



FILED VIA ePUC

May 5, 2022

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

Re: Vermont Green Hydrogen Pilot Project

Dear Ms. Anderson:

In August 2021, the Commission approved the Alternative Regulation Plan of Vermont Gas Systems, Inc. (“VGS” or the “Company”), which provided that VGS shall pursue “projects, programs, and services that support Vermont’s statewide energy goals by advancing promising technologies to facilitate efficient, lower carbon energy choices for its customers.”¹ Section 5(d) of the Plan 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.

By this filing, VGS provides notice of its intent to commission necessary engineering work for the Vermont Green Hydrogen Pilot Project (“GHP”) as a component of our Climate Action and Innovation programming. As described below, the GHP is a large project that VGS will seek regulatory approval for as the project advances in the coming months. This notice is related to the discrete investment in next-phase engineering that will cost \$75,000.

Introduction: Green Hydrogen

“Green Hydrogen” is hydrogen produced from renewable electricity. It is recognized nationally and globally as a viable storage solution to support expanding electrification.² As nations around the globe are advancing strategic electrification, the need for large-scale storage is emerging as a critical path. Hydrogen has the capacity to provide this type of needed storage.

Additionally, as an alternative to traditional battery storage, Green Hydrogen can be used to displace fossil fuels. It can be blended into existing natural gas pipelines at levels ranging from 2% to 20%, and then combusted with natural gas. This blending strategy is being tested in several pilots. For example, Enbridge is currently piloting a blending project for energy provided

¹ See Exhibit VGS-JMP-5 filed May 21, 2021 in Case No. 19-3529-PET.

² For example, see *Carbonomics: The clean hydrogen revolution*, Goldman Sachs, Feb. 4, 2022, available at <https://www.goldmansachs.com/insights/pages/gs-research/carbonomics-the-clean-hydrogen-revolution/carbonomics-the-clean-hydrogen-revolution.pdf>.

to 3,600 homes in Ontario.³ VGS has developed a similar pilot with a focus on blending Green Hydrogen at large industrial customer sites. This industrial focus simplifies the blending process by interfacing with a single combustion system. It also enables the hydrogen generation equipment (i.e., the electrolyzer⁴) to benefit from economies of scale and provides a controlled environment to ensure safe operation of the system.

Project Background

In January 2022, VGS announced a partnership with GlobalFoundries and the University of Vermont to develop the Vermont Green Hydrogen Pilot Project.⁵ This project will be one of the first of its kind in the nation, where Green Hydrogen⁶ will be created and used to displace fossil natural gas through blending. If successful at the pilot scale, it is anticipated a future expansion of the project will replace GlobalFoundries's existing grey hydrogen used in microchip manufacturing, in addition to expanded hydrogen consumption onsite for other purposes.⁷ UVM is engaged in the partnership to expand the University's research and curriculum in the emerging field of Green Hydrogen to help prepare the skilled workers needed to achieve Vermont's energy goals.

In 2021, VGS and GlobalFoundries began preliminary design and engineering work on the GHP. VGS enlisted Sanborn, Head & Associates, Inc. ("Sanborn") to provide a design and high-level cost estimate for the project.⁸ Sanborn provides engineering services for a variety of sectors and has considerable experience in the natural gas and biogas industries, as well as other related industries and infrastructure.

Sanborn's preliminary work resulted in the following plans. The project will involve installing a one-megawatt electrolyzer on the GlobalFoundries campus, which will be connected to the electric grid to create hydrogen. A piping system will deliver the hydrogen to a blending station near GlobalFoundries's heating plant. The pilot will focus on blending the hydrogen in low percentages with GlobalFoundries's natural gas feed in two of its six boilers. GlobalFoundries's heating plant consultant provided an initial assessment indicating that its boilers could consume a blend of up to 20% hydrogen with little modification.⁹ The GHP will be highly controlled with a focus on safety and developing experience around hydrogen uses in industrial applications. The

³ See *Hydrogen blending project now operational, reducing carbon footprint of natural gas delivered by Enbridge Gas*, Enbridge, Jan. 13, 2022, available at <https://www.enbridge.com/stories/2022/january/hydrogen-blending-project-enbridge-gas-cummins-operational-markham-ontario>.

⁴ An electrolyzer is the unit that houses electrolysis, the process of using electricity to split water into hydrogen and oxygen. For more information, see <https://www.energy.gov/eere/fuelcells/hydrogen-production-electrolysis>.

⁵ See *Vermont Partnership Advances Use of Green Hydrogen as Clean Fuel of the Future*, Jan. 20, 2022, available at <https://www.uvm.edu/news/story/vermont-partnership-advances-use-green-hydrogen-clean-fuel-future>.

⁶ All of the hydrogen produced by the GHP will be zero carbon. As GlobalFoundries transitions to 100% renewable electricity, the hydrogen will be fully renewable as well.

