



FILED VIA ePUC

June 15, 2026

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

Re: Single-Family Residence Geothermal Project

Dear Ms. Anderson:

By this filing, Vermont Gas Systems, Inc. (“VGS” or the “Company”) provides notice that it intends to use a portion of its innovation funding to support installation of ground-source geothermal heating, ventilating, and air conditioning (“HVAC”) systems in single family residences, by offering incentives and funding mechanisms that reduce risk and uncertainty for developers and homebuyers in exchange for the opportunity to evaluate geothermal systems against air-source heat pumps.

VGS proposes to work with O’Brien Brothers to enroll up to 20 new-construction single-family residences in a program to utilize geothermal heating and cooling systems for homes in an all-electric neighborhood. VGS plans to incentivize these installations on the terms described below so that VGS can evaluate whether geothermal costs more to construct and operate as compared to air source heat pumps. We believe that uncertainty over these costs has been a barrier to broader adoption of geothermal to date. This project presents a unique opportunity to compare geothermal to air source heat pumps because O’Brien Brothers has recently-completed single-family homes with air-source heat pump HVAC systems in an all-electric neighborhood in South Burlington, which will enable VGS to make direct comparisons between geothermal and air-source heat pump technologies in single-family building stock that is substantially identical in size, location, and building technology. Our hypothesis is that, except for the underground loop, installing geothermal equipment will not raise the cost of construction compared to air-source equipment. We also expect that operational cost reductions will substantially offset the incremental cost of the loop. Additionally, we anticipate that the data generated will enable comparative evaluation of geothermal and air-source performance during peak winter and summer weather conditions.

Section 9 of the Company’s Alternative Regulation Plan provides that “VGS shall pursue and consider projects, programs, and services that support Vermont’s statewide energy goals by advancing promising technologies to facilitate efficient, lower carbon energy choices for Vermont customers.”¹ Section 9(e) requires VGS to provide 30 days’ advance notice to the Commission and the Department of Public Service (“Department”) “before commencing any spending on a project, program, or service under the Climate Action and Innovation Budget that exceeds \$25,000.” As detailed below, spending on this Project is expected to exceed that

¹ See Alternative Regulation Plan filed on October 26, 2023 in Case No. 22-5085-PET.

threshold. Accordingly, VGS is providing the following notice, addressing all criteria required by Section 9(f).

Background

Geothermal systems can significantly reduce greenhouse gas emissions and provide customers with affordable, efficient, and low maintenance heating and cooling; they are considered the most efficient heating and cooling systems available. Developing a utility approach could enable geothermal services for many sectors. VGS is well positioned to support expansion in Vermont by developing pilot projects and facilitating workforce development. Additionally, while unlocking barriers for developers and customers, offering a range of geothermal services could provide an alternative revenue source for VGS to help all customers transition to a lower-carbon energy future.

Over the past several years, VGS has supported expanding geothermal adoption in Vermont, in furtherance of determining whether and how VGS could play a role in greater adoption. In 2022, VGS began conducting exploratory work for various geothermal projects.² We scoped several potential projects, participated in the Commission's thermal energy exchange network investigation, and worked with the U.S. Department of Energy to model a permanently affordable development of large, multi-family buildings in Hinesburg, previously known as the Windy Ridge Project, and now marketed as "Riggs Meadow". In 2025, VGS began developing a geothermal proposal for heating and cooling the multi-family buildings at the project.³ As the development enters construction in the coming months and VGS begins installation of its first geothermal project, Riggs Meadow will provide experience working with drilling technology and interior ground-source heat pump equipment, and will demonstrate use of closed-loop geothermal systems in Vermont.⁴ VGS will continue to support and be involved in larger multifamily building developments such as Riggs Meadow that are interested in geothermal.

VGS has recently broadened its focus to include geothermal systems for residential new home construction. This is because VGS saw that there could be opportunity with new all-electric developments where geothermal could be more price competitive and considering the State's critical need for new housing in the coming years. The 2025 Vermont Housing Needs Assessment estimates that 16,000 new owner-occupied homes will need to be built in Vermont through 2029 to meet anticipated demand.⁵ If even a fraction of those new homes could be built with geothermal systems, that could go a long way toward meeting the State's GHG emission reduction goals. And, as VGS builds experience with the technology in this sector, we hope to

² See correspondence of Jill Pfenning, dated July 29, 2022 in Case No. 22A-3045.

