

To: The Vermont Public Utility Commission  
From: Frederick Weston, Chair, CHS Technical Advisory Group  
Date: 10 January 2025

Re: 2024 End-of-Year Report on TAG Activities

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This memo summarizes the first-year activities of Clean Heat Standard's Technical Advisory Group (TAG) and the status of its current efforts. Act 18 identifies a set of tasks for TAG, to advise and assist the PUC in the design, implementation, and ongoing management of the clean heat standard. This report is organized according to those tasks,<sup>1</sup> which were prioritized largely by deadlines set in statute or by the PUC in the rulemaking that it is conducting pursuant to the statute.<sup>2</sup>

The TAG began its work at the end of 2023. The full TAG met first on 11 December 2023. Since then, it has met 25 more times (through 12 December 2024). In addition, it has held a similar number of ad hoc sub- (or breakout-) group meetings, convened to dig into particular issues, report on their work to the full TAG, and, where appropriate, to make recommendations for specific TAG actions.

1. 30 VSA §8124(d)(2): Clean Heat Measures Expected to Lower Annual Energy Bills

Obligated parties under Act 18 will have annual emissions reductions requirements (i.e., obligations to create specified amounts of clean heat credits). They are required to acquire 16% of their annual credit requirements from low-income customers and another 16% from low- or moderate-income customers. Half of these credits must be generated by “installed clean heat measures that require capital investments in homes, have measure lives of 10 years or more, and are estimated by the Technical Advisory Group to lower annual energy bills.”

The TAG has only recently begun to address this issue. The TAG does not have internal capability to perform the kinds of analyses that can determine which installed measures are likely to reduce energy bills. To begin our discussions, *Efficiency Vermont* provided a cost-benefit analysis of a limited number of installed measures (ductless and ducted heat pumps, heat pump water heaters, air sealing and insulation), but it was illustrative and not intended to be the basis of specific findings. Certainly, obligated parties will need to know what installed measures will satisfy the criteria, so there will come a time when the requisite analytical work will need to be done. The PUC will need to determine who should complete this work and also allocate resources for it.

2. 30 VSA §8127(b): Credit Ownership

This section directs the PUC, in consultation with the TAG, to “establish a standard methodology for determining what party or parties shall be the owner of a clean heat credit upon its creation.” A straw proposal on the question was developed by PUC staff and comments in response to it were solicited from interested parties and the public. On 16 May, the TAG approved by a vote of 11 in favor and none opposed, with one abstention, a response to the straw proposal. On 16 July 2024, the PUC issued its decision on credit ownership.

3. 30 VSA §8128: The Technical Advisory Group

This section identifies ten tasks for the TAG. A number of the tasks require data collection and technical analysis. §8128(c) provides the PUC with authority to hire a third-party consultant to

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<sup>1</sup> 30 VSA §8124(d)(2), §8127(b), and §8128(a) & (c).

<sup>2</sup> 30 VSA §§8122, 8126, and 8131.

perform such work. The TAG's tasks, then, have consisted primarily of identifying key matters to be addressed, responding to the consultant's inquiries, providing feedback on the consultant's work product, and, where possible, reaching its own conclusions on particular matters.

In the spring, the PUC contracted with Opinion Dynamics (OD) to develop a draft technical resource manual (TRM) for the CHS. The TRM, which ultimately is subject to PUC review, modification, and approval, contains, among other things, emissions rate schedules (for fossil fuels, delivered measures, installed measures, and Vermont's electricity portfolio), detailed measure characterizations, and the data sources and mathematics that underpin them. At key points in the development of the TRM, OD consulted with the TAG. Much of our input and feedback was given orally during these sessions and, for the most part, it consisted of individual members' reactions, questions, and recommendations. Some input was communicated in writing, by means of memos from the chair on behalf of the TAG to PUC staff.

On the whole, the process worked well, but the compressed timelines presented challenges. OD did its best to incorporate the TAG's input and recommendations, where it was deemed appropriate, which couldn't have been easy at those times when the TAG did not speak unanimously or with a strong majority opinion.

a. §8128(a)(1): Emissions Accounting Methodology

This subsection requires that the PUC establish a "lifecycle carbon dioxide equivalent (CO<sub>2</sub>e) emissions accounting methodology to be used to determine each obligated party's annual requirement". This is perhaps the central challenge to designing a practical thermal sector emissions program. Relatively straightforward in concept (the legislation sets out the broad parameters and mathematics), it becomes complex measure by measure (particularly for delivered measures, i.e., fuel), each with its own set of nuanced and contentious upstream and downstream effects. The TAG did not reach a strong majority (which we defined as a majority of ten or more) on the life-cycle emissions profiles of all delivered measures, but our diverse views and the bases for them were explored in great depth in our internal conversations and with OD. (See also subsection c., below.)

