

July 31, 2024

Via email only

PSD.CleanHeat@vermont.gov

Re: Comments and response to Clean Heat Standard potential study draft results

To Whom It May Concern:

I am writing in my capacity as a member of the Vermont Climate Council¹, to which I was appointed by the Vermont Legislature to provide expertise in energy and data analysis. On the Climate Council I co-chair the Science & Data subcommittee and serve on the Cross-Sector Mitigation subcommittee and the Council Steering committee.

I am writing in response to the Department of Public Service's (PSD's) request for comment on NV5's Clean Heat Standard potential study draft results. Since this information is also relevant to pacing considerations for the Clean Heat Standard, the PSD suggested that I also file this letter with the PUC via ePUC.

In summary, the draft potential study A) uses an assumption regarding the GHG emissions reduction target for the RCI sector that is inconsistent with Vermont's Climate Action Plan and is not supported by the Vermont Climate Council's decision regarding sectoral proportionality or the Affordable Heat Act. Additionally, the draft potential study B) does not incorporate the latest GHG Inventory data from ANR. The combined result is that **NV5 has modeled a scale of GHG emissions reduction from the thermal/RCI sector that appears to be nearly twice what is actually required by January 1, 2030.**

A) Sectoral Proportionality

The Affordable Heat Act (Act 18 of 2023) is designed to achieve thermal or Residential, Commercial, and Industrial (RCI) fuel use sector GHG emissions reductions in service of helping to meet overall, economy-wide GHG emissions reduction targets of the Global Warming Solutions Act (GWSA) (Act 153 of 2020).²

¹ To be clear and in accordance with the Climate Council's governance document, I am writing on my own behalf, as an individual Councilor, not on behalf of the entire Council. See:

<https://outside.vermont.gov/agency/anr/climatecouncil/Shared%20Documents/Climate%20Council%20Governance%20-%2020231211.pdf>

² See Act 18 of 2023, 30 V.S.A. § 8121. INTENT "Pursuant to 2 V.S.A. § 205(a), it is the intent of the General Assembly that the Clean Heat Standard be designed and implemented in a manner that achieves Vermont's thermal sector greenhouse gas emissions reductions necessary to meet the requirements of 10 V.S.A. § 578(a)(2) and (3), minimizes costs to customers, protects public health, and recognizes that affordable heating is essential for Vermonters." Also see: 30 V.S.A. § 8123. DEFINITIONS (13) "Thermal sector" has the same meaning as the "Residential, Commercial and Industrial Fuel Use" sector as used in the Vermont Greenhouse Gas Emissions Inventory and Forecast and does not include nonroad diesel or any other transportation or other fuel use categorized elsewhere in the Vermont Greenhouse Gas Emissions Inventory and Forecast.

<https://legislature.vermont.gov/Documents/2024/Docs/ACTS/ACT018/ACT018%20As%20Enacted.pdf>

While the GWSA requires Vermont's total GHG emissions to be at least 40% below 1990 levels by January 1, 2030, and 80% below 1990 levels by Jan. 1, 2050, it does not establish sectoral shares of responsibility for emissions reduction within those overall, economy-wide targets.

Instead, 10 V.S.A. § 592 (d) (2) of the GWSA states that the Vermont Climate Action Plan shall further the following objective:

(2) to provide for greenhouse gas emissions reductions that reflect the relative contribution of each source or category of source of emissions;

In responding to this legislative directive and as part of the Initial Vermont Climate Action Plan, the Vermont Climate Council established 2018 as the reference year for determining the share of sectoral responsibility in relation to meeting GWSA emissions targets.³ There were multiple reasons for this, including that 2018 was the most recent year for which emissions estimates were available post-GWSA passage and during the time that we were working on the Initial Climate Action Plan. Another key reason was the recognition that sectoral shares of emissions were very different in 2018 than they were in 1990 and that it did not make sense to hold sectors or the actors within them responsible for long-ago emissions proportions that were no longer present at the time the GWSA was passed.

The Findings section of Act 18 makes clear that the legislature designed Act 18 in response to the Climate Action Plan's Clean Heat Standard recommendation which, in turn, was written in the context of setting 2018 as the reference year for establishing sectoral proportionality, including for the RCI sector. The Findings section of Act 18 even explicitly mentions the 2018 emissions from the RCI sector in finding 4.

Act 18 Sec. 2. FINDINGS The General Assembly finds:

(3) The Vermont Climate Council was established under the GWSA and was tasked with, among other things, recommending necessary legislation to reduce greenhouse gas emissions. The Initial Vermont Climate Action Plan calls for the General Assembly to adopt legislation authorizing the Public Utility Commission to administer the Clean Heat Standard consistent with the recommendations of the Energy Action Network's Clean Heat Standard Working Group.

