

Climate Action Input Session: Buildings and Thermal Summary of Input

Thursday, October 24, 12:30-2:00pm
*hosted by the Cross-Sector Mitigation Subcommittee
of the Vermont Climate Council*

Overview

The Vermont Climate Council is updating the state's Climate Action Plan. Subcommittees of the Council are holding a series of virtual public meetings to get input on their initial ideas for the update.

This document summarizes input during a session on October 24, 2024, focused on reducing climate pollution from the buildings and thermal (heating/cooling) sector. Approximately 70 people attended the 90-minute Zoom meeting. A participant list is included below.

This document is not a transcript of the session, but rather an overview of themes and ideas that participants provided verbally, in the chat, or subsequently over email to Vermont's Climate Action Office.

The session began with a presentation of emerging ideas from the Buildings and Thermal Task Group of the Council's Cross-Sector Mitigation Subcommittee.

- [View presentation slides.](#)
- [View discussion questions.](#)
- [Watch the Buildings & Thermal Input Session recording.](#)

Summary of input

High-level summary

At the end of the input session, participants were asked to answer the question, "what themes are jumping out?" Using a Menti link, they offered the short phrases as responses, which are grouped below by theme.

Many comments focused on addressing the needs of low-income Vermonters

- Keep low-income Vermonters' needs and circumstances front of mind.
- A solution is needed, but it must be affordable.
- Electricity rate protections for low-income residents.
- Funding to help low-income folks weatherize and upgrade heating equipment.
- Flexible programs that center access and equity; reduce thermal demand (and electric demand) growth (not just electrify everything).

- Whatever changes happen must be at no harm to low-income Vermonters.
- Be sure not to penalize low-income Vermonters.
- Raising moderate income level.

Other comments focused on funding, implementable solutions, and local solutions

- We need a funding source, maybe a surcharge on short-term rentals?
- More money for implementation, better balanced with or exceeding money for planning.
- Set specific, measurable goals for short-term action. More implementation funding, with community-led participatory budgeting. Help make existing programs more successful (ie. WAP).
- We need to find cost-efficient and effective ways to decarbonize our existing housing stock.
- Prioritize cost-effective steps that are technically feasible.
- Focus on the achievable! Don't make a long list of things that we know will never happen.
- Federal Funding needs to be aligned with local needs.
- Community solutions
- How do we translate state policy into local action?
- Be careful with unfunded mandates.
- Integrated program coordination with municipalities.

Several comments focused on contractors, building codes and workforce issues

- Contractor training is critical and keep low-income Vermonters' circumstances in mind.
- Enforcing building codes.
- Code enforcement
- Incentivizing builders.
- "Most builders never even look at the energy code" - very true! How can we encourage/enforce that they do?
- We need workforce, but workforce won't come into being without businesses - and those businesses won't arise unless there is a defined future for thermal improvements over a course of years.

Participants had other key takeaways as well

- Focus on greenhouse gas reductions as mandated by Global Warming Solutions Act. Not on renewables. Biofuels also have greenhouse gas reductions. Also include health concerns in emissions considerations.
- Coordination among administrators and implementers.
- Education
- Regulation
- Utilities

Detailed summary by theme

Below is a more detailed summary of input provided verbally during the conversation, in the chat, and from subsequent emails, grouped by theme.

Workforce development

- Trainings and certifications
 - The weatherization workforce is limited in terms of how many workers there are, what services they offer, and whether they are doing the work themselves or outsourcing it.
 - Weatherization is not an attractive option for young people – pay scale will be crucial to attract workers.
 - Contractors are not recommending upgrading failing equipment and are simply installing what they have on hand. One of the reasons for the lack of uptake of heat pump hot water heaters is because of contractors' lack of knowledge and/or a bad experience. Need more training for contractors who don't attend Better Buildings by Design conference.
 - Increase awareness and training among experienced and trusted tradespeople to build fluency and confidence in energy-efficiency.
 - There is a need for workforce training about dealing with refrigerants and ensuring leak-proof systems.
 - Consider starting a mandatory contractor and professional licensure program reaching building and HVAC contractors for training, certification, education, and best practices.
 - Current weatherization training is inconvenient to travel to and only addresses workers, not companies. We need more companies doing comprehensive weatherization.
 - Encourage Office of Professional Regulation to allow for certifications (i.e. building science, energy code. etc.) and find a way to enforce contractors to register and list their certifications on the Office of Professional Regulation website.
 - Get building science certification listed on the voluntary registry. Some contractors are joining the registry voluntarily but need to reach hundreds of contractors and those in the build community who are not aware.
 - It can be challenging to access the local certifications and trainings that are necessary to enter skilled trades associated with the energy transition. Invest in workforce development to help meet the demand created by these incentives.
 - Improve language access to training (as well as the number and availability of instructors).
- Apprenticeship and co-op programs
 - There are currently programs working on increasing our weatherization workforce in Vermont, but we need to increase funding to local schools.

