



FILED VIA ePUC

March 9, 2023

Holly R. Anderson
Clerk of the Commission
112 State Street
Montpelier, VT 05620-2701

Re: Case No. 22A-0155, Hybrid Heating Research & Development Project, Phase 1

Dear Ms. Anderson:

On January 14, 2022, Vermont Gas Systems, Inc. (“VGS” or the “Company”) provided notice that we intended to use Climate Action and Innovation Budget funds on the first phase of our Hybrid Heating Research & Development Project (the “Project”). It has been one year since the Project was allowed, so we are providing the Commission and Department with an annual report of the Project’s progress.¹

As discussed in our January 2022 filing, VGS is planning to promote hybrid heating systems by adding Cold Climate Heat Pump (“CCHP”) installation into our portfolio of in-home services, and is striving to offer CCHP hybrid heating in a way that will empower customers to understand their hybrid systems to better make personal carbon reduction choices. We envisioned and began prototyping an interactive tool—the Cost vs. Carbon Calculator—that will allow each customer to see a hybrid heating system’s specific carbon-emitting fuel consumption and how both the system’s emissions and cost change with adjustments to the outside temperature set point.²

Through Phase 1 of the Project, VGS began exploring this idea by developing and testing a prototype with customers and experts. Fourteen customers³ participated in our test sessions, including six subject matter experts from Vermont distribution and efficiency utilities and eight customers recruited through a survey. VGS has spent \$30,000 on the project to date, funding delivery of the prototype calculator, enrollment of project participants, prototype testing and customer surveying, analysis and reporting, and stakeholder presentation. A report was prepared presenting findings and recommendations, and after concluding the customer test sessions, we compiled the survey data and qualitative observations responsive to the following questions, as summarized below.

¹ For procedures required by VGS’s Alternative Regulation Plan, please see Exhibit VGS-JMP-5 filed May 21, 2021 in Case No. 19-3529-PET.

² This set point is the setting in the smart thermostat that automatically switches the heating source from the heat pump to the gas furnace or vice versa based on outdoor air temperature.

³ Originally we had planned to engage with 40-50 customers in our test sessions. After consulting with a User Experience professional, we revised this number downward on the advice that our results would be more informative if we conducted more in-depth interviews with fewer people.

1. At the beginning of this project, we identified the following key hypotheses; were we able to affirm them?

- a. *It is possible to closely estimate the potential CO2 reductions and financial impacts from a hybrid heating system using simple inputs from the customer in conjunction with VGS's existing billing data.*

The calculator successfully delivered on its core functionality, automatically estimating the potential cost and CO2 impacts of a customer's operational choices for a hybrid heat pump system. The custom software delivered by our consultant Resilient Edge was able to ingest gas and electric data⁴ and generate a secure web-based interface that allowed customers to interactively explore the impacts of different swap-over temperatures, RNG percentages, and electric rates. Expert users generally agreed with the calculation approach, though some wanted to see more details about the assumptions.

- b. *Customers are motivated to reduce their "carbon footprint," can articulate a goal that they want to reach, and are willing to pay for a service that helps them achieve this goal.*

While this group of customers expressed a high willingness to reduce their carbon footprint, only the expert participants were able to frame those goals in terms of annual tons of CO2. Customers expressed a moderate interest in a "one-stop shop" for their home energy needs but were mixed as to whether a home energy advisor could help them reduce CO2 emissions.⁵

- c. *Customers will be more willing to pursue the installation of a hybrid heating system if the costs and benefits are framed in the context of CO2 reductions toward their stated goal and take into consideration overall cost.*

Customers indicated that they were more interested in a hybrid heat pump system after using the calculator and cited CO2 reductions as a key reason. Several communicated their surprise that the cost premium for increasing the use of the heat pump by lowering the swap-over temperature was not as high as they anticipated.

2. What else did we learn about the customer response to interacting with the calculator?

Participants found the advice to be credible because it was based on their actual energy use data. However, cost and CO2 are not the only factors in the decision; comfort was also a consideration for some participants, and the calculator does not currently indicate at what point a lower swap-over temperature might impact comfort. Nor does the tool educate customers about whether comfort concerns are well founded.

⁴ Electric data was successfully integrated from both Burlington Electric Department and Green Mountain Power.

⁵ The trial did not include any direct experience with a home energy advisor (only with the automated calculator), so this is not a definitive finding.

3. What new questions arose based on these customer test sessions?

Participant responses presented several questions that will inform further development of the tool. As noted, participants would like to see comfort illustrated with the graphs provided. They would also like to see how the cost of heat pump installation would impact results and raised questions about air conditioning, such as how potential A/C cost and carbon savings compared with window A/C units.

4. Based on what we've learned, do we recommend pursuing this idea further?

Yes. During fiscal years 2023 and 2024 we anticipate launching Phase 2 of development of the tool. This will enable VGS to integrate the tool into VGS's hybrid heating program so that it can be utilized whenever a new centrally ducted heat pump is being installed by our service technicians. Phase 2 will focus on making accuracy improvements, tracking and comparing the model with actual results, and expanding the number of participants to further validate the customer value as a decision-making tool and carbon-reduction strategy in tandem with a residential hybrid heating system pilot. Investment in Phase 2 that triggers notice under our Alternative Regulation Plan will be filed with the Commission accordingly.

As always, we are available to the Commission and the Department to answer any questions about this filing.

Respectfully submitted,

/s/ Mary G. Bouchard

Mary G. Bouchard
Regulatory Counsel
Vermont Gas Systems, Inc.
mbouchard@vermontgas.com