In the spring, the PUC staff issued and sought comment on its straw proposal on "pacing."<sup>3</sup> The document addressed a number of process issues that related not only to the determination of an emissions accounting methodology and emissions rates, but also to, among other things, declining carbon intensity values, the thermal sector's emissions reduction requirements, and the obligated parties' annual requirements. On 27 June 2024, the TAG submitted a statement in response to the straw proposal. It was adopted by a vote of ten in favor and none opposed, with one abstention.

b. §8128(a)(2): Credit values for Clean Heat Measures

All eligible clean heat measures must have credit values associated with them. The PUC determined that each credit would be equal to one ton of emissions reductions. Mathematically, annual credit values for each measure can be straightforwardly calculated from the emissions rate schedules, and the TAG examined a number of examples for doing so. The translation of emissions rates into credit values illuminated some intriguing differences in the performance of various measures, which were raised with OD in our 12 December conversation with them.

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<sup>3</sup> Straw Proposal of the Staff of the Vermont Public Utility Commission (PUC) on the topic of Pacing – Part I for the Clean Heat Standard (Act 18), 30 VSA, elements within §§8124 and §§8127, 29 May 2024.

c. §8128(a)(3): Periodic Reporting

The TAG is required to periodically assess and report to the PUC “on the sustainability of the production of clean heat measures” by considering a variety of factors, among them greenhouse gas emissions, carbon sequestration, human health impacts, land-use changes, ecological impacts, pollution, and food costs. The statute doesn’t say when the TAG should first take up these questions—there was debate about whether this called for making findings before the clean heat program is up and running or whether it’s a *post hoc* exercise requiring data on the actual performance of the CHS—but, as a number of the potential impacts relate directly or indirectly to the calculation of life-cycle emissions, they naturally informed our discussions.

Of those discussed, the TAG reached a strong majority position on none. (It’s probably more accurate to say that our discussions never progressed to the point where we felt a strong majority might emerge.) The most divisive (I use the term without judgment) had to do with potential upstream benefits and impacts of biofuels production, chief among them being avoided methane emissions and deleterious land-use impacts. Among the TAG there are genuine and defensible differences of opinion on these questions, especially as they relate to the incremental effects of Vermont’s actions on the broader national and international markets. OD was made fully aware of these debates.

Although we did not achieve develop strong majority positions on these issues, we nonetheless submitted memos to the PUC that described our discussions (and differences of opinion) around consideration of (1) upstream avoided emissions of biofuels, (2) land use change, (3) the characterization of advanced wood heat, and (4) the treatment of wood fuel emissions schedules.

d. §8128(a)(4): Expected Lives of Clean Heat Measures

The total number of credits that a clean heat measure can earn is a function of its expected lifetime. Delivered measures produce credits (emissions reduction) only in the year that they are used (combusted). Installed measures, in contrast, generate savings across multiple years. The draft TRM gives expected lifetimes of installed measures. The TAG reviewed them and discussed them with OD. Consistency with current regulatory practice in Vermont (e.g., the Tier 3 and *Efficiency Vermont* TRMs) was an important theme. The TAG noted that, in some cases, such as the assumptions about the hours of operation of ducted heat pumps, there is not in fact consistency and urged that this be addressed through the review process.

e. §8128(a)(5): Credit Values over Expected Lives; Adjusting for Interactions Among Measures

See sub-paragraph b., above. As noted, the calculation of credit values is straightforward. That said, accounting for interactions among measures over time (whether *ex ante* or *ex post*) introduces complexities to the math. The emissions reductions from weatherization and improved insulation depend, for example, on whether they are calculated before or after (analytically or in chronological fact) a heat pump is installed. Success of the program depends on the integrity of the accounting.