Workforce development begins with youth, Career and Technical Education programs, and certification programs that increase the pipeline of workers.

- Vermont should deliver a registered apprenticeship program for carpenters and high-performance builders (not just for carpenters because the new generation needs to understand water vapor management, energy code, and have a foundation in building science).
- Consider co-op high school programs that get students into paid internships while attending high school and community college. Staffing green trades such electrical and mechanical and HVAC technology should offer well-paying jobs and provide the workforce we need.

Affordability and support for low-income Vermonters

- Fully and thoroughly consider how any planned actions you may take to address climate change may contribute to or worsen the housing crisis which Vermont is currently facing and the 3500+ unhoused Vermonters, including many who have never struggled with housing until now.
- Develop policies for low-income electricity ratepayers as we make the transition to electrification.
- Ensure that there are no unintended financial consequences if we are requiring people who already have heat pumps to change refrigerants (i.e. adding new duct work, sensors for safety, etc.).
- While ground source heat pumps in Vermont are highly efficient, they are also very inaccessible for most Vermonters because of the costs associated with geothermal drilling.
- Heat pumps are more expensive to operate. Consider rate modification and a way to fund this work that is not reimbursement based.
- Consider having the state bulk purchase appliances such as heat pump hot water heaters and distribute them to low-income folks at no cost and middle-income folks at a reduced cost through the dealer and/or installers.
 - Heat pump purchase in this manner could depend on weatherization first.
- For older buildings in the long-term rental market that might need assistance with weatherization costs: can we include low-cost housing or long-term rentals in the potentially subsidized category?

Code enforcement

- Codes are getting stricter, and builders are not paying as much attention to them. Should focus more on addressing existing homes with large amounts of heat loss instead of on making codes more restrictive because that will only further discourage builders from following them.
- It seems pointless updating code if they are not adequately enforced — need policies that fund code enforcement for new construction, renovations, and additions. Issue non-compliance fines as well.

- Passive shading is a cost-effective strategy to reduce cooling loads from exposed windows in summer and should be added to the Residential Building Energy Standards handbook.
- The International Energy Conservation Code standard does not take into consideration Vermont's microclimate.
- All new infrastructure that is built must include renewable energy (primarily solar) and energy-saving techniques (even if building affordable housing)
- The 2024 Residential Building Energy Standard's base standard for air tightness is just 0.15 CFM50/ sq. ft. building shell area; this could be better. In new construction, this is very easy to exceed with the right building envelope design.
- These standards and codes need some attached "carrots or sticks" (incentives or disincentives) to ensure people who can clearly afford to build houses in compliance with the Residential Building Energy Standard are doing so. Right now that's not the case.
- National electric code needs to allow for smart panels

Incentives and/or regulations

- Consider regulations such as "no installation of fossil fuel hot water heaters will be permitted if Heat Pump models are applicable." Otherwise, incentives are more accepted by the public.
- Focus on incentives for domestic hot water heating instead of regulations. Seeing a lot of need for re-upping refrigerants in systems.
- It is difficult to retrofit the existing housing stock. Make incentives more broadly available for retrofits and ensure low barriers to those incentives (i.e. Efficiency Vermont's example).
 - Efficiency Vermont's residential programs and incentives do not always support deep energy retrofits (especially for older "leaky" houses).
- Electrification often requires upgrading panels and meters, and multiple subcontractors (electricians and plumbers/mechanical contractors). Any regulatory approach, if considered, should ensure this isn't a barrier to compliance for single-family housing and small-scale commercial property owners.
- Need better incentives from the Tier 3 IOUs and the EEU's. Current incentives from Green Mountain Power and Efficiency Vermont are not enough to make the systems achieve cost-parity with air-source heat pumps.
- Must take action toward weatherization now, primarily focusing on the lower- and middle-income residents (homeowners and renters) where their homes waste the most residential energy. Consider charging a small fee per gallon of fuel (or equivalent for natural gas) and put into funding of weatherization projects. There should be an exemption based on household income. For those not exempted, it should be an incentive for them to use the incentives to weatherization.
- Think through ways to get second homeowners and "McMansion" owners to reduce their energy use.