(4) As required by the GWSA, the Vermont Climate Council published the Initial Vermont Climate Action Plan on December 1, 2021. As noted in that plan, over one-third of Vermont's greenhouse gas emissions in 2018 came from the thermal sector. In that

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See: https://outside.vermont.gov/agency/anr/climatecouncil/Shared%20Documents/Sectoral%20Proportionality%20Memo_DRAFT%2010182021_Final.pdf

for the memo that more fully lays out this rationale. Please also see this link

<https://outside.vermont.gov/agency/anr/climatecouncil/Shared%20Documents/10-26-21%20Minutes%20-%20Vermont%20Climate%20Council.pdf> for the minutes showing that this recommendation was officially adopted by the Council.

year, approximately 72 percent of Vermont’s thermal energy use was fossil based, including 29 percent from the burning of heating oil, 24 percent from fossil gas, and 19 percent from propane.

In their draft, NV5 described a needed 40% reduction below 1990 emissions levels in the RCI sector (so going from 2.26 MMTCO_{2e} to 1.36 MMTCO_{2e}, or a 0.90 MMTCO_{2e} reduction), based on the latest GHG Inventory from ANR, published July 2024.

However, the assumption NV5 used is inconsistent with the Council’s sectoral proportionality decision. Instead, RCI’s share of Jan. 1, 2030 (or 2029 annual) maximum allowed emissions by sector should be calculated in reference to 2018 GHG emissions (as reported in the latest Inventory), in which RCI was 31% of total emissions.⁴

Using the approach adopted by the Council along with using the most recent Inventory data means that Vermont should aim to go from 2.26 MMTCO_{2e} (1990 RCI emissions) to no more than 1.61 MMTCO_{2e} by Jan. 1, 2030 (or 2029 annual emissions) in the RCI sector, not down to 1.36 MMTCO_{2e}. So, compared to 1990 emissions, that would be a reduction of RCI sector emissions of 0.66 MMTCO_{2e} by January 1, 2030.

Stated differently, based on the Council's sectoral proportionality decision, the RCI sector should aim to achieve a minimum 29% reduction in GHG emissions from 1990 to 2029 rather than a minimum 40% reduction.

Looking out to the Jan. 1, 2050, GWSA requirement, this means going from 2.26 MMTCO_{2e} (1990) to no more than 0.54 MMTCO_{2e} (2049) rather than down to no more than 0.45 MMTCO_{2e} by Jan. 1, 2050. So that would be a 76% reduction in RCI emissions by January 1, 2050, relative to 1990 rather than an 80% reduction.

| GWSA targets using Council-adopted 2018 sectoral proportionality (MMTCO_{2e}) | | | |
|--|--|--|--|
| Sector | Jan. 1, 2025, target for maximum allowed emissions (using 2018 proportionality) | Jan. 1, 2030, target for maximum allowed emissions (using 2018 proportionality) | Jan. 1, 2050, target for maximum allowed emissions (using 2018 proportionality) |
| Transportation | 2.92 | 2.06 | 0.69 |
| Thermal (RCI) | 2.28 | 1.61 | 0.54 |
| Electricity | 0.26 | 0.18 | 0.06 |
| Agriculture | 1.17 | 0.83 | 0.28 |
| Fossil fuel industry | 0.03 | 0.02 | 0.01 |
| Industrial processes | 0.44 | 0.31 | 0.10 |
| Waste management | 0.19 | 0.13 | 0.04 |
| Total | 7.30 | 5.14 | 1.71 |

⁴ For comparison, RCI made up 26% of total emissions in 1990.

B) Using the most up to date and accurate GHG emissions data

In addition to using an incorrect target for 2029 annual RCI emissions, the NV5 draft also assumes much higher values for recent annual RCI emissions totals than are correct, primarily because its draft used out of date Vermont GHG Inventory values (as NV5 themselves have acknowledged).

Specifically, the Agency of Natural Resources (ANR) published its latest Vermont Greenhouse Gas Inventory and Forecast in July 2024⁵, providing updated statewide GHG emissions estimates for 1990 – 2021. Additionally, ANR shared with NV5 values for RCI sector emissions totals going through 2023 (note: while ANR does not have annual emissions estimates consistent with Inventory methods for all sectors for 2022 and 2023 yet, they do for the RCI sector).

| | 1990 RCI emissions (MMTCO ₂ e) | Latest Annual RCI Emissions (MMTCO ₂ e) | 2029 Annual (or Jan. 1, 2030) RCI target (MMTCO ₂ e) | Total Annual RCI reduction target by Jan. 1, 2030 (MMTCO ₂ e) |
|---------------------------|---|--|---|--|
| NV5 draft used values | 2.54 | 2.87 (2021) | 1.52 | 1.35 |
| Correct values (ANR 2024) | 2.26 | 2.30 (2023) | 1.61 | 0.69 |

As shown in the table above, when up to date and correct numbers are used, the annual total GHG reduction to be achieved in the RCI sector as of 2029, relative to the most recent annual RCI emissions available, would be 0.69 MMTCO₂e, not 1.35 MMTCO₂e. In other words, **the scale of RCI emissions reductions being modeled by NV5 appears to be nearly twice as high as appropriate.**

C) NV5 baseline assumptions do not account for warming VT winters

During a July 30 meeting with PSD staff held at the request of TJ Poor and Matthew Bakerpoole, I learned that NV5 is not incorporating declining heating degree days into their modeling.

