



December 10, 2024

VIA ELECTRONIC FILING

Brinda Westbrook-Sedgwick
Commission Secretary
Public Service Commission
of the District of Columbia
1325 G Street, NW, Suite 800
Washington, DC 20005

Re: Formal Case No. 1179, In the Matter of the Investigation into Washington Gas Light Company's Strategically Targeted Pipe Replacement Program

Dear Brinda Westbrook-Sedgwick:

Attached for filing please find Sierra Club's Direct Testimony, with accompanying exhibits, as follows:

- Ex. SC(A) – Direct Testimony of Zach Pierce
- Ex. SC(B) – Direct Testimony of Conor Lyman
- Ex. SC(C) – Panel Direct Testimony of Jim Crowley & Jeremy Walker

Thank you for your attention to this matter. Should you have any questions, please contact me at toberleiton@earthjustice.org.

Sincerely,

Timothy R. Oberleiton
Senior Attorney
Earthjustice
1001 G St. NW, Ste. 1000
Washington, D.C. 20001
(202) 667-4500
toberleiton@earthjustice.org

**BEFORE THE PUBLIC SERVICE COMMISSION OF THE DISTRICT OF
COLUMBIA**

**In the Matter of the Investigation into
Washington Gas Light Company's
Strategically Targeted Pipe Replacement
Plan**

Formal Case No. 1179

**PREPARED DIRECT TESTIMONY OF
ZACH PIERCE**

EXHIBIT SC (A)

**On Behalf of
Sierra Club**

December 10, 2024

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Exhibit SC (A)-1	Resume of Zach Pierce
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1 **I. Introduction, Qualifications, Purpose of Testimony, and Recommendations**

2 **Q PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

3 **A** My name is Zach Pierce. My business address is 1828 L Street NW, Suite 300-C,
4 Washington, DC 20036.

5 **Q BY WHOM ARE YOU EMPLOYED AND IN WHAT POSITION?**

6 **A** I am employed by Rewiring America as Senior Director of State and Regional Policy.
7 Rewiring America is the leading electrification nonprofit, focused on electrifying our
8 homes, businesses, and communities. We develop accessible, actionable data and tools,
9 and build coalitions and partnerships to make going electric easier for households and
10 communities. Rewiring America helps Americans save money, tackle nationwide
11 emissions goals, improve health, and build the next generation of the clean energy
12 workforce. We believe in an abundant, flourishing, climate-safe future, and we know that,
13 together, we can realize one.

14 **Q ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?**

15 **A** I am testifying on behalf of the Sierra Club.

16 **Q PLEASE SUMMARIZE YOUR RESPONSIBILITIES AND QUALIFICATIONS.**

17 **A** I have spent over a decade working as a public servant and an advocate on climate change
18 and clean energy policy across the United States. As the Senior Director of State &
19 Regional Policy, I lead Rewiring America's efforts to influence and establish programs
20 and policies encouraging electrification in states and localities across the country. Before
21 joining Rewiring America, I served as North Carolina Governor Roy Cooper's Senior
22 Advisor for Climate Change Policy. I previously served in senior climate policy roles for
23 Governor Jared Polis and Governor John Hickenlooper in Colorado. I was also a Senior
24 Campaign Representative for the Sierra Club's Beyond Coal Campaign, focusing on clean
25 energy regulatory and legislative advocacy in Colorado and New Mexico. My
26 qualifications are listed after the conclusion of my testimony.

1 **HAVE YOU PREVIOUSLY TESTIFIED IN PROCEEDINGS BEFORE THE**
2 **PUBLIC SERVICE COMMISSION OF THE DISTRICT OF COLUMBIA?**

3 **A** No.

4 **Q** **HAVE YOU PREVIOUSLY TESTIFIED IN PROCEEDINGS BEFORE ANY**
5 **OTHER PUBLIC SERVICE COMMISSIONS?**

6 **A** Yes. Earlier this year, I testified before the Colorado Public Utilities Commission
7 (“Colorado PUC”) in the Public Service Company of Colorado’s Clean Heat Plan filing.
8 In my previous role as a Senior Campaign Representative for the Sierra Club, I testified
9 before the New Mexico Public Regulation Commission in the Public Service Company of
10 New Mexico’s 2017 rate case.

11 **Q** **HAS REWIRING AMERICA PREVIOUSLY SUBMITTED TESTIMONY TO THE**
12 **COMMISSION?**

13 **A** Yes. In June 2024, my colleague Jamal Lewis filed testimony on Washington Gas and
14 Light (“WGL,” “Washington Gas,” or the “Company”)’s previous PROJECTpipes III
15 proposal before the Commission on behalf of Rewiring America. Mr. Lewis’ testimony
16 requested that the Commission reject WGL’s PROJECTpipes III gas pipe replacement
17 program proposal in favor of a pipe repair program that would save DC ratepayers money,
18 advance the District’s climate goals, and allow the Company to redirect funding away
19 from inefficient gas infrastructure and toward electrification.

20 Rewiring America also submitted an Electrification Study for the District of Columbia in
21 Formal Case No. 1167. In that proceeding, we proposed proactive and targeted efforts to
22 electrify all appliances and facilitate the decommissioning of gas distribution systems in
23 specific neighborhoods with high energy burdens or high incidences of methane gas leaks.
24 Specifically, the report focused on potential decommissioning efforts in River Terrace and
25 Deanwood, as proposed in the FY 2024 DC Council proposed budget.

26 My testimony in this proceeding builds on these previous filings from Rewiring America.

1 **Q WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

2 **A** My testimony outlines why Washington Gas’s Revised Application for Approval of the
3 District Strategic Accelerated Facility Enhancement (“District SAFE”) Plan is not
4 responsive to the Commission’s Order No. 22003, perpetuates status quo planning and
5 investment in the gas distribution system that is inconsistent with the District of Columbia
6 (“District” or “DCG”)’s climate policies and creates significant financial risks for WGL
7 customers and company assets. In support of the above points, my testimony also
8 summarizes the Pipe Segment Analysis detailed in Mr. Lyman’s testimony, which
9 examines three investment scenarios for two isolated segments of the distribution main
10 pipeline in the Company’s territory, and their diverging impacts on capital costs, customer
11 bills, and greenhouse gas (“GHG”) emissions.

12 **A** Finally, my testimony provides recommendations for the Public Service Commission of
13 the District of Columbia (“Commission”) and Washington Gas to better align the District
14 SAFE proposal and associated efforts with the District’s climate and consumer protection
15 imperatives.

16 **Q PLEASE SUMMARIZE YOUR RECOMMENDATIONS.**

17 **A** My recommendations are as follows:

- 18 1. The Commission should require WGL to engage in long-term planning that
19 reconciles major spending in its gas system with the District’s climate laws and
20 changes in technology and consumer preferences.
- 21 2. The Commission should require WGL to pursue alternatives to pipeline
22 replacements, with a preference for replacing the gas system with targeted
23 beneficial electrification or geothermal pilot projects, where feasible and cost-
24 effective.
- 25 3. Where major changes to the gas system are not feasible, the Commission should
26 require WGL to develop a more robust procedure for considering more limited
27 non-pipeline alternatives (“NPAs”) before undertaking costly pipe replacements.

- 1 4. The Commission should prioritize pipeline repairs, as opposed to replacements, in
2 locations where electrification or geothermal projects are impractical and other
3 NPAs are not adequate to mitigate the risks of gas leakage.
- 4 5. In those instances where a pipeline must be replaced, WGL should not receive
5 accelerated or advance approval for pipeline replacements or surcharge recovery,
6 but should recover replacement costs after prudence review under a regular rate
7 case, with demonstration that repairs or other NPAs were not feasible.
- 8 6. The Commission should consider developing performance incentive mechanisms
9 (“PIMs”) for WGL to implement NPAs and/or pipeline repairs in lieu of pipeline
10 replacements.
- 11 7. The Commission should prevent WGL from recovering any ratepayer funds for
12 advertisements, customer outreach, or other lobbying promoting gas or expansion
13 of the gas system.
- 14 8. The Commission and the Company should convene a workshop and stakeholder
15 engagement process to design an updated Customer Choice Pilot Program that
16 complements the current pipe replacement program with a more comprehensive
17 effort to evaluate and execute street-segment electrification projects and other
18 NPAs that will unlock benefits at the customer and system level while advancing
19 the District’s climate goals.

20 **II. Washington Gas’s Revised Application is not Responsive to the Commission’s Order**
21 **No. 22003, is Inconsistent with the District’s Climate Goals, and Poses a Significant**
22 **Financial Risk to Customers and Company Assets.**

23 **Q HOW WOULD YOU SUMMARIZE ORDER NO. 22003 AS IT RELATES TO**
24 **YOUR TESTIMONY?**

25 **A**In Order No. 22003, the Commission took decisive steps to better align WGL’s pipe
26 replacement program with quickly evolving public policy and energy system planning
27 imperatives. The Commission required the Company to file an updated pipe replacement
28 plan reflecting a “new normal” that elevates electrification and targeted pipe replacement
29 over the complete replacement of over 400 miles of aging, high-risk pipelines across

1 WGL’s distribution system.¹ As noted by the Commission, this paradigm shift requires
2 balancing the very real need to replace the highest-risk pipe segments with an obligation
3 to facilitate better alignment with the District’s climate goals and minimize stranded assets
4 as the Company continues to feel the impacts of the energy transition that is currently
5 underway.²

6 **Q IS WGL’S DISTRICT SAFE PLAN RESPONSIVE TO THE “NEW NORMAL”**
7 **THAT THE COMMISSION ARTICULATED IN ORDER NO. 22003?**

8 **A** WGL’s District SAFE Plan is not responsive to important facets of the Commission’s
9 Order No. 22003. Firstly, the new proposal does not adequately align the utilities’
10 planning and investments with the District’s climate goals. Moreover, the District SAFE
11 Plan does not take sufficient steps to evaluate and mitigate the self-reinforcing cycle of
12 declining throughput, rate increases, and the growing risk of stranded assets. I expand
13 upon these two topics below.

14 **Q WHAT ARE THE DISTRICT’S CLIMATE GOALS?**

15 **A** The District of Columbia Government has taken important steps—in the form of goal-
16 setting and the implementation of underlying strategies and initiatives—to mitigate and
17 respond to the climate crisis. Numerous parties have summarized the District’s climate
18 initiatives in detail for this Commission, including the Department of Energy and
19 Environment (“DOEE”)’s Initial Comments on WGL’s PROJECTpipes III Application in
20 Formal Case No. 1175. Of particular note, the District enacted the Climate Commitment
21 Act of 2022, which updated and expanded GHG reduction targets between 2025 and 2050.
22 Specifically, the Climate Commitment Act requires the District to reduce emissions:

23 (1) Not less than 45% below 2006 greenhouse gas emission levels by 2025;

24 (2) Not less than 60% below 2006 greenhouse gas emission levels by 2030;

¹ Formal Case No. 1179, *In the Matter of the Investigation Into Washington Gas Light Company’s Strategically Targeted Pipe Replacement Plan*, Order No. 22003 at 18, June 12, 2024 (“Order No. 22003”).

² *Id.* at 17.

- 1 (3) Not less than 70% below 2006 greenhouse gas emission levels by 2035;
- 2 (4) Not less than 85% below 2006 greenhouse gas emission levels by 2040; and
- 3 (5) A level consistent with carbon neutrality by 2045, and in each year thereafter.³

4 **Q WHAT IS THE COMMISSION’S RESPONSIBILITY TO SUPPORT THE**
5 **DISTRICT’S CLIMATE GOALS?**

6 **A** In regulating WGL, the Commission is legally mandated to consider “the District’s public
7 climate commitments,” as well as its decisions’ “effects on global climate change.”⁴ Ten
8 Councilmembers previously cited this obligation in a letter to this Commission, stating
9 that “PROJECTpipes does not align with the new, fossil-free future that the Council has
10 charted.”⁵ This letter also warned about the high costs that will be imposed on ratepayers—
11 particularly low-income ratepayers— who are unable to transition off the gas system, and
12 are left with paying an ever-growing share of WGL’s costs as other customers electrify.⁶ I
13 expand upon these points in greater detail later in my testimony. Finally, in his recent
14 concurrences in Formal Cases Nos. 1154 and 1175, Commissioner Beverly pointed to the
15 inconsistency between the PROJECTpipes 3 Application and the District’s climate laws.⁷

16 **A** The Commission clearly articulated this responsibility in Order No. 22003: “Because of
17 the District’s climate commitments, the Commission is responsible for ensuring that the
18 utilities that we regulate adopt programs to assist the District in reaching its climate goal
19 of 85% greenhouse gas emission reductions by 2040 relative to 2006 and carbon neutrality
20 by 2045.”⁸

³ D.C. Code § 8-151.09d (2022).

⁴ D.C. Law 22-257, The Clean Energy DC Omnibus Amendment Act of 2018 (effective Mar. 22, 2019), <https://code.dccouncil.gov/us/dc/council/laws/22-257>.

⁵ *Councilmember Allen Letter on ProjectPipes to PSC* (Feb. 7, 2024), https://www.charlesallenward6.com/councilmember_allen_letter_projectpipes_psc.

⁶ *Id.*

⁷ *Formal Case Nos. 1154 & 1175, Partial Concurrence of Commissioner Beverly to Order Nos. 22003 & 22004* at 4 (June 12, 2024).

⁸ Order No. 22003 at 6.

1 **Q HOW DOES WGL ADDRESS THE DISTRICT’S CLIMATE GOALS IN ITS**
2 **DISTRICT SAFE PLAN?**

3 **A** The Company’s core argument—in response to the Commission’s directive to support the
4 District’s climate goals—is that by identifying and replacing the most leak-prone and
5 riskiest pipes, it will by default address those areas of the system with the highest GHG
6 emissions.⁹ Witness Hardwick notes that the accelerated pipeline replacement through
7 District SAFE would “reduce the Company’s annual direct Scope 1 fugitive emissions
8 from distribution mains and services from the current approximately 66,300 to
9 approximately 5,300 metric tons of carbon dioxide equivalent, representing approximately
10 92% reduction in fugitive emissions attributed to the distribution mains and services.¹⁰ In
11 the Company’s estimation, this co-benefit of delivering safe and reliable gas service also
12 “aligns [its] GHG reductions with the targets adopted in the Climate Commitment Act of
13 2022,” as ordered by the Commission.”¹¹

14 **Q IS THE COMPANY TAKING THE NECESSARY STEPS TO ASSIST THE**
15 **DISTRICT IN REACHING ITS CLIMATE GOAL OF 85% GHG EMISSION**
16 **REDUCTIONS BY 2040, RELATIVE TO 2006, AND CARBON NEUTRALITY BY 2045?**

17 **A** WGL’s methane leakage reduction efforts fall well short of what is needed to support the
18 District’s GHG commitments. There is no question that reducing the leakage of methane
19 gas from the Company’s distribution system is an important near-term climate strategy.
20 However, the Company fails to act on the broader imperative to modernize our energy
21 system, including facilitating a managed transition away from fossil-gas combustion
22 towards the electrification of heating and cooking in buildings. To contextualize the
23 Company’s proposed efforts, we can turn to DOEE’s 2006-2021 Greenhouse Gas
24 Inventory. According to the inventory, “Fugitive Emissions & Upstream Impacts of
25 Activities” from the Company’s distribution system totaled 90,137 metric tons of carbon

⁹ Hardwick, Dodge, Thurston-Seignious, *Washington Gas Light Company’s Revised Application For Approval Of The District Strategic Accelerated Facility Enhancement Plan* at 14 (Sept. 2024).

¹⁰ *Id.* at 13.

¹¹ *Id.*

1 dioxide equivalent (“MT CO₂e”) in 2021.¹² In that same year, the end-use combustion of
2 methane gas in residential and nonresidential buildings in the District resulted in
3 1,434,345 MT CO₂E. Even if WGL eliminated the vast majority of leaks from its
4 distribution system, it would be leaving over 90% of the available system emission
5 reductions unaddressed. Addressing less than 10% of the problem is not an adequate
6 solution, considering the District’s ambitious 2045 carbon neutrality goal.

