

Working Group Topic: Building Energy Use

Commission Members:

Bob Stevens, Tom Donahue, Linda McGinnis, Jenn Wallace-Brodeur, Matt Cota, Paul Costello, and Kristin Carlson

State Agency Staff:

Dan Edson, Josh Kelly, Kelly Launder, and Jared Ulmer

Public Members:

Existing Condition and Trajectory:

- Approximately 250,000 residential year-round occupied units
- Approximately 54,000 commercial accounts
- Roughly 20% of the state's energy used for buildings and processes is from renewables (CEP)
- 30% of the building stock was built before 1940 (CEP)
- About 25% of Vermont's energy bill is for heating and process requirements (CEP, 5)
- The residential sector accounts for 60% of Vermont's thermal fuel consumption, commercial 29%, and industrial 11%. (CEP, 88)
- Weatherization Assistance Program waiting lists can be years long
- Typically deep retrofits achieve 15-30% energy savings through weatherization.
- The current pace of weatherization 2000 homes/year while we need to be doing 12,000/year (Building Energy Panel)
 - Through 2016 we have 23,297 of the 80,000 target
 - 10,900 of the 23,297 are low income households through 2016 (Vt PSD report)

Goals:

High level goals

- 90% renewables by 2050 (CEP at 2)
- 80-95% carbon free by 2050 (Title 10)
- Renewable Energy Standard (Act 56 of 2015)
 - Tier I – 55% in 2017 increasing by 4% every 3 years achieving 75% in 2032
 - Tier II – 1% of annual sales in 2017 increasing by 3/5ths of a percent until 10% in 2032
 - Tier III – Fossil fuel savings of 2% in 2017 from market transformation projects increasing by 2/3rds of a percent per year until 12% achieved in 2032
- 25% renewables by 2025 (10 VSA § 580(a))
- 40% renewables by 2035 (CEP at 2)
- 15% reduction in total energy consumption per capita by 2025 and 1/3rd by 2050 (CEP at 2)

Building energy goals

- Goal is to realize 30% of energy use in buildings from renewables by 2025 (CEP at 2)
- 80,000 residences weatherized by 2020 (Act 92 of 2008)
- All new buildings are "net zero" by 2030 (CEP at 8)
- 35,000 cold climate heat pumps by 2025 would begin the transformation of other buildings (CEP)

Other Entities Exploring Topic:

Working Group Topic: Building Energy Use

Commission Members:

Bob Stevens, Tom Donahue, Linda McGinnis, Jenn Wallace-Brodeur, Matt Cota, Paul Costello, and Kristin Carlson

State Agency Staff:

Dan Edson, Josh Kelly, Kelly Launder, and Jared Ulmer

Public Members:

[What state (Vermont or others) or federal entities are exploring this topic? Where is there overlap? Does the Commission have a sufficient role to play? Is it worth a dedication of our resources?]

- Clean Energy Finance Collaborative is looking at overcoming barriers to financing clean energy investments.
- Vermont utilities and Tier 3 pathways related to buildings (mostly cold climate heat pumps)
- Experience in other states
 - Washington and Oregon on increasing energy efficiency investments in state buildings
 - Net zero building costs in California
- Building and General Services (state buildings)
- Weatherization
- Neighborworks of Vermont
- Efficiency Vermont
- Thermal Energy Task Force
- Vermont Housing and Conservation Board (VHCB)
- Various Vermont consulting outfits (e.g., VEIC and EFG)
- State Wood Energy Team (SWET)
- Biomass Energy Research Center (BERC) of VEIC (Adam Sherman)

PSD [Comprehensive Energy Plan](#)

Local biomass summary from the [Vermont Independent](#)

Proposed Commission Focus:

1. Building Electrification

- a. Revisit potential policy pathways, technologies, and business models for furthering building electrification;
- b. Extend the reach of existing building electrification through expansion of utility incentives and service offerings;
- c. Extending the role of storage systems, metering technology, and measurement devices;
- d. Explore pathways for extending the reach of building electrification to models for third party delivery models and aggregation of customer loads;
 - i. Options for monetization of value streams;
 - ii. Framework for cooperation and working with distribution utilities and ISO-NE;
 - iii. Dynamic and time-varying pricing.

