont's first multi-family affordable housing built to Passive House standards, utilizes 72% less energy to heat and cool than a code built building
- Translates to long-term cost savings. Utilizing cold climate air source heat pumps paired with very high efficiency building envelope, at current electric rates this project will cost only \$2,350/yr to heat and cool (\$6.50/apartment per month).

VHCB & VHFA Multifamily Energy Design Standards

March 2012, Ver. 1.0

									Advanced Mechanical ⁸		
	Units	Ceiling / Attic R ¹	Wall R ²	Window ³ R-value / U-Value	Foundation R-Value, Continuous	Slab Edge R	Air Sealing: MASP ⁵	Mechanical ⁶	Solar ⁷	Biomass ⁹	ASHP
Rehabilitation	All	60	25	R 3.3 / U.30	15	15	<3ACH 50	MMDP	Required 50% Load	<i>Not Required</i>	<i>Not Required</i>
New Construction	≥5	60	25	R 3.3 / U.30	15	15	<2ACH 50	MMDP	Required 50% Load	<i>Not Required</i>	<i>Not Required</i>
New Construction	≤4	60	25	R5/U.20 ⁴	15	15	<2 ACH50	MMDP	Required 50% Load	<i>Not Required</i>	<i>Not Required</i>
Tier II Level	All	60	30	R 5 / U.20	15	15	<1ACH 50	HRV required	75%+ of load	75%+ of load	COP >3

Alternative Model Based Design Standard:

Exceptions to the minimum requirements may be granted if the project can demonstrate equivalent or lower energy consumption through funder-approved modeling.

Projects not meeting the base standard or Alternative Model Based Design will be considered Moderate Rehabilitation Projects

Moderate Rehabilitation Discouraged:

Where required for portfolio reasons moderate rehabilitation projects will be underwritten from an energy perspective on a case-by-case basis. During pre-application feasibility a blower door guided energy audit is required to determine all possible energy upgrades that can be accomplished within the parameters of project scope and budget. In addition all moderate rehabilitation upgrades shall include an operating budget based on \$6.25/gal. fuel oil equivalent input price.

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