In its recent paper “Analyzing changes in fossil heating fuel use in Vermont, 2018 – 2023”⁶, EAN included population-weighted heating degree day data for Vermont, accessed from the National Oceanic and Atmospheric Administration (NOAA) for 1990 to 2023.⁷ While there is year to year variability, incorporating a regression trend line shows that **the average number of heating degree days in Vermont has declined by about 4% from 1990 to 2023, or roughly an average decline of 0.13% each year.**⁸

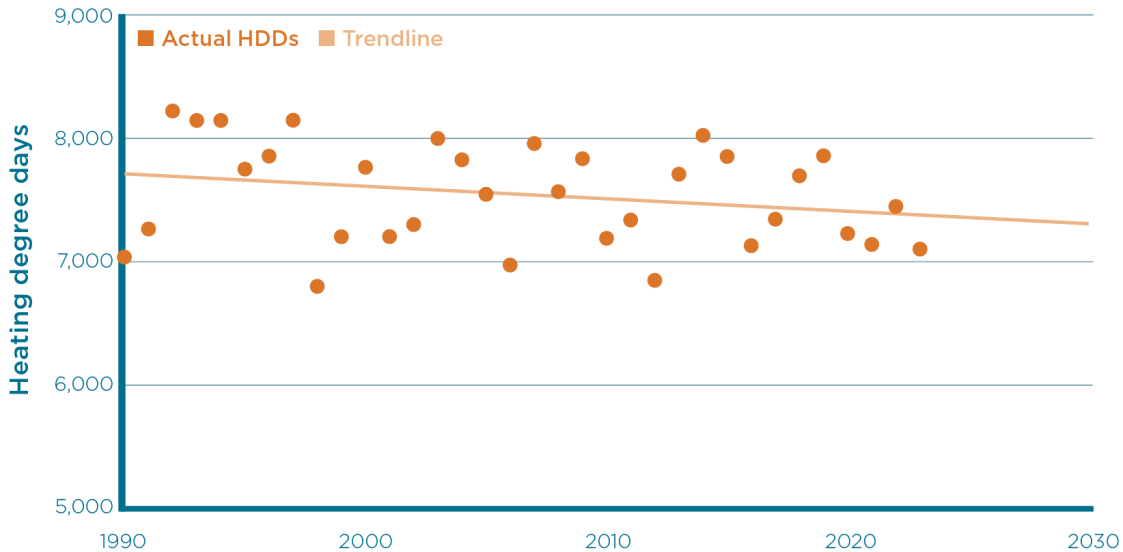
⁵ See: https://outside.vermont.gov/agency/anr/climatecouncil/Shared%20Documents/1990-2021_GHG_Inventory_Uploads/Vermont_Greenhouse_Gas_Emissions_Inventory_Update_1990-2021_Final.pdf and, for a summary of some of the key takeaways from the Inventory, including a brief explanation of the methodology changes that led to lower RCI emissions estimates, see: <https://eanvt.org/wp-content/uploads/2024/07/GHG-Inventory-Summary-2024-1.pdf>

⁶ See: <https://eanvt.org/project/fossil-heating-fuel-changes/>

⁷ See: https://ftp.cpc.ncep.noaa.gov/htdocs/degree_days/weighted/legacy_files/heating/statesCONUS/

⁸ There may be better data to use for future HDD projections, perhaps via the Vermont or National Climate Assessments. However, a winter warming/ lower HDD trendline over the past few decades in VT is clear.

Vermont annual heating degree days, 1990–2023



Source: NOAA Climate Prediction Center, Vermont population-weighted heating degree day data, 1990-2023.



Warming winters (or fewer heating degree days) result in lower heating loads and therefore contribute to declining fossil fuel use. As unfortunate as the reality of our warming winters may be, I do not think this physical reality should be ignored in modeling. Consider the opposite situation: would the PUC accept a Demand Resources Plan (DRP) from a distribution utility that failed to account for projected increases in summer electricity demand for cooling, due to increasing cooling degree days? If not, I would suggest that it is not appropriate to accept modeling that fails to incorporate the physical reality of warming winters in its projections for heating demand and related RCI emissions into the future.

I submit the information in this letter in service of helping to establish accurate and appropriate baseline inputs and assumptions related to Clean Heat Standard modeling. Failing to use appropriate inputs and assumptions will likely lead to findings that are inaccurate and misleading -- something that is important to avoid with regard to our shared interest in careful fact- and evidence-based deliberation.

Respectfully submitted,

/s/ Jared Duval

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Member, Cross-Sector Mitigation Subcommittee