³ See correspondence of Mary G. Bouchard, dated June 27, 2025 in Case No. 25A-0742.

⁴ Closed loop geothermal is a continuous loop in which a heat exchange fluid circulates continuously. It differs from open-loop technology, which withdraws and returns ground water.

⁵ see https://outside.vermont.gov/agency/ACCD/ACCD_Web_Docs/Housing/Housing-Needs-Assessment/2025-2029/2025-Factsheet-5-Owners.pdf?_gl=1*1bxdp0z*_ga*MTM0ODI1MzU4NS4xNzcyNDkxMDE5*_ga_V9WQH77KLW*cze3NzI0TEwNzkkbzEkZzEkdDE3NzI0OTIxNjQkajYwJGwwJGgw

learn how to sufficiently reduce costs to make geothermal a viable economic alternative to natural gas.

As VGS began discussions with developers about single-family developments and the potential for geothermal, two primary concerns emerged that were obstructing acceptance of geothermal HVAC systems in the marketplace. First, the added costs of construction to install geothermal have deterred developers because those additional costs would raise prices for new home buyers. Second, developers (and homeowners) were unfamiliar with the technology and, without any operational experience with these systems, had concerns about operational costs and reliability.

A geothermal system has two major components, inside equipment (ground source heat pumps) and an exterior underground loop that acts as a heat exchanger. VGS's initial research and modeling has indicated that the cost breakdown between these two components is approximately 40% / 60% for outside and inside components, respectively. For the inside components, VGS's research suggests that installation should be similar in cost to other all-electric heating solutions like air-source heat pumps, but that hypothesis has yet to be borne out. Geothermal equipment may even result in lower costs for other trades, such as electrical, due to reduced scope as compared to air-source heat pumps. But with limited experience in the Vermont market, developers face the risk of cost overrun with an unfamiliar technology.

Regarding the outside component, the underground loop, this is an added cost to construct a home with this form of HVAC. However, the promise of geothermal is that by accepting this higher upfront cost, homeowners could realize significant operational savings over time.

Homeowners, too, have limited information related to the operational costs of a geothermal HVAC system, relative to alternatives, and are forced to rely on anecdotes from other users or theoretical energy models that are sensitive to input assumptions. Anecdotal evidence is rarely directly applicable due to differences in home type and user behavior, and the propensity of models to vary results in response to small changes can reduce confidence in the ability to achieve those results in a given scenario. VGS believes it can address these hurdles for developers and homeowners, and as VGS continues to expand its electrified product portfolio, the ability to demonstrate real-world comparative information will help our customers decide what investments to make and thus inform which products we offer.

Project Description

Summary

VGS proposes to work with O'Brien Brothers to deploy geothermal at Hillside East at O'Brien Farm ("Hillside East"), an all-electric neighborhood currently under development. New homes will be built with geothermal in the next round of construction at Hillside East, a location that provides the opportunity to demonstrate the technology in single-family residential application and to document comparative costs with existing air-source HVAC systems in homes that are of substantially identical construction, vintage, and location, all within the local Vermont market

for labor, materials, and energy. With two incentive offerings, VGS will construct, own, and maintain the exterior ground loops for each home for twenty years.

First, to address developer concerns about the installation cost of inside HVAC equipment exceeding that of other all-electric alternatives such as air source heat pumps, VGS proposes offering an incentive to developers to cover such differential, if any, for the first three homes. This incentive is designed as a limited reimbursement of up to \$20,000 per home based on the actual costs incurred. This incentive will address the risk of cost overrun related to installation of geothermal interior equipment to make developers more comfortable offering geothermal to new home buyers. The incentive will cover documented differentials in construction cost related to the selection of geothermal HVAC instead of air-source HVAC. This could include things like changes to electrical panels or wiring, plumbing, and ductwork. The incentive will not include the direct components of the loop or the heat pumps themselves.

Second, VGS will offer an incentive and repayment structure to homeowners who select a geothermal HVAC system to reduce geothermal loop construction costs and allow customers to pay for the cost of the underground loop over time, while they experience lower operating costs. Homeowners will enter into an agreement with VGS to repay the cost of the outside loop, minus the incentive, over a twenty-year period.