The TAG looked at this question while reviewing the study of clean heat potential performed by NV5, a consultant to the Department of Public Service. Determining the contribution of particular measures, more than one of which might be installed in the same building, is altogether affected by the sequence of installation. This is analogous to a “loading order” for electric supply resources in the long run. The TAG did not feel that, at this point, the potential problem of double- or over-counting is a significant risk. It will be greatly mitigated by measure characterizations that recognize the circumstances at the time of installation. It should be easy

enough to differentiate the savings of, by way of example, a heat pump installed in a well-insulated home from those of a heat pump installed in a less well-insulated one.

f. §8128(a)(6): Coordination with Other Energy Programs

§8127(k)(1) states, among other things, that all clean heat measures delivered in Vermont, including those “resulting from the State’s energy efficiency programs, the low-income weatherization program, and the Renewable Energy Tier 3 program.” §8128(a)(6) instructs the TAG and PUC to develop appropriate rules around the coordination of the CHS with such programs.

The TAG first addressed the topic in its statement on credit ownership (16 May). It came up in subsequent discussions, especially those having to do with the cost of credits and the clean heat program overall (see the following sub-paragraph). Other than the TAG’s credit ownership statement submitted to the PUC, the TAG has not spoken further on this issue.

g. 8128(a)(7): Cost of Credits and Savings

This subsection of the statute requires the PUC to calculate the impact on heating-fuel prices of the costs of credits and savings generated by delivered clean heat measures (i.e., eligible fuels). The PUC is currently conducting a study to estimate those effects. Members of the TAG have participated in the public meetings on this study, but the TAG itself has taken no formal action on this question. We await the results of the study.

h. 8128(a)(8): Public Health Benefits

Act 18 directs the PUC to calculate “the savings associated with public health benefits due to clean heat measures.” TAG members do not think that this statutory wording constrains their consideration to benefits only, since there are such things as “negative benefits,” but especially so when reading this subsection in conjunction with §8128(a)(3), which speaks of “human health impacts” (see sub-paragraph c., above).

The TAG recently turned its attention to this question. The TAG’s initial effort consisted of a literature review, to begin to develop an understanding of the range of the potential public health impacts the various clean heat measures. On 9 January 2025, the TAG adopted, by a vote of ten in favor and three opposed with no abstentions, a statement on health considerations with respect clean heat measures.

The TAG’s periodic review (pursuant to §8128(a)(3)) should align with the PUC’s biennial review of consequences of the CHS. Calculating the public health benefits and impacts likely requires dedicated funding and expertise. Such analysis, conducted by an independent consultant or a state agency and provided with resources sufficient to do so, should dovetail with the PUC’s first review of consequences. The TAG can advise on methodology and review results, in the same way that it has done with the PUC’s and Department’s technical consultants.

i. §8128(a)(9): Coordination with the Agency of Natural Resources

The subsection of Act 18 directs the PUC to work with Agency of Natural Resources “to ensure that the greenhouse gas emissions reductions achieved in another sector through the implementation of the Clean Heat Standard are not double-counted in the Vermont Greenhouse Gas Emissions Inventory and Forecast.”

The Agency of Natural Resources (ANR) is represented on the TAG. So is the Department of Public Service (DPS), the state’s energy office and ratepayer advocate in matters before the PUC. The TAG discussed this question of potential double-counting and decided that no action is

needed at this time. This expressed confidence that, since ANR is the state entity charged with monitoring the state's greenhouse gas emissions inventory and the DPS has an intimate understanding of how Vermont consumers use energy, the risk of double-counting is very low.

j. §8128(a)(10): Periodic Assessment and Revision

§8124(a)(3) directs the PUC to, among other things, institute a triennial process of assessing the achievements of the clean heat standard and, if necessary, revise the schedule ("pace") for achieving the requirements of the GWSA. §8128(a)(10) tasks the TAG with assisting the PUC in that effort. We look forward to the opportunity.

4. Coda

In closing, I would like to commend the TAG's members for their dedication to the work. They have allocated a significant amount of personal and professional time to the effort, in what is clearly for each of them a sincere desire to see that a workable clean heat program, capable of meeting the Global Warming Solutions Act's goals as efficiently and fairly as possible, is put in place. We've not made perhaps as much progress by this time as we'd hoped, but I believe that we've done much to articulate, clarify, and at least begin to craft solutions to the CHS's thornier design and implementation challenges. Nothing in this memo should be construed to suggest that the cause has not been worth the effort. Rather, the contrary: the difficulty of the undertaking is a measure of its importance. I hope that the TAG's work of the last year will inform the continuing efforts of the legislature and administration to create a robust program to reduce greenhouse gas emissions from Vermont's thermal sector.

I want also to thank the facilitator from the Consensus Building Institute and the PUC staff who've more than assisted the TAG this past year. Without their constant effort, good humor, and attention to detail, the TAG would not have been nearly so productive.