2. Advanced wood heat

- a. Resurface ambitions, targets and pathways for further consideration;
- b. Some potential pathways to address barriers to market adoption;
 - i. Reducing barriers to capital for advanced wood heating systems;

Working Group Topic: Building Energy Use

Commission Members:

Bob Stevens, Tom Donahue, Linda McGinnis, Jenn Wallace-Brodeur, Matt Cota, Paul Costello, and Kristin Carlson

State Agency Staff:

Dan Edson, Josh Kelly, Kelly Launder, and Jared Ulmer

Public Members:

- ii. Options for funding and providing support incentives (current legislative bill);
- iii. Strategies for overcoming barriers to public perception;
 - 1. System performance and reliability;
 - 2. Emissions;
 - 3. Forest sustainability; and
 - 4. How wood heat solutions compare against other heating options.
- c. Regulatory Framework;
 - i. Consider clear, and consistent regulations can help expand market adoption and stimulate private investments in the wood heat sector.
- d. Role for EVT;
- e. Role for Clean Energy Development Fund;
- f. Role of Utilities in relation to Tier III;

3. Low-income Weatherization

- a. Revisit eligibility criteria for low-income weatherization;
- b. Develop or resurface information on status, progress, risks associated with existing funding of low-income weatherization;
- c. Options and opportunities for funding low-income weatherization programs;
- d. Recommendations for extending the depth of low-income weatherization retrofits;
- e. Expanding or scaling up demonstrated programs like the Heat Saver Loan Program;
- f. Use of bonding authority in connection with pre-existing revenue streams to increase investment in low-income weatherization (e.g., H. 831)

4. Internalizing the ESCO model to extend self-sustaining investment for MUSH institutions (extending the BGS model)

- a. Investigate pre-existing pathways to develop this model in Colorado, Washington, and Maryland
- b. Identify the energy profile or budgets for municipal buildings, primary and secondary educational institutions, universities, and hospitals in Vermont;
- c. Options and opportunities for the establishment or expansion of a revolving loan funds to support the framework;
- d. Explore the potential pathways and permutations for leveraging the following institutions to build on the success of the BGS model:
 - i. BGS role;
 - ii. Role of ESCOs and Commons Energy;
 - iii. Role of EVT;
 - iv. Role of new hire or virtual program manager

Working Group Topic: Building Energy Use

Commission Members:

Bob Stevens, Tom Donahue, Linda McGinnis, Jenn Wallace-Brodeur, Matt Cota, Paul Costello, and Kristin Carlson

State Agency Staff:

Dan Edson, Josh Kelly, Kelly Launder, and Jared Ulmer

Public Members:

- e. Identify likely frameworks for models to adapting the BGS model to reach other MUSH institutions and sectors.

5. Revision and Increasing Efficiency of Building Energy Codes/High Performance Buildings

- a. Resurface the state of our understanding of building energy codes, including cost and compliance;
- b. Mapping out the development of building energy codes to reach CEP objectives for all new construction to meet net zero design by 2030;
- c. Extend pathways for increasing the code compliance and enforcement efficiency;
- d. Building energy code options and opportunities for mandating a storage for peak shaving;
- e. Building energy code options for building energy management and renewable energy;
- f. Electrification and Building Codes:
 - i. Level 1 and 2 EV integration for multi-unit threshold requirements;
 - ii. Explore pathways to encourage building electrification as a component requirement in building codes.

Expand educational outreach for high performance building labels like LEAD, Energy Star, and Home Energy Ratings.

Metrics:

[How will we define success? What are the GHG implications? How will we monitor that progress?]

- 80,000 Vermont residences with deep retrofits (target)
- Energy use by public buildings (metrics)
- Percent improvement in energy efficiency of public buildings (target)
- 100% of new buildings “net zero design”
- Commercial buildings metrics and targets
- Percentage of high performance residential and commercial energy efficient buildings
- Percentage improvement in energy efficiency, renewables, and reduction in energy expense for for municipal, university, schools and hospitals financing and implementation
- Targets and metrics for advanced wood heating systems
- District heating projects

Information Needs:

- Baseline information on all targets and policy pathways

Working Group Topic: Building Energy Use

Commission Members:

Bob Stevens, Tom Donahue, Linda McGinnis, Jenn Wallace-Brodeur, Matt Cota, Paul Costello, and Kristin Carlson

State Agency Staff:

Dan Edson, Josh Kelly, Kelly Launder, and Jared Ulmer

Public Members:

- Up-to-date progress report regarding deep retrofits on residences (PSD reports 23,397 residences and 10,900 low income HH through 2016)
- Municipal and school energy profiles
- State buildings energy profile
- Commercial building energy profile

Potential Expertise:

- Efficiency Vermont
- CAP Agencies
- Weatherization
- Vermont Public Service Department
- Vermont Housing and Conservation Board
- Clean Energy Finance Collaborative
- Local consultants
 - Energy Futures Group (EFG)
 - Vermont Energy Investment Corporation (VEIC)
 - Biomass Energy Resource Center (BERC – part of VEIC)

Full Commission Discussion Items: