BEFORE THE
PUBLIC SERVICE COMMISSION
OF THE DISTRICT OF COLUMBIA

In the Matter of	**§**	
	§	
the Merger Application of AltaGas	**§**	**Formal Case No. 1142**
Ltd. and WGL Holdings, Inc.	**§**	

AFFIDAVIT OF ELIZABETH A. STANTON, PHD

Attachment A

On Behalf of the
Office of the People's Counsel
for the District of Columbia

June 26, 2020

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I. INTRODUCTION & QUALIFICATIONS

1. My name is Elizabeth A. Stanton, and I have been retained by the Office of the People's Counsel for the District of Columbia (OPC) to review the Climate Business Plan filed by AltaGas, Ltd. (AltaGas or Company) with the District of Columbia Public Service Commission (Commission or PSC) in Formal Case No. 1142.

2. I am the founder and Director of the Applied Economics Clinic (Clinic), a non-profit consulting group. The Clinic provides expert testimony, analysis, modeling, policy briefs, and reports for public interest groups on the topics of energy, environment, consumer protection, and equity. The Clinic also provides training to the next generation of expert technical witnesses and analysts through applied, on-the-job experience for graduate students in related fields and works proactively to support diversity among both student workers and professional staff.

3. I am a researcher and analyst with more than 19 years of professional experience as a political and environmental economist. I have authored more than 140 reports, journal articles, books and book chapters as well as more than 40 expert comments and oral and written testimony in public proceedings on topics related to energy, the economy, the environment, and equity. My articles have been published in Ecological Economics, Climatic Change, Environmental and Resource Economics, Environmental Science & Technology, and other journals. I have also published books, including Climate Change and Global Equity (Anthem Press, 2014) and Climate Economics: The State of the Art (Routledge, 2013), which I co-wrote with Frank Ackerman. I am also co-author of Environment for the People (Political Economy Research Institute, 2005, with James K.

Boyce) and co-editor of Reclaiming Nature: Worldwide Strategies for Building Natural Assets (Anthem Press, 2007, with Boyce and Sunita Narain).

4. My recent work includes Integrated Resource Plan ("IRP") and Demand-Side Management ("DSM") planning review, analysis and testimony of state climate laws as they relate to proposed capacity additions, and other issues related to consumer and environmental protection in the electric and natural gas sectors. I have submitted expert testimony and comments in state dockets in New Hampshire, Massachusetts, Vermont, Indiana, Illinois, Louisiana, and Minnesota as well as several federal dockets. In my previous position as a Principal Economist at Synapse Energy Economics, I provided expert testimony in electric and natural gas sector dockets. I also led studies examining environmental regulation, cost-benefit analyses, and the economics of energy efficiency and renewable energy. Prior to joining Synapse, I was a Senior Economist with the Stockholm Environment Institute's ("SEI") Climate Economics Group, where I was responsible for leading the organization's work on the Consumption-Based Emissions Inventory ("CBEI") model and on water issues and climate change in the western United States. While at SEI, I led domestic and international studies commissioned by the United Nations Development Programme, Friends of the Earth-U.K., and Environmental Defense Fund, among others.
5. I earned my Ph.D. in economics at the University of Massachusetts-Amherst, and have taught economics at Tufts University, the University of Massachusetts-Amherst, and the College of New Rochelle, among other colleges and universities. My curriculum vitae is attached to this Affidavit as Attachment (A)-1.

6. I am submitting this affidavit on behalf of the Office of People's Counsel of the District of Columbia ("OPC" or "Office"). This affidavit and the accompanying exhibits were prepared by me or under my direct supervision and control.

II. SUMMARY OF AFFIDAVIT & FINDINGS

7. OPC retained me to review policy and economic aspects of AltaGas' Climate Business Plan ("CBP" or "Climate Business Plan")[1] and the attached Renewable Natural Gas Study ("RNG Report")[2] that was prepared by ICF Resources, LLC ("ICF").

8. My findings can be summarized as follows:

- First, the CBP examines only one scenario, with a limited set of options to achieve the District's required emission reductions. It does not adequately address other pathways to achieve emission reductions, such as the role of electrification, energy efficiency, or accelerated pipeline replacement activities.
- Nor does the CBP address the pressing concerns of how to achieve the transition to a low emission environment affordably and equitably.
- The CBP appears to rely heavily on initiatives that the Company would like to be supported through ratepayer funding. The Commission should continue to monitor these requests with a critical eye.

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[1] *Formal Case No. 1142, In the Matter of the Merger of AltaGas Ltd. and WGL Holdings, Inc.* ("*Formal Case No. 1142"*), Climate Business Plan for Washington D.C. ("CBP" or "Climate Business Plan"), filed March 16, 2020.

[2] *Formal Case No. 1142*, Climate Business Plan, Appendix D, "Study on the Use of Biofuels (Renewable Natural Gas) in the Greater Washington, D.C. Metropolitan Area, March 2020" ("RNG Report"), filed March 16, 2020.

- While AltaGas' analysis and publicly provided materials do not provide sufficient information regarding assumptions, data, and methods to allow comprehensive third-party review, certain AltaGas and ICF assumptions and conclusions appear to be erroneous or inconsistent with other recent analyses.
- The District is at the forefront of jurisdictions confronting the challenges that carbon reduction policies pose to gas utilities. However, there are several other jurisdictions that are confronting a similar transition that the Commission may be interested in monitoring to inform its own activities.

9. At this preliminary stage, the CBP is insufficient to fully ascertain the role of AltaGas' operations in aiding the District's clean energy and climate goals. As I will outline below, I recommend that the Commission continue to gather more information and outline a clear path for how it plans to proceed.

III. DISCUSSION

A. AltaGas' CBP provides a limited view of how WGL can help further the climate and environmental goals of the District

10. As part of the terms of acquiring Washington Gas Light Company ("WGL" of "the Company"), the District of Columbia's sole natural gas distribution utility, AltaGas was required to "file with the Commission a long-term business plan on how it can evolve its business model to support and serve the District's 2050 climate goals (e.g., providing innovative and new services and products instead of relying only on selling natural gas)." The merger terms also require AltaGas to hold bi-annual public meetings to report on and discuss its progress on the business plan after it is filed.

11. AltaGas' CBP offers one scenario for technical specifications to achieve the District's required emission reductions (which I address further below). However, it fails to provide full consideration of other scenarios that could also achieve these reductions while doing a better job of adhering to the MEDSIS Guiding Principles (*see* Table 1).

Table 1. MEDSIS Guiding Principles

Principle	Description
Sustainable	Meet energy needs of present without comprising ability of future generations to meet their own needs
	Protect natural resources; reduce emissions and energy consumption
	Promote economic growth and innovation
	Promote social equity: Recognize impact of energy usage on daily life, strengthen community involvement, and provide equal access
Well-Planned	Poles and wires able to withstand high impact event; optimal use of distributed energy resources; include stakeholder input
Safe & Reliable	Utility and distributed generation safe and reliable; data collection and sharing to update interconnection rules and and service options
Secure	Best-practice physical and cybersecurity protections and risk management
Affordable	**Distribution is just and reasonable and balances desires of customers and utilities**
Interactive	Interactive and flexible energy delivery system
Non-Discriminatory	Energy system open to competition, provides customer choice, and utilizes customer data to better serve customers; reduce or eliminate barriers to DERs

Source: Smart Electric Power Alliance. May 31, 2019. Modernizing the Energy Delivery System for Increased Sustainability: Final Report v1.0 of the DCPSC MEDSIS Stakeholder Working Groups. Available at: https://dcpsc.org/PSCDC/media/PDFFiles/Final-Report.pdf

1. The CBP does not account adequately for affordability and equity concerns.

12. As OPC is the statutory representative of ratepayers in the District, I would like to draw particular attention, to the MEDSIS principles related to social equity and affordability:

- **Promote social equity:** Recognize impact of energy usage on daily life, strengthen community involvement, and provide equal access

- **Affordability**: Distribution is just and reasonable

13. AltaGas' CBP presents a suite of new investments in programs and infrastructure but does not present a detailed plan to pay for these investments. Rather, the CBP refers repeatedly to "socializing costs" and ensuring "cost recovery" concerning end-use, transmission, and sourcing and supply.[3] If implemented as written, the CBP could translate into substantial costs for ratepayers. While AltaGas never explains its plan to "socialize" costs, this term implies a spreading of costs across members in a society. This kind of vague suggestion of cost planning in not sufficient to adhere with the District's MEDSIS principles of social

[3] *See, e.g. Formal Case No. 1142*, Climate Business Plan, p. 3 (stating that WGL will "seek regulatory cost recovery" for its sourcing and supply initiatives and will "Socialize cost across customer base"); p. 28 (under general policy considerations stating that "Washington Gas will seek consideration for the following over-arching regulatory mechanisms[:]. . . Developing a cost recovery mechanism that would socialize the costs and benefits of gas use to all energy users."); *Id.* (under Policy-End Use stating that the "Policies to facilitate measures specifically related to energy efficiency promotion and programs as well as accelerating the deployment of high-efficiency equipment and appliances include: . . . Ensuring cost recovery and enabling utilities to earn a return on investment (ROI) for investments in next-generation end-use technology; Allowing for cost recovery associated with the promotion of ready-now lower GHG emissions appliances, contractors' education, demonstration pilots, and similar items; . . . Utilizing accelerated recovery mechanisms to support infrastructure investment in service areas of high CHP/demand potential;. . . Applying tiered performance incentives (e.g. ROI adders) to support the implementation of behavioral energy efficiency programs."); p. 29 (under policy transmission and distribution stating that "other policies that policymakers and the DC PSC can pursue to facilitate GHG emissions reduction during the transmission and delivery of natural gas, include[e]:. . . Cost recovery for investments in new detection equipment and personnel and/or pilot project participation; [and] Built-in incentives for performance that reward timely deployment and results."); *Id.* (under Policy-Sourcing and Supply stating that "The development of RNG production sources for national, regional and local supply scenarios in the greater Washington, D.C. metropolitan region are all contingent upon Washington Gas being able to gain approval of some kind of legislative and/or regulatory structure that will include a timely cost recovery mechanism for Washington Gas." And that "this policy structure should address the following. . . Allocate incremental cost of low carbon gas supply to all customers in the District; [] Rate base and approve return for investments in interconnection facilities and equipment to facilitate access to low carbon gas supplies needed to meet gas quality specifications and standards (odorization, metering, gas chronometers, emergency shut off valves, etc.); [and] Rate base of investment in larger facilities such as pipelines and low carbon gas production, supply facilities and recovery of pipeline capacity costs that would support and facilitate the development and access to RNG and other low carbon supply").

equity and affordability. To achieve MEDSIS standards, all DC energy plans and programs must transparently analyze and discuss the distribution of costs and benefits across specific actors including utility investors, ratepayers, and taxpayers. For those costs to be borne by either customers or taxpayers, a transparent presentation of costs requires analysis of the distribution of costs by customer type, income groups, and other social groupings, such as race and ethnicity.

2. The CBP does not adequately address the District's electrification policies.

14. The District of Columbia Department of Energy and Environment (DOEE) developed the *Clean Energy DC: Climate and Energy Action Plan* ("DC Action Plan") as a roadmap for how the District plans to achieve its clean energy goals.

15. The DC Action Plan specifically calls for electrification to displace fossil fuel combustion stating that "The share of end-use energy coming directly from electricity or fuels produced from electricity must increase from less than 20% in 2010 to over 50% in 2050, displacing fossil fuel combustion."[4] The DC Action Plan also includes electric heat pumps among the characteristics of high performance buildings, and recommends that the District update building codes to make heat pumps more feasible, promote conversion to electric heat pumps for deep retrofits, and support related training and certification for HVAC technicians.[5]

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[4] *The District of Columbia Climate and Energy Action Plan*, at 5, August 2018, *available at*: https://doee.dc.gov/sites/default/files/dc/sites/ddoe/page_content/attachments/Clean%20Energy%20DC%20-%20Full%20Report_0.pdf

[5] *Id.*, pp. 62, 67-68, 80, 116.

16. AltaGas' CBP rejects electrification of heating end uses in favor of a set of emission reduction measures that are largely speculative on a commercial scale, including "renewable" natural gas and "green" hydrogen injected into the existing gas delivery system, and the use of "gas heat pumps."

17. With regards to renewable natural gas (RNG), the DC Action Plan recommends a two-step process in order of priority: first, any end uses currently using natural gas that can be electrified should be; and second, investigate the use of biologically derived fuels to supply any remaining end uses.

18. The DC Action Plan makes no mention of hydrogen injection, or gas heat pumps. Instead it highlights electric-based systems for heating and cooling, including neighborhood-scale energy systems. DOEE has also funded research on ground source heat pumps[6] and included electric heat pumps among strategies for improved energy efficiency.[7]

19. AltaGas's CBP offers one additional scenario that complies with the District's emissions goals but dismisses its own electrification-focused scenario on the basis of cost. Unfortunately, AltaGas has not made available any of the assumptions, data, or methods that would make it possible for stakeholders and third-party experts to review and evaluate

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[6] DOEE, *Notice of Funding Availability - A Characterization Study of Direct Geothermal Resource Potential for Ground Source Heat Pump Technologies*, October 20, 2017, *available at*: https://doee.dc.gov/release/notice-funding-availability-characterization-study-direct-geothermal-resource-potential

[7] DOEE, *BEPS Working Group Session # 4 - Energy Efficiency Strategies and the Prescriptive Path*, September 17, 2019, *available at*: https://doee.dc.gov/sites/default/files/dc/sites/ddoe/publication/attachments/BEPS%20WG4%20Session%20Notes.pdf

these claims. AltaGas' claim that its preferred scenario is more affordable should be robust enough to withstand outside review—a minimum standard in any public process.

20. AltaGas' choice to reject heating electrification and instead embrace less established technologies is surprising and out of step both with the District's plans, and policies and programs for reducing emissions from the heating sector nation-wide.

21. AltaGas' rejection of electrification is also out of step with actions that are being taken in other jurisdictions. Across the United States, there has been a widespread adoption of heating and water heating electrification technologies, such as air-source heat pumps and solar-powered hot water. Every state in the country except Georgia has some kind of electric-based renewable thermal program or policy.

22. Many states are providing incentives to their residents to adopt renewable energy or electrify their home energy systems by offering equipment rebates, tax credits and other tax incentives, loans and grants. For example:

    - Thirty-seven states offer equipment rebates on electric heat pump and/or renewable thermal energy systems. Some of these rebates are flat amounts—like Hawaii's $750-$1,000 rebate for solar water heating[8]—and some are scaled to the size of the system installed or the amount of fossil fuels displaced —like South Dakota's $250

[8] *Water Heating*, Hawai'i Energy, *available at*: https://hawaiienergy.com/for-homes/rebates/water-heating.

per ton for electric air source heat pumps[9] or New York's $1.25 per kilowatt-hour of displaced thermal load for solar water heating systems.[10]

- Seventeen states offer a tax credit or tax exemption to purchase and/or install renewable energy systems—most commonly for solar and geothermal devices. For example, Connecticut offers 100 percent sales tax exemption for the purchase and installation of home solar or geothermal energy systems.[11] South Dakota offers a $50,000 property tax exemption for small wind, solar, biomass, hydro and geothermal systems.[12]
- Nine states offer loan programs to install an electric heat pump system and/or solar water heating system. For example, Nebraska offers a low-interest loan (1.5 percent) for qualifying homeowners to finance an air source or ground source heat electrical heat pump.[13]

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9 *2020 South Dakota Heat Pump Rebates*, Otter Trail Power Company, *available at*: https://www.otpco.com/media/3103/sd_heatpump-rebatetable.pdf.

10 *Solar Thermal Incentive Program – New York*, DSIRE, July 23, 2015, *available at*: https://programs.dsireusa.org/system/program/detail/4490.

11 DSIRE, *Sales and Use Tax Exemption for Solar and Geothermal Systems - Connecticut*, July 1, 2019, *available at*: https://programs.dsireusa.org/system/program/detail/2613.

12 South Dakota Public Utilities Commission, *Energy Efficiency Tax Incentives*, May 30, 2014, *available at*: https://puc.sd.gov/energyefficiency/default.aspx.

13 DSIRE, *Clay Electric Cooperative, Inc - Solar Thermal Loans – Florida*, November 15, 2018, *available at*: https://programs.dsireusa.org/system/program/detail/3060.

- Some states, like New Hampshire[14] and Massachusetts,[15] also offer grant programs to support renewable thermal and/or electrification projects.

23. Ultimately, electrifying home heating equipment is a widespread, trusted strategy to lower emissions and heating costs.

3. The CBP does not adequately address the role of energy efficiency in reducing carbon emissions.

24. The energy efficiency savings included in AltaGas' CBP preferred plan do not appear to be additional to that already required in the District. At present, the District's gas energy efficiency programs are administered by the DC Sustainable Energy Utility (DCSEU). In accordance with the CleanEnergy DC Omnibus Act, the District's Public Service Commission formed a working group to develop metrics for electric and gas company energy efficiency and demand response ("EEDR") programs, with the goal of establishing utility-led EEDR programs that are not duplicative of those now offered by the DCSEU.[16]

25. Prior to the CleanEnergy DC Omnibus Act, DOEE established performance benchmarks for DCSEU for the five-year period between FY2017-FY2021. In FY2017, DCSEU exceeded the Year 1 maximum target of 0.5 percent, achieving 0.6 percent savings. In FY2018, DCSEU exceeded the cumulative Year 2 maximum target of 1.0 percent,

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[14] DSIRE, *Commercial & Industrial Renewable Energy Grants – New Hampshire*, June 7, 2017, *available at*: https://programs.dsireusa.org/system/program/detail/5104.

[15] Massachusetts Department of Energy Resources, *Leading by Example Grants, available at*: https://www.mass.gov/service-details/leading-by-example-grants.

[16] *Formal Case No. 1160, In the Matter of the Development of Metrics for Electric Company and Gas Company Energy Efficiency and Demand Response Programs Pursuant to Section 201(b) of the Clean Energy DC Omnibus Amendment Act of 2018,* ("*Formal Case 1160"*), Energy Efficiency And Demand Response (EEDR) Metrics Working Group Report, filed January 30, 2020 ("EEDR January 30, 2020 Report").

achieving 1.2 percent savings. For FY2021, DCSEU's cumulative gas energy efficiency target is 2.5 to 3 percent.[17,18] (For reference, continuing DCSEU's minimum pace of 0.5 percent annual incremental gas savings would add up to *8 percent in 2032 and 17 percent in 2050*—before accounting for gradual retirement of measures over time.)

26. In contrast, AltaGas' CBP calls for cumulative energy efficiency savings of *4 percent by 2032 and 14 percent by 2050*, even though it includes measures not currently offered by DCSEU: behavioral programs and "gas heat pumps." These savings goals have a baseline of 2006 (compared to 2014 for DCSEU's goals).

27. It should also be noted that in its DC Action Plan and Sustainable DC 2.0 Plan, the District has set out to achieve a long-term energy savings target of a 50 percent reduction in District-wide energy use by 2032 from a 2012 baseline.[19] Even after adjusting for different baseline years, this savings target is more than 12 times greater than the 2032 savings recommended in AltaGas' CBP.

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17 DC Office of the Deputy Mayor for Planning and Economic Development, *Contract DOEE-2016-C-0002*. Awarded to Vermont Energy Investment Corporation, April 5, 2017, *available at*: http://app.ocp.dc.gov/Award_attachments/CW51134_VermontEnergyInvestmentCorporationContractNoDOEE-2016-C-0002executedApril52017.pdf

18 NMR Group *et. al.*, *Performance Benchmark Assessment of FY2018 DC Sustainable Energy Utility Programs*, submitted to the District of Columbia Department of Energy and Environment, June 25, 2019, *available at*: https://doee.dc.gov/sites/default/files/dc/sites/ddoe/publication/attachments/DCSEU%20FY2018%20Performance%20Benchmarks%20Report%20-%20FINAL%20DRAFT.pdf

19 *Formal Case No. 1160*, EEDR January 30, 2020 Report, ¶ 16.

4. The CBP does not adequately address the role of accelerated pipeline replacement activities.

28. The pipeline repairs and replacement included in AltaGas' preferred plan do not appear to be additional to those already required and planned under PROJECT*pipes* 1 or proposed by WGL under PROJECT*pipes* 2. AltaGas' CBP calls for a continuation of the PROJECT*pipes* work—a 40-year program to replace all gas distribution—not a change, addition, or acceleration of that program.

29. The PROJECT*pipes* program began in 2014.[20] The 40-year replacement timeline extends beyond the District's 2050 carbon neutrality policy deadline.

30. The AltaGas/WGL Merger Commitment No. 74 required that "AltaGas and Washington Gas shall, within twelve (12) months after Merger Close, develop a proposal to accelerate PROJECT*pipes* to a 30-year program rather than a 40-year program." AltaGas' CBP does not include provisions for any acceleration.[21]

5. The AltaGas CBP closely follows the American Gas Association playbook, which itself presents an incomplete view as to how gas utilities can further jurisdictional climate goals

31. The American Gas Association ("AGA") is an industry organization representing more than 200 gas utility companies, which together serve 95 percent of all gas customers across

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[20] *Formal Case 1115, Application of Washington Gas Light Company for Approval of a Revised Accelerated Pipe Replacement* Program ("*Formal Case 1115*"), Order No. 17602, rel. August 21, 2014.

[21] *Formal Case No. 1142, In the Matter of the Merger of AltaGas Ltd. And WGL Holdings, Inc.,* Order No. 19396, *Appendix A,* p. 28, rel. June 29, 2018.

the United States.[22] AGA advocates on behalf of its members on various gas industry issues and promotes the delivery of gas to homes and businesses.[23]

32. For nearly a decade AGA has published its annual "AGA Playbook" to provide up-to-date information on gas and the gas industry, claiming that gas is "the solution for a clean energy future".[24] The AGA playbook discusses recent trends in the gas industry as well as the organization's long history. The 2020 playbook also covers the opportunities and challenges that face the gas industry in an effort to promote a path forward for gas as "the best energy choice."[25]

33. AltaGas cites the AGA Playbook as the source of its CBP's arguments that gas is reliable, affordable, and highly efficient when compared to electricity for similar end uses.[26] In doing so, AltaGas attributes to the AGA Playbook the claim that gas is "over 99 percent reliable and affordable, costing $879 less per year than a comparable home using electricity for heating, hot water, cooking and clothes drying."[27]

34. Neither the AGA Playbook nor AltaGas' CBP provide explanation or verification of these findings. Missing are their underlying data, assumptions, methodology, description of scenarios, and any other basic information conventionally expected to substantiate

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[22] American Gas Association, *American Gas Association Overview*, March 4, 2019, *available at*: https://www.aga.org/research/fact-sheets/american-gas-association-overview/.

[23] American Gas Association, *Mission*, *available at*: https://www.aga.org/about/mission/.

[24] , American Gas Association, *American Gas Association Playbook*, 2020, *available at*: http://playbook.aga.org/.

[25] *Id.*

[26] *Formal Case No. 1142*, Climate Business Plan, p. 25.

[27] *Id.*

analytical work. In a public process such as this one, making calculations behind asserted modeling results available for review and verification by stakeholders and their third-party experts is a basic, universally respected minimum standard for accuracy.

B. The CBP and underlying studies have technical deficiencies.

35. As a threshold issue, neither AltaGas' CBP nor the attached studies provide sufficient information regarding the assumptions, data, and methods that were used to develop the analysis. The lack of this information inhibits the ability for third-party review and verification. It is my understanding that when OPC contacted AltaGas to get the underlying workpapers as another party requested through discovery, OPC was directed to the AltaGas website. The "workpapers" provided on the website are limited and not in native file format.

36. The lack of underlying information is also apparent in other ways. For example, during the March 30, 2020 technical conference on the Commission's Environmental Notice of Inquiry, I raised my concern that the CBP did not provide any analysis as to the methods used affordability or cost reduction. When I attempted to ask questions regarding that information, and OPC was instructed to seek that information in this proceeding.

37. In addition, AltaGas has not provided sufficient information regarding its cost modeling to assess whether or not its assumptions are accurate.

38. AltaGas should demonstrate that its analysis is robust by making its underlying data, assumptions and methodology available in this public process, including by providing all the information needed to replicate, confirm and/critique its findings. AltaGas should make this information available as soon as possible.

39. Without the underlying workpapers I was only able to conduct a high-level review of the CBP. Nevertheless, AltaGas' CBP includes several assumptions that appear to be erroneous, including:

- AltaGas' assumed RNG demand for the District seems to be well within regional supply limits, but only if the District is assumed to be the only purchaser of the RNG in the local region. Supplying 13 to 41 percent of total gas demand from RNG would be much more challenging if the rest of WGL or all of Metro DC was purchasing at this same level.[28]
- Even the least expensive RNG is expected to cost twice or more the price of natural gas. The higher the demand, the greater the cost, with ICF predicting that the most expensive RNG will sell for at least 10 times the price of natural gas.
- AltaGas assumes incorrectly that all RNG is zero emitting.
- Injection of green hydrogen and RNG into a gas distribution system requires a higher (and more expensive) standard of pipe than typically used for natural gas; no costs for this system upgrade appear to have been included in AltaGas' analysis.

C. AltaGas' reliance on the incorporation of RNG into its system is undercut by the low number of successfully-implemented utilizations.

40. To date, very few U.S. gas utilities have successfully incorporated RNG into their gas distribution systems. Summit Natural Gas of Maine[29] and DTE Energy of Michigan[30] have

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[28] *Formal Case No. 1142*, Climate Business Plan at 18.

[29] Summit Utilities, *AGA ESG/Sustainability Reporting*, December 2019, *available at*: https://www.summitutilitiesinc.com/Documents/SUI%20AGA%20ESG%20Reporting%20Metrics.pdf

[30] DTE Energy, *BioGreenGas*, *available at*: https://newlook.dteenergy.com/wps/wcm/connect/dte-

both introduced some RNG into their distribution systems through voluntary programs, while SoCalGas of California[31] offers customers the opportunity for RNG to be delivered through their distribution system. Dominion Energy has also partnered with Smithfield Foods and Vanguard Renewables to produce RNG from farms in multiple states with goal of adding it to gas distribution.[32]

41. In 2018, Liberty Utilities of New Hampshire[33] and CenterPoint Energy of Minnesota[34] submitted proposals seeking to introduce RNG into their networks but were each denied by their respective state's utility commission. In April 2020, CenterPoint Energy submitted a second proposal to the Minnesota Public Utilities Commission requesting approval to permit RNG injection into its distribution system.[35] In February 2020, CenterPoint also proposed the Natural Gas Innovation Act at the Minnesota Legislature, which would allow gas utilities, such as itself, "to submit an alternative resource plan to the Public Utilities Commission to offer its customers alternative fuels, such as RNG, as well as new energy-

web/home/service-request/residential/renewables/biogreen-gas#:~:text=The%20renewable%20natural%20gas%20is,supply%20from%20other%20traditional%20sources.

[31] SoCalGas, *Understanding Renewable Natural Gas*, *available at*: https://www.socalgas.com/smart-energy/renewable-gas/understanding-renewable-natural-gas

[32] Dominion Energy, *Renewable Natural Gas*, *available at*: https://www.dominionenergy.com/company/renewable-natural-gas

[33] New Hampshire PUC DG 18-140 – Liberty Utilities (EnergyNorth Natural Gas)*Petition for Approval of a Renewable Natural Gas Supply and Transportation Contract*, *available at*: https://www.puc.nh.gov/Regulatory/Docketbk/2018/18-140.html

[34] CenterPoint Energy, *CenterPoint Energy files for renewable natural gas program in Minnesota*, August, 23, 2018, *available at*: https://www.centerpointenergy.com/en-us/corporate/about-us/news/1179

[35] CenterPoint Energy, *CenterPoint Energy proposed tapping Minnesota-made renewable natural gas*, April 24, 2020, *available at*: https://www.centerpointenergy.com/en-us/corporate/about-us/news/1337

efficiency and carbon-capture technologies to reduce or avoid greenhouse gas emissions from natural gas use."[36] Both proposals are still under review.

42. In addition to individual utilities, states such as Oregon[37] and Nevada[38] have adopted regulations that allow and encourage gas utilities to incorporate RNG into their portfolios. In 2020, a bill was introduced to the Colorado General Assembly to adopt a renewable natural gas standard, which aims to establish portfolio targets for large gas utilities (serve more than 250,000 customers) on the percentage of gas purchased that is RNG.[39] This bill was postponed indefinitely on May 28, 2020.[40]

43. While my research into hydrogen use in U.S. gas distribution systems did not identify any utilities currently engaging in this practice, a handful of international programs have researched and tested the injection of hydrogen, particularly from renewable sources (i.e. green hydrogen), into existing gas distribution systems. In the United Kingdom, a pilot program called HyDeploy injected zero-carbon hydrogen into Keele University's gas

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[36] CenterPoint Energy, *CenterPoint Energy proposed tapping Minnesota-made renewable natural gas*, April 24, 2020, *available at*: https://www.centerpointenergy.com/en-us/corporate/about-us/news/1337

[37] Oregon Legislative Assembly, Senate Bill No. 98, *Relating to Renewable Natural Gas*, 2019, *available at*: https://olis.leg.state.or.us/liz/2019R1/Downloads/MeasureDocument/SB98/Enrolled

[38] Nevada Legislature, Senate Bill No. 154, *Requires the Adoption of Regulations Authorizing Certain Renewable Natural Gas Activities*, February 13, 2019, *available at*: https://www.leg.state.nv.us/Session/80th2019/Bills/SB/SB154.pdf

[39] Colorado General Assembly, Senate Bill No. 20-150, *Adopt a Renewable Natural Gas Standard*, 2020, *available at*: https://leg.colorado.gov/bills/sb20-150

[40] *Id.*

network.[41] Similar pilot programs have taken place in France,[42] Germany,[43] and the Netherlands.[44] German gas pipeline operators have even presented a plan for the world's largest hydrogen grid based on former gas pipelines.[45] The Dutch government recently published an *Outlook on Hydrogen* outlining their plans to support a green hydrogen industry.[46] In the United States, researchers at the University of California Irvine, funded by SoCalGas, were the first in the nation to attempt to inject green hydrogen into a gas system in 2016.[47,48]

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[41] Smart Energy International, *Hydrogen injected into gas network – first for UK*, January 7, 2020, *available at*: https://www.smart-energy.com/industry-sectors/smart-energy/hydrogen-injected-into-gas-network-first-for-uk/

[42] ENGIE, *The GRHYD demonstration project*, November 8, 2016, *available at*: https://www.engie.com/en/businesses/gas/hydrogen/power-to-gas/the-grhyd-demonstration-project

[43] Hydrogen London, *Injection of hydrogen into the German gas distribution grid*, December 12, 2013, *available at*: http://www.hydrogenlondon.org/news/injection-of-hydrogen-into-the-german-gas-distribution-grid/

[44] Kippers, M.J. *et al.*, *Pilot project on hydrogen injection in natural gas on Island of Ameland in the Netherlands*, 2011, *available at*: http://members.igu.org/old/IGU%20Events/igrc/igrc2011/igrc-2011-proceedings-and-presentations/poster%20paper-session%201/P1-34_Mathijs%20Kippers.pdf

[45] Radowitz, B., *German pipeline operators present plan for world's largest hydrogen grid*, Recharge, May 18, 2020, *available at*: https://www.rechargenews.com/transition/german-pipeline-operators-present-plan-for-world-s-largest-hydrogen-grid/2-1-810731

[46] Janssen, Jan Erik, Veii Jacobs, and Bart van Oorschot, *The Netherlands as a green hydrogen hub: government presents views on future of hydrogen*, Lexology, April 20, 2020, *available at*: https://www.lexology.com/library/detail.aspx?g=84848b41-0541-4269-a151-30c87f6e20ff

[47] UCI News, *In a national first, UCI injects renewable hydrogen into campus power supply*, December 6, 2016, *available at*: https://news.uci.edu/2016/12/06/in-a-national-first-uci-injects-renewable-hydrogen-into-campus-power-supply/

[48] SoCalGas, *Power-to-gas technology*, *available at*: https://www.socalgas.com/smart-energy/renewable-gas/power-to-gas

44. Gas heat pumps do not appear to be viable technology choice for low-cost heating and cooling. A gas heat pump is a type of air-source heat pump[49] that runs on gas rather than electricity. However, gas heat pumps are more expensive[50] and less readily available[51] than their electric counterparts. As of 2017, the cost to produce a gas heat pump ranged from $14,000 to $24,000, due in large part to the unique requirements for gas heat pump engines.[52] Due to their very small share of the U.S. heating/cooling market, customers are not broadly aware of gas heat pumps and the sales of and services for gas heat pumps are very limited.[53] The use of gas heat pumps for cooling is especially challenging,[54] and the reliable use of this equipment requires that its engine be run consistently over long periods of time.[55]

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49 U.S. Department of Energy, *Absorption Heat Pumps, Heat Pump Systems, available at*: https://www.energy.gov/energysaver/heat-pump-systems/absorption-heat-pumps.

50 Abuheibi, A., Mahderekal, I., Momen, A., and Vineyard, E., *Challenges and opportunities of Gas Engine Heat Pumps — Two Case Studies*., Oak Ridge National Laboratory, 2017, *available at*: http://hpc2017.org/wp-content/uploads/2017/05/P.4.7.4-Challenges-and-Opportunities-of-Gas-Engine-Driven-Heat-Pumps-Two-Case-Studies.pdf.

51 *Id*., p. 4.

52 *Id*.

53 *Id.*

54 Glanville, P. and Rowley, P., *Review of Research, Development, and Deployment of Gas Heat Pumps in North America*., Gas Technology Institute, 2019, *available at*: https://www.gti.energy/wp-content/uploads/2019/04/Review-of-Research-Development-and-Deployment-of-Gas-Heat-Pumps-in-North-America-June2018.pdf

55 Abuheibi, A., Mahderekal, I., Momen, A., and Vineyard, E., *Challenges and opportunities of Gas Engine Heat Pumps — Two Case Studies*, at 3, Oak Ridge National Laboratory, 2017, *available at*: http://hpc2017.org/wp-content/uploads/2017/05/P.4.7.4-Challenges-and-Opportunities-of-Gas-Engine-Driven-Heat-Pumps-Two-Case-Studies.pdf.

1. ICF's findings regarding the availability of RNG to the District are not consistent with it own recent analyses.

45. The only other recent study of U.S. RNG potential was also completed by the consulting firm ICF (*see* Figure 1).[56] The results of ICF's 2020 "Conservative" scenario match that of the its 2019 "Low" scenario, and the 2020 "Achievable" matches 2019 "High" with one exception: the earlier study included one more stock material: "P2G/Methanation."[57] The total U.S. achievable potential range presented by ICF is very large: 1,600 to 3,800 million MMBtu in 2040. U.S. total RNG potential from other studies varies widely: Excluding scenarios of maximum technical potential these estimates range from 800 to 4,500 million MMBtu per year.[58]

[56] For citations from AEC's literature review of RNG resources *see* Table 2, *infra.*

[57] ICF defines P2G/Methanation as follows: "The Power-to-Gas (P2G) process converts electricity to gas through electrolysis - where electricity is used to split water into hydrogen and oxygen. In the methanation process, hydrogen is processed with carbon dioxide to produce methane. If the electricity is sourced from renewable resources, the fuel product is carbon neutral. Hydrogen produced from P2G is a flexible energy product that can be used in energy storage, injected into the natural gas system to augment gas supply, or converted to methane and injected into pipelines directly." *See* ICF/AGF Study at 38.

[58] Where RNG volumes were presented as Bcf or dekatherms, they were converted to MMBtu using standard conversion factors.

Figure 1. U.S. national RNG potential comparison (million MMBtu/year)

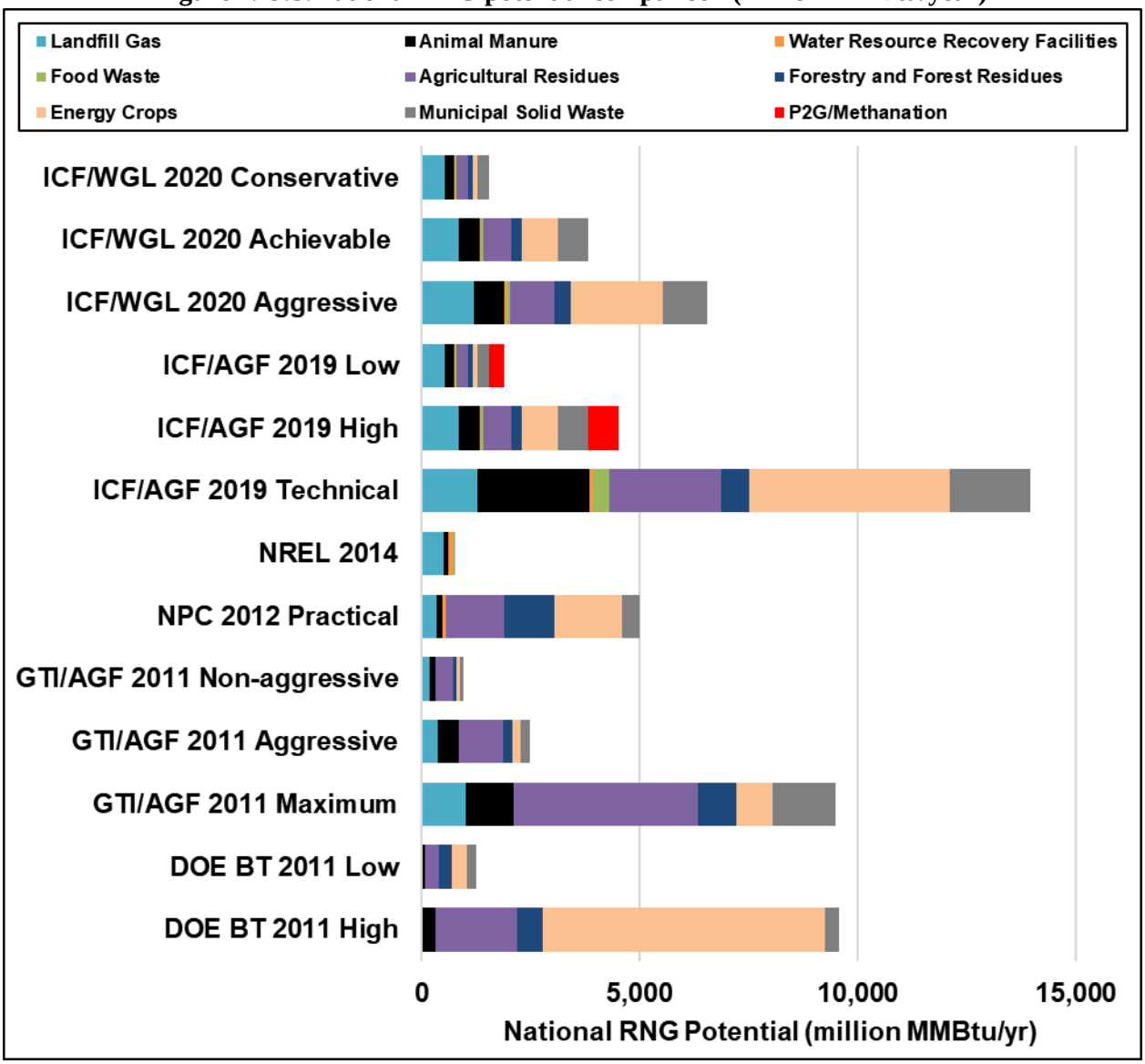


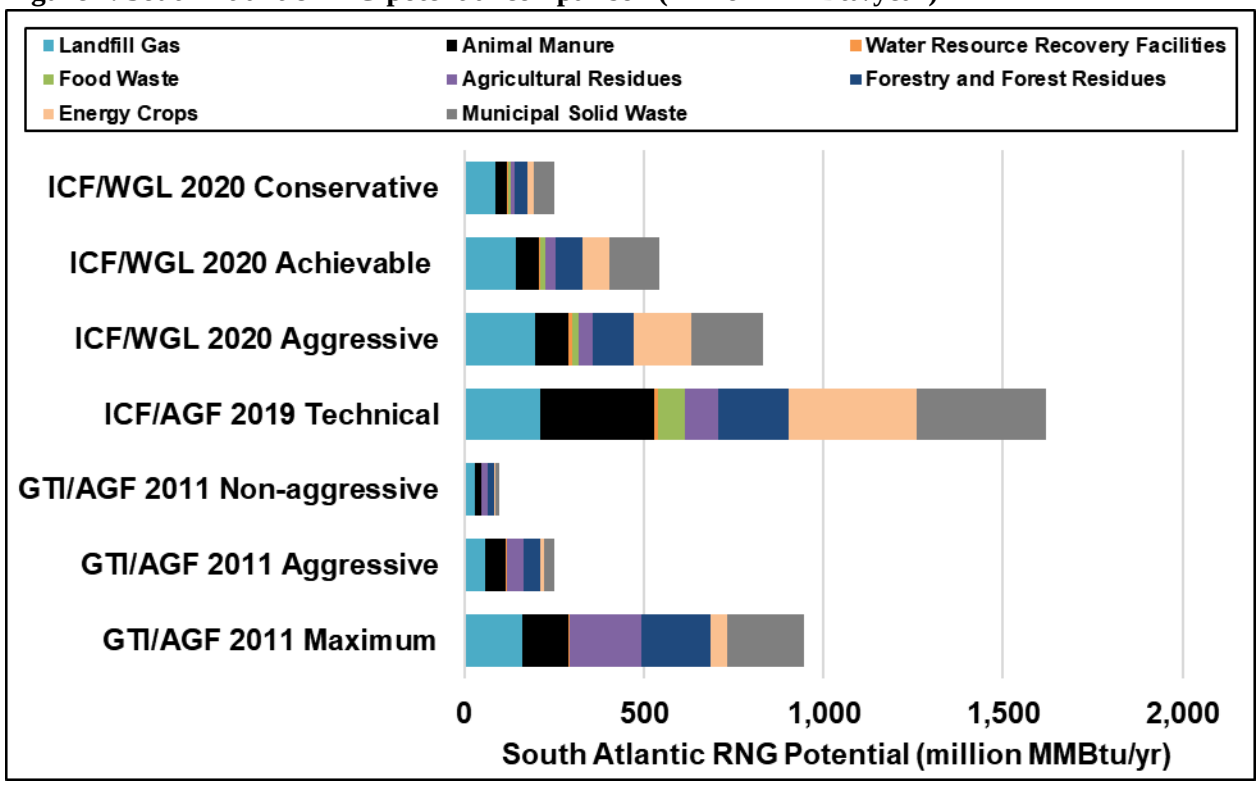
Table 2. Citations for RNG literature review