7 **A** WGL’s District SAFE Plan calls into question electrification as a climate strategy,
8 asserting that “carbon neutral is not synonymous with electrification. Natural gas
9 consumption in the District in the Buildings and Energy sector continues to account for
10 much lower total GHG emissions and lower combustion-related emissions per energy unit
11 profile than electricity’s associated emissions in the same sector.”¹³ The Company’s
12 reasoning does not account for the fact that the GHG emissions associated with electricity
13 use in residential and non-residential buildings across the District have dropped nearly
14 50% between 2006 and 2021 and will continue to drop as zero-carbon sources of
15 renewable energy proliferate across the region.¹⁴ WGL’s analysis also fails to analyze
16 future GHG emission factors for each energy source—a significant omission considering
17 WGL will seek to recover the costs of new pipelines through customer bills for nearly 50
18 years. Our analysis, outlined in more detail in Section IV of Mr. Lyman’s testimony,
19 explores future emissions projections for the electric and gas systems and finds that a
20 managed transition to electrification is the lowest-emission and lowest-cost pathway for
21 the District. Depending on which assumptions are used, Mr. Lyman’s analysis finds that
22 the carbon intensity of electricity will be lower than that of piped gas starting somewhere
23 between 2028 and 2033. What’s more, the District has thoroughly evaluated and clearly
24 identified electrification as the core strategy to reduce GHGs across the built environment,
25 given its cost-effectiveness and scalability compared to other technologies. For example,

¹² Department of Energy & Environment, *Greenhouse Gas Inventories* (2021),
<https://doee.dc.gov/service/greenhouse-gas-inventories>.

¹³ *Formal Case No. 1179, In the Matter of the Investigation Into Washington Gas Light Company’s Strategically Targeted Pipe Replacement Plan*, Washington Gas Light Company’s Revised Application For Approval Of The District Strategic Accelerated Facility Enhancement Plan, filed Sept. 27, 2024 (“District SAFE Plan”), WG(A)-1 at 31.

¹⁴ Department of Energy & Environment, *Greenhouse Gas Inventories* (2021),
<https://doee.dc.gov/service/greenhouse-gas-inventories>.

1 the Clean Energy DC and Carbon Free DC plans call for a significant shift away from
2 natural gas combustion and a steady move towards the electrification of heating and
3 cooking in buildings.¹⁵ In line with these strategies, the District also recently passed the
4 Clean Energy DC Building Code Act of 2022, establishing net-zero standards for the
5 majority of new buildings and major renovations after 2026 and prohibiting on-site fuel
6 combustion.¹⁶

7 **Q DOES THE DISTRICT SAFE PLAN ADDRESS ANY ACTIONS TO REDUCE**
8 **GREENHOUSE GASSES BEYOND METHANE LEAKAGE REDUCTION?**

9 **A** WGL’s Revised Application for the District SAFE Plan briefly alludes to new pipeline
10 investments enabling an “affordable, equitable, and resilient transition to alternative
11 energy carrier fuels such as hydrogen.”¹⁷ The significant technological, cost, and
12 scalability concerns associated with alternative fuels such as hydrogen and renewable
13 natural gas are well documented and should not be used to justify risky investments in the
14 gas distribution system.¹⁸ Additionally, hydrogen fuel leaks from pipelines at a rate three
15 times higher than that of methane, creating even greater climate risks, and threatens public
16 safety due to its flammability in air ranging between 4% to 74% hydrogen by volume,
17 compared to methane’s flammability range of 5% to 15%.¹⁹ In other words, hydrogen can
18 more easily catch fire in enclosed spaces because it burns in air over a much wider range
19 of concentrations than methane.

¹⁵ Formal Case No. 1175, *In the Matter of the Washington Gas Light Company’s Application for Approval of PROJECTpipes III Plan*, Comments of the District Department of Transportation, Exhibit 2 (May 2, 2023).

¹⁶ D.C. Code § 6-1453.01 (2022).

¹⁷ District SAFE Plan, Exhibit WG (A)-1 at 37.

¹⁸ Rewiring America, S. Pantano, et al., *Electrification Study for the District of Columbia*, at 49-55, <https://content.rewiringamerica.org/reports/dc-electrification-report-final.pdf>; see also Formal Case No. 1142, *In the Matter of the Merger of AltaGas, Ltd. And Washington Gas Holdings, Inc.*, Comments by the Department of Energy and Environment on behalf of the District of Columbia Government Concerning AltaGas Ltd.’s Climate Business Plan (June 26, 2020), <https://edocket.dcpssc.org/apis/api/filing/download?attachId=105393&guidFileName=9bdbe1aa-b3f8-4282-8dbe-e5f994464caa.pdf>; see also Formal Case No. 1167, *In the Matter of the Implementation of the Climate Business Plan*, Written Comments from RMI (May 10, 2022), <https://edocket.dcpssc.org/apis/api/filing/download?attachId=168889&guidFileName=b298312c-dd9a-4fc3-bd98-bbe33b14829a.pdf>.

¹⁹ Hy4Heat, *Work Package 7 - Safety Assessment: Conclusions Report (Incorporating Quantitative Risk Assessment)*, <https://static1.squarespace.com/static/5b8eae345cfd799896a803f4/t/60e399b094b0d322fb0dad4/1625528759977/conclusions+inc+ORA.pdf>.

1 **A** Public utility commissions across the country are calling into question investments in
2 these speculative technologies given the myriad risks. Earlier this year, the Colorado PUC
3 finalized a Clean Heat Plan for Xcel Energy, including a \$440 million approved budget
4 designed to reduce GHG emissions stemming from the gas utility’s distribution system.
5 Approximately 98% of the total budget was dedicated to consumer-facing rebates to
6 encourage electrification, while the Commission rejected any spending on hydrogen
7 blending, citing concerns about system compatibility, infrastructure costs, and emission
8 reduction potential.²⁰ The Colorado PUC authorized the remaining ~2% of the total
9 budget to be spent on renewable natural gas (“RNG”), flagging numerous limitations
10 about the technology, including concerns that the proceeding’s record did not establish
11 that RNG was a cost-effective emissions reduction tool relative to electrification or
12 efficiency.²¹ In Massachusetts, the Department of Public Utilities’ Order 20-80 declined
13 the gas distribution companies’ recommendations to modify the existing gas supply
14 procurement policy to allow for RNG, citing concerns over cost, limited availability, and
15 the uncertain classification of RNG as a zero-emission fuel.²² Order 20-80 also determined
16 that while hydrogen may be useful in decarbonizing certain hard-to-electrify sectors of the
17 economy, such as the industrial sector, it is unlikely to become a primary fuel source for
18 residential heating due to unresolved issues, including its flammability and higher leakage
19 rate.²³

20 **Q** **WHAT OTHER PROPOSALS DOES THE COMPANY MAKE TO SUPPORT**
21 **THE DISTRICT’S CLIMATE GOALS?**

²⁰ *Pub. Util. Comm’n of the State of Colorado, Proceeding No. 23A-0392EG*, Commission Decision Granting Application With Modifications, Requiring Filings, And Issuing Certain Directives To Guide Next Clean Heat Plan Filing, Decision No. C24-0397 at 51 (June 2024).

²¹ *Pub. Util. Comm’n of the State of Colorado, Proceeding No. 23A-0392EG*, Commission Decision Granting Application with Modifications, Requiring Filings, and Issuing Certain Directives to Guide Next Clean Heat Plan Filing, Decision No. C24-0397 at 46-49 (June 2024).

²² Massachusetts D.P.U. 20-80, *The Role of Gas Distribution Companies in Achieving the Commonwealth’s Climate Goals*, at 25, (Mar. 2022), <https://thefutureofgas.com/content/downloads/2022-03-21/3.18.22%20-%20Independent%20Consultant%20Report%20-%20Regulatory%20Designs.pdf>.

²³ *Massachusetts Dep’t of Pub. Utils. Docket No. 20-80-B, Investigation by the Department of Public Utilities on its own Motion into the role of gas local distribution companies as the Commonwealth achieves its target 2050 climate goals*, Order on Regulatory Principles and Framework at 1-2 (Dec. 6, 2023).

1 **A** The Company mentions the potential for “gradual transitions to networked geothermal in
2 areas further assessed as simultaneously prime for main and service retirement and
3 geothermal deployment.”²⁴ Thermal Energy Networks (“TENs”), including district
4 electrification and geothermal networks, can provide highly efficient, clean, and
5 affordable heating and cooling to many different types of buildings and entire
6 neighborhoods. These systems also present opportunities to reduce harmful pollution and
7 GHGs while promoting high-road labor opportunities, reducing peak demand on the
8 electric grid, and growing seasonal storage capacity for electric end-uses across the built
9 environment.²⁵ We support the Company’s interest in further assessing TENs as a strategy
10 to support the District’s climate goals and facilitate a managed transition from the gas
11 distribution system.

12 **Q** **WHAT STRANDED ASSET RISKS DOES THE COMPANY FACE?**

13 **A** The Company contends that “the Commission should not now, after two previously
14 approved accelerated cost recovery plans for replacing the high-risk, aged infrastructure,
15 and with many miles still left to go in the District, suddenly change the manner through
16 which the Company achieves this critical safety objective.”²⁶ Proceeding with a business-
17 as-usual approach to the pipe replacement program, as WGL suggests, without due
18 consideration to the very real changes in consumer preference, technology, and public
19 policy in the District, will only exacerbate stranded asset risks already facing the
20 Company and its ratepayers.

21 WGL’s stranded asset risk is rooted in the market shift towards electrification, which
22 offers numerous benefits for District residents in the form of improved comfort, health,
23 and bill savings. According to Rewiring America’s modeled savings and energy estimates
24 using ResStock, National Renewable Energy Laboratory (“NREL”)’s publicly available
25 residential building model, a household in the District would save \$422 a year on average

²⁴ District SAFE Plan, Exhibit WG(A)-1 at 37.

²⁵ Building Decarbonization Coalition, *Thermal Energy Networks (TENs)*, <https://buildingdecarb.org/resource-library/tens>.

²⁶ District SAFE Plan at 2.

1 by upgrading to a medium efficiency air source heat pump (“ASHP”).²⁷ The compounding
2 impacts of technological advancement, shifting consumer preferences, and government
3 incentives, such as rebates and tax credits, have all contributed to heat pumps outselling
4 gas furnaces across the U.S. in 2022 and 2023. Last year, manufacturers shipped over 3.6
5 million heat pumps in the US, surpassing 3 million gas furnaces sold.²⁸ From 2013 to
6 2021, ASHP sales in the Northeast increased from just under 50,000 units to over 225,000
7 units on an annual basis.²⁹ Specifically in DC, the share of homes heating with electricity
8 has consistently increased since 2010. In 2010, the share of household heating fuel in DC
9 was roughly two-thirds gas to one-third electricity. Today, the share of households heating
10 with gas and electricity is nearly equal: gas heats 50% of households, electricity heats
11 45%, and other fuels heat 5%.³⁰

12 WGL would not be the only gas utility responding to the risk of stranded assets based on
13 market shifts toward building electrification. Vermont Gas Systems (“VGS”), a gas
14 distribution utility in Northwest Vermont, is already positioning itself as a thermal
15 solutions utility to expand its customer base, making heat pumps and hot water heat
16 pumps easier to afford. The latest VGS Integrated Resource Plan reflects this change.³¹
17 Previously, VGS’s long-term planning process under 30 V.S.A. § 218c was focused on
18 how VGS would respond to the then-growing demand for natural gas service, including
19 the safety protocols and infrastructure investments needed to serve the increasing energy
20 demands of Vermont customers. As regulations and policy priorities have shifted toward

²⁷ The simulated medium efficiency air-source heat pump has performance characteristics similar to a centrally-ducted heat pump with Seasonal Energy Efficiency Ratio (“SEER”) 18, 10 Heating Seasonal Performance Factor (“HSPF”), or a ductless mini split heat pump with SEER 18, 10.5 HSPF, depending on whether the building has existing ductwork. The modeled air-source heat pump uses electric resistance backup, is sized using the Home Energy Rating System (“HERS”) methodology, and does not have a setpoint setback. The performance of the heat pump was selected to be similar to heat pumps that would qualify for the Inflation Reduction Act’s home energy tax credits in the District.

²⁸ AHRI, *AHRI Releases December 2023 U.S. Heating and Cooling Equipment Shipment Data* (Feb. 2024), <https://www.ahrinet.org/system/files/2024-02/December%202023%20Statistical%20Release.pdf>.

²⁹ D. Seavey, *Leaked & Combusted: Strategies for reducing the hidden costs of methane emissions & transitioning off gas* [hereinafter “Seavey Report”], (May 2024), https://assets-global.website-files.com/649aeb5aaa8188e00cea66bb/663a27270c0fa4fffcfe447d_Leaked-and-Combusted-May-2024.pdf.

³⁰ This is based on 5-year estimates in “Table B25040: House Heating Fuel” from 2010 to 2022. See <https://data.census.gov/table/ACSDT5Y2021.B25040?q=B25040:%20House%20Heating%20Fuel&g=040XX00US11>.

³¹ Vermont Gas Systems, Inc., *Integrated Resource Plan* (Jan. 2024), <https://vgsvt.com/wp-content/uploads/2024/02/VGS-2024-Integrated-Resource-Plan.pdf>.

1 reducing GHG emissions at an accelerating pace, VGS’s long-term planning process has
2 also evolved from one rooted in customer-growth forecasts to one that is focused on
3 carbon reduction pathways. Other U.S. utilities advancing NPA projects include National
4 Grid and Con Edison. National Grid published its “Clean Energy Vision” plan for net-zero
5 emissions by 2050, which outlines its intent to invest in numerous NPAs, including
6 targeted electrification, network geothermal, and residential hybrid heating systems.³²
7 National Grid has already begun acting on this plan in Massachusetts, where it has
8 developed a pilot program for networked geothermal heating and cooling for a
9 neighborhood of 129 rental units.³³ Con Edison currently operates two NPA programs, the
10 “Electric Advantage Program” and the “Area Load Relief” program. The Electric
11 Advantage Program seeks to strategically convert customer appliances to fully electrify
12 homes and to avoid leak-prone gas main pipe replacements.³⁴

13 The consumer transition to electrification is gaining momentum irrespective of climate
14 policies, but those policies are acting as accelerators at the District and federal levels. In
15 2022, the District passed the Clean Energy DC Building Code Act, which, as discussed
16 above, requires all-electric new construction and substantial renovations for all residential
17 buildings less than four stories high beginning in 2026.³⁵ This policy change was informed
18 by the Building Electrification Institute’s findings that:

19 All-electric multifamily new construction is lower cost to build than new mixed
20 fuel multifamily buildings that are built to the 2020 Energy Code; Building
21 electrification significantly reduces energy use in existing multifamily, existing
22 single family, and new multifamily buildings in Washington, DC; Building
23 electrification will also typically reduce residents’ energy bills, provided that high-
24 efficiency equipment is installed, and targeting all-new construction for all-electric

³² National Grid, *Our Clean Energy Vision* (Apr. 2022), <https://www.nationalgrid.com/us/fossilfree>.

³³ C. Milligan., *Mayor Michelle Wu Announces Agreement Between Boston Housing Authority and National Grid to Develop Networked Geothermal Heating at Franklin Field Apartments* (Jan. 2024), <https://www.nationalgridus.com/News/2024/01/Mayor-Michelle-Wu-Announces-Agreement-Between-Boston-Housing-Authority-and-National-Grid-to-Develop-Networked-Geothermal-Heating-at-Franklin-Field-Apartments/>.

³⁴ RMI, Lalakea Alter, A., et al., *Non-Pipeline Alternatives: Emerging Opportunities in Planning for U.S. Gas System Decarbonization* (May 2024).

³⁵ D.C. Law 24-177, Clean Energy DC Building Code Amendment Act of 2022 (effective Sept. 21, 2022), <https://code.dccouncil.gov/us/dc/council/laws/24-177>.

1 equipment is more cost-effective than replacing gas equipment with all-electric
2 retrofits in existing buildings.³⁶

3 At the federal level, the Inflation Reduction Act (“IRA”) authorized federal income tax
4 credits that provide savings of up to \$3,200 per year for energy-efficient home upgrades,
5 and these are currently available through 2032. The U.S. Department of the Treasury’s
6 2023 data on IRA tax credit uptake reveals that 3.4 million Americans took advantage of
7 the credits, receiving a total of \$839,871,000.³⁷ The uptake of tax credits was more than
8 double the federal government’s early projections. In the District, households received
9 \$9,535,000 in federal tax credits for home electrification and renewable energy upgrades,
10 a trend that could increase on an annual basis for the next eight years. Additionally, on
11 November 1st, 2024, the District launched its Home Efficiency Rebates and Home
12 Electrification and Appliance Rebates programs, expanding upon the District’s
13 Affordable Housing Retrofit Accelerator and Affordable Home Electrification Program
14 and bringing greater electrification incentives to low-income households, with a total
15 allocation of \$59,384,096 in federal funds.

16 The above factors are disrupting business-as-usual investments in the gas distribution
17 system. As economics, consumer preferences, and public policy reduce customer demand
18 for methane gas—and thereby reduce WGL’s per-customer usage and overall customer
19 base—system delivery costs will be spread across fewer ratepayers. We are already
20 observing the impact of this dynamic in states like California, where Pacific Gas and
21 Electric is raising rates because a decrease in demand for methane gas is requiring the
22 company to spread basic costs, such as transmission and storage, among fewer
23 customers.³⁸ The negatively-reinforcing cycle of declining throughput and increasing rates
24 could in turn lead to downward revisions of the economic lifespan, capacity utilization,

³⁶ Building Electrification Institute, *Washington, D.C. Customer Economics Analysis for Building Electrification* (Dec. 2020),
https://static1.squarespace.com/static/5b6a482db27e39e8fcf65bbf/t/6298044502087000c9537c03/1654129734671/B/El-DC+Customer+Economics+Analysis_Dec+2020_FINAL.pdf.

