Aquidneck Island Gas Constraint

Demand-Side Solutions Analysis

December 1, 2020

Acadia Center
Advancing the Clean Energy Future

National Grid's Gas Supply Constraint

In its recent analysis of long-term energy needs on Aquidneck Island[i], National Grid largely ignores available clean energy strategies in favor of large-scale gas infrastructure spending to address a problem the utility could avoid completely by taking "no regrets" steps now. National Grid has already connected more Aquidneck Island customers to the gas network than can be responsibly supported per the negotiated terms of its transmission contracts.[ii] As a result, National Grid predicts there might currently be a constraint in delivering gas to customers on Aquidneck Island in the event of a rare "Design Day" event—described by the utility as a day with "an *average* temperature of -3 degrees Fahrenheit" and a likelihood of occurring once every 60 years.[iii]

On such a "design day" event, the gas constraint would currently be 129 dekatherms/hour (Dth/hour) at peak demand. Despite a growing recognition of the climate, health, and safety dangers of natural gas, National Grid assumes gas expansion will continue over the next 15 years and that this occasional potential deficit could grow to 302 Dth/hour as a result. National Grid looks past proven and reliable solutions to address the near-term problem and instead presents a number of proposals to address the larger, avoidable longer-term problem. These proposals include various gas infrastructure projects ranging in cost from $31 million to as much as $257 million.[iv] National Grid also studied a $190 million "non-infrastructure solution", which consists mostly of customer incentives—incentives that would most likely be ratepayer funds collected by the utility to then be distributed back to consumers for various demand-side measures like weatherization and electrification. The non-infrastructure solution, while the best value for consumers, is also sized to meet the larger predicted constraint—a problem that is completely avoidable by simply not adding gas customers over the ensuing 15 years.

In this brief, Acadia Center analyzes the potential for a smaller-scale non-infrastructure approach to address the current potential gas constraint issues. This "no regrets" solution addresses today's problem and, coupled with smart policy decisions, will help prevent the long-term constraint concerns from ever materializing. This targeted non-infrastructure solution also makes buildings on Aquidneck Island healthier and more comfortable, creating a far better set of outcomes than National Grid's proposed gas infrastructure investments. This smaller non-infrastructure approach is also unique in that it is completely scalable to address the long-term energy needs on Aquidneck Island unlike many of the gas proposals that would lock Rhode Island into stranded gas assets.

Acadia Center Recommendations

National Grid has identified a constraint issue that would be exacerbated by the Company allowing new gas connections on Aquidneck Island. Therefore, National Grid should stop pushing to worsen this potential problem. By electrifying new construction and helping delivered fuels and gas customers choose clean, electrified heating solutions instead of selling more gas, National Grid could both avoid creating or worsening this constraint issue, and begin the necessary transition away from fossil fueled buildings in order to meet Rhode Island's climate targets. National Grid could use funds it would have spent on gas-related customer acquisition, marketing, and implementation efforts to instead help publicize opportunities for existing Aquidneck Island gas customers to reduce gas consumption. This effort could be considered as a non-pipeline alternative under the System Reliability and Procurement process, as a demonstration project, or perhaps even a carbon reduction performance incentive mechanism. National Grid could leverage existing energy efficiency program funds and

recent funding provided by the Office of Energy Resources for heat pump installations by extending incentive eligibility to existing gas heating customers.

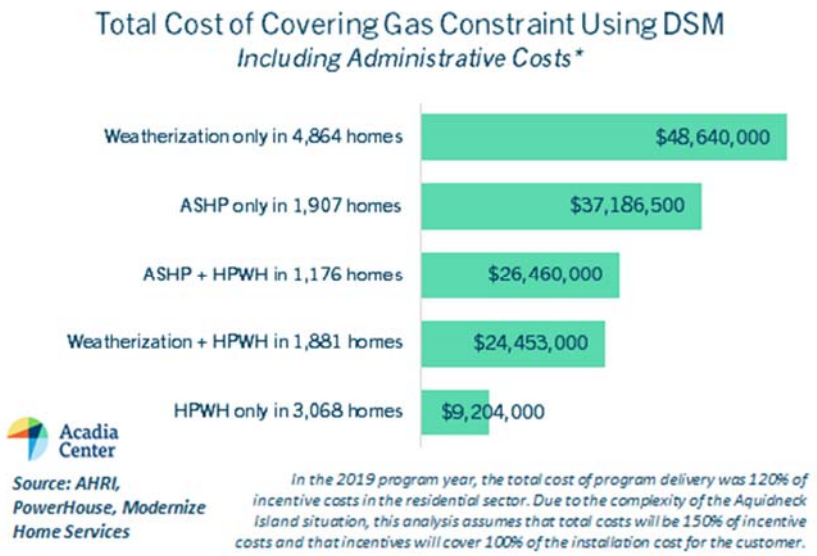
The residents of Aquidneck Island have good reason to support this approach and join jurisdictions around the world that are prohibiting fossil fuel use in new buildings and prioritizing the shift to energy efficient clean electric heating. As more buildings become free of fossil fuels, communities become safer, healthier, more resilient, and potentially more energy independent by adding solar arrays and energy storage systems. The General Assembly, Office of Energy Resources, Division of Public Utilities and Carriers, and Public Utilities Commission should also support this strategy as the most straightforward and economically responsible approach to permanently solve the identified gas constraint problem, reduce greenhouse gas emissions and deliver proven, reliable heating solutions at a lower cost to all Rhode Island ratepayers.