Study	Source
E3 2020	Aas, D. et al. April 2020. *The Challenge of Retail Gas in California's Low-Carbon Future* . Prepared for California Energy Commission. CEC-500-2019-055-F. Available at: https://ww2.energy.ca.gov/2019publications/CEC-500-2019-055/index.html
ICF/WGL 2020	ICF. March 2020. *Study on the Use of Biofuels (Renewable Natural Gas) in the Greater Washington, D.C. Metropolitan Area* . Prepared for Washington Gas Light Company. Available at: https://edocket.dcpsc.org/public/search/details/fc1142/597
ICF/AGF 2019	American Gas Foundation. December 2019. *Renewable Sources of Natural Gas: Supply and Emissions Reduction Assessment* . Prepared by ICF. Available at: https://www.gasfoundation.org/2019/12/18/renewable-sources-of-natural-gas/
Parker et al. 2017	Parker, N. et al. 2017. "Renewable natural gas in California: An assessment of the technical and economic potential." Energy Policy 111, 235-245. Available at: https://doi.org/10.1016/j.enpol.2017.09.034.
UC Davis 2016	Jaffe, A. et al. June 2016. *The Feasibility of Renewable Natural Gas as a Large-Scale, Low Carbon Substitute* . UC Davis Institute of Transportation Studies. UCD-ITS-RR-16-20. Available at: https://steps.ucdavis.edu/wp-content/uploads/2017/05/2016-UCD-ITS-RR-16-20.pdf.
NREL 2014	Saur, G., Milbrandt, A. July 2014. *Renewable Hydrogen Potential from Biogas in the United States* . National Renewable Energy Laboratory (NREL). Available at: https://www.nrel.gov/docs/fy14osti/60283.pdf
Duke 2014	Murray et. al. February 2014. *Biogas in the United States: An Assessment of Market Potential in a Carbon-Constrained Future* . Nicholas Institute for Environmental Policy Solutions, Duke University. Available at: https://nicholasinstitute.duke.edu/content/biogas-united-states-assessment-market-potential-carbon-constrained-future.
NPC 2012	Hamberg, K., et. al. March 2012. *Renewable natural gas for transportation: an overview of the feedstock capacity, economics, and GHG emission reduction benefits of RNG as a low-carbon fuel. Topic Paper #22* . A White Paper for the National Petroleum Council – Future Transportation Fuels Study. Available at: https://www.npc.org/FTF_Topic_papers/22-RNG.pdf
GTI/AGF 2011	American Gas Foundation. September 2011. *The potential for renewable gas: biogas derived from biomass feedstocks and upgraded to pipeline quality* . Prepared by the Gas Technology Institute. Available at: https://www.eesi.org/files/agf-renewable-gas-assessment-report-110901.pdf
DOE BT 2011	Sheehy, P. and Rosenfeld, J. 2017. *Design Principles for a Renewable Gas Standard* . ICF. Available at: https://static1.squarespace.com/static/53a09c47e4b050b5ad5bf4f5/t/5a56701dec212d1888aa212a/1515614239606/ICF_WhitePaper_Design_Principles.pdf **Note:** The DOE BT study (including the most recent update) did not estimate yields of RNG. The focus of the study is on the feedstock rather than the finished fuel. ICF used conversion efficiencies from the UC Davis work to estimate the tBtu of finished fuel (in this case, RNG) based on the feedstock potential reported in the DOE BT study.

46. ICF 2020 RNG Report also provides estimates for smaller regions: the South Atlantic (MD, DE, VA, WV, NC, SC, GA, FL and Greater DC) and DC Metro (including parts of Maryland, Virginia, and West Virginia). For the South Atlantic region, the ICF 2020 RNG

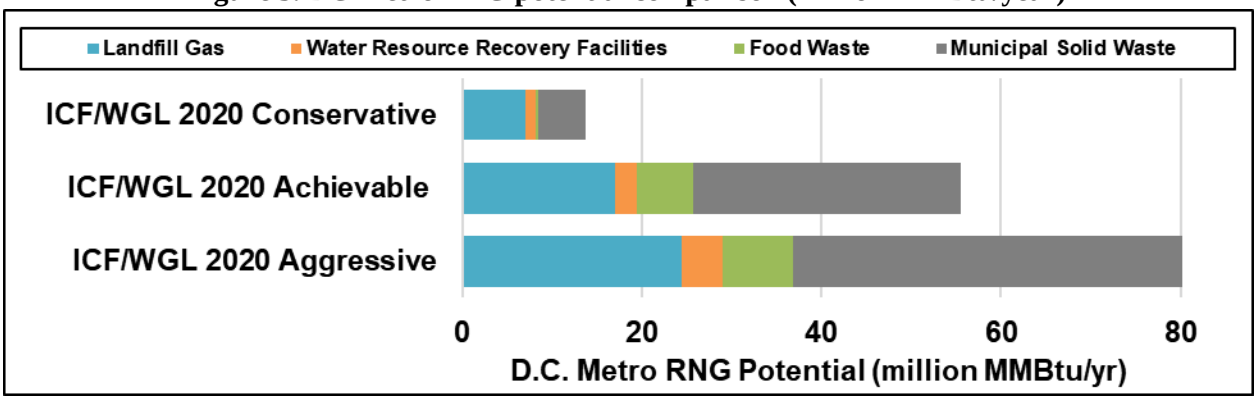
Report estimates 250 to 540 million MMBtu of achievable RNG potential (*see* Figure 2). In comparison, a 2011 GTI/AGF study estimated just 100 to 250 million MMBtu of achievable RNG potential.

Figure 2. South Atlantic RNG potential comparison (million MMBtu/year)



47. Only the ICF 2020 RNG Report provided an estimate of RNG potential for the greater DC region (including parts of Maryland, Virginia, and West Virginia): 14 to 56 million MMBtu of achievable RNG potential in 2040 (*see* Figure 3).

Figure 3. DC Metro RNG potential comparison (million MMBtu/year)



2. AltaGas contention that there is, or will be, sufficient RNG source material to supply the District's gas energy needs is unrealistic.

48. AltaGas' CBP includes replacement of 3 million MMBtu in 2032 (supplying 13 percent of District demand) rising to 7 million MMBtu in 2050 (supply 41 percent of District demand). Three to 7 million MMBtu is half or less than the ICF's conservative RNG supply potential for the DC Metro area (14 million MMBtu).

49. However, any assumption that DC would find RNG to be an affordable heating fuel choice that meets climate and reliability goals but that other jurisdictions would not find these same advantages in RNG would be very problematic. If RNG is a good choice for the District, it must also be a good choice for at least some of its neighbors. Virginia, for example, enacted a Clean Economy Act in 2020 that establishes net zero greenhouse gas emissions target for 2045.[59]

[59] Virginia S.B. 94, *An Act to amend and reenact §§ 67-100, 67-101, 67-102, and 67-201 of the Code of Virginia, relating to the Commonwealth Energy Policy and Virginia Energy Plan*, (2020), *available at*: https://lis.virginia.gov/cgi-bin/legp604.exe?201+ful+SB94ER+pdf.

50. Customer demand from WGL's entire service territory in the Greater DC area was 180 million MMBtu in 2018 (the District's demand is about 17 percent of this total).[60] Supplying the same share of demand from RNG (13 to 41 percent) for WGL's Greater DC customers would require 23 to 74 million MMBtu.

3. The expected costs of RNG compared to that of natural gas does not result in cost savings.

51. The expected costs of RNG do not compare favorably to that of natural gas: that is, RNG does not appear to provide a cost savings to customers and may result in a very large increase in costs. The price of natural gas in the DC region is expected to grow from around $2.60 per MMBtu in 2019 up to $3.70 per MMBtu in 2050 (*see* Figure 4).[61] (Note that these EIA price forecasts were formulated before the onset of the 2020 COVID-19 economic contraction.)

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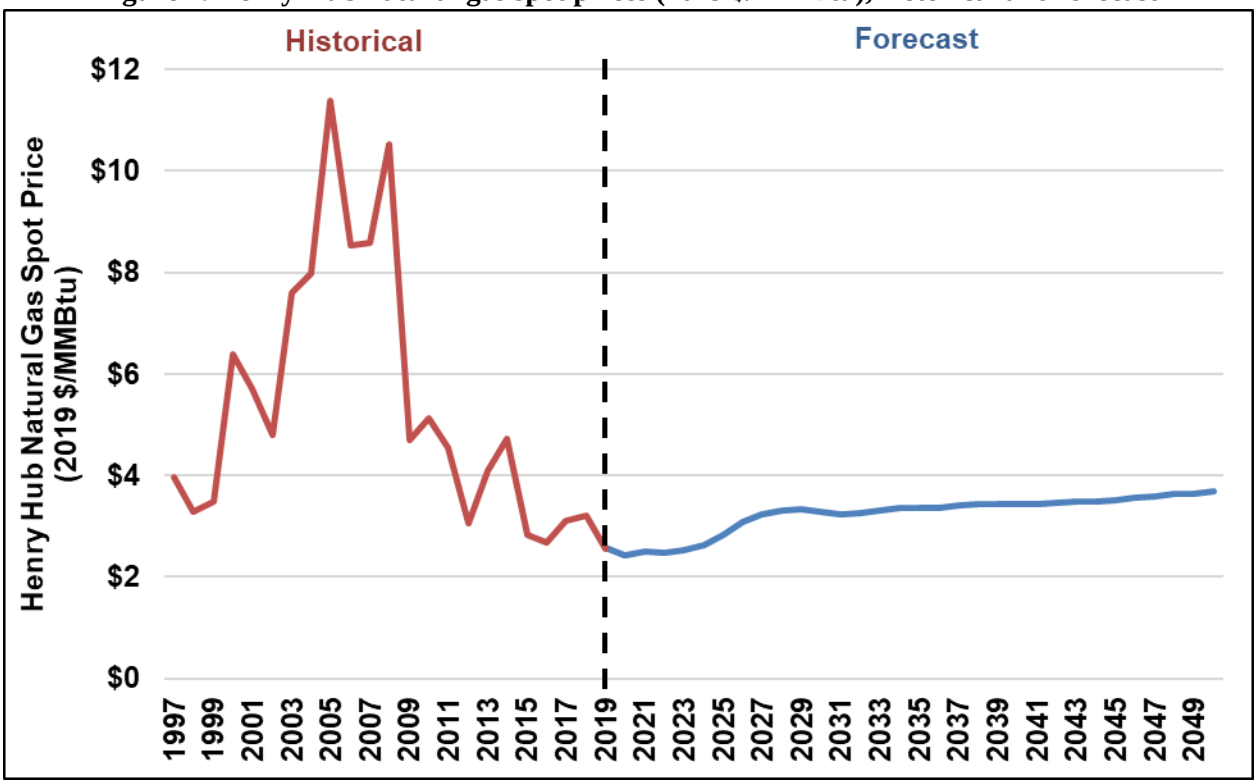
60 U.S. Energy Information Administration, *Natural Gas Annual Respondent Query System, Report: 176 Natural Gas Deliveries*, Released October 2019, *available at*: https://www.eia.gov/naturalgas/ngqs/.

61 All dollar values presented in 2019 dollars, converted (when necessary) using the CPI-U.

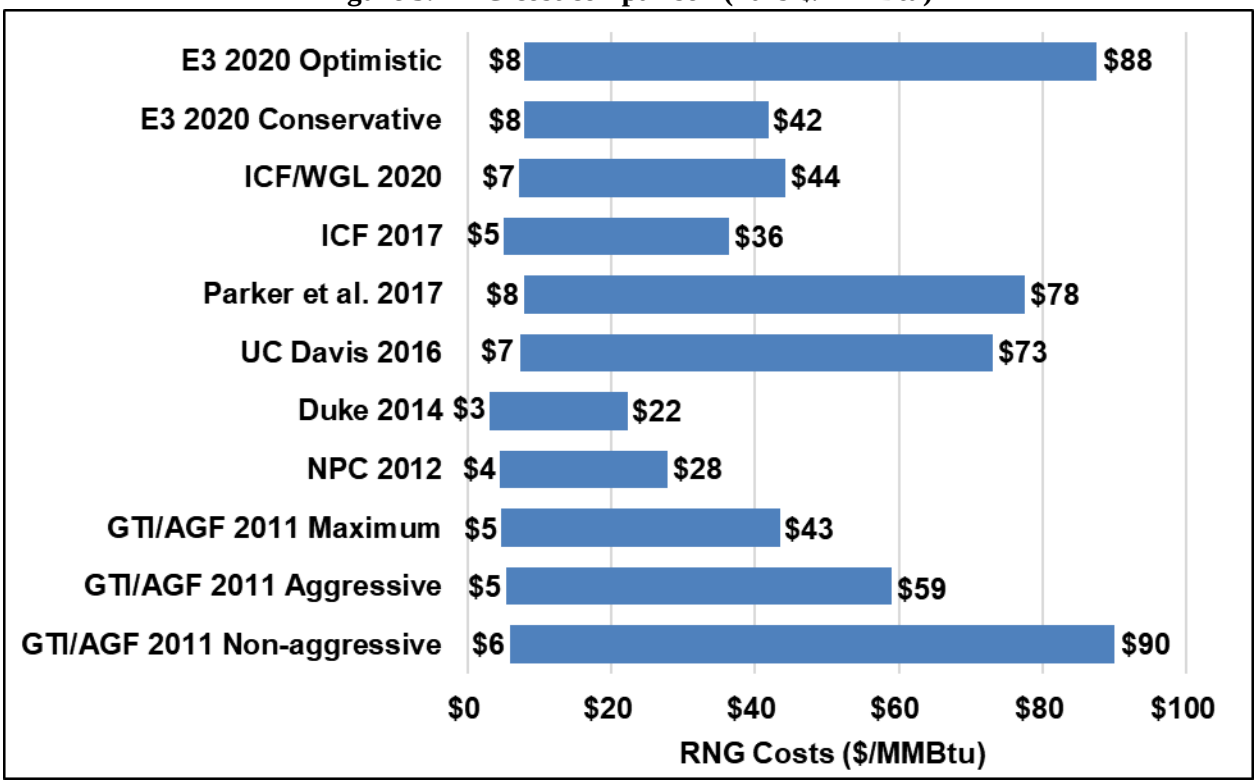
Figure 4. Henry Hub natural gas spot prices (2019 $/MMBtu), historical and forecast



Data sources: Historical: U.S. EIA, *Henry Hub Natural Gas Spot Price: 1997-2019, available at*: https://www.eia.gov/dnav/ng/hist/rngwhhdA.htm; Future: U.S. EIA, *Annual Energy Outlook 2020 – Table 13. Natural Gas Supply, Disposition, and Prices*, January 29, 2020, *available at*: https://www.eia.gov/outlooks/aeo/data/browser/#/?id=13-AEO2020&region=0-0&cases=ref2020&start=2018&end=2050&f=A&linechart=~~~ref2020-d112119a.31-13-AEO2020&map=&ctype=linechart&sourcekey=0

52. Every forecast of expected RNG prices gives a wide range of values depending on both the source material of the RNG and the extent of demand for the materials. RNG made from the least expensive materials is expected to cost $3 to $8 per MMBtu while that made from the most expensive materials ranges from $22 to $90 per MMBtu depending on the study (*see* Figure 5).

Figure 5. RNG cost comparison (2019 $/MMBtu)



53. The least expensive RNG—according to the ICF 2020 RNG Report—would come from landfill gas and water resource recovery. ICF estimates the achievable RNG potential from these two materials (with costs starting at around $7 per MMBtu) at 8 to 20 million MMBtu. Although this RNG potential is more than enough to fulfill the anticipated RNG demand of 3 to 7 million MMBtu (to supply 13 to 41 percent of total District gas demand), the District will likely need to compete for RNG supply with surrounding communities in the Greater Washington, DC metropolitan area (which includes parts of Maryland, Virginia, and West Virginia). Even at the low end of ICF's cost estimates, RNG is still expected to cost twice as much as the price of natural gas. The higher demand for RNG, the greater the cost as more expensive RNG feedstocks are required, with ICF predicting a high end RNG cost that is at least 10 times the price of natural gas.

4. AltaGas' assumption of zero emissions from RNG are inaccurate.

54. AltaGas' assumption of zero emissions from RNG is incorrect, or, at best, is only correct under very special circumstances.

55. According to the ICF 2020 RNG Report: "RNG represents a valuable renewable energy source with a low or net negative carbon intensity depending on the feedstock. The GHG emission accounting methodology has a significant impact on how carbon intensities for RNG are estimated, with a lifecycle approach reflecting the full emission reduction potential, such as including credit for avoided methane emissions."[62]

56. Leading research organizations do not support ICF's claim. A 2017 study by M.J. Bradley & Associates found that when compared to natural gas, the net lifecycle emissions of RNG provide a 40 percent emission reduction.[63] The National Renewable Energy Laboratory notes that for biogas to qualify under the U.S. Environmental Protection Agency's Renewable Fuel Standard (RFS), it must meet a 60 percent emission-reduction threshold.[64]

57. The emissions impacts of RNG depend entirely on the specifics of its production and distribution as well as the emissions of the fuel it is displacing. Most U.S. biogas that qualifies under the RFS is produced from landfill waste, food waste, animal waste and wastewater.[65] Researchers from the European Commission have found that the feedstock

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62 *Formal Case No. 1142*, ICF 2020 Report p. 81.

63 Russel, P., Lowell, D., Jones, B., *Renewable Natural Gas*, M.J. Bradley & Associates, April 2017, *available at*: https://www.mjbradley.com/sites/default/files/MJB%26A_RNG_Final.pdf.

64 Moriarty, K et al. *2017 Bioenergy Industry Status Report*, pp. 39-40, National Renewable Energy Laboratory, NREL/TP-5400-75776, April 2017, *available at*: https://www.nrel.gov/docs/fy20osti/75776.pdf..

65 *Id.*

for biogas (i.e. landfill waste, food waste, etc.) and the method used to store it (open or closed system) have a big impact on emission reductions—finding emissions reductions as small as 3 percent and as large as 330 percent with different combinations of feedstock and storage.[66] The emissions of RNG also depend on its transport—leaks are costly from an emissions-reduction standpoint:[67] Because biogas consists mostly of the methane it captures from waste streams, it is a much more potent greenhouse gas than carbon dioxide.[68]

58. According to the World Resources Institute, the claimed emission reductions of RNG depend on the notion that biogas is captured from a diverted waste stream[69]—so not only do emissions reductions depend on:

    a) the emissions that would have occurred if it were not for the biogas[70] (i.e. how much would the landfill, wastewater plant or agricultural producer have emitted if its waste stream had not been diverted to biogas[71]),

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66 Boulamanti, A., Magilo, S., Giutoli, J., and Agostini, A., 2013, "Influence of different practices on biogas sustainability," Biomass and Bioenergy 53, pp. 149-161, *available at*: https://doi.org/10.1016/j.biombioe.2013.02.020.

67 Lyng, K. and B. Andreas, 2019, "Environmental Life Cycle Assessment of Biogas as a Fuel for Transport Compared with Alternative Fuels," Energies, 12, p. 532 https://doi.org/10.3390/en12030532.

68 Rudek, J., Schwietzke, S, "Not all biogas is created equal," Environmental Defense Fund, April 15, 2019, *available at*: http://blogs.edf.org/energyexchange/2019/04/15/not-all-biogas-is-created-equal/.

69 Gasper, R., Searchinger, T., *The production and use of renewable natural gas as a climate strategy in the united states*, World Resources Institute, April 2018, *available at*: https://wriorg.s3.amazonaws.com/s3fs-public/production-use-renewable-natural-gas-climate-strategy-united-states.pdf.

70 Energy Systems Division, September 2011, *Waste-to-Wheel Analysis of Anaerobic-Digestion-Based Renewable Natural Gas Pathways with the GREET Model*,at 1 Argonne National Laboratory, available at: https://publications.anl.gov/anlpubs/2011/12/71742.pdf.

71 U.S. DA, U.S. EPA, U.S DOE, August 2014, *Biogas Opportunities Roadmap: Voluntary Actions*

but also these impacts also depends on:

b) the assumption that the methane being captured for the biogas would have been produced anyway. In contrast, growing crops for the sole purpose of creating biogas does not help reduce net methane emissions.

59. While RNG is widely acknowledged to facilitate some emissions reductions, not only are these emissions reductions significantly less than 100 percent, they also depend on the specifics of the RNG production and distribution process in question. Claiming that all RNG entails zero greenhouse gas emissions is not in line with the best available research, depends on a leak-free transmission and distribution system, and can only be true for RNG from a subset of source materials.

D. The District is not alone in addressing the transition to a zero-emission future.

60. The District is on the cutting edge of greenhouse regulation and energy sector transformation. Few examples exist of states that have progressed further and could, therefore, provide a definitive roadmap for the PSC to follow as it explores how best to support the District's climate policy goals. Nevertheless, I offer below several examples of procedures and regulations in other U.S. jurisdictions that provide a window into this active and growing area of state and local policy making.

1. New York

61. On March 19, 2020, the New York Public Service Commission (NY PSC) launched a proceeding to consider various issues related to gas utilities' planning procedures, stating:

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to Reduce Methane Emissions and Increase Energy Independence, p. 18, available at: https://www.usda.gov/oce/reports/energy/Biogas_Opportunities_Roadmap_8-1-14.pdf.

"Gas utilities need to learn from recent experience and adopt improved planning and operational practices that enable them to meet current customer needs and expectations in a transparent and equitable way while minimizing infrastructure investments and maintaining safe and reliable service."[72] The NY PSC notes that gas utilities' planning procedures "must be conducted in a manner consistent with the recently enacted Climate Leadership and Community Protection Act (CLCPA)."[73]

62. The NY PSC explained that with this proceeding it aims to address several related issues, including: supply constraints, gas planning, non-pipe solutions, and gas moratoria standards, among others.

63. Since non-pipe solutions such as energy efficiency and electrification can decrease the need for additional investments in gas infrastructure, gas utilities should consider them beyond an "as-needed basis" and begin to integrate these solutions into their planning processes.[74]

64. New York has launched several programs that address the intersection of natural gas and the state's climate policy goals.

65. For example, the New York State Energy Research and Development Authority (NYSERDA) and New York State Department of Public Service (NYS DPS) have initiated a program entitled: *New Efficiency: New York*.[75] As part of this initiative, the New York

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[72] NYS PSC Case No. 20-G-0131, *Proceeding on Motion of the Commission in Regard to Gas Planning Procedures*, pp. 2-3, March 19, 2020, *available at*: http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=20-G-0131&submit=Search.

[73] *Id.*

[74] *Id.*, p. 7.

[75] NYSERDA and NYS DPS, *New Efficiency: New York*, 2018, *available at*:

State Public Service Commission (NYS PSC) issued an *Order Adopting Accelerated Energy Efficiency Targets*.[76] This 2018 initiative and order introduce building electrification as an option to simultaneously achieve the New York State's energy efficiency and climate goals:

> New York State is catalyzing the innovation needed to bring energy efficiency into homes and businesses with energy benchmarking and new data-driven tools, State appliance standards and accelerated building codes, and other efforts to stimulate advancement in building electrification and heat pumps.[77]
>
> The New York State Public Service Commission's (PSC) December 2018 Order adopts significantly accelerated utility energy efficiency targets, which will double utility energy efficiency achievement over 2019 to 2025, including a subsidiary goal for energy savings from the installation of heat pumps.[78]

66. In January 2020, NYS PSC issued an *Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios Through 2025*,[79] which resulted in the development of

https://www.nyserda.ny.gov/About/Publications/New-Efficiency.

[76] NYS PSC Case No. 18-M-0084, *In the Matter of a Comprehensive Energy Efficiency Initiative*, Order Adopting Accelerated Energy Efficiency Targets, December 13, 2018, *available at*: http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={B330F932-3BB9-46FA-9223-0E8A408C1928}

[77] NYSERDA and NY DPSC, *New Efficiency: New York*, 2018, *available at*: https://www.nyserda.ny.gov/About/Publications/New-Efficiency.

[78] *Id.*

[79] NYS PSC Case No. 18-M-0084, *In the Matter of a Comprehensive Energy Efficiency Initiative*, Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios Through 2025, January 16, 2020, (Implementation Order), *available at*: http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={06B0FDEC-62EC-4A97-A7D7-7082F71B68B8}

the *New York State Clean Heat Statewide Heat Pump Program*.[80] This program and order help further advance the development of building electrification in New York:

> In its Implementation Order, the New York State Public Service Commission [] initiated a common statewide heat pump framework for New York State ("NYS"), designed to guide the efforts of the Electric Utilities and the New York State Energy and Research Development Authority ("NYSERDA") in this area. The Electric Utilities and NYSERDA (collectively, "Joint Efficiency Providers") support the State's ambitious clean energy policies and particularly its efforts to advance the development of energy efficiency resources and building electrification.[81]
>
> This NYS Clean Heat Statewide Heat Pump Program ("NYS Clean Heat Program") Implementation Plan ("CHIP" or "Implementation Plan") is a key element of the State's clean energy pathway and is designed to support customers in transitioning to energy-efficient electrified space and water heating technologies.[82]
>
> In general, customers are eligible for incentives under these programs no matter which heating fuel (e.g., fuel oil, natural gas, propane, biomass, electricity) they are either transitioning from or declining to include in a new construction application.[83]

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80 NYSERDA, *NYS Clean Heat*, 2020, *available at*: https://saveenergyny.ny.gov/NYScleanheat/; NYS PSC, Case No. 18-M-0084, *In the Matter of a Comprehensive Energy Efficiency Initiative*, NYS Clean Heat: Statewide Heat Pump Program Implementation Plan, March 16, 2020, updated May 29, 2020, *available at*: http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={C8B4A2CD-CF7A-4149-A49B-F08DD7CAA32F}.

81 NYS DPS Case No. 18-M-0084, *In the Matter of a Comprehensive Energy Efficiency Initiative*, NYS Clean Heat: Statewide Heat Pump Program Implementation Plan, p. 3, March 16, 2020, updated April 30, 2020.

82 *Id.*

83 *Id.*, p. 6.

67. NYSERDA has also issued a report entitled: *Toward a Clean Energy Future: A Strategic Outlook 2020-2023*.[84] In this report, building electrification is one of NYSERDA's strategic areas of focus.

> New York State will be investing over $450 million in heat pump incentives through utilities and over $200 million in market enabling support through NYSERDA. Achieving New York's aggressive emissions reduction goals will require a complete transformation in how New Yorkers heat and cool buildings, moving from fossil fuel-based systems to all-electric clean energy homes and buildings. This new initiative, called NY-Clean Heat, will pair consumer incentives with market-enabling initiatives to deliver electrification solutions to New Yorkers.[85]

68. Among several key actions for 2020-2023, NYSERDA identifies the following:[86]

> Workforce development for building electrification and energy efficiency — Increase pool of skilled labor and industry partnerships to rapidly scale the nascent heat pump industry, providing economic opportunity for New Yorkers, including by making use of $40 million in workforce development funding announced in 2020 State of the State.
>
> Clean Heat Community Engagement and Assistance — Provide support to communities and local groups to stimulate adoption of heat pumps along with building envelope solutions, while leveraging local labor.
>
> Clean Thermal District System — Test and demonstrate potentially scalable models for clean thermal district systems, using a NY-Prize style approach.
>
> Clean Heat Supply Chain Development — Support development activities to draw larger HVAC companies and

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84 NYSERDA, *Toward a Clean Energy Future: A Strategic Outlook 2020-2023*, 2020, *available at*: https://www.nyserda.ny.gov/About/Publications/Program-Planning-Status-and-Evaluation-Reports/Strategic-Outlook

85 *Id*., p. 34.

86 *Id*., p. 36.

> general contractors into the heat pump business and grow businesses that are selling/servicing heat pumps.
>
> Heat-Pump-Ready Buildings — Build markets for insulation and air sealing services to accompany new heat pump solutions, to reduce thermal load and peak energy demands and increase home comfort.

69. New York utilities have also started their own initiatives to examine the impact of the gas transition on their services. For example, National Grid, a multi-state utility that serves roughly 3.6 million gas customers[87] throughout New York, Massachusetts, and Rhode Island, recently issued *Natural Gas Long-Term Capacity Report for Downstate New York*.[88]

70. In the report, National Grid is proposing both RNG and hydrogen injection and some building electrification and neighborhood geothermal for its New York State gas distribution system:

> We are supportive of partnering with the state of New York to achieve its Climate Leadership and Community Protection Act (CLCPA) goal of net zero Greenhouse Gas (GHG) emissions by 2050, with 85% reductions from New York's energy and industrial emissions compared to 1990 levels and 15% carbon offsets. We are fully cognizant of the changing role of utilities, and the desire to include non-pipeline alternatives as part of the pathway to a sustainable energy future.[89]

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87 National Grid, *US Principle Operations*, *available at*: https://www.nationalgrid.com/about-us/what-we-do/us-principal-operations

88 National Grid, *Natural Gas Long-Term Capacity Report for Downstate New York*, February 2020, *available at*: https://millawesome.s3.amazonaws.com/Downstate_NY_Long-Term_Natural_Gas_Capacity_Report_February_24_2020.pdf

89 *Id*., p. 7.

71. In addition to "pursuing low-carbon gas options such as Renewable Natural Gas (RNG) and Hydrogen to increase supply and help meet carbon reduction targets",[90] National Grid believes that they "can play an important role in building out Geothermal Heat Pumps as a targeted alternative to oil, new gas connections, and end-of-the-line Leak Prone Pipe repairs."[91]

72. In 2016, National Grid connected a total of ten homes with "shared-loop GSHP systems" in a geothermal demonstration project in Downstate NY. "Building off this successful initial pilot, National Grid has proposed in its recent rate case filings a $12M program that will connect 900 homes in Downstate NY to geothermal ground loops over the next four years."[92]

2. Rhode Island

73. On July 8, 2019, Rhode Island Governor Gina Raimondo signed Executive Order 19-06 outlining steps for a heating sector transformation that would ensure reliability and protect against climate change.[93] In this order, Governor Raimondo directed the Division of Public Utilities and Carriers (DPUC) and Office of Energy Resource (OER) to lead a Heating Sector Transformation effort "with the goal of reducing emissions from the heating sector while ensuring that Rhode Islanders have access to safe, reliable and affordable heating."[94]

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90 *Id*., p. 10.

91 *Id*., p. 42.

92 *Id*., p. 47.

93 Raimondo, G., *Executive Order 19-06: Heating Sector Transformation to Ensure Reliability and Protect against Climate Change*, State of Rhode Island and Providence Plantations, 2019, *available at*: https://governor.ri.gov/documents/orders/Executive%20Order%2019-06.pdf

94 *Id*., p. 2

74. DPUC and OER were ordered to provide Heating Sector Transformation recommendations by April 22, 2020 (see Brattle Group report below) to include:[95]

> Identification of the energy, economic, and environmental opportunities and challenges posed by Rhode Island's heating sector;
>
> Development of a future state framework – through 2020 – for Rhode Island's heating sector highlighting points of intersection across our energy landscape, including the electric sector;
>
> Identification of statutory and/or regulatory barriers to sector transformation and potential solutions to more effectively implement transformative heating solutions;
>
> Opportunities to leverage existing programs and emerging opportunities to deliver lower-carbon heating solutions to Rhode Island households and businesses;
>
> Identification of innovative partnership and new technologies that can provide heat to Rhode Islanders at sustainable economic and environmental levels.

75. In response to Governor Raimondo's Executive Order 19-06, the Rhode Island DPUC and OER commissioned the Brattle Group to conduct analysis and develop recommendations on the transformation of Rhode Island's heating sector. The Brattle analysis entitled: *Heating Sector Transformation in Rhode Island: Pathways to Decarbonization by 2050* ("Brattle Group Report"), notes that there are "many solutions for decarbonizing the heating sector, but they fall into three broad categories: (1) reducing energy needs by improving building energy efficiency; (2) replacing current fossil heating fuels with carbon

95 *Id*.

neutral renewable gas or oil; and (3) replacing current fossil-fueled boilers and furnaces with electric ground source or air source heat pumps powered by carbon-free electricity."[96]

76. The Brattle Group further notes that:

> [A]part from energy efficiency measures, which must play an important role independent of what heat solution is chosen, the decarbonization solutions" include: (1) decarbonizing fuels with renewable gas/power-to-gas (P2G) for gas customers and biofuel or power-to-liquids (P2L) for most other customers, and (2) electrifying heat via air source heat pumps (ASHP) and ground source heat pumps, including the development of GeoMicroDistricts.[97]

77. The Brattle Group found that its scenarios focusing efforts on conversion to electric heat pumps were less expensive than scenarios focused on renewable fuels.

3. Pennsylvania

78. In 2019, the City of Philadelphia issued a Request for Proposals (RFP) to develop a business diversification study for its municipally-owned gas utility, Philadelphia Gas Works (PGW).[98] PGW has experienced a decrease in customer demand as a result of energy efficiency and conservation efforts in addition to the impacts of the region's warming weather patterns. In light of the continued impacts of climate change and climate-related policies, PGW seeks input on how it will fit into a lower-carbon future while continuing to thrive financially and retain its workforce. The RFP states that:

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96 *Id*., p. i.

97 *Id*.

98 Philadelphia's Office of Sustainability, *Request for Proposals for a Philadelphia Gas Works Business Diversification Study for The City of Philadelphia*, October 2019, *available at*: https://secure.phila.gov/ECONTRACT/documents/frmPDFWindow.aspx?docid=21191016133950021191 0181027421N&ext=pdf

> The City and PGW are interested in developing a business diversification study that provides a range of economically, and environmentally sustainable pathways for the utility to consider pursuing. Along with anticipated carbon emissions reductions, the study should also present the financial, regulatory and technological viability of each pathway.[99]

4. California

79. The California's Public Utilities Commission's (CPUC)'s recently instituted a rulemaking to investigate a path forward as the state transitions away from natural gas.[100] In CPUC Rulemaking 20-01-007 the Commission states that:

> The Commission issues this Order Instituting Rulemaking to respond to past and prospective events that together will require changes to certain policies, processes, and rules that govern the natural gas utilities in California. With respect to past events, several operational issues in Southern California prompt the Commission to reconsider the reliability and compliance standards for gas public utilities. Over the next 25 years, state and municipal laws concerning greenhouse gas emissions will result in the replacement of gas-fueled technologies and, in turn, reduce the demand for natural gas.
>
> Thus, in order to ensure safe and reliable natural gas service at just and reasonable rates in California, the Commission will (1) develop and adopt updated reliability standards that reflect the current and prospective operational challenges to gas system operators; (2) determine the regulatory changes necessary to improve the coordination between gas utilities and gas-fired electric generators; and (3) implement a long-term planning strategy to manage the state's transition away from natural gas-fueled technologies to meet California's decarbonization goals.[101]

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99 *Id*., p. 1.

100 CPUC Rulemaking 20-01-007, *Order Instituting Rulemaking to Establish Policies, Processes, and Rules to Ensure Safe and Reliable Gas Systems in California and Perform Long-Term Gas System Planning*, January 2020, *available at*: https://www.transmissionhub.com/wp-content/uploads/2020/01/CAorderGasJan272020.pdf

101 *Id*., p. 2.

5. Massachusetts

80. On June 4, 2020, the Massachusetts' Office of the Attorney General requested that the Department of Public Utilities:

> initiate an investigation to assess the future of local gas distribution company (LDC) operations and planning in light of the Commonwealth's legally binding statewide limit of net-zero greenhouse gas (GHG) emissions by 2050.…[T]he Commonwealth's climate policy requirements will have profound impacts on gas distribution system management, operations, and rates.[102]

81. According to the Massachusetts Attorney General, status quo business and operating practices are not enough for Massachusetts gas utilities to continue to meet the Commonwealth's emission reduction goals into the future:

> The Department has both the authority and expertise to initiate this urgent public discussion by promptly opening an investigation that will (1) examine the gas distribution industry, regulatory, and policy changes needed to support the achievement of the Commonwealth's mandated GHG emission limits; and (2) determine what near- and long-term adjustments are necessary to maintain a safe and reliable gas distribution system and protect consumer interests as the Commonwealth transitions from fossil fuels to a clean, increasingly electrified, and decarbonized energy future by 2050.[103]

82. At the same time, the Massachusetts' FUTURE Act (Bill H.2849 and Bill S.1940) is presently in committees of both legislative houses.[104] In addition to addressing the safety

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102 Massachusetts Office of the Attorney General (MA AGO), *Petition of the Office of the Attorney General Requesting an Investigation into the impact on the continuing business operations of local gas distribution companies as the Commonwealth achieves its 2050 Climate Limits,* June 2020, *available at*: https://www.mass.gov/doc/dpu-gas-petition/download. p. 1

103 *Id.*, p. 3.

104 The Commonwealth of Massachusetts 191st General Court, Senate Docket No. 1953 and House

challenges associated with the Commonwealth's current gas distribution system, the FUTURE Act aims to create a path forward to a safer renewable energy future. The FUTURE Act will provide a roadmap for gas distribution companies to transition to renewable thermal technologies for heating by: (1) allowing gas companies to pipe renewable thermal energy to buildings (i.e. neighborhood geothermal); (2) allowing gas companies to replace leak-prone gas infrastructure with modern renewable thermal infrastructure; (3) including a small fee on gas bills, similar to that on electric bills, to fund renewable energy projects; (4) requiring gas companies to increase renewable thermal energy capacity each year; and (5) ensuring that the costs associated with new fossil fuel infrastructure cannot be passed along to ratepayers after 2050.[105]

83. Similar to New York, Massachusetts utilities have been actively involved in examining alternative technologies. As a part of their latest performance-based regulatory plan, Eversource, an investor-owned utility that delivers gas to approximately 533,000 customers in Connecticut and Massachusetts, has proposed to pilot three neighborhood projects that will test geothermal networks in series of targeted scenarios, including: multi-family buildings, mixed-use residential and commercial areas, and residential neighborhoods.[106] The objective of the geothermal pilot projects is to understand how to

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Docket No. 3719, Bill No. S.1940/H.2849, *An Act For Utility Transition To Using Renewable Energy (FUTURE), available at*: https://malegislature.gov/Bills/191/S1940.

[105] Gas Leak Allies, *The F.U.T.U.R.E. Act (H.2849/S.1940) An Act For a Utility Transition to Using Renewable Energy*, October 2019, *available at*: https://d3n8a8pro7vhmx.cloudfront.net/mothersoutfrontma/pages/2591/attachments/original/1572553462/FUTUREInfo10.23.2019.pdf?1572553462

[106] MA DPU Docket No. 19-120, *Petition of NSTAR Gas Company d/b/a Eversource Energy for Approval of an Increase in Base Distribution Rates and Performance-Based Regulatory Plan for Gs Service*

replace gas use with renewable heating and cooling systems through a shared geothermal system.[107] In its rate case petition, Eversource claimed that:

> Because geothermal networks provide a low-carbon source of heating, exploring the potential of a geothermal network is critical as the Commonwealth seeks to reduce greenhouse gas emissions pursuant to the Global Warming Solutions Act.[108]

6. Illinois

84. Peoples Gas, the gas distribution company serving customers in Chicago, has had some form of a leak-prone pipe replacement program since 1981. Over the years, stakeholders claim that Peoples Gas has failed to properly design, implement, and manage these programs, which has increased the public safety risks posed by the leak-prone infrastructure in the first place. Peoples Gas' most recent gas main replacement program, the System Modernization Program (SMP), has received similar critiques.

85. Critics claim that the SMP fails to protect public safety due to: (1) the prioritization of broader system improvement objectives over public safety objectives; and (2) the

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Pursuant to General Laws Chapter 164, §94 and 220 C.M.R. §§ 5.00, et seq., Exhibit ES-PMC/MRG-1, Direct Testimony of McLean Conner, P. and Goldman, M., p. 46, November 8, 2019, *available at*: https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/11419982

[107] HEET, *Eversource Plans Three Geothermal Pilots*, January 3, 2020, *available at*: https://heetma.org/2020/01/03/eversource-plans-three-geothermal-pilots/

[108] MA DPU Docket No. 19-120, *Petition of NSTAR Gas Company d/b/a Eversource Energy for Approval of an Increase in Base Distribution Rates and Performance-Based Regulatory Plan for Gs Service Pursuant to General Laws Chapter 164, §94 and 220 C.M.R. §§ 5.00, et seq.*, Exhibit ES-PMC/MRG-1, Direct Testimony of McLean Conner, P. and Goldman, M., p. 43, November 8, 2019, *available at*: https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/11419982

consistent mismanagement of the SMP causing failure to meet annual replacement targets and have a credible cost estimate:[109]

> Peoples Gas is failing to appropriately address the public safety risk it invokes to justify the SMP. Instead of implementing a program that scientifically prioritizes at-risk pipes for replacement, the company is conducting a broad, overly reactive, system-wide upgrade. The pace of SMP spending places an unjustified and unnecessary affordability burden on Chicago gas customers. The acceleration of gas system improvement investment harms Illinois' ability to meet its greenhouse gas emission targets and risks saddling ratepayers with billions of dollars of stranded investment.[110]

86. An Illinois Commerce Commission docket on this subject is anticipated.

87. This concludes my affidavit.

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[109] Scarr, A. & Orcutt, J., *Tragedy of Errors: The Peoples Gas Pipe Replacement Program is a Poorly Designed, Mismanaged, Bad Investment for Chicago*, Illinois PIRG Education Fund, June 2019, *available at*: https://illinoispirg.org/sites/pirg/files/reports/Tragedyoferrors_scrn.pdf

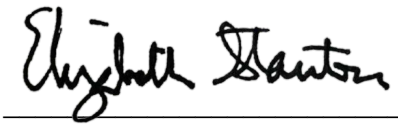
[110] *Id*., p. 63.

BEFORE THE
PUBLIC SERVICE COMMISSION
OF THE DISTRICT OF COLUMBIA

In the Matter of	**§**	
	§	
the Merger Application of AltaGas	**§**	**Formal Case No. 1142**
Ltd. and WGL Holdings, Inc.	**§**	

ATTESTATION

I declare under penalty of perjury that the foregoing affidavit was prepared by me or under my direction and is true and correct to the best of my knowledge, information, and belief.



Elizabeth A. Stanton 6/26/2020

ATTACHMENT (A)-1

Applied Economics Clinic
Economic and Policy Analysis of Energy, Environment and Equity

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PROFESSIONAL EXPERIENCE

Applied Economics Clinic, Arlington, MA. *Director and Senior Economist*, February 2017 – Present.

The Applied Economics Clinic provides technical expertise to public service organizations working on topics related to the environment, consumer rights, the energy sector, and community equity. Dr. Stanton is the Founder and Director of the Clinic (www.aeclinic.org).

Liz Stanton Consulting, Arlington, MA. *Independent Consultant*, August 2016 – January 2017.

Providing consulting services on the economics of energy, environment and equity.

Synapse Energy Economics Inc., Cambridge, MA. *Principal Economist*, 2012 – 2016.

Consulted on issues of energy economics, environmental impacts, climate change policy, and environmental externalities valuation.

Stockholm Environment Institute - U.S. Center, Somerville, MA. *Senior Economist*, 2010 – 2012; *Economist*, 2008 – 2009.

Wrote extensively for academic, policy, and general audiences, and directed studies for a wide range of government agencies, international organizations, and nonprofit groups.

Global Development and Environment Institute, Tufts University, Medford, MA. *Researcher*, 2006 – 2007.

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Adjunct Professor, Department of Urban Environmental Policy and Planning, 2007, 2017, 2018

College of New Rochelle, New Rochelle, NY

Assistant Professor, Department of Social Sciences, 2007 – 2008

Fitchburg State College, Fitchburg, MA

Adjunct Professor, Social Sciences Department, 2006

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