³⁷ Internal Revenue Service, *SOI tax stats - Clean energy tax credit statistics - Table 3. Form 5695 Residential Energy Credits, by State, Tax Year 2023 (through Filing Season 2024 Cycle 21, May 23, 2024)*,
<https://www.irs.gov/statistics/soi-tax-stats-clean-energy-tax-credit-statistics>.

³⁸ J. Johnson, “Another PG&E rate hike is in the works for Californians,” *SAN FRANCISCO CHRONICLE* (Sept. 2024),
<https://www.sfchronicle.com/california/article/pge-rate-hike-electricity-gas-19742334.php>.

1 and/or profitability of gas infrastructure, and raise the risk of unrecoverable gas
2 investment costs, such as undepreciated balances.³⁹

3 WGL's stranded asset risks are exacerbated by the fact that the Company's pipeline
4 replacement program is very expensive, even compared to other U.S. cities with old
5 building stocks. According to WGL, the only region where pipe replacement is more
6 expensive than in D.C. is Manhattan.⁴⁰ Looking at WGL's project list submitted prior to
7 the Commission's Order No. 22003, WGL projected an average cost of \$9.5 million per
8 mile for replacement projects that targeted distribution mains, which is higher than the
9 historic rate of \$7.9 million WGL references in the District SAFE proposal. Program costs
10 for 2025, 2026, and 2027 are \$50M, \$75M, and \$90M, respectively, while the number of
11 main miles replaced are 2.2, 2.5, and 7.7 miles, respectively. It remains to be seen what
12 the cost will be for main replacement versus service line replacement, but assuming a rate
13 of \$9.5 million per mile⁴¹ would mean nearly half of the 2025 budget would be dedicated
14 to replacing 2.2 miles of main.⁴²

15 **Q DO DECLINING THROUGHPUT AND STRANDED ASSETS RISKS HAVE**
16 **DISPROPORTIONATE IMPACTS ON PARTICULAR COMMUNITIES?**

17 **A** Yes, for low-income and disadvantaged communities across the District, an unmanaged
18 gas transition poses acute risks that must be directly addressed to avoid perpetuating
19 existing inequities. Without centering these households in the transition to electrification
20 and clean energy, we risk repeating historical patterns where marginalized communities
21 are facing the worst effects of climate change, are the last to benefit from technological
22 advancements, and will bear the brunt of the costs of transitioning away from our fossil
23 fuel economy.

³⁹ Seavey Report, *supra* note 29.

⁴⁰ District SAFE Plan, Exhibit WG(A)-1 at 21.

⁴¹ This estimate of \$9.5 million/mile is based upon the project list included in PIPES 3, and was calculated by dividing the sum of project costs that include main replacement by the number of miles replaced in those projects.

⁴² District SAFE Plan, Exhibit WG(A)-1 at 30-31.

1 Specifically, these communities tend to face disproportionately high energy costs, live in
2 areas with higher pollution levels, and endure other social-environmental harms, including
3 unaffordable housing, underemployment, and inadequate healthcare access. For
4 underserved and overburdened communities, the potential gains from electrification are
5 enormous—lower energy bills, reduced exposure to harmful pollutants, and a pathway to
6 improved living conditions. However, because these communities often face greater
7 barriers to electrification, they are more likely to be negatively impacted by rising bills to
8 fund the status quo maintenance of gas infrastructure, while more privileged customers
9 depart the system or dramatically reduce their gas consumption. Without proper
10 prioritization, support, and meaningful engagement, these communities face the greatest
11 exposure to the risks inherent in an unmanaged transition away from the gas system.

12 In Section IV of my testimony, I outline specific opportunities to ensure low-income and
13 disadvantaged communities across the District are meaningfully integrated into the clean
14 energy transition as a part of the Company’s proposed Customer Choice Pilot Program.

15 **Q DOES WGL’S DISTRICT SAFE PLAN MINIMIZE THE RISKS OF STRANDED**
16 **ASSETS?**

17 **A** No, the District SAFE Plan takes only minimal steps, if any, to respond to the
18 Commission’s clear direction for WGL to “minimize stranded assets as the Company
19 continues to feel the impacts of the energy transition underway.”⁴³ In fact, WGL’s
20 updated filing goes so far as to state that the Company is not “aware of any data on its
21 system that indicates there is a threat posed by stranded assets.”⁴⁴

22 WGL cites the Customer Choice Pilot Program as an attempt to balance the Company's
23 need to ensure that its facilities are safe with the “Commission’s concerns regarding
24 stranded assets.”⁴⁵ The Customer Choice Pilot Program proposal initiates an important
25 conversation about updating status quo planning and investment processes to better
26 respond to the increasing risk of stranded assets. As proposed, however, the program

⁴³ Order No. 22003 at 17.

⁴⁴ District SAFE Plan, Exhibit WG(A)-1 at 11.

⁴⁵ *Id.* at 9.

1 contains notable scope and process deficiencies that perpetuate the financial, climate, and
2 consumer protection risks of an unmanaged gas transition. I discuss these points and
3 associated recommendations in greater detail in Section IV of my testimony.

4 **III. Rewiring America's Pipe Segment Analysis For WGL's Service Territory Details the**
5 **Consumer Protection, Climate, and Company Asset Risks of an Unmanaged Gas System**
6 **Transition.**

7 **Q CAN YOU SUMMARIZE REWIRING AMERICA'S PIPE SEGMENT**
8 **ANALYSIS?**

9 **A** Rewiring America's Pipe Segment Analysis, conducted in collaboration with Mr. Lyman,
10 compares the impacts of strategic decommissioning of two isolated segments of
11 distribution main pipeline in WGL's territory, paired with three electrification scenarios,
12 to WGL's planned replacement of the pipe segments. The study analyzes the impacts on
13 overall capital costs, customer bills, and GHG emissions that result from each scenario.
14 The intent of the study is to provide a real-world example of the wide array of benefits that
15 would result from the strategic decommissioning of pipeline segments in WGL's territory.

16 **Q CAN YOU EXPLAIN THE THREE SCENARIOS FOR PIPELINE SEGMENTS**
17 **THAT WERE MODELED AND OUTLINED IN MR. LYMAN'S TESTIMONY?**

18 **A** Mr. Lyman's testimony focuses on two identified pipeline segments within WGL's
19 service territory that are set to be replaced by 2030. These pipe segments, Segment One
20 and Segment Two, are isolated segments that supply gas to various District housing types.
21 The Pipe Segment Analysis evaluates the impacts of three distinct scenarios: an
22 Unmanaged Business as Usual Electrification scenario, an Unmanaged Full Electrification
23 scenario, and a Managed Electrification scenario. The Unmanaged Business as Usual
24 Electrification scenario assumes that the pipe segment is replaced in 2030, a portion of
25 households on the pipe segment fully convert to electric appliances, and the remaining
26 homes that receive gas off of the pipe segment continue to utilize gas services at their
27 current usage rates. The Unmanaged Full Electrification scenario models an unmanaged

1 energy transition approach where all homes electrify at the end-of-life of existing
2 appliances. Under the Unmanaged Full Electrification scenario, the pipe segment is
3 replaced in 2030 and all homes on the pipe segment are electrified by 2050. The Managed
4 Electrification scenario models the effects of a fully managed electrification transition that
5 allows for the decommissioning of the pipe segment in 2030. Under the Managed
6 Electrification scenario, all homes served by the pipe segment transition to fully electric
7 appliances, either at the end of their appliances' useful lives or when the gas pipe is
8 decommissioned, whichever comes earlier.

9 **Q WHAT WERE THE PROJECT COST ESTIMATES FOR THE UNMANAGED**
10 **BUSINESS AS USUAL SCENARIO MODELED IN MR. LYMAN'S TESTIMONY?**

11 **A** Project cost estimates come from WGL's annual project list, submitted in conjunction
12 with its PROJECTpipes III proposal. Segment One and Segment Two have estimated
13 replacement project costs of \$1,063,877 and \$2,244,289, respectively, as reported by
14 WGL.⁴⁶ Additionally, net customer investments in new appliances for their homes
15 (estimated using a 30-year average appliance lifetime and net value of incentives) under
16 this scenario were estimated to be \$384,864 for Segment One and \$977,000 for Segment
17 Two.

18 **Q HOW DO THE CAPITAL COST ESTIMATES FOR EACH OF THE**
19 **ELECTRIFICATION SCENARIOS OUTLINED IN MR. LYMAN'S TESTIMONY**
20 **COMPARE TO THE CONTINUED GAS SCENARIO CAPITAL COSTS FOR SEGMENT**
21 **ONE AND SEGMENT TWO?**

22 **A** The combined electric system, gas pipeline decommissioning, and residential appliance
23 upgrade costs associated with the Managed Electrification scenario is significantly less
24 than the equivalent costs in either the Unmanaged Business as Usual Electrification
25 scenario or the Unmanaged Full Electrification scenario. The Managed Electrification
26 scenario results in \$80,000 in electric network upgrade costs and \$20,000 in natural gas

⁴⁶ *Formal Case No. 1175, Washington Gas Light Company's Application for Approval of PROJECTpipes 3 Plan, Washington Gas's Final Annual Project List, filed Oct. 31, 2024.*

1 decommissioning costs for Segment One, and \$180,000 in electric upgrade costs and
2 \$20,000 in gas decommissioning costs for Segment Two. Customer investments in new
3 electric appliances, minus the value of available local and federal electric appliance
4 incentives, total \$496,800 for Segment One and \$1,083,200 for Segment Two.

5 **A** The capital cost of the Unmanaged Full Electrification scenario is the highest of the three
6 scenarios. The Unmanaged Full Electrification scenario results in \$80,000 in electric
7 network upgrade costs in addition to the WGL replacement project costs for Segment One,
8 and \$180,000 in electric network upgrade costs in addition to the WGL replacement
9 project costs for Segment Two. Customer investments in new electric appliances, minus
10 the value of available local and federal electric appliance incentives, total \$522,800 for
11 Segment One and \$1,159,200 for Segment Two. By 2050, all households served by these
12 pipe segments are fully electrified and the residual, undepreciated value of the pipe
13 segments is effectively stranded. This equates to unrecovered book value of nearly
14 \$800,000 for Segment One and over \$1.5 million for Segment Two.

15 **A** The capital cost of the Unmanaged Business as Usual Electrification scenario is slightly
16 lower than the Unmanaged Full Electrification scenario, but still over twice as high as the
17 Managed Electrification Scenario. The Unmanaged Business as Usual Electrification
18 scenario avoids electric network costs, but includes the full WGL replacement project
19 costs for Segment One and Segment Two. Customer investments in new appliances,
20 minus the value of available local and federal electric appliance incentives, total \$384,864
21 for Segment One and \$977,000 for Segment Two. This increased capital cost emphasizes
22 the financial risks associated with a lack of coordination between gas system investments
23 and observable household electrification trends across the District.

24 **Q HOW WOULD ELECTRIFICATION OF HOMES ON SEGMENT ONE AND**
25 **SEGMENT TWO IMPACT CUSTOMER BILLS?**

26 **A** According to Mr. Lyman's analysis, customers on Segment One who choose to electrify
27 their home appliances would save an average of \$1,284 on their energy bills each year,
28 while customers on Segment Two would save an average of \$775 on their annual energy

1 bills. This decrease in energy bills serves as further motivation for consumers on Segment
2 One and Segment Two to electrify, and underscores the importance of planning for a
3 future gas system that has less residential gas throughput than today’s gas system.

4 **Q WHAT ARE THE IMPACTS TO GREENHOUSE GAS EMISSIONS FROM EACH**
5 **SCENARIO MODELED IN MR. LYMAN’S TESTIMONY?**

6 **A** Despite WGL’s assertion that “natural gas consumption in the District in the Buildings
7 and Energy sector continues to account for much lower total GHG emissions and lower
8 combustion-related emissions per energy unit profile than electricity’s associated
9 emissions in the same sector,”⁴⁷ the analysis performed by Mr. Lyman shows that CO₂e
10 emissions resulting from the Unmanaged Business as Usual scenario will be higher than
11 emissions resulting from both the Unmanaged Full Electrification and the Managed
12 Electrification scenarios. This discrepancy is likely because the analysis that WGL cited in
13 its statement comes from the 2006-2021 DOE GHG Inventory, which only looks at the
14 GHG emissions by sector and fuel type through 2021, but fails to analyze future GHG
15 emission factors for each energy source. In order to perform an accurate analysis of
16 varying fuel types, replacement scenarios, and NPA strategies, the GHG emission data
17 that is utilized needs to be forward-looking, especially considering that newly installed gas
18 pipelines have a depreciation schedule of 48 years.⁴⁸ In his analysis, Mr. Lyman quantified
19 the future emissions reductions for each scenario using a standard EPA combustion factor
20 for natural gas emissions and the NREL Cambium marginal emission factor forecasts for
21 PJM East for electricity emissions. It is imperative for utility companies serving the
22 District, including WGL, to focus their investments in energy infrastructure solutions that
23 minimize emissions not only at the time of implementation, but also throughout the
24 lifetime of the assets. Mr. Lyman’s forward-looking analysis shows that by the year 2050,
25 the cumulative emissions on Segment One and Segment Two from a Unmanaged Business

⁴⁷ District SAFE Plan, Exhibit WG(A)-1 at 31.

⁴⁸ Wong, C, Dann, MR, & Wong, R, *Life Expectancy of Decommissioned Pipelines Under External Corrosion: Probabilistic Modeling*, Proceedings of the 2020 13th International Pipeline Conference, Vol. 1 (Sept. 28–30, 2020); District SAFE Plan, WG(F)-1, Workpaper 2.

1 as Usual scenario would be nearly double the cumulative emissions from a Managed
2 Electrification scenario.

3 **IV. Recommendations to Align WGL’s Investment and Planning with the District’s**
4 **Climate and Consumer Protection Imperatives.**

5 **Q WHAT RECOMMENDATIONS DO YOU HAVE FOR THE COMMISSION TO**
6 **BETTER ALIGN WGL’S PLANNING PROCESS WITH DISTRICT LAW?**

7 **A** My testimony has outlined why Washington Gas’s revised District SAFE Plan poses
8 significant financial risk to customers and company assets and is inconsistent with the
9 District’s climate goals. In order to protect consumers and responsibly steward ratepayer
10 dollars while supporting the District’s climate goals, the Commission should seriously
11 consider taking the following actions in ruling on WGL’s District SAFE proposal:

- 12 1. First and foremost, the Commission should require WGL to engage in long-term
13 planning that reconciles major spending on its gas system with the District’s
14 climate laws, along with changes in technology and consumer preference. The
15 Company should not be installing new gas pipelines at risk of becoming stranded
16 assets within 5-10 years. This long-term planning might end up taking place
17 through a different docket, such as Formal Case No. 1167, but it is important that
18 District SAFE projects be consistent with any Commission-approved long-term
19 plans for WGL’s gas system. WGL’s long-term planning should also be
20 coordinated with Pepco’s planning for building out its electrification system.
- 21 2. Next, the Commission should require WGL to pursue alternatives to pipeline
22 replacements, with a preference for replacing the gas system with targeted
23 beneficial electrification or geothermal (e.g. thermal energy networks) pilot
24 programs, where feasible. I expand on this recommendation in my discussion
25 below of the Company’s proposed Customer Choice Pilot Program. Gradually
26 transitioning DC neighborhoods toward cleaner energy sources is a more
27 sustainable, cost-effective means of reducing emissions in the District than

1 gradually slowing the rate of pipe replacements without creating more alternatives
2 to the gas system.