- Whatever incentives we can offer small businesses to promote distributed renewable energy and decrease climate-warming fuels, the better. However, in doing so we cannot burden small businesses with more taxes or fees. We want to make it easier for younger people to come to Vermont and open small businesses.

Equipment used in buildings and other strategies to reach energy efficiency

- New equipment and applying new performance standards while understanding different buildings' needs
 - We need to carefully think through applying equipment performance standards for requiring installations in existing homes when old equipment dies. Avoid financially burdening property owners and take into consideration the limitations of the existing housing stock (i.e. layout, vermiculite, and electrical limitations). Consider offering solutions paired with significant resources for home repairs.
 - Instead of replacing heating systems, use “upgrading systems by adding heat pumps to reduce fossil fuel usage in existing structures.” Encourage heat pumps for cooling as it gets warmer, along with heat pump clothes dryers to make homes safer and warmer. No vent hole in the exterior wall can make a difference.
 - A new technology that could make a difference but is not yet widely available in the USA is induction stoves with battery storage. These do not require an electrical service upgrade, and can use the 120V electrical outlet.
 - Different buildings require different technology and not everyone's home is conducive to the current technology. Heat pump hot water heaters do not usually work for mobile homes and their wastewater and supply water designs.
- Passive House Standard
 - We should educate ourselves on the Passive House Standard and look into ways to incentivize more multi-family passive house projects. Passive house retrofits and panelization deep retrofits can have a positive effect on energy demand.
 - The Passive House Standard is ultimately more affordable and has health benefits.
 - Vermont Housing and Finance Authority gives extra 'points' in the Qualified Action Plan for competitive project scoring for passive house certification, but few developers have used this pathway.
- Opportunities for solar
 - There are many opportunities to put solar on city buildings, but we are limited. We need to raise limits substantially to ultimately increase the State's solar capacity.
 - Solar hot water heating works in Vermont – electrification of water heating should not be the only option.
- Other strategies
 - Explore the option of Thermal Energy Networks (TENS), that capture heat, either ground source or waste and move it around as needed.

- Continue conversations about waste heat recovery and community solutions because we need ground source heat pumps to be shared infrastructure. Interested in State support to ensure funding is implemented effectively.
 - Pairing a solution with community solar and electric ratepayer protection will be helpful.
- Geothermal ground loops are a cost-effective way to absorb cooling and heating energy from a shallow buried ground loop to add to Heat recovery ventilators (HRV) and energy recovery ventilators (ERV) systems.
- Some building encapsulation options (adjusting additions to buildings to encourage energy conservation) offer great potential.
- The best way to reduce greenhouse gas emissions is to use less energy/electricity, not simply electrifying everything. Electrification must be paired with reductions in electric demand.

Fuels assistance and fuel used in equipment

- Fuel assistance is mostly federal and currently fuel assistance can only be used for one fuel source. Even though fuel assistance is not meant to cover the entire cost, we still need to change these rules at the federal level.
 - Need to make sure low-income homeowners are not penalized if there are higher fuel costs down the road.
- Consider opportunities to use the revised Climate Action Plan to recommend actions that Vermont may not be able to take directly through its agencies or legislature, but that are important to capture in a formal written plan or recommendation (i.e. urge federal changes to fuel assistance).
- Most Vermonters have primary and secondary fuel types – make sure to consider how to maintain and advocate for flexibility both in rulemaking and in various programs. Incorporate this into ways we are collecting data, setting baselines, and tracking progress.
- Look at the clean heat standard in the context of what is being considered “clean.” Biofuels are not clean.
- The inclusion of biomass (wood) is a serious shortcoming as wood combustion does have significant greenhouse gas emissions and health concerns.
- Don’t incentivize advanced wood heat because of pollution, forest degradation, and hidden factors such as processing and transportation costs.
- Fuel source is in our own backyards — includes solar, wind, geothermal, and a renewable wood source. Using modern wood heating makes sense for our fuel needs and the local economy. Improving the McNeil plant to include a thermal heat component for the community would make that plant more efficient.
 - Source of wood is not coming from clearcutting but from management that maintains a balance of age classes. Forests that are 20-80 years old are sequestering carbon at the greatest rates. By managing our forests to have a range of age classes, we can grow older trees (150 plus) while maintaining a high

rate of sequestrations in the younger age classes. The McNeil plant uses wood from forests managed in this way.

- Other modern heat such as bulk pellets for boiler systems are an excellent source of fuel. Wood stoves are also still valuable as there is minimal processing prior to BTU (heat) output, and are traditional in Vermont.
 - Pellets manufactured in the region should stay in the region. Pellets lose their carbon value when shipped long distances. Keep things bioregional and produce our own thermal heat and electricity.

Potential funding sources

- Important to advocate for Vermont at the federal level — there is a gap between what the federal government provides for funding and how much it actually costs in Vermont.
- Home Weatherization Assistance Program (HWAP) funds are decreasing as winters get warmer and more people switch to using electricity as a heat source. The federal job cost average of upgrading a whole heating system is around \$8,500, but in Vermont the cost of weatherization can be over \$15,000. We are having to spend State funds on jobs that are considered federal just to complete them. Need to figure out how to maintain these levels of fundings (i.e. increasing HWAP tax).
- The Municipal Energy Resilience Program (MERP) does not provide enough money to cover all of the buildings that need upgrades and it has been difficult to identify other funding sources.
- The State needs to find a better balance between how much funding it puts into planning versus implementation (i.e. money goes into enhanced energy planning but not into implementing those plans at the municipal level).
- Hopeful that the legislature considers a bill that allows municipalities to borrow from the state's revolving loan fund and the Bond Bank's new fund for MERP upgrades without requiring voter approval since the energy savings should pay for most if not all the repayments.
- Funding is a high priority, including savings from weatherization; no interest on-bill financing.
- Consider a zero-interest revolving loan fund to fund energy projects, particularly if the funds are Federal monies coming into the state. The funds could be administered by Regional Planning Commissions around the state.
- As a housing funder, we are hesitant to require buildings to be all electric because Efficiency Vermont is only able to incentivize performance above code. It is challenging to ask developers to pay for energy efficiency that will not reliably pan out and ultimately depletes scarce housing funding resources.
 - Hopeful that greenhouse gas reduction fund money will serve as a funding solution.

Topics that have been missed

- “Embodied energy” or “lifecycle emissions”
 - The amount of energy it takes to create certain building products (foam and concrete) – and therefore the greenhouse gas emissions from those – should not be left out of the conversation.
- Smart panels
 - These are critical in the transition to electric homes and cars, but also are one of the most complex interconnections of policy, regulation (both state and national), and emerging technologies.
 - People in rural areas are paying too much for panel upgrades when smart panels (breakers that shut off certain appliances when they’re not needed) would be more affordable. But these aren’t recognized by the national electric code yet and that needs to change.
- Education and storytelling
 - Missing components: education, outreach, and neighbor-to-neighbor storytelling and documentation.
 - Educate Vermonters about the benefits of saving energy and how Vermont can have an impact nationally.
- Off-grid residents
 - Off-grid residents will never be able to get an electric vehicle or heat pump, even with many on-site solar panels; cannot get rid of propane entirely that’s needed for cooking and hot water.
- Don’t overlook building foundations
 - Need to ensure that new construction has especially deep footings to hold buildings against soil loss around foundations.
 - Site design to divert water flow away from foundations, roadways and other homes and buildings.
- Explore new business models
 - Business models for electrical utilities.
 - Encourage creativity and innovation when exploring solutions, particularly systemic improvements that can address multiple challenges.
 - Develop a community-scale customer-centric and contractor-friendly approach that caters to the needs of individual households.
 - Neighborhood-oriented hubs are great opportunities for providing a range of services (i.e. transportation, vehicle pooling and mass transit as well as emergency services).
 - Spend time on how programs should run properly in order to provide the savings and benefits. Don’t assume just spending money on energy efficiency means it will get results.

Participants

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