Together, these incentives encourage the developer to offer geothermal HVAC by reducing the risk of construction cost overrun with an unfamiliar technology and encourage homebuyers to select geothermal over other more familiar choices that do not require significant upfront construction costs. Through this program, VGS expects to gain access to consumption information from participating homeowners that can be used as a basis of comparison to the performance of air-source heat pumps.

Our focus will be to document the relative impact between geothermal and air source HVAC on the barriers we have identified that prevent the wider deployment of geothermal technology. VGS believes that all of these components will compare favorably to air-source heat pumps, and that by documenting them we can reduce uncertainty and risk for developers and homeowners, leading to wider deployment of geothermal technology. In addition, we expect that the data generated will allow a comparison of performance during severe winter and summer weather, which will be useful information for our efficiency partners as the state continues its efforts to reduce emissions in the building sector.

Purpose

The Hillside East all-electric neighborhood offers a unique opportunity to make comparisons between geothermal and air-source heated homes. O'Brien Brothers has installed electric appliance packages that, to date, have included air-source heat pumps to serve heating and cooling requirements. Between 2024 and March 2026, forty-four homes have been constructed to this standard at the Hillside at O'Brien Farm neighborhood and more are underway. This stock of recently built air-source heated-and-cooled homes provides a control group for evaluating construction costs, operational costs, and customer acceptance because of substantial similarities

in the homes' ages, locations, sizes, and thermal efficiencies to the homes in which VGS intends to install geothermal systems.

VGS has worked with numerous engineering firms to estimate construction costs for different geothermal projects and, in many cases, estimates show that the interior and above-ground installation costs for geothermal are approximately equal to those for air-source heat pumps. HVAC contractors are largely unfamiliar with geothermal technologies, however, so when developers seek bids from subcontractors for these systems, cost estimates are higher in price than air source heat pumps. This disparity suggests that the installers are increasing the risk premium to ensure a job can be completed profitably. We believe the increased risk premium—and thus installation cost differential—is primarily due to the HVAC installers' unfamiliarity and can be addressed by building experience with this technology among installers and developers.

In addition to direct installation costs, our research revealed that developers and homeowners also consider other trade work costs, and that air-source HVAC systems require substantially more electrical work compared to geothermal HVAC systems. Geothermal may reduce costs by reducing panel size, length and number of wiring circuits, lowering voltage requirements, and using electric service more efficiently. Combined with smaller interior and exterior equipment footprints, the reduction in secondary trade costs has the potential to be material, once experience allows them to be understood.

Finally, uncertainty around operational costs is a barrier to adoption of geothermal. What is needed to address this barrier is data based on actual operating conditions in local homes. This project presents a unique opportunity to gather and analyze that data. In the absence of such a comparison, developers and homebuyers try to determine what operating costs might be based on anecdotal evidence or theoretical energy models. Models VGS has evaluated show consistent directionality, and VGS is confident geothermal systems will result in lower operational cost than air source systems. However, the magnitude of savings varies based on the model and its assumptions and inputs, which can reduce homebuyer confidence.⁶ All of this makes it difficult for homebuyers and developers to make informed decisions about which technologies and products to deploy. Data gathered through this program will provide concrete information regarding the relative performance of air source and ground source HVAC systems in Vermont.

O'Brien Brothers has been a collaborative partner, helping VGS understand residential construction, the pressures on developers, and homebuyer interests. Geothermal is an attractive proposition with significant potential, but uncertainty and inadequate local experience make it difficult to deploy. To attack this uncertainty, O'Brien Brothers has agreed to offer geothermal in the next round of homes constructed at Hillside East and to assist VGS in reducing the information gap that prevents geothermal from wider deployment across the state. Homebuyers signing a development agreement will have the option to select from among the HVAC systems

⁶ For example, VGS recently evaluated a single-family home design by requesting comparative energy modeling from two sources. Results indicated that geothermal heat pumps could reduce energy consumption by either ~19% or ~50% over air-source heat pumps. While directionally consistent, this differential is materially relevant to cost/value decisions and reduces confidence in geothermal technology that has not been widely deployed to date.

O'Brien offers, including geothermal. If homes are built without a development agreement in place (e.g., on speculation), prospective buyers will be informed during the sales process.

Project Detail

VGS will offer two types of incentives to encourage selecting and constructing geothermal systems at Hillside East: One to the developer to reduce the overall construction cost differential (if any), and one to homeowners selecting geothermal systems in their new-construction homes.

First, VGS plans to use a portion of its innovation expense budget to address construction cost risk related to installation of the inside equipment for the first three homes built at Hillside with geothermal HVAC systems. Modeling shows that the interior and above-ground equipment installation costs for geothermal should be substantially similar to air-source heat pumps, and that other trade costs (not including the underground loop) may be reduced. But to reduce the risk O'Brien Brothers faces by offering an unfamiliar technology, VGS will provide a limited guarantee that the above-ground portion of the geothermal system does not increase the total construction cost, considering both the direct and indirect costs, and will reimburse up to \$20,000 of incremental costs per home as compared to air-source HVAC, for the first three homes. O'Brien Brothers has agreed to provide confidential cost evaluations on each new home and provide comparisons with recently built similar homes. In addition, O'Brien Brothers will request time-and-materials proposals from their HVAC contractor for these three homes, revealing true installation costs without risk premiums often included in fixed-price bids. With these commitments, we believe three homes will provide enough opportunity to build construction familiarity and gain early acceptance from O'Brien Brothers and its subcontractors.

Second, VGS will use a portion of its innovation capital budget to incentivize homeowners to select geothermal. While the cost of interior equipment for geothermal HVAC is similar to other heating technologies, drilling and installation costs are incremental. Modeling suggests that, when repaid over time, homeowners will offset this cost with reduced operating and maintenance expenses. The total cost to drill and install underground loops varies based on the home size and its thermal demand; the cost is expected to fall between \$15,000 for smaller, more efficient homes and \$35,000 for large homes with high demand requirements. For interested buyers, VGS will work with its drilling partners to identify a cost for installation of the ground loop, based on known parameters such as home size and orientation, as well as estimated geological conditions. Based on this information, VGS will offer a fixed repayment schedule that includes an incentive of 35% of the cost to construct the loop, with the remaining 65% of construction costs repaid by the homeowner through a 20-year geothermal agreement with VGS, after which the system's ownership would transfer to the homeowner. Together, the incentive and fixed payment schedule reduce homebuyer uncertainty and encourage selection of geothermal heating. Homebuyers receiving the geothermal incentive under this program will agree to share usage and consumption data with VGS and its partners through automated methods (for example, through meter data or smart electrical panels) that will be used for the evaluation purposes described herein.

VGS has included a 10% contingency in the Geothermal Construction component of program costs that are detailed below. Based on our work with geothermal drillers, and information on wells they have drilled in other locations, drilling costs can generally be estimated with reasonable accuracy based on publicly available geological information. Since geology is the primary source of uncertainty, accuracy is incrementally improved with each drill on a particular site as subterranean conditions are confirmed. VGS anticipates updating prices as needed based on available information. Deviation in construction cost, if any, should rapidly diminish as installation of ground loops proceeds. Information on the aggregate accuracy of construction estimates will inform how VGS structures future projects.

When agreeing to build a new home at Hillside, buyers will have the option to select geothermal under these terms, or to have other HVAC heating technology installed that is not subject to a long-term agreement with VGS. VGS expects to include a variety of home sizes and types, so in some cases, VGS and O'Brien Brothers may identify certain lots that will be developed with geothermal in advance. In this case, buyers will be informed that a property is being developed and sold subject to the geothermal agreement outlined above and will have the option to proceed or select a different property. Regardless, the same incentive and repayment terms are expected to apply. Homeowners who enter a geothermal agreement with VGS and later decide to sell their property will have the option to transfer the agreement to the subsequent owner or to settle remaining payments. In either case, VGS will seek to continue data collection from the property.

VGS plans to capture operational data from enrolled homes to help inform future developers and homebuyers of expected costs and performance of geothermal systems. In addition, VGS expects to work with Efficiency Vermont ("EVT") to compare electrical consumption and operational cost data for homes within the Hillside East neighborhood. EVT will be a valuable partner for data evaluation at the aggregate level, for both operational electrical consumption and seasonal performance during extreme weather.

Timeline

VGS plans to make incentive commitments available starting in fiscal year 2026 through the end of its fiscal year 2027. Due to the expected delay between contract execution and delivering the finished home, initial operation of individual geothermal systems may not occur within the same fiscal year in which the commitment was executed. VGS intends to offer commitments and allocations from its innovation budget through the end of fiscal year 2027, even if construction and initial operation occurs afterward. New commitments would only be made in fiscal year 2028 or later subject to the terms of VGS's then-current Alternative Regulation Plan.

Costs

Program costs are broken into three categories: building construction, geothermal construction, and administrative overhead.

Building Construction (Developer Incentive): VGS will reduce the risk of possible increased interior and above-ground construction costs for geothermal by reimbursing up to \$20,000 in

documented incremental costs per home for the first three homes built with geothermal. Incremental construction cost will be calculated net of all trades, including plumbing, HVAC, and electrical, and compared to the same work for air-source heat pumps. The maximum expense for this component is \$60,000. VGS will utilize our innovation expense budget for these costs.

Geothermal Construction (Homeowner Incentive): VGS will use funds from its innovation capital budget to construct underground geothermal loops for up to twenty participating homes. The anticipated installation cost for geothermal loops ranges between \$15,000 and \$35,000 per home, depending on several factors, including, but not limited to, size, location, thermal efficiency, and geographic orientation. VGS will reserve a 10% contingency to account for cost variability, particularly considering that incentives would be made available through the end of fiscal year 2027. To incentivize homeowners to select geothermal, VGS will offer an incentive of 35% of the installation cost of the ground loop for each home, with the remaining 65% recovered pursuant to a twenty-year geothermal agreement. VGS anticipates a variety of home sizes participating. At the median cost of \$25,000 per home, the total construction cost for the program would be approximately \$550,000, including contingency, with incentives making up \$192,500 and recoverable costs making up \$357,500. If all twenty homes required the largest loop size, the maximum total construction cost would be approximately \$770,000, including the contingency. Of this, the 35% incentive portion would be \$269,500, while the recoverable portion would be \$500,500. Some variation may occur in the percentage of project cost covered by incentive if cost estimates vary from actual construction cost. However, as discussed in the Project Detail section, it is anticipated that variance will be rapidly eliminated after the initial drills, and will not exceed the contingency specified above, in aggregate.

Administrative Costs: VGS anticipates incurring administrative costs to deliver this project, such as retaining HVAC design experts, energy software modeling, energy consumption data capture, third-party training for VGS field service personnel, and various due diligence tasks. In aggregate, VGS proposes allocating up to \$50,000 from its innovation expense budget for administrative expenses related to this project.⁷

These investments are in rates, as Innovation capital and expense provided for in our Alternative Regulation Plan. These expenditures are already contemplated by our current Plan as they do not exceed the one-year budgetary amounts of \$1.5 million in Innovation Capital and \$500,000 in Innovation Expense. VGS plans to include the geothermal outside loops for these homes in rate base as capital assets and will depreciate them over the life of the geothermal agreement.⁸

⁷ VGS has already incurred expenses related to researching this opportunity, which will be booked as pre-development work. *See* Case No. 22A-3045.

⁸ VGS is continuing to evaluate the appropriate accounting treatment for these projects under US GAAP, with a particular focus on assessing applicable lease classification criteria. Notwithstanding the ultimate accounting treatment under GAAP, the Company maintains that these assets should be included in rate base for ratemaking purposes.

Vermont Energy Goals and Greenhouse Gas Emissions

Home heating represents approximately 31% of Vermont's annual emissions, reduction of which is a key target under the 2022 Comprehensive Energy Plan. Geothermal is a particularly cost-effective measure to reduce carbon emissions because it can eliminate the on-site emissions from HVAC systems over a long-term horizon. With an expected 50-year lifetime for the outside loop, the total lifetime emissions reduction for the average single-family home amounts to approximately 300 tonnes compared to a natural gas system. Information gathered from this study will be directly applicable to future projects where developers choose to commit to all-electric construction, and this will inform VGS's efforts to develop non-emitting infrastructure. In addition, in this project itself, VGS would be helping to facilitate lifetime non-emitting heating and cooling systems for twenty homes.

At a wider scale, application of geothermal to homes that would otherwise use fossil fuels other than natural gas will generate greater emissions savings, and realize potentially favorable impacts to home construction costs, operational costs, and societal costs in the form of reduced emissions and lower electrical demand. As a basis of comparison, if Hillside East were a traditional natural gas neighborhood, the maximum incentive (i.e., non-recovered) costs, divided by carbon saved over a 25 year period, would amount to \$127/tonne (\$379,500 maximum non-recovered costs, divided by 6 tonnes per year, divided by 20 homes, divided by 25 year expected life for heat pump equipment). However, the underground loop is expected to last 50 years, and measuring over that time frame reduces the maximum abatement cost to \$63/tonne.

Additionally, these geothermal systems provide direct and measurable benefits to natural gas customers. Specifically, they reduce greenhouse gas emissions in alignment with the State's decarbonization mandate and position VGS to lower potential future carbon compliance costs that would otherwise be borne by natural gas customers. In addition, these investments begin to develop a framework under which certain operating and administrative costs may, over time, be allocated to participating geothermal customers. As noted previously, VGS anticipates that information and experience gathered through this program will be used to develop models that allow geothermal to compete as a heating source in both all-electric and traditionally heated buildings

With this Hillside study, VGS seeks to reduce the uncertainties associated with installation and operation of geothermal systems, which will drive down costs and increase adoption, and ultimately reduce fossil fuel use in home heating at lower cost.

Efficiency and EEU

Electrified heating devices are not currently within the scope of VGS's EEU activities, but we expect the information gathered by this project will be useful to EEU partners as they consider future activities and incentives. Since geothermal offers a highly efficient option for electrified heating and cooling, we anticipate collaborating with Efficiency Vermont and Burlington Electric Department as the technology is more widely adopted. As discussed above, VGS also

plans to work with Efficiency Vermont to perform a portion of the work comparing operational cost between heat pump types.

Variance from Tariffed Services

VGS expects to collect a monthly fee from owners of homes with a geothermal system installed over a twenty-year period pursuant to an agreement with customers. The fee, which is initially expected to be between \$100 and \$200 per month, will vary based on the size of the system (correlated to home size). The fee will include capital, return, and maintenance and service on the underground loop. VGS will provide homeowners with a geothermal agreement, governing the terms applicable to individual homeowners, including VGS's responsibility for operation and maintenance of the loop.

VGS also anticipates executing a development agreement with O'Brien Brothers that will govern the terms of construction for the geothermal system, the terms available to homebuyers, and any access requirements necessary to install and maintain the loops.

Customer Outreach

VGS expects to collaborate with O'Brien Brothers' sales and marketing personnel to make potential buyers aware of this program. VGS and O'Brien Brothers will work together to help customers understand program benefits and to respond to any questions that arise. Since the program will specifically target Hillside East, we do not anticipate conducting a wider public notice campaign.

Conclusion

Through this filing, VGS proposes to use a portion of its Climate Action and Innovation Budget to evaluate ground-source geothermal HVAC systems in single-family new construction in partnership with O'Brien Brothers at Hillside East in South Burlington. The program will document differentials in construction cost, operational cost, and peak weather-driven loads between geothermal and air-source heat pump systems in homes of substantially identical construction, providing data that does not currently exist in the Vermont market.

The forty-four air-source heat pump homes already completed at Hillside provide a control group that would be difficult to replicate elsewhere, and this program represents the logical next step following VGS's ongoing multi-family geothermal work in Hinesburg. The information gathered will reduce the uncertainty that currently prevents developers and homebuyers from selecting geothermal, support VGS's efforts to develop non-emitting infrastructure, and advance Vermont's statewide energy and emissions reduction goals.

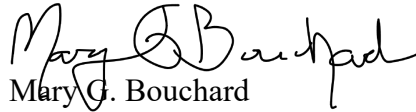
Holly R. Anderson, Clerk

June 15, 2026

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

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Mary G. Bouchard". The signature is fluid and cursive, with the first name "Mary" and last name "Bouchard" clearly distinguishable.

Mary G. Bouchard

Senior Counsel

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