3 The Commission would not be alone in pursuing the above two recommendations. As
4 noted earlier in my testimony, electrification is the primary policy for reducing GHG
5 emissions from District buildings, which is the same conclusion the Massachusetts
6 Department of Public Utilities (“DPU”) reached in its future of gas docket, where it
7 declared that “[t]he Commonwealth’s dominant building decarbonization strategy [] is
8 electrification.”⁴⁹ In New York, the Public Service Commission passed a natural gas
9 planning law in 2022 that includes requirements for utilities to analyze the potential of
10 NPAs in each of their plan filings.⁵⁰ Furthermore, the law encourages natural gas
11 utilities to take a “neighborhood approach” to addressing leak-prone pipe segments that
12 focuses on the simultaneous removal of the pipe segment and a transition to
13 electrification. Additionally, in November 2024, Massachusetts Governor signed S.
14 2967 into law requiring the Department of Public Utilities to evaluate whether gas
15 pipeline expansion is appropriate based on the state’s climate goals, stranded asset and
16 bill impact risk, and the viability of alternatives. In June, Eversource Gas brought the
17 first networked geothermal pilot online, delivering energy to 36 buildings in
18 Framingham, MA, embracing the transition away from gas through providing efficient,
19 electric heating and cooling to households. Under the EmPOWER energy efficiency
20 program in Maryland, a state that has a very similar climate to DC, utilities are now
21 required to provide financial incentives to customers to “achieve GHG emissions
22 reductions through energy efficiency, conservation, demand response, and *beneficial*
23 *electrification*.”⁵¹ Maryland’s gas and electric utilities have proposed plans that include
24 rebates for electric appliances—especially for households transitioning from gas to
25 electric appliances—in this year’s EmPOWER filings. Maryland utilities are also
26 initiating geothermal pilot programs under Maryland’s recently enacted WARMTH

⁴⁹ *Massachusetts Dep’t of Pub. Utils. Docket No. 20-80-B* at 35.

⁵⁰ *New York Dep’t of Pub. Serv., Case 20-G-O 131, Proceeding on Motion of the Commission in Regard to Gas Planning Procedures*, Order Adopting Gas System Planning Process (May 12, 2022).

⁵¹ Md. H.B. 864 (2024).

1 Act.⁵² There is a Public Service Commission docket through which Maryland’s gas
2 utilities will provide plans this fall for pilot geothermal systems for neighborhoods—
3 prioritizing underserved or overburdened communities—within their service
4 territories.⁵³ These new policies represent strong, wide-reaching efforts to transition
5 Marylanders away from relying on the gas system, and reduce their exposure to harmful
6 emissions from gas home equipment and gas pipelines.

- 7 3. Where full NPAs are not feasible, the Commission should require WGL to develop
8 a robust procedure for considering more limited NPAs before undertaking costly
9 pipe replacements. In addition to electrification and geothermal heating, NPAs
10 include energy efficiency measures, demand response programs, advanced leak
11 detection (“ALD”) practices, on-site gas storage, and methane capture.
12 Massachusetts, a state with fewer cooling degree days and more heating degree
13 days than DC, is a compelling example of a state requiring local gas distribution
14 companies to justify pipeline-for-pipeline segment replacements. With Order 20-
15 80, the Massachusetts DPU will no longer allow cost recovery for gas
16 infrastructure without proof that non-gas alternatives were considered.
- 17 4. Next on its hierarchy of policies, the Commission should require pipeline repairs,
18 as opposed to replacements, in locations where electrification or geothermal
19 projects are infeasible and NPAs are not adequate to mitigate the risks of gas
20 leakage. Pipeline repairs are significantly lower cost for ratepayers than wholesale
21 replacements. For example, an analysis conducted by DOEE in December 2022
22 revealed that “the one-time cost of [pipeline] repairs to ratepayers” is “between
23 one-tenth and one-hundredth of the cost of pipeline replacement.”⁵⁴
- 24 5. Where none of those measures are feasible and WGL does replace pipelines, it
25 should not receive accelerated or advance approval for cost recovery related to
26 pipeline replacements but rather should be compensated on a case-by-case after

⁵² Md. H.B. 397 (2024).

⁵³ See generally *Md. Pub. Serv. Comm’n Case No. 9749, Pilot Thermal Energy Network Systems*.

⁵⁴ *Formal Case No. 1175, WGL’s Application for Approval of PROJECTpipes III Plan*, DC Dep’t of Energy & Env’t, Strategic Electrification in Washington, DC: Neighborhood Case Studies of Transition from Gas to Electric-based Building Heating at 6 (Dec. 14, 2022) (emphases added).

1 showing, subject to Commission approval, that repairs or other NPAs were not
2 feasible in areas that it replaces. In providing its explanations and justifications for
3 replacing certain segments of pipes, WGL should also be required to provide
4 infrastructure spending assessments to include benefit/cost ratios of the pipeline
5 replacements, bill impacts resulting from these replacements, and lifecycle
6 emissions analyses for the new pipes that are being installed.

7 6. Additionally, the Commission should consider developing financial incentives to
8 promote NPAs and/or disincentivize pipeline replacements. For example, the
9 Commission can approve a performance incentive mechanism (“PIM”) through
10 which WGL would financially benefit from engaging in alternatives to pipeline
11 replacements, such as NPAs and repairs, and generally taking actions that align
12 with the District’s climate laws. The Commission could also enable WGL to alter
13 its securitization practices so that it can recover the costs of its existing pipelines
14 over a shorter period of time and does not have an incentive to leave ratepayers on
15 the hook for financing stranded assets over a longer time period. A direction from
16 the Massachusetts DPU is instructive, and could be repurposed in the District:
17 “[T]he Department directs all [gas local distribution companies] to conduct a
18 comprehensive review that includes a forecast of the potential magnitude of
19 stranded investments, and to identify the impacts of accelerated depreciation
20 proposals, as well as potential alternatives to accelerated depreciation.”⁵⁵
21 Requiring WGL to provide this information would be informative for both the
22 Commission and intervenors in developing policies to reduce the financial burden
23 borne by ratepayers and WGL alike as the District takes steps to comply with its
24 climate laws.

25 7. Finally, the Commission should require WGL to disclose the content of its
26 advertisements and community and customer outreach materials, as well as its
27 lobbying promoting gas or expansion of the gas system. This would improve
28 public transparency regarding WGL’s promotion of pipeline replacements. Such a
29 directive would be consistent with the Massachusetts DPU’s Order 20-80, which

⁵⁵ *Massachusetts Dep’t of Pub. Utils. Docket No. 20-80-B* at 2.

1 prohibits cost recovery for any utility promotion efforts “geared toward the
2 promotion or expansion of gas service.”⁵⁶ It would also be consistent with the DC
3 Superior Court’s recognition that this Commission has regulatory oversight over
4 WGL’s marketing materials and communications to its customers.⁵⁷

5 **Q DO YOU HAVE ANY MORE RECOMMENDATIONS FOR THE COMMISSION?**

6 **A** Yes, before concluding my testimony, I have feedback and recommendations for the
7 Company’s proposed Customer Choice Pilot Program that WGL proposed in its District
8 SAFE Plan.

9 **Q CAN YOU BRIEFLY SUMMARIZE THE CUSTOMER CHOICE PILOT**
10 **PROGRAM?**

11 **A** The Company’s proposed Customer Choice Pilot Program would establish a notification
12 and opt-out process for customers desiring to cease services from Washington Gas. The
13 program’s objective is to “identify customers served from vintage facilities that no longer
14 wish to receive gas service, so that the Company can avoid installing facilities that are not
15 needed to serve customers.”⁵⁸

16 Under the Customer Choice Pilot Program, the Company would provide advance notice to
17 customers who are impacted by planned service line replacements. If an impacted, eligible
18 customer indicates that they have converted their home—or plan to convert their home—
19 to an alternative fuel source, the Company will terminate and abandon the service instead
20 of proceeding with the pipe replacement. According to WGL, “the Customer Choice Pilot
21 Program attempts to balance the Company’s need to ensure that its facilities are safe, with
22 the Commission’s concern regarding stranded assets.”⁵⁹

⁵⁶ *Id.* at 56.

⁵⁷ *Client Earth v. Washington Gas Light Company*, Case No. 2022 CA 003323 B (D.C. Super. Ct. Aug. 31, 2023), https://climatecasechart.com/wp-content/uploads/case-documents/2023/20230831_docket-2022-CA-003323_order.pdf.

⁵⁸ District SAFE Plan, Exhibit WG(A)-1 at 37.

⁵⁹ *Id.* at 9.

1 **Q WHAT FEEDBACK DO YOU HAVE ON THE CUSTOMER CHOICE PILOT**
2 **PROGRAM?**

3 **A** The Company’s proposed Customer Choice Pilot Program opens the door to an important
4 conversation about updating status quo planning and investment processes to better
5 respond to the changing policy, technological, and economic factors leading to declining
6 gas throughput and the elevated risk of stranded assets in the District. I agree there is a
7 need to “provide the Commission and all parties with better data regarding customer
8 behavior, and to address the Commission’s concerns regarding potential customer
9 migration and stranded assets.”⁶⁰

10 As proposed, however, the Customer Choice Pilot Program contains notable scope and
11 process deficiencies. At its core, the Customer Choice Pilot Program perpetuates the
12 financial, climate, and consumer protection risks of an unmanaged gas transition. If
13 electrification continues to occur in an uncoordinated and scattershot manner, as
14 contemplated by the Customer Choice Pilot Program, WGL will likely increase
15 investment in the gas system while throughput declines. This mismatch will lead to higher
16 household bills, thereby accelerating the customer transition away from the gas system
17 and magnifying inequitable outcomes for those customers whose energy bills are a larger
18 fraction of their income and who experience greater barriers to realizing the benefits of
19 electrification. This negatively-reinforcing feedback loop raises the risk of the company's
20 gas assets becoming stranded investments over time. Our analysis outlined in Section III
21 joins a growing list of studies demonstrating that a proactive and managed approach to
22 strategically downsizing the gas system will be safer, more cost-effective, and more
23 equitable than relying on a scattershot, house-by-house transition.⁶¹

24 I fully appreciate that WGL cannot delay all efforts to undertake critical safety work
25 where elevated risks are present; however, the Company should balance necessary pipe
26 replacements with more proactive efforts to avoid unnecessary and risky expenditures in

⁶⁰ *Id.* at 38.

⁶¹ K. Bagdanov, et al., *Neighborhood Scale: The Future of Building Decarbonization* (Dec. 2023), https://gridworks.org/wp-content/uploads/2023/12/FINAL_BDC_Neighborhood-Scale-Report_WEB.pdf.

1 the gas system and future-proof new investments through street-segment electrification
2 projects and other NPAs. Unfortunately, the Customer Choice Pilot Program, as proposed,
3 positions the Company as a passive actor, placing the entire burden of targeted
4 neighborhood electrification efforts on customers who have neither the visibility nor the
5 responsibility to determine which NPAs make the most sense for WGL’s gas distribution
6 network.

7 **Q HOW COULD THE CUSTOMER CHOICE PILOT PROGRAM BE IMPROVED?**

8 **A** I appreciate Order No. 22003’s reminder that the Commission “cannot and is without the
9 authority to prevent WGL from selling natural gas.”⁶² While future statutory reforms may
10 be needed to unlock least-cost pathways for consumers, building on the Customer Choice
11 Pilot Program is a compelling and available opportunity to pair the Company’s proposal to
12 end gas service to customers who plan to electrify or otherwise leave the gas system with
13 a more comprehensive evaluation of how to achieve correlated system objectives ranging
14 from economic efficiency and GHG reductions to environmental justice. An updated
15 process could evaluate various criteria to prioritize projects based on system and customer
16 impact, including but not limited to: a safety and leakage risk assessment of the pipe
17 segment; the cost-saving potential of NPAs compared to pipe replacement; customer bill
18 impacts, including the opportunity to reduce the energy burden for low-income and
19 disadvantaged communities (“LIDAC”); GHG reductions; and electric distribution grid
20 capacity. Importantly, in those cases where WGL avoids a planned pipeline replacement
21 in favor of a more cost-effective NPA, the Company should divert a portion of the
22 resources that would have otherwise been used to replace the pipeline towards consumer-
23 facing rebates— focusing on LIDAC households—to directly incentivize the transition.

24 **Q ARE THERE ANY NATIONAL EXAMPLES OF A NEIGHBORHOOD-SCALE**
25 **NPA PILOT PROGRAM THAT COULD INFORM UPDATES TO THE PROPOSED**
26 **CUSTOMER CHOICE PILOT PROGRAM?**

⁶² Order No. 22003 at 16.

1 **A** Earlier this year, the California legislature passed Senate Bill 1221 (“SB 1221”),
2 authorizing 30 zero-emission pilot projects across the state that will reduce utility
3 spending by deferring gas pipeline replacement projects with more affordable alternatives,
4 such as transitioning neighborhoods to clean, electric appliances.⁶³ The bill was motivated
5 in part by a recent analysis estimating that targeted building electrification and gas
6 decommissioning projects across the state could avoid \$20 billion in gas pipeline
7 replacement costs by 2045, while only affecting 3% of current gas customers; in 2024
8 these savings would average approximately \$32,000 per affected customer, which would
9 cover the upfront costs of electrification.⁶⁴

10 The pilot program authorized under SB 1221 may prove informative for the Company, the
11 Commission and other stakeholders across the District. Under the program, gas utilities
12 across the State of California must annually submit maps to the California Public Utilities
13 Commission (“California PUC”) that include all potential gas distribution line
14 replacement projects. Drawing from the utility mapping and other factors like the presence
15 of “disadvantaged or low-income communities in high-temperature climate zones or low-
16 temperature climate zones that disproportionately lack cooling or heating,” the California
17 PUC is directed to establish priority neighborhood decarbonization zones.⁶⁵ Before July 1,
18 2026, the California PUC is directed to work with the state’s gas utilities to “facilitate the
19 cost-effective decarbonization of priority neighborhood decarbonization zones, not to
20 exceed 30 pilot projects across the state and affecting no more than 1% of each gas
21 corporation’s customers within their service territory.”⁶⁶ The legislation outlines several
22 program guidelines to successfully administer these pilot projects. For example, the
23 California PUC is tasked with establishing:

24 I. A process for gas corporations to determine and submit pilot projects for approval;

⁶³ Cal. S.B. No. 1221, *Gas corporations: ceasing service: priority neighborhood decarbonization zones* (2024), https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202320240SB1221.

⁶⁴ S. Smillie, et al., *Avoiding Gas Distribution Pipeline Replacement Through Targeted Electrification in California* (June 2024), <https://www.ethree.com/wp-content/uploads/2024/06/Gas-Decommissioning-Fact-Sheet-2024-06-18.pdf>.

⁶⁵ *Id.*

⁶⁶ *Id.*

- 1 II. Criteria and methodology for determining the cost-effectiveness of a zero-emission
2 alternative, including non-energy benefits, compared to replacement, repair, or
3 continued operation of an affected gas asset;
- 4 III. Requirements to ensure that a substitute for gas service is affordable, adequate,
5 efficient, just, and reasonable, especially for low-income customers;
- 6 IV. A requirement that no less than 67% of the property owners with natural gas
7 service within the pilot project boundary consent to the pilot project;
- 8 V. A requirement for addressing master-meter properties to ensure tenants receive
9 adequate notification and engagement;
- 10 VI. A preference for pilot projects that provide prevailing wages and use high-road job
11 programs;
- 12 VII. A requirement that gas utilities, electric utilities, local governments, and other
13 relevant entities coordinate and collaborate; and
- 14 VIII. A requirement that gas utilities recover costs related to the pilot projects that are
15 deemed just and reasonable, and a requirement that prohibits gas utilities from
16 recovering behind-the-meter costs associated with the pilot projects as capital costs
17 that are afforded a rate of return.⁶⁷

18 California’s Senate Bill 1221 joins a growing list of state efforts across the country to plan
19 for and thoughtfully manage a cost-effective and equitable modernization of our energy
20 system.⁶⁸ While it may not be appropriate to assume a like-for-like replication of any such
21 programs in the District, they nonetheless provide valuable points of reference and data
22 for the Commission and the Company’s efforts to balance pipe replacement activity with
23 broader social, climate, and economic imperatives.

⁶⁷ *Id.*

⁶⁸ NRDC, K. Velez, *Progress Report: How States Are Kicking Gas* (Dec. 2023), <https://www.nrdc.org/bio/kiki-velez/state-progress-report-kicking-gas>.

1 **Q WHAT RECOMMENDED NEXT STEPS DO YOU HAVE FOR THE CUSTOMER**
2 **CHOICE PILOT PROGRAM?**

3 **A** I will be the first to acknowledge that establishing a new initiative along the lines of what I
4 have proposed would require significant technological, regulatory, legal, and economic
5 analysis informed by diverse stakeholder engagement. With this in mind, I recommend
6 that the Commission build upon the Company's proposal through a robust workshop and
7 stakeholder engagement process that is designed to scope an updated Customer Choice
8 Pilot Program that complements the current pipe replacement program with a more
9 comprehensive effort to evaluate and execute street-segment electrification projects and
10 other NPAs that will unlock benefits at the customer and system level while advancing the
11 District's climate goals.

12 **Q DOES THIS CONCLUDE YOUR TESTIMONY?**

13 **A** Yes.

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE DISTRICT OF COLUMBIA**

IN THE MATTER OF)	
THE INVESTGIATION INTO)	Formal Case No. 1179
WASHINGTON GAS LIGHT COMPANY'S)	
STRATEGICALLY TARGETED PIPE)	
REPLACEMENT PROGRAM)	

DECLARATION

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

Dated: December 10, 2024



Zach Pierce

QUALIFICATIONS

ZACH PIERCE

PROFESSIONAL EXPERIENCE

Rewiring America (Berkeley, California) 2023-Present
Senior Director, State & Regional Policy

- Lead Rewiring America's efforts to influence and establish policy that advances the organization's mission in states and localities across the country.
- Building out and empowering regional teams across the country to identify and execute policy campaigns by providing thought leadership and strategic support.

