To: Deirdre Morris, Thomas Knauer, Vermont Public Utility Commission
From: Rick Weston, Chair, CHS Technical Advisory Group
Date: 8 July 2024
cc.: TAG members

Re: Early Win Measure Characterizations

Members of the TAG have reviewed Opinion Dynamics' document, "Vermont Clean Heat Standard: Early Win Measure Characterizations" and its cover memo, dated June 28th. In preparation for the upcoming meeting of the full TAG (this Thursday, July 11th) and our discussion with Opinion Dynamics staff about the characterizations, a subset of TAG members met today to share reactions to the documents and identify questions and issues in want of fuller exploration. I forward them to you now, for sharing with Opinion Dynamics before Thursday's meeting. The outline of our questions follows that of the characterizations document.

Thank you.

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Building Envelop Measures

- The formula for calculating the emissions-reduction effects of weatherization employs area of insulation installed as a key variable. How does it relate to the square footage of the building served, such that the formula in some way accounts for the varying type and size of buildings? Put another way, there's a question about whether average residential fuel mix and heat load are sufficient for the purposes of the CHS.
- Where partial building weatherization occurs (e.g., just one unit in a three-unit building), how will the savings be calculated and what data will be used to measure the savings?
- Weatherization improvements target not only insufficient insulation, but also air infiltration. It is not clear that air infiltration is addressed in this measure characterization. What assumptions are being made in this respect and how are potential savings from improved air-tightness being captured?
- It appears that the data on heating loads cited by OP are not the most up-to-date data used by the Vermont Department of Public Service and other state agencies. These data should match what the state uses.
- Would it be possible to cite actual source material for many of the assumptions and inputs? For instance, instead of citing Vermont's efficiency and Tier III technical reference manuals, please cite the DOE and other sources on which those TRMs rely ("Remove the middleman" where possible).
- Will Opinion Dynamics make the documents it references available to us?
- What sources of data will be used to perform weatherization calculations for CHS credits? Will these sources be linked in some way to the registration of actual projects? [This question may not be answerable at this time.]

Residential HVAC - Advanced Thermostats

- Our understanding is that emissions reductions are calculated with respect to the hourly capacity of the heating unit rather than the annual heat load of the building. If that's the case, then the thermal efficiency of the house is not accounted for. Please explain.
- Please confirm that lifetime GHG emissions savings will be converted to and expressed in annual credits. [This applies to all measures.]

- OD has included savings from the effects of advanced thermostats on cooling loads in its measure characterizations. This seems reasonable. However, the TAG is aware that a question has been raised by at least one party to the proceeding about whether the measure, as it relates to non-onsite fossil energy loads (i.e., electricity), should be eligible. What clarification from the PUC has OD received on this point?
- Are savings from the effects of advanced thermostats on fossil systems calculated differently from their effects on heat pumps? [Manufacturers recommend that heat pumps be maintained on a steady setting, rather than being cycled during night times and when houses are empty, to maintain unit efficiency of unit.] Are the energy savings assumed to be the same (though the emissions savings will clearly be different)?
- [Question raised by a member of the public:] To the extent that heat pumps will be cycled on at times when marginal emissions on the electric system are greater, will this be accounted for? [Note: the TAG has not taken a position on the nature of marginal carbon emissions from the electric grid and today's subgroup is neither agreeing or disagreeing with the premise of this question.]

Residential HVAC – Heat pump water heater

- Measure characterizations are split between water heater tanks less-than-55 gallons and greater-than-55 gallons. The characterizations treat the efficiency of the measures the same; is this reasonable? Would it be better to base savings on usage (assuming the data are available) rather than tank capacity? The Tier III TRM shows that the smaller systems produce higher savings than the larger one, which may not necessarily be logical, but it is nonetheless relevant.
- The system that is being replaced is critical to the calculation, too. For example, isn't there a meaningful difference between replacing the energy use of an on-demand water heater and that of a non-heat pump storage system? Are such differences accounted for?
- Do the calculations account for the fact that heat pump water heaters typically must be larger than a standard water heater in order to meet the same level of demand (it's not a 1:1 size replacement)?

Residential low-flow faucet aerators

- Does aeration reduce the thermal capacity of the water by injecting more air into the water and therefore requiring more energy to achieve desired temperatures or does it simply reduce the flow of water?

Residential low-flow showerheads

- [Same questions as for low-flow faucet aerators]

Residential induction stove tops

- There is some confusion about whether gas for cooking is considered "thermal" under Act 18. The RCI definition includes all uses of fossil fuels, but earlier guidance from PUC staff to a TAG member indicated that cooking and back-up power generation were considered non-thermal and should **not** be included in the registry. Please clarify what guidance PUC has provided OD on this issue.
- Measure cost is given here, as it is for the other measures. Is there a particular reason that it's included?

Commercial/Industrial Sector: Advanced thermostats, low-flow faucets, and low-flow showerheads

- [Same questions as for the same residential measures]

General

Thank you for this opportunity to weigh in on measure characterizations. We encourage OD to take full advantage of the TAG's expertise in these matters, as it continues to develop and refine its analyses. We hope that on Thursday OD will identify any matters that it would like the TAG to dig into now and provide more immediate input on (rather than waiting until a complete draft of the TRM is made available).