⁷ "Grey hydrogen" is produced from natural gas without capturing the greenhouse gases.

⁸ VGS did not file notice of this preliminary work to the Commission and Department because the work was completed prior to the approval of the Company's current Alternative Regulation Plan.

⁹ The assessment also suggested that the facility's boilers could consume as much as 100% hydrogen with more significant modifications.

GlobalFoundries facility is an excellent candidate for this pilot because it already utilizes hydrogen, and, as a result, its engineers and staff are well versed in hydrogen safety.

Current Investment: Description

The next phase of the GHP is for Sanborn to act as lead engineer, assisting VGS and GlobalFoundries in final design; supporting VGS's bid solicitation process, which will involve selecting equipment and an installation vendor; and providing firm pricing for the project. Sanborn's current scope of work includes the five tasks summarized below:

1. Final Site Selection: Preliminary work identified six possible sites on the GlobalFoundries campus, and narrowed selection to two candidates with the most favorable characteristics. The scope of this task will include final evaluation and selection based on safety, security, constructability, operability, and potential for future expansion.
2. Design Basis Update: Preliminary work completed in 2021 identified an initial design and high-level cost estimates for feasibility purposes. The scope of this task includes updating and expanding the initial design to incorporate changes and updates identified during the feasibility process, and to provide additional design specificity to support other tasks within the scope of work.
3. Bidder Qualification: Sanborn will develop a bidder qualification package, solicit information from potential bidders through a Request for Qualification ("RFQ"), and produce a report identifying qualified contractors capable of supporting development of the GHP.
4. Preparation of Request for Proposals: Sanborn will develop and produce a Request for Proposals ("RFP") for distribution to candidates identified through the RFQ process. The RFP will include complete instructions for response, technical specifications and drawings, commercial terms and conditions, and insurance requirements.
5. RFP Support: Sanborn will provide support throughout the RFP process to conduct bidder information calls and respond to technical questions in conjunction with VGS and GlobalFoundries. Sanborn will further review and summarize submitted bids and assist in evaluation to identify the lowest cost response(s) that meet technical, safety, and deliverability requirements.

Current Investment: Cost and Timeline

For this phase, VGS plans to spend \$75,000 on Sanborn work product that will cover the items discussed above. The expense will be integrated in base rates through our innovation expense budget, impacting all customers equally. There will be no variance from VGS's current tariffs for

this expenditure and no customers (other than GlobalFoundries¹⁰ and UVM) will be engaged to participate at this stage. We expect tasks 1-3 above to be completed within two to three months of a notice to proceed, and tasks 4-5 to require an additional two to three months. The budgeted amount will be disbursed as work is completed by Sanborn over the four-to-six-month period anticipated for completion.

Project Future

VGS is currently working on several strategies to seek federal funds through the U.S. Department of Energy's Hydrogen Hub grants that will be awarded later this summer. We are optimistic that the GHP is a great award candidate, and that the Sanborn work product will make the project shovel-ready. Grant funding would enhance the project economics and research opportunities with UVM. We intend to seek regulatory approval of the project later this year, with plans to begin construction in 2023. We expect future proceedings to include reporting the results of this engineering spend, discussion around capital expense, and potential development of repeatable processes to support broader green hydrogen adoption. Ultimately, VGS's goal is to establish a procedure or tariff that accommodates integration of hydrogen resources on our system.

Conclusion

Innovation around Green Hydrogen presents real opportunities for large-scale energy storage and new pathways to decarbonize the thermal grid. Following this pilot, we expect to expand GlobalFoundries's installation and replicate the concept at other industrial sites. VGS is engaged in initial evaluation for a second green hydrogen site where we will target expansion of our blended fuel offers. We also expect Green Hydrogen to re-emerge as a vehicle fuel and to grow in electric generation with hydrogen fuel cell use. Leveraging our VGS infrastructure for hydrogen delivery will position Vermont well for the clean energy transition.

With the support of the Department and Commission, VGS has led the nation in the development of renewable natural gas. Green Hydrogen is simply another form of renewable fuel, but we need active projects to develop the technical, market, and regulatory constructs that will allow it to reach its full potential. The Vermont Green Hydrogen Pilot Project will be a real-world test bed for the use of Green Hydrogen in a gas utility's portfolio and as a hydrogen hub for industrial decarbonization.

¹⁰ VGS is aware that GlobalFoundries's Petition to operate a self-managed utility is pending before the Commission in Case No. 21-1107-PET. Assuming economic and environmental feasibility, VGS intends to pursue the GHP regardless of the outcome of that Case.

Holly R. Anderson, Clerk

May 5, 2022

Page 5

We are available to the Commission and the Department to answer any questions about this filing.

Respectfully submitted,

/s/ Jill Pfenning

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