Senior Manager, State & Local Policy (Western Region)

- Defined and executed Rewiring America's efforts to influence and support state and local policy initiatives across the Western United States.
- Managed multiple staff and lobbying contracts across several states.

Office of Governor Roy Cooper (Raleigh, NC) 2021 – 2023
Senior Advisor for Climate Change Policy

- Lead climate advisor to the Governor. Oversaw stakeholder engagement, project management, and strategic planning to execute the Governor's climate agenda.
- Managed the Governor's Climate Change Policy Advisor and developed Executive Order No. 271 supporting the transition to zero-emission vehicles.

Climate Change Policy Advisor

- Implemented transportation and built environment policy agendas. Managed development of the Deep Decarbonization Pathways Analysis evaluating climate mitigation pathways. Primary contributor to the Governor's climate and environmental justice Executive Order No. 246.

Office of Governor Jared Polis (Denver, CO) 2020 – 2021
Special Advisor on Climate and Energy

- Lead policy advisor to the Governor on climate and energy issues, responsible for convening senior leadership to develop legislative, regulatory, and budget priorities. Managed strategic planning, project management, stakeholder engagement, and other duties to execute the Governor's climate agenda.
- Convened the steering committee that developed and implemented the Governor's Greenhouse Gas Pollution Reduction Roadmap.

Senior Policy Advisor on Energy and Natural Resources 2019 – 2020

- Lead policy advisor on a broad portfolio of energy and natural resources topics. Drafted and oversaw implementation of the Governor's first executive order

targeting a transition to zero-emission vehicles. Primary contributor to the Governor's 2021 legislative agenda.

Sierra Club (Denver, CO) 2017 – 2019

Senior Campaign Representative, Beyond Coal Campaign

- Scaled clean energy in CO and NM through policy, organizing and communications efforts in state legislative and regulatory venues. Designed, implemented, and managed all aspects of the campaign.

Independent Policy and Strategy Consultant (Denver, CO) 2016 – 2017

- Provided project management, policy analysis, and scoping services for several non-profits.

Office of Governor John Hickenlooper (Denver, CO) 2013 – 2016

Energy and Natural Resources Policy Advisor

- Implemented the Governor's policy agenda, working closely with Cabinet and senior staff. Developed policy recommendations and keynote speeches; managed projects and stakeholder engagement.

Human Services Policy Advisor

- Responsible for above outlined duties with a focus on Human Services.

Drug Policy Coordinator

- Supported implementation of recreational marijuana legalization pursuant to Amendment 64.

EDUCATION

Colorado College 2008 – 2012

B.A., History/Political Science

University of Idaho 2019

Legislative Energy Horizon Institute Energy Policy Planning Program

National Renewable Energy Laboratory 2021

Executive Energy Leadership Academy

**BEFORE THE PUBLIC SERVICE COMMISSION OF THE DISTRICT OF
COLUMBIA**

**In the Matter of the Investigation into
Washington Gas Light Company's
Strategically Targeted Pipe Replacement
Plan**

Formal Case No. 1179

**PREPARED DIRECT TESTIMONY OF
CONOR LYMAN**

EXHIBIT SC (B)

**On Behalf of
Sierra Club**

December 10, 2024

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1 **I. Introduction**

2 **Q PLEASE STATE YOUR NAME, TITLE, AND EMPLOYER.**

3 **A** My name is Conor Lyman and I am a Senior Research Scientist for Groundwork Data,
4 currently contracted by Rewiring America.

5 **Q ON WHOSE BEHALF ARE YOU TESTIFYING?**

6 **A** I am testifying on behalf of the Sierra Club.

7 **Q PLEASE SUMMARIZE YOUR RESPONSIBILITIES AND QUALIFICATIONS.**

8 **A** In my capacity both with Groundwork Data and Rewiring America, I am responsible for
9 developing analytical tools and models to investigate the future of our energy distribution
10 systems. A key focus of this is the development of the Pipe Segment Analysis tool that
11 aggregates assumptions and datasets related to capital and operational costs, energy
12 consumption, emission rates, and demographic factors, to name a few variables, with the
13 aim of better understanding how investments in energy infrastructure will impact
14 customers, utility managers, policy stakeholders, and the environment. In my capacity at
15 Groundwork Data, I have also served as a researcher and contributor to reports
16 investigating gas utility finances and the connection between pipe investment and
17 customer rates.

18 I have six years of experience developing analytical models and tools for energy systems.
19 Further details on my qualifications and experience are attached.

20 **Q PLEASE SUMMARIZE THE TESTIMONY YOU ARE PROVIDING TODAY.**

21 Washington Gas Light Company (“Washington Gas” or “WGL”) is a decade into
22 PROJECTpipes (“PIPES”), a 40-year pipe replacement program. Reviewed by the Public
23 Service Commission of the District of Columbia (“Commission” or “PSC”) every five
24 years, PIPES is currently in its third review period. The Commission rejected WGL’s

1 proposal for its third iteration of PIPES (“PIPES 3”) with Order No. 22003, prompting
2 WGL to submit an updated proposal for PIPES 3, now termed “District SAFE,” on
3 September 27, 2024.

4 Historically accepted as critical for upholding the safety and reliability of the gas
5 distribution system, pipe replacement programs are facing increased scrutiny throughout
6 the United States. There are growing calls for gas companies and public utility
7 commissions to consider non-pipeline alternatives (“NPAs”), such as building
8 electrification, geothermal systems, energy efficiency measures, and advanced leak
9 detection. This testimony highlights concerns with pipeline replacement in the District by
10 analyzing two pipe segments that WGL scheduled for near-term replacement as part of its
11 PIPES 3 proposal. While PIPES 3 was rejected and District SAFE is currently under
12 review, an analysis of these pipe segments nevertheless provides valuable insights. This
13 analysis highlights the need for coordinated planning between the gas system, the electric
14 system, and building investments to reduce costs for customers and reduce greenhouse gas
15 emissions in line with the District’s climate targets. Notably, these goals are not in
16 conflict; this testimony demonstrates how—based on pipe replacement cost data from
17 WGL—a managed transition that coordinates the electrification of D.C. homes with the
18 decommissioning of old, leak-prone pipes can both reduce customer costs and reduce
19 emissions, and reduce the risk of stranded gas assets. In contrast, this testimony also
20 highlights the risks of unmanaged investments. If WGL continues to invest in pipe
21 replacement without regard for the trend of customers opting for electric alternatives
22 because of climate, health, financial, comfort, and other motivations, those investments in
23 pipes are at risk of becoming underutilized, or stranded.

24 The two illustrative examples provided in this testimony highlight the potential energy
25 futures of segments of the gas distribution system in D.C. based on real-world data. The
26 analysis examines the costs and benefits of a managed transition of these pipe segments
27 that pairs pipe decommissioning with building electrification compared to costly pipe
28 replacement in the face of customer departures, departures that are already occurring in the
29 District and may accelerate in the future. These pipe segments were analyzed using the

1 Pipe Segment Analysis tool developed by Groundwork Data and supported by Rewiring
2 America. Such an analysis can be applied to many proposed pipe replacement projects to
3 evaluate how NPA strategies can reduce emissions and costs for D.C. residents.

4 **Q HAVE YOU PREVIOUSLY TESTIFIED IN PROCEEDINGS BEFORE THE**
5 **PUBLIC SERVICE COMMISSION OF THE DISTRICT OF COLUMBIA?**

6 **A** No.

7 **II. The Importance of Considering Alternatives to Gas Pipeline Replacement**

8 **Q WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

9 **A** The purpose of my testimony is to show that Washington Gas’s proposed District SAFE
10 program is not aligned with the District’s climate goals and is not the most cost-effective
11 solution for customers, and that there are alternatives to pipe replacement that uphold
12 customer affordability and put the District on track to meet its goal of net-zero economy-
13 wide emissions by 2045. The analysis presented in my testimony shows that District
14 SAFE will not put the District on a path to meeting its requirement to reach net-zero
15 emissions by 2045 and will not reduce costs for the District’s residents.¹ Further, I
16 demonstrate the risks of an unmanaged gas transition through a robust analysis of two pipe
17 segments in WGL’s service territory.

18 In its updated proposal to the Commission for District SAFE, WGL proposes to spend
19 \$215 million over the next three years on replacing distribution mains and services in the
20 District, including \$50 million in 2025.² While some amount of investment is necessary to
21 ensure the safe and reliable operation of the gas distribution system, the cost per mile of

¹ D.C. Code § 8-151.09d (2022).

² *Formal Case No. 1179, In the Matter of the Investigation Into Washington Gas Light Company’s Strategically Targeted Pipe Replacement Plan*, Washington Gas Light Company’s Revised Application For Approval Of The District Strategic Accelerated Facility Enhancement Plan, filed Sept. 27, 2024 (“District SAFE Plan”), Exhibit WG(A)-1 at 30.

1 main replacements in the District is increasing, and will be passed on to WGL customers
2 through rising rates.³

3 With regard to leaks, the pace of replacement is insufficiently addressing emissions from
4 leaking methane. PIPES began in 2014, yet fugitive methane emissions are higher today
5 than they were in 2006.⁴ This suggests that WGL is not replacing pipes at the rate that new
6 leaks arise. However, the pace of pipe replacement would actually decrease under District
7 SAFE: through the first two iterations of PIPES, WGL replaced an average of 3-4 miles of
8 main pipe each year; the company is proposing to replace only 2.2 miles in 2025.⁵ This is
9 not a phenomenon specific to WGL. A recent study found that despite years of pipe
10 replacement work throughout the US, programs similar to and including PIPES are
11 insufficiently addressing leak emissions. The results of this study suggest there is a
12 significant amount of methane leaking behind-the-meter: “Current efforts to reduce
13 [methane] emissions often target pipeline leaks; however, if a significant portion of
14 [methane] emissions are not from pipelines but from consumption-driven processes, it
15 could require changing the scope of future policy.”⁶ This suggests that even a dramatic
16 increase in pipe replacement rates—besides being incredibly costly for customers—would
17 not fully address emissions from methane leaks.

18 At the same time that WGL is replacing pipes, alternatives to household functions
19 traditionally served by piped methane gas are becoming more popular and financially
20 attractive to residents. The share of homes heating with electricity in the District has
21 increased substantially in the past decade, largely cutting into gas’s share of the home
22 heating market; between 2010 and 2022, the share of D.C. homes heating with gas fell

³ *Id.* at 23.

⁴ Department of Energy & Environment, *Greenhouse Gas Inventories (2006-2021)* [hereinafter “DOEE GHG Inventory, 2006-2021”], <https://doee.dc.gov/service/greenhouse-gas-inventories>.

⁵ District SAFE Plan, Exhibit WG(A)-1 at 16, 31.

⁶ Sargent, et. al., *Majority of US urban natural gas emissions unaccounted for in inventories* (Oct. 2021), <https://doi.org/10.1073/pnas.2105804118>. The top-down study looked at eight years of methane emissions for the Boston metro region and found that there was no significant decrease in methane emissions, despite years of efforts to address leaking pipes. The study further evaluated multiple U.S. cities—including D.C.—and found that bottom-up GHG inventories, like DOEE’s, are likely significantly undercounting leak emissions.

1 from 64% to 50% of homes, while the share of homes heating with electricity rose from
2 30% to 45% of homes.⁷

3 The combination of increasing replacement costs, a replacement pace that does not
4 meaningfully reduce leaks, and alternative household technologies gives rise to a
5 misaligned status quo where there is increasing investment in a gas system that is getting
6 more expensive for customers and does not align with the District's climate targets. This
7 poses a growing threat that pipe replacement investments may become underutilized or, in
8 some areas, stranded as customers exit.

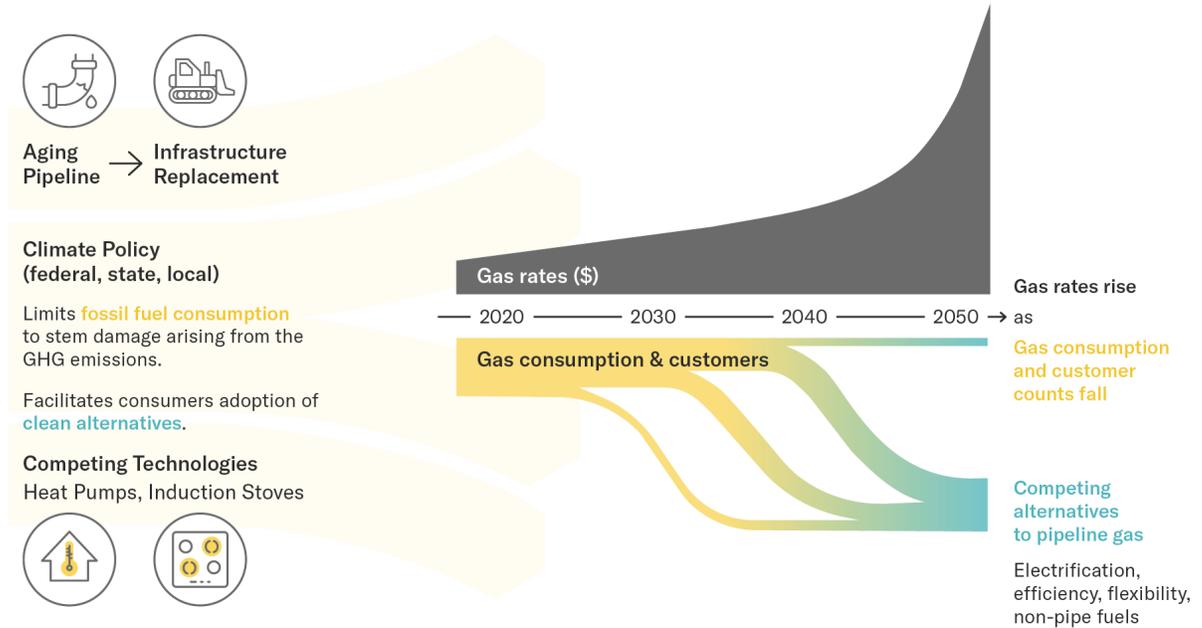
9 This testimony shows that there are alternatives to pipe replacement that uphold customer
10 affordability and put the District on track to meet its goal of net-zero economy-wide
11 emissions by 2045. I present a study of plausible energy scenarios for homes served by
12 two segments of WGL's system to demonstrate the value of a managed transition of the
13 gas system.

14 **Q COULD YOU PLEASE DESCRIBE THE CONCERNS OF AN UNMANAGED**
15 **TRANSITION AND THE CONCEPT OF A MANAGED TRANSITION AS IT RELATES**
16 **TO THE DISTRICT?**

17 **A** As described in Mr. Zach Pierce's accompanying testimony on behalf of Sierra Club in
18 this docket, a consumer transition to electrification is underway. This has created a
19 paradigm shift for regulated utilities: gas and electric utilities now find themselves in
20 competition for household functions. In an unmanaged transition, investment in the gas
21 system continues to rise, even as increasing competition from electric alternatives and
22 climate policy reduces the number of gas customers and gas consumption. This
23 concentrates the growing system costs on those who remain on the gas system. This
24 population of gas customers is likely to be disproportionately represented by those who
25 are energy burdened today, and thus cannot afford the up-front costs of clean, efficient
26 electric appliances and heating equipment, let alone future rate increases.

⁷ U.S. Census Bureau, *Table B25040 ACS 2022 5-year estimate*,
<https://data.census.gov/table/ACSDT5Y2022.B25040>.

1



2

3 **Figure 1: Illustration of the drivers and consequences of an unmanaged transition⁸**

4 With regard to WGL’s pipe replacement program, an unmanaged transition manifests
5 itself when investments are made to replace pipes in locations that later experience
6 customer attrition due to electrification. The remaining gas customers are left with ever-
7 growing costs to compensate for the dwindling customer base. This is not an abstract
8 scenario in the District. As I mentioned, the share of households heating with gas is
9 steadily declining as electric heating becomes increasingly popular.⁹

⁸ Building Decarbonization Coalition and Groundwork Data, *The Future of Gas in New York* (Mar. 2023), <https://buildingdecarb.org/wp-content/uploads/BDC-The-Future-of-Gas-in-NYS.pdf>.

⁹ U.S. Census Bureau, *Table B25040 ACS 2022 5-year estimate*, <https://data.census.gov/table/ACSDT5Y2022.B25040>.

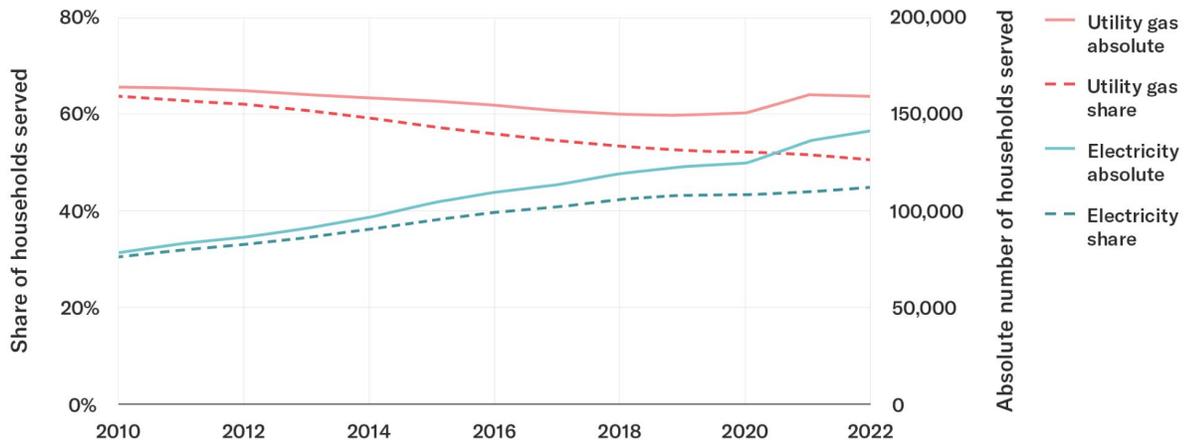


Figure 2: ACS 5-year estimates of D.C. home heating fuel share and absolute households

The alternative to an unmanaged transition is a managed transition. A managed transition is a strategic approach to align customer energy needs with climate goals, while working to preserve and enhance heating affordability.¹⁰ For pipe replacement programs, a managed transition seeks to coordinate building electrification with pipe decommissioning, thus avoiding the high capital costs to replace gas pipe segments, reducing customer costs and emissions, and reducing the risk of underutilized or stranded gas assets.

Q COULD YOU PLEASE DESCRIBE THE STUDY YOU CONDUCTED?

A The study analyzes two segments of WGL’s distribution network that were scheduled for near-term replacement in WGL’s annual project list filed in tandem with the PIPES 3 proposal. These exact pipes may no longer be scheduled for near-term replacement: an updated project list is expected that aligns with District SAFE following the rejection of PIPES 3. Also, it is likely difficult to intervene on pipe segments that are scheduled for immediate replacement, such as the segments in the project list. However, the study nevertheless highlights the differences between a managed and an unmanaged transition for D.C. residents and the importance of considering non-pipeline alternatives to pipeline

¹⁰ *Rhode Island Pub. Util. Comm’n Docket No. 23-49-NG*, Testimony of Dr. Michael J. Walsh & Dr. Dorie Seavey on Behalf of the Conservation Law Foundation, filed Feb. 9, 2024 [hereinafter “Walsh & Seavey Testimony”], https://ripuc.ri.gov/sites/g/files/xkgbur841/files/2024-02/2349-CLF-Testimony-Walsh-Seavey_2-9-24.pdf.

1 replacement. Using cost data for actual pipes in WGL’s system, I show why a pipe
2 segment analysis is critical for evaluating future pipe replacement proposals.

3 I used modeling from the Pipe Segment Analysis tool to analyze and compare an
4 unmanaged and a managed transition for two pipe segments. The tool aggregates disparate
5 datasets related to upfront and operating costs, energy consumption, and emissions data to
6 detail the impacts of different scenarios and transition strategies on customers, utility
7 managers, policy stakeholders, and the environment.

8 **Q WHAT ARE THE MAIN FINDINGS OF YOUR STUDY?**

9 **A** This study shows that a managed transition off gas that coordinates gas system, electric
10 system, and building interventions lowers energy bills for customers, lowers total capital
11 investment, puts the District on a path to meet net-zero carbon emissions by 2045, and
12 reduces stranded asset risks for WGL.

13 An unmanaged transition is the most expensive option for D.C. It incurs the cost of pipe
14 replacement in addition to the cost of building electrification. It does not achieve D.C.’s
15 climate goals and puts WGL’s investments at risk of being stranded. While not explicitly
16 modeled here, the high cost of pipe replacement, combined with a shrinking customer
17 base, will increase gas costs in an unmanaged transition. Only the customers that electrify
18 will see bill reductions.

19 **III. An Analysis of Proposed Pipe Replacement Projects in the District**

20 **Q HOW DID YOU SELECT SEGMENTS OF WGL’S SYSTEM TO ANALYZE?**

21 **A** These pipe segments were chosen from WGL’s annual project list, which was submitted
22 following the submission of the PIPES 3 proposal.¹¹ I selected two isolated pipe segments
23 in WGL’s network, making the assumption that isolated pipes—such as dead-ends—can

¹¹ *Formal Case No. 1175, Washington Gas Light Company’s Application for Approval of PROJECTpipes 3 Plan, Washington Gas’s Final Annual Project List, filed Oct. 31, 2024.*

1 be decommissioned without negatively impacting the safe and reliable operation of the
 2 rest of the gas network.

3 **Q PLEASE DESCRIBE THE PIPE SEGMENTS YOU SELECTED.**

4 **A** Key characteristics of the two pipe segments from WGL’s project list are described in
 5 Table CL-1. The pipe segments are located at the 2800 block of McKinley Place NW
 6 (Segment One) and the 1200 block of Walter Street SE (Segment Two). Both pipeline
 7 segments serve single-family homes in the District, with different levels of density.
 8 McKinley Place NW is a less-dense neighborhood of larger, detached single-family
 9 homes, whereas Walter Street NW is a higher-density neighborhood of rowhouses. Both
 10 pipe segments are made up of materials that—in its District SAFE proposal—WGL
 11 emphasizes must be replaced to increase the safety and reliability of the system.¹²

	Segment One	Segment Two
Location	McKinley Place NW	Walter Street SE
Ward	4	6
Feet cast iron	0	1,027
Feet bare/unprotected wrapped steel	503	169
Total feet	503	1,196
Total miles	0.10	0.23
Affected services	18	56
Total project cost	\$1,063,877	\$2,244,289
Cost per foot	\$2,115	\$1,876
Cost per mile	\$11,167,536	\$9,907,898
Cost per customer*	\$59,104	\$40,077

* Uses affected services as a proxy for the number of customers

Table 1: Pipe segment details

¹² District SAFE Plan at 4-5.

1 **Q WHAT ASSUMPTIONS AND DATA SOURCES DID YOU USE FOR THIS**
2 **STUDY?**

3 **A** I assumed that, for all scenarios, the pipe segments would be scheduled for replacement in
4 2030. These segments were originally scheduled for immediate replacement (starting in
5 2025, rather than 2030), but their status is unknown following the Commission’s Order
6 No. 22003 and in anticipation of an updated project list from WGL. Additionally, this is
7 meant to be an illustrative study; a planning horizon of roughly 5 years allows for
8 thoughtful consideration and a deployment of alternatives to pipe replacement.

9 Additionally, I assumed all homes connected to a pipe segment use piped gas for heating
10 in the baseline case; I did not assume, for example, that a home connected to the gas
11 network heats with electricity and uses piped gas solely for cooking or hot water.

12 Each scenario analyzes the impact of different pipeline and household interventions on
13 cost (to the customer and the utility), emissions, and energy consumption. The model
14 calculates and quantifies these impacts out to 2050. It’s important to note the timing of
15 household interventions in these scenarios. For each home, I assumed all major household
16 appliances (HVAC, domestic hot water heaters, stoves and ranges, and clothes dryers)
17 were installed in the same year for a given home and have a useful life of 18 years.¹³ I
18 used data from the District’s tax parcel database on when homes were built, renovated,
19 and remodeled to determine their next “natural” appliance replacement year. For example,
20 if a home was renovated in 2010, then I assumed it would naturally replace appliances in
21 2028. My modeling restricted homes to only replace appliances once during the study
22 period.

23 The study is built on a number of datasets that model household energy consumption,
24 household appliance costs, utility billing rates, and emission rates. These datasets are
25 described in Table CL-2. My study uses 2024 dollars.

¹³ E3’s NPA study for the San Francisco Bay area uses a simplified assumption of an 18-year useful life for all appliances, based on previous E3 analyses. See E3, *Benefit-Cost Analysis of Targeted Electrification and Gas Decommissioning in California* (Dec. 2023), https://www.ethree.com/wp-content/uploads/2023/12/E3_Benefit-Cost-Analysis-of-Targeted-Electrification-and-Gas-Decommissioning-in-California_u.pdf.

Data	Use	Source
DC tax parcel data	Provides key household characteristics used for modeling home energy consumption and determining appliance replacement schedule	D.C. Computer Assisted Mass Appraisal - Residential (DC CAMA) ¹⁴
Gas-consuming home's energy consumption	Simulates the energy consumption of each home when the home is consuming gas	NREL's ResStock database ¹⁵
Electrified home's energy consumption	Simulates the energy consumption of each home when the home is electrified	Rewiring America's internal household energy consumption profiles, derived from NREL's ResStock database ¹⁶
Household appliance cost	Quantifies the capital investment into homes for new electric or gas appliances	Rewiring America, ¹⁷ RMI, ¹⁸ and E3 ¹⁹ cost databases ²⁰
Electrification incentives	Determines the amount of incentive dollars for each home to electrify	Rewiring America's incentive database ²¹
Utility billing rates	Average fixed and volumetric rates for residential electricity	Rewiring America's internal rate database ²²

¹⁴ City of Washington, DC, *Computer Assisted Mass Appraisal - Residential*, <https://opendata.dc.gov/datasets/DCGIS::computer-assisted-mass-appraisal-residential/about> (accessed Sept. 10, 2024).

¹⁵ Energy consumption for all homes was estimated by matching building characteristics from the tax parcel data to building characteristics in NREL's ResStock database. See National Renewable Energy Lab, *End Use Savings Shapes, 2022.1 Release*, <https://resstock.nrel.gov/datasets>.

¹⁶ Rewiring America has developed an internal dataset of building energy consumption derived from ResStock that simulates energy consumption for a medium-efficiency heat pump, rather than the minimum- and maximum-efficiency heat pumps in the ResStock 2022.1 Release.

¹⁷ Rewiring America, *Report: Upfront cost of home electrification* (Mar. 2024), <https://www.rewiringamerica.org/research/home-electrification-cost-estimates>.

¹⁸ RMI, *Green Upgrade Calculator*, <https://greenup.rmi.org/> (accessed Sept. 12, 2024).

¹⁹ E3, *E3 Releases Technical Analysis Report in the Rhode Island Future of Gas Docket* (June 11, 2024), <https://www.ethree.com/rhode-island-future-of-gas-docket/>.

²⁰ The Rewiring America cost modeling comes from an analysis of multiple state-level data sources. The RMI and E3 sources were used to supplement Rewiring America's data and provide cost data for appliances that are not in Rewiring America's dataset.

²¹ Rewiring America, *Rewiring America Incentive API*, <https://api.rewiringamerica.org/> (accessed Nov. 20, 2024).

²² The rates were derived by Rewiring America using data from the U.S. Energy Information Administration, NREL's Utility Rate Database, the American Gas Association, and the Homeland Infrastructure Foundation-Level

	and natural gas delivery to determine customer energy bills	
Emission rates	Convert energy consumption to carbon emissions	For natural gas, standard factor sourced from EPA for combustion. ²³ For electricity, NREL Cambium marginal emissions factors forecast for PJM East ²⁴

Table 2: Data sources

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Q PLEASE DESCRIBE THE OPTIONS YOU MODELED FOR THESE PIPE SEGMENTS.

A The segment study presented here considers two unmanaged transition scenarios and one managed transition scenario for each pipe segment: Unmanaged Business-as-usual (“BaU”) Electrification, Unmanaged Full Electrification, and Managed Electrification. These are described in the following table. The scenarios vary as to what kind of intervention is made on the pipe segment as well as when, and how, individual homes served by that pipe change their energy consumption habits through the adoption of different household appliances. For homes that replace existing gas appliances with new gas appliances, I did not model or assume any changes in their energy consumption.

Scenario	Home electrification	Gas pipe intervention in 2030
Unmanaged Business as Usual (BaU) Electrification	The Business as Usual rate of home electrification in DC continues – 0.5% of homes electrify each year. Non-electrifying homes replace existing gas appliances with	The gas pipe is replaced in 2030.

(HIFLD) Database. Rewiring America calculated utility-average rates (both fixed and volumetric) for both electricity and gas.

²³ U.S. Environmental Protection Agency, *Greenhouse Gas Equivalencies Calculator - Calculations and References*, <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator-calculations-and-references>.

²⁴ Cambium publishes marginal emissions factors for a number of scenarios; this study assumed the “Mid-case” scenario. See National Renewable Energy Lab, *Long-run Marginal Emissions Rates for Electricity* (Feb. 2024), <https://data.nrel.gov/submissions/230>.

	new gas appliances.	
Unmanaged Full Electrification	All homes electrify at the end-of-life of existing appliances. By 2050, all homes on the pipe segment are electrified.	The gas pipe is replaced in 2030.
Managed Electrification	All homes electrify, either at the end of their appliances' useful lives or when the gas pipe is decommissioned, whichever comes earlier.	The gas pipe is decommissioned in 2030.

1 **Table 3: Study scenarios**

2 As I mentioned, while immediate action may not be possible for the exact pipe segments
 3 in my analysis, the principles of this analysis hold true for other segments of WGL's
 4 system. The fact that this is an illustrative analysis does not mean that the scenarios
 5 presented here are not plausible. As Mr. Pierce and I discuss in both our testimonies, the
 6 District is in the midst of a customer shift to electrification that will reduce piped gas
 7 consumption.

8 **Q WHAT DID YOU ASSUME TO BE THE NATURAL RATE OF BUILDING**
 9 **ELECTRIFICATION IN THE DISTRICT?**

10 **A** As I previously mentioned and showed in Figure CL-2, the share of homes heating with
 11 electricity in D.C. is increasing, primarily cutting into gas's share of the home heating
 12 market. In 2010, the split of homes heating with utility gas versus electricity was roughly
 13 two-thirds and one-third, respectively. Today, the gap between utility gas and electricity
 14 for home heating is nearly closed: in 2022, 50% of households heated with utility gas,
 15 compared to 45% of households that heated with electricity. In terms of absolute
 16 customers, the number of households heating with electricity grew by over 81% during
 17 this period. The number of households heating with piped gas fell about 3% during the
 18 same period, averaging a decline of 0.5% each year. This suggests that most of

1 electricity’s gain in the market came from new builds, rather than retrofits of existing
 2 homes.²⁵

3 **A** Given this, I assumed that the natural rate of electrification for existing buildings follows
 4 the decline in households heating with utility gas. This means that in the Unmanaged BaU
 5 Electrification scenario, I assumed 0.5% of homes on each street segment electrify each
 6 year. I randomly assigned homes to electrify or stay on gas to match this departure rate.
 7 For the Unmanaged Full Electrification scenario, I modeled a situation where continued
 8 changes in consumer preference and increased efforts to encourage electrification electrify
 9 all homes by 2050. An accelerated adoption of electrification, like the one modeled in this
 10 scenario, is required to meet our emissions targets by 2050.²⁶ The number of homes
 11 electrifying under each scenario is summarized in Table CL-4.

Segment	Scenario	Total Households	Households that electrify by 2050
Segment One	Unmanaged BaU Electrification	18	2
	Unmanaged Full Electrification		18
	Managed Electrification		18
Segment Two	Unmanaged BaU Electrification	56	7
	Unmanaged Full Electrification		56
	Managed Electrification		56

12 **Table 4: Number of households that electrify in each scenario**

13 A higher rate of electrification and gas customer exits is not outside the realm of
 14 possibility. Mr. Pierce’s testimony highlights how increasing heat pump sales, NPA

²⁵ U.S. Census Bureau, *Table B25040 ACS 2022 5-year estimate*, <https://data.census.gov/table/ACSDT5Y2022.B25040>.

²⁶ Rewiring America, *Pace of Progress* (2023), https://a-us.storyblok.com/f/1021068/x/1c5bfb0365/pace_of_progress_2024.pdf.

1 investments from other gas utilities, new all-electric building codes in the District, and the
2 uptake of electrification incentives are all putting upward pressure on the rate of
3 electrification.

4 Another factor examined by Mr. Pierce related to gas system departure is WGL's
5 proposed Customer Choice Pilot Program. This program is a step in the right direction in
6 managing the energy transition; however, as I will later show, lack of coordination
7 between customer exits and pipe replacement or pipe decommissioning could dramatically
8 increase costs for remaining gas customers and presents a financial risk to WGL in the
9 form of underutilized or stranded gas assets.

10 **Q HOW DO THESE SCENARIOS DIFFER WITH REGARD TO CAPITAL**
11 **INVESTMENT?**

12 **A** The capital costs in this analysis include the cost to replace building appliances (with gas
13 or electric appliances, depending on the scenario), the cost of pipeline intervention
14 (replacement or decommissioning), and the cost of upgrading the local electric grid, if
15 needed, to serve higher peak loads.

16 Building appliance costs include the upfront (gross) cost of the appliances, the incentive
17 amount for electrification, and the resulting net cost. D.C. does not have incentive
18 programs for gas appliances. I considered the costs to replace HVAC, domestic hot water,
19 cooking, and clothes drying appliances. With regards to HVAC, I modeled the cost of
20 installing a medium-efficiency air-source heat pump for buildings that electrify. I did not
21 model any weatherization upgrades that would reduce the heating or cooling demands of a
22 given home, though incentives for those upgrades are also available to D.C. residents.

23 As previously stated, the cost of pipe segment replacements came from WGL's project
24 list. In addition to the data sources and assumptions previously mentioned, I made
25 assumptions regarding the cost of gas pipe decommissioning and electric transformer
26 upgrades based on previous segment studies I have conducted for other regions of the

1 country.²⁷ These assumptions include an assumed cost to decommission a gas pipe
 2 segment of \$20,000 and an assumed cost to increase the capacity of electric distribution
 3 transformers to serve higher peak demand on the street of \$20,000 per transformer.

4 Tables CL-5 and CL-6 describe the total capital investment for each scenario for Segment
 5 One and Segment Two, respectively. The costs are broken out by the building sector
 6 (building appliances, both gas and electric), the electric network, and the gas network.
 7 Building-sector costs are further broken down into the gross upfront costs for appliances,
 8 the total incentive amount, and the resulting net costs. Per Rewiring America’s Incentives
 9 API, these homes are eligible for the federal 25C Energy Efficient Home Improvement
 10 Tax Credit.²⁸ This tax credit is capped at \$2,000 annually for heat pumps (including air
 11 source heat pumps and heat pump water heaters) and expires in 2032. Some homes in the
 12 Unmanaged BaU and Unmanaged Full Electrification scenarios electrify after 2032 and
 13 therefore are not eligible for the tax credit. More electrification incentives are available for
 14 District residents via the Inflation Reduction Act’s Home Energy Rebates, which can
 15 further reduce the net cost of building electrification for qualifying households. These
 16 additional incentives could apply to homes not eligible for the 25C tax credit or increase
 17 the total incentive amount for homes taking advantage of 25C.

	Unmanaged BaU Electrification	Unmanaged Full Electrification	Managed Electrification
Gross appliance costs	\$ 386,864	\$ 532,800	\$ 532,800
25C tax credit	\$ (2,000)	\$ (10,000)	\$ (36,000)
Net building appliance costs	\$384,864	\$522,800	\$496,800

²⁷ Previous analysis I have conducted based on decommission costs for Peoples Gas in Chicago show an average decommissioning cost of about \$190,000 per mile. For information on decommission costs, see Illinois Commerce Commission, *Natural Gas Investigations*, <https://www.icc.illinois.gov/programs/natural-gas-investigations>. Testimony I supported that analyzed Rhode Island Energy’s service territory assumed \$10,000 for pipe decommissioning (based on cost figures for Liberty Utilities in Massachusetts) and \$20,000 for electric distribution transformer upgrades. See Walsh & Seavey Testimony, *supra* note 10. These provide estimates for costs in D.C., but costs will vary by region.

²⁸ Rewiring America, *Incentives API*, <https://api.rewiringamerica.org>.

Electric network	\$ -	\$ 80,000	\$ 80,000
Gas network	\$ 1,063,877	\$ 1,063,877	\$ 20,000
Grand total	\$ 1,448,741	\$ 1,666,677	\$ 596,800

1

Table 5: Segment One total capital investment

	Unmanaged BaU Electrification	Unmanaged Full Electrification	Managed Electrification
Gross appliance costs	\$ 987,000	\$ 1,195,200	\$ 1,195,200
25C tax credit	\$ (10,000)	\$ (36,000)	\$ (112,000)
Net building appliance costs	\$ 977,000	\$ 1,159,200	\$ 1,083,200
Electric network	\$ -	\$ 180,000	\$ 180,000
Gas network	\$ 2,244,289	\$ 2,244,289	\$ 20,000
Grand total	\$ 3,221,289	\$ 3,583,489	\$ 1,283,200

2

Table 6: Segment Two total capital investment

3 Results for both segments are similar. The results show that the cost to replace the pipeline
 4 segment far exceeds the cost to electrify the homes served by that pipe. Total costs for the
 5 Unmanaged scenarios are more than double that of the Managed Electrification scenario.
 6 **An unmanaged electrification is the most expensive option for both pipe segments,**
 7 **primarily because of the high cost to replace gas pipes. Even if the cost of building**
 8 **electrification was double what is modeled here, the total capital costs of a managed**
 9 **electrification for each street segment would still be lower than the total capital costs**
 10 **for an unmanaged electrification with pipe replacement.** These results do not capture
 11 any costs associated with underutilized or stranded gas system investments; however, it is
 12 clear that the replaced gas pipe in the Unmanaged scenarios serves a dwindling customer
 13 base. I explore the effects of this later in my testimony.

	Unmanaged BaU Electrification	Unmanaged Full Electrification	Managed Electrification
Building net cost	\$ 21,381	\$ 29,044	\$ 27,600
Electric network	\$ –	\$ 4,444	\$ 4,444
Gas network	\$ 59,104	\$ 59,104	\$ 1,111
Total	\$ 80,486	\$ 92,593	\$ 33,156

1 **Table 7: Segment One average cost per building**

	Unmanaged BaU Electrification	Unmanaged Full Electrification	Managed Electrification
Building net cost	\$ 17,446	\$ 20,700	\$ 19,343
Electric network	\$ –	\$ 3,214	\$ 3,214
Gas network	\$ 40,077	\$ 40,077	\$ 357
Total	\$ 57,523	\$ 63,991	\$ 22,914

2 **Table 8: Segment Two average cost per building**

3 Tables CL-7 and CL-8 highlight the spending per household in each scenario. This does
 4 not mean that this is the amount each individual customer is spending; rather, it provides
 5 an understanding of how capital investments are distributed. For example, for Segment
 6 One we can see that pipeline replacement costs nearly \$60,000 per household served, yet
 7 electrifying the entire street and decommissioning the pipe would cost about half as much
 8 per household. This perspective is important to understand; a limited view of just building
 9 appliance costs shows that electrifying buildings costs more than installing modern-day
 10 gas appliances and obscures the fact that high pipe replacement costs are passed on to
 11 customers via growing gas bills.

1 **Q DO CUSTOMERS REALIZE SAVINGS DUE TO ELECTRIFICATION?**

2 **A** Yes. Despite the higher upfront cost to install electric appliances, the modeling projects
 3 bill savings for all households that fully electrify. Of course, electricity bills will rise, but
 4 the total household energy bill decreases with the elimination of gas bills. The average
 5 annual savings are significant: nearly \$1,300 for houses on Segment One and nearly \$800
 6 for houses on Segment Two. This is because the higher cost of electricity is compensated
 7 for by the higher efficiency of heat pumps compared to gas furnaces.

	Pre-electrification	Post-electrification	Savings
Min	\$ 2,978	\$ 1,752	\$ 1,225
Max	\$ 4,136	\$ 2,559	\$ 1,576
Average	\$ 3,171	\$ 1,887	\$ 1,284

8 **Table 9: Segment One range of annual total (electric + natural gas) energy bills**

	Pre-electrification	Post-electrification	Savings
Electricity	\$ 1,572	\$ 1,887	\$ (315)
Natural gas	\$ 1,599	\$ –	\$ 1,599
Total average bill	\$ 3,171	\$ 1,887	\$ 1,284

9 **Table 10: Segment One average annual electric and gas bills, pre- and post-electrification**

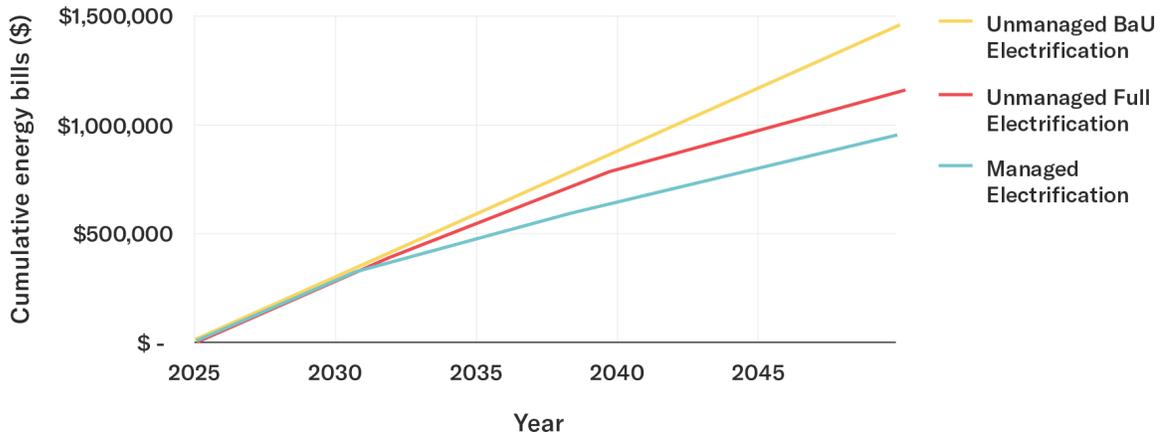
	Pre-electrification	Post-electrification	Savings
Min	\$ 1,767	\$ 1,188	\$ 579
Max	\$ 2,963	\$ 2,156	\$ 807
Average	\$ 2,209	\$ 1,434	\$ 775

10 **Table 11: Segment Two range of annual total (electric + natural gas) energy bills**

11

	Pre-electrification	Post-electrification	Savings
Electricity	\$ 853	\$ 1,434	\$ (581)
Natural gas	\$ 1,356	\$ –	\$ 1,356
Total average bill	\$ 2,209	\$ 1,434	\$ 775

1 **Table 12: Segment Two average annual electric and gas bills, pre- and post-electrification**



2
 3 **Figure 3: Cumulative energy costs for all buildings for each scenario, Segment One**

4 The modeled energy bills do not assume changes to rates over time, from inflation or
 5 otherwise. Note that previous research in other jurisdictions projects gas rates will increase
 6 due to pipeline replacement programs similar to WGL’s PIPES program.²⁹ Electric rates
 7 may also rise as more homes electrify. An Energy and Environmental Economics (“E3”)
 8 study of the state of Illinois—a state that is home to some of the largest gas utilities in the
 9 country and is, like D.C., evaluating the future of its gas system in the face of vintage,
 10 leak-prone pipe—modeled future increases in gas and electric rates and found that
 11 monthly energy costs are lower for fully electrified households than for households
 12 consuming piped gas. Their modeling found that monthly energy costs for electrified
 13 homes are lower because “gas rates escalate more rapidly than electric rates.”³⁰ Lastly,

²⁹ Dorie Seavey, et al. *The Future of Gas in Illinois* (May 2024), <https://buildingdecarb.org/resource/the-future-of-gas-in-illinois>.

³⁰ E3, *Illinois Decarbonization Study* (Dec. 2022), <https://www.ethree.com/wp-content/uploads/2022/12/E3-Commonwealth-Edison-Decarbonization-Strategy-Report.-December-2022-1.pdf>.

1 the cost for customers to operate a heat pump may be further reduced if the District adopts
2 so-called “heat pump rates,” which would adjust electric rates to encourage electrification
3 and align affordability and policy goals, such as those proposed in Massachusetts.³¹

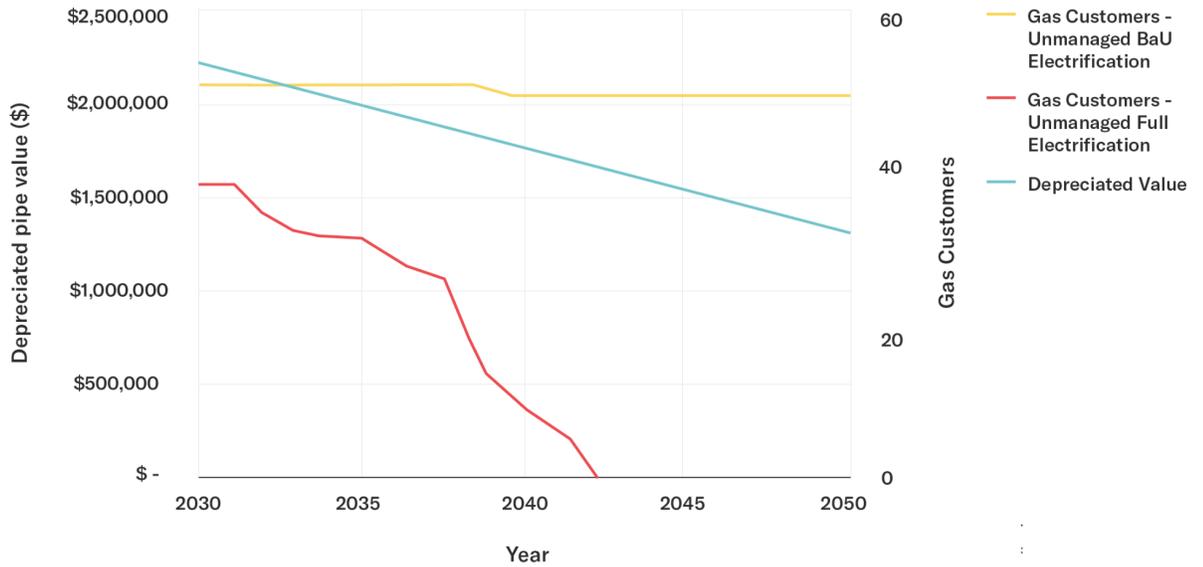
4 **Q WHAT IMPACTS ON THE GAS SYSTEM WERE OBSERVED IN THIS STUDY?**

5 **A** This study highlights the risks of underutilized or stranded gas assets. Pipe replacements
6 in the District may face impacts similar to those shown here, as electricity continues to cut
7 into gas’s share of household heating. The Unmanaged scenarios for both pipe segments
8 illustrate how customer exits will increase per-customer gas system costs, which puts
9 upward pressure on gas rates and may further motivate customer departures in a negative
10 feedback loop.

11 Figure CL-4 shows the number of customers in the two Unmanaged scenarios and the
12 depreciated value of the pipe for Segment Two. Using the estimated pipe replacement cost
13 and assumptions on the depreciation rates of the replaced pipe (described below), we can
14 show the risk of stranded asset value from customer attrition. For this modeling exercise, I
15 assumed a depreciation rate of 2.09%, which is a depreciable life of approximately 48
16 years, based on the depreciation figures provided in WGL’s District SAFE proposal.³² I
17 assumed straight-line depreciation for pipe replacement costs.

³¹ *Massachusetts Dep’t of Pub. Utils. Docket Nos. 23-80 & 23-81, Order (June 2024),*
<https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/19281184>.

³² District SAFE Plan, WG(F)-1, Workpaper 2.



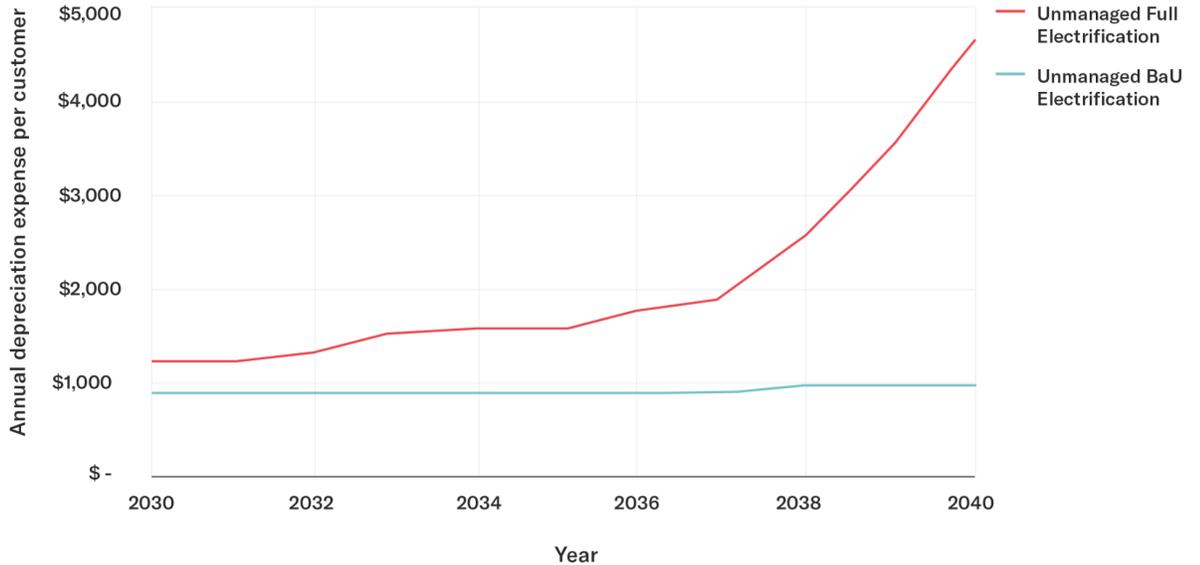
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Figure 4: Unrecovered book value (depreciated value) of replaced gas pipe compared to customer counts in an unmanaged transition for Segment Two³³

As Figure CL-5 illustrates, the depreciation expense per customer of the replaced pipe (annual depreciation divided by the number of customers on the pipe, which we can use as a proxy for the rate burden) grows by 4% in the Unmanaged BaU scenario and 280% in the Unmanaged Full scenario between 2030 (when the pipe is replaced) and 2040. After 2040, all customers have electrified in the Unmanaged Full scenario. The Unmanaged BaU scenario is our most conservative modeling of electrification rates, while the Full scenario is what is required to meet emissions targets. The actual Unmanaged outcome could be somewhere in between, but more likely towards the higher end as D.C. continues striving towards its emissions targets, and in any unmanaged transition, gas costs per customer increase. Customers will not be required to pay off the investment of the exact pipe they are served by; system costs are spread across the entire customer base. However, this provides a discrete understanding of how pipe investments may become underutilized or stranded, and how customer exits will lead to unrecovered values that will put upward pressure on costs for all customers. In an effort to reduce bill impacts, cost recovery for

³³ Please note that the chart starts when the pipe is replaced, in 2030. In the modeling, some customers have already exited by 2030.

1 pipe investments could be disallowed in the future.³⁴ The annual depreciation expense per
2 customer for the Unmanaged scenarios for Segment Two are shown in Figure CL-5,
3 below.



4
5 **Figure 5: Annual depreciation expense per customer of an unmanaged transition for Segment**
6 **Two**

7 In the Unmanaged Full Electrification scenario, the unrecovered book value of the pipe is
8 nearly \$800,000 for Segment One and over \$1.5 million for Segment Two when the last
9 customer electrifies and leaves the system. This means about 75% of the pipe replacement
10 investment would not be recovered by the time all customers exited the system for both
11 pipe segments.

12 **Q DOES TARGETED ELECTRIFICATION HELP THE DISTRICT REACH ITS**
13 **EMISSIONS GOALS?**

14 **A** Yes. The modeling shows that managed electrification will put D.C. on track to reach its
15 target of net-zero emissions by 2045. I used the modeled energy consumption for each

³⁴ For a report exploring the risks of stranded gas assets and concerns with cost recovery of pipe replacement programs in great detail, see Dorie Seavey et al., *Peoples Gas: Escalating business risk in a changing energy landscape* (Oct. 2024), www.groundworkdata.org/research/peoplesgas.

1 scenario and emissions factors for natural gas and electricity consumption to project total
2 CO₂e emissions for each scenario.

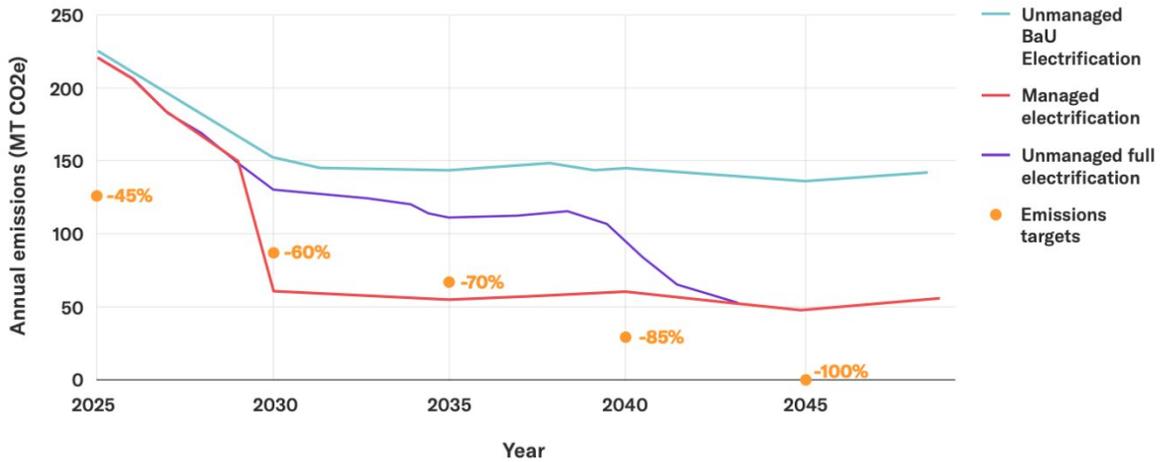
3 Natural gas emission rates are standard and published by the U.S. Environmental
4 Protection Agency (“EPA”). For future electricity emissions, I used projected marginal
5 emission rates for PJM East—which includes D.C.—developed by the National
6 Renewable Energy Laboratory (“NREL”). Note that these factors are for a much larger
7 territory than the District; in addition to D.C., PJM East includes Maryland, Virginia,
8 West Virginia, Pennsylvania, New Jersey, Delaware, Ohio, and parts of Kentucky.
9 Therefore, these factors do not capture the specific clean energy targets of D.C. and they
10 may change as more states in PJM establish, update, or make progress on emissions
11 reduction targets.

12 The District has established economy-wide emissions reduction targets, relative to a 2006
13 baseline. I used these targets to establish emissions targets for each street segment by
14 determining each street segment’s 2006 baseline emissions. For this, I used EPA’s
15 Emissions & Generation Resource Integrated Database (“eGRID”) to determine the
16 electric-sector emissions rate for 2006.³⁵ This allowed me to construct an approximation
17 for each street segment’s emissions in 2006. While the District does not have sector-
18 specific emissions targets, I applied the economy-wide reduction targets to each street
19 segment. This is represented by orange markers in the following figures, showing the
20 emission reduction target relative to my estimate of 2006 emissions. While imperfect, this
21 provides a proxy to translate economy-wide targets to actions taken at individual pipe
22 segments and in individual households.

23 Figures CL-6 and CL-7 show the annual emissions for each segment out to 2050.
24 In each, it is clear that electrification puts these homes on a path to meet the
25 District’s emissions targets. In 2050, annual emissions in the Unmanaged BaU
26 Electrification scenario are more than double what they are in the Managed
27 Electrification scenario. While emissions from electrification are not zero by

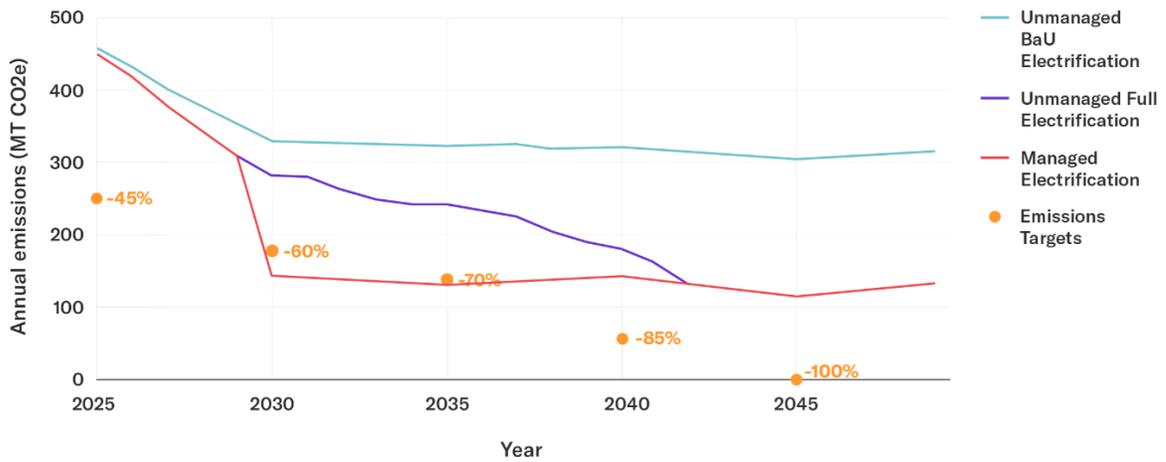
³⁵ EPA, *Emissions & Generation Resource Integrated Database (eGRID)*, <https://www.epa.gov/egrid> (accessed Oct. 2024).

1 D.C.’s target date of 2045—NREL’s modeling projects non-zero marginal
 2 emissions for PJM East in 2045—the modeling shows that the resulting emissions
 3 from a managed electrification would be roughly a quarter what they are today.



4 **Figure 6: Segment One annual emissions from energy consumption (metric tons CO2e)**

5



6 **Figure 7: Segment Two annual emissions from energy consumption (metric tons CO2e)**

7

8

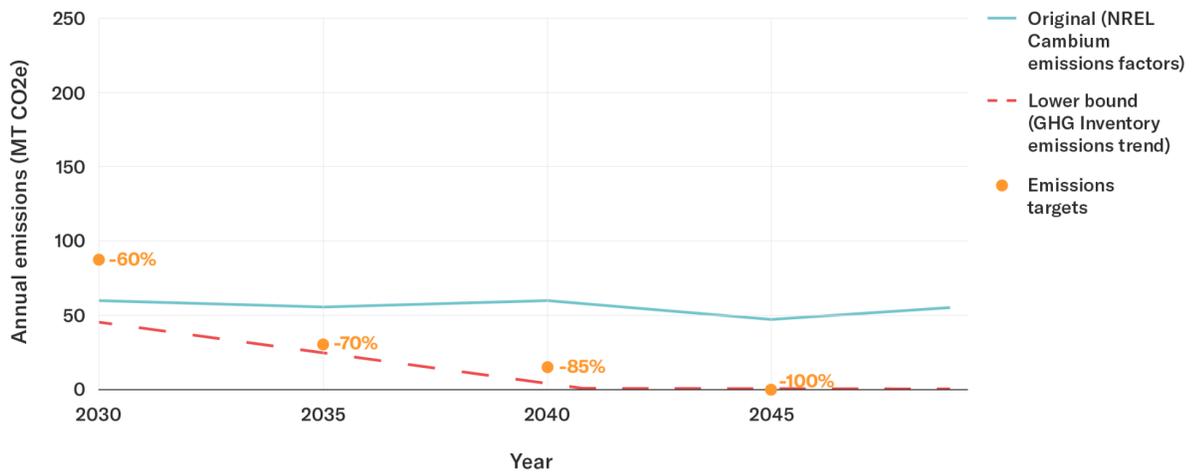
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10

	Unmanaged BaU Electrification	Unmanaged Full Electrification	Managed Electrification
Segment One	3,824	2,663	2,046
Segment Two	8,389	5,593	4,471

11 **Table 13: Cumulative emissions (metric tons CO2e) for each scenario, 2025-2050**

1 As I mentioned, the electric emission rates I used represent a much larger territory than
 2 that of Washington, D.C. Electric sector emission rates are not 0 by 2045; however, the
 3 Greenhouse Gas (“GHG”) Inventory from the D.C. Department of Energy and
 4 Environment (“DOEE”) shows a consistent decrease in electric sector emission rates since
 5 2006. Using the trend in electric sector emission rates from the GHG Inventory, I
 6 constructed a lower bound on street segment emissions (with the NREL projections
 7 serving as an upper bound). Figure CL-8 shows the resulting range of possible emissions
 8 for Segment One post-electrification (Managed Electrification scenario, only). The
 9 original results for the Managed Electrification scenario in Figure CL-6 are shown along
 10 with an update to these results if electric sector emission rates follow the decreasing trend
 11 found in the GHG Inventory.



12 **Figure 8: Segment One upper (NREL Cambium projected emissions factors) and lower**
 13 **(GHG Inventory trend) bounds on emissions post-electrification for the Managed**
 14 **Electrification scenario**
 15

16 The results show that electrification puts D.C. on a path to net-zero emissions. Depending
 17 on which projection is used, the emissions intensity of electric consumption would be
 18 lower than that of piped gas sometime between 2028 (using the GHG Inventory trend) and
 19 2033 (using the NREL Cambium projection).

20 I did not consider emissions from piped alternative fuels in this analysis. WGL states that
 21 pipe replacement would enable it “to safely facilitate the transportation of certain

1 renewable and lower carbon intensity fuel types within the District.”³⁶ However,
2 alternative piped fuels like hydrogen or renewable natural gas (“RNG”) are not practical
3 solutions for decarbonizing the District’s building stock. Such fuels are expensive and can
4 increase the supply cost of gas multifold, motivating customers to switch away from gas.
5 They also do not follow the same economies of scale found in decarbonization
6 technologies like electrification, rely on limited feedstocks, and are better suited to non-
7 residential sectors that are harder to decarbonize.³⁷

8 Additionally, I did not include emissions from methane leaks. While pipe replacement
9 would reduce leaks, it would not eliminate them completely, as pipe decommissioning
10 would.³⁸ Per the District SAFE proposal, replacement of all vintage materials would still
11 result in over 5,000 MT CO₂e of fugitive leak emissions annually.³⁹ Regardless, leak
12 emissions are not well quantified and the existing data suggests leaks are a small portion
13 of emissions compared to gas combustion.⁴⁰ While the District SAFE plan highlights that
14 replacement of vintage main has the potential to result in “an approximately 92%
15 reduction in fugitive emissions,” DOEE’s GHG Inventory for 2021 shows that fugitive
16 methane emissions only represented 6% of total emissions from natural gas consumption.
17 Further, if we compare total building emissions in the GHG Inventory to WGL’s estimates
18 of annual leak emission reductions, we find that the annual emission savings since 2014
19 were less than 1% of total building emissions.^{41, 42} All of this is happening while data
20 from the GHG Inventory and studies of pipe replacement programs in other parts of the

³⁶ District SAFE Plan, Exhibit WG(A)-1 at 36.

³⁷ Building Decarbonization Coalition and Groundwork Data, *The Future of Gas in New York* (Mar. 2023), <https://buildingdecarb.org/wp-content/uploads/BDC-The-Future-of-Gas-in-NYS.pdf>.

³⁸ WGL’s District SAFE proposal translates emissions factors from the WGL Annual GHG Emissions Report in Formal Case No. 1162 as 4,757 kgCO₂e/yr/mile for plastic main and 4 kgCO₂e/yr/service for plastic services. *See* District SAFE Plan, Exhibit WG(A)-1 at 34.

³⁹ *Id.* at 34-35.

⁴⁰ See my previous discussion of Sargent, et. al., which found that leaks are likely undercounted in existing methodologies.

⁴¹ *See* Table 6, District SAFE Plan, Exhibit WG(A)-1 at 33.

⁴² DOEE GHG Inventory, 2006-2021.

1 country—including the Sargent study I previously discussed—are showing that pipe
2 replacement programs are not meaningfully reducing leaks.⁴³

3 **IV. Conclusion**

4 **Q PLEASE SUMMARIZE THIS STUDY.**

5 **A** This illustrative analysis shows that pipe replacement in the District is not the most
6 prudent solution to reducing customer costs and achieving climate goals. The competitive
7 price of electricity today, combined with the efficiency of electric heat pumps, makes it
8 such that D.C. households can realize energy bill savings today by electrifying. Managed
9 electrification of District homes may speed up the natural pace of building investments,
10 but it will minimize future financial risks for customers and WGL alike by avoiding
11 reinvestment in pipelines that may become underutilized or stranded. Investments in
12 building electrification, coupled with gas pipe decommissioning, cost less than investment
13 in gas pipe replacements and bring about significantly lower building-sector emissions
14 relative to the status quo.

15 **Q ARE THE FINDINGS OF THIS STUDY UNIQUE TO THE DISTRICT?**

16 **A** No, the value of a managed transition and the risks of an unmanaged transition are not
17 unique to D.C. This is why—in addition to the District—twelve states are currently
18 investigating the future of their regulated gas utilities.⁴⁴ The exact strategies and their
19 associated costs and benefits will vary, both across regions and within a given gas utility’s
20 territory. For example, delivered fuels, like propane, can be incorporated as a strategy in
21 less dense regions with a robust delivery system, but are likely not appropriate for D.C.⁴⁵

⁴³ The GHG Inventory shows that leak emissions were in fact 62% higher in 2021 than they were in 2006. A 2021 study of Massachusetts’s gas pipe replacement program found that “leak repair activity, at best, has only managed to keep up with the new leaks emerging each year.” See Dorie Seavey, *GSEP at the Six-Year Mark: A Review of the Massachusetts Gas System Enhancement Program*, Version 1.0 (Oct. 2021), <https://gasleaksallies.org/gsep>.

⁴⁴ See Building Decarbonization Coalition, *DecarbNation, Issue 2: The