Acadia Center Analysis

Cost of Demand-Side Management

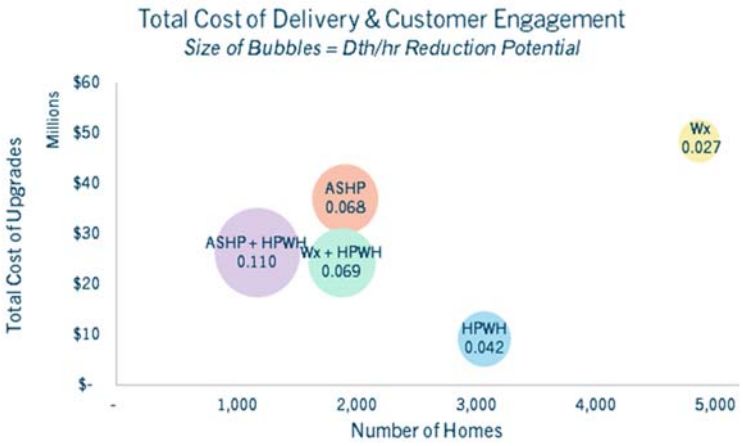
Acadia Center's analysis shows investment in demand-side management solutions would present a far better value for ratepayers than National Grid's preferred options. Acadia Center estimated equipment, installation, and program administration costs for common gas-fired heating and water heating appliances.[v] Using conservative estimates Acadia Center found that certain combinations of demand-side tools would eliminate the current gas constraint for substantially less cost than required by any of National Grid's proposals for additional gas spending.

For example, National Grid's lowest cost proposal envisions operating the Old Mill Lane liquified natural gas site for at least the next 15 years at a cumulative cost of $31 million. In contrast, Acadia Center finds that pursuing a strategy to displace gas-fired space and water heating in 1,176 homes could eliminate the current peak constraint claimed by National Grid for less than $27 million, even when assuming very high administrative costs and full coverage of equipment and installation costs for consumers.[vi] This scenario involves engaging the fewest number of buildings and it is reasonable to assume this effort could be concluded in the course of 3-4 years[vii], eliminating the need for the Old Mill Lane operation. This measure and other potential scenarios are provided in the figure below.



Strategic Considerations

As the below figure shows, converting gas-fired water heaters to heat pump water heaters would be the most inexpensive way to address the constraint overall. However, it could involve more administrative costs and uncertainty than other approaches due to the larger number of homes involved. Additionally, relying on water heater retrofits alone may not guarantee sufficient peak gas demand savings because the displaced gas appliance may not have been running during the peak gas event. Displacing gas-fired space heating will more likely yield the desired gas savings as people are more certain to turn up the heat when it is cold than they are to run hot water.



Acadia Center finds that offering a free or steeply discounted ductless mini-split and heat pump water heater retrofit to just under 1,200 residential customers on the island would alleviate the current gas constraint with the fewest number of engagements. This constitutes about 12% of the homes on the island[viii] that use gas as their primary heating fuel or 5% of all homes, according to the 2018 American Community Survey.

Investments like heat pumps and water heaters also align with important state policy goals, like reducing greenhouse gas emissions, improving the quality of housing, economic development, and creating or sustaining local jobs in the energy efficiency and clean energy industry. Heat pump equipment can reduce emissions by up to 60% relative to gas equipment, even accounting for added electricity consumption. Pairing an ASHP with weatherization measures like insulation and air sealing can compound these benefits, reducing overall consumer energy needs, reducing ratepayer costs, and improving health and safety. Importantly, these investments in local jobs help to keep more money in the Rhode Island economy instead of being exported to fossil fuel producing regions of the country. Continuing to expand gas infrastructure provides no such benefit for the citizens of Aquidneck Island or the rest of Rhode Island.

For more information:

Hank Webster, Rhode Island Director, hwebster@acadiacenter.org

Matt Rusteika, Director, Buildings Initiative, mrusteika@acadiacenter.org

---

[i] National Grid Aquidneck Island Long-Term Gas Capacity Study, September 2020.

[ii] Infra, page 25. The supply constraint is largely contractual in nature rather than physical or technical. As established by multiple investigations into the January 2019 gas outage, multiple upstream operational, managerial, and mechanical failures had to occur simultaneously in order for the low-pressure event experienced on Aquidneck Island to occur.

[iii] Infra, Page 3. *Emphasis Added.*

[iv] National Grid acknowledges its $147 million cost estimate for an AGT pipeline reinforcement would increase by 75% to $257 million if Massachusetts ratepayers do not split costs with Rhode Island ratepayers. https://www.nationalgridus.com/media/pdfs/other/openhousequestions.pdf

[v] Acadia Center analysis of nameplate ratings of common gas-fired heating and water heating equipment, along with Acadia Center's internal PowerHouse energy calculation tools. Data from the Air Conditioning, Heating, and Refrigeration Institute (AHRI) Directory of Certified Product Performance, accessible here.

[vi] Replacing one standard gas-fired water heater with a heat pump water heater reduces gas demand by 0.04205 Dth/hr and costs $3,000, inclusive of program administration costs. Replacing one gas boiler with a system of ductless mini-split heat pumps reduces gas demand by 0.06765 Dth/hr and costs $19,500, inclusive of program administration costs. Insulating and air sealing one gas-heated home reduces gas demand by about 0.02652 Dth/hr and costs $10,000, inclusive of program administration costs. Program delivery costs were assumed to be 150% of incentive costs in the residential sector.

[vii] Based on past heat pump deployment successes, Maine law establishes a goal of installing 100,000 heat pumps by 2025. National Grid could pursue a similar plan for Rhode Island, including Aquidneck Island.

[viii] There are 24,639 housing units on Aquidneck Island, 9,639 (39%) of which report using gas as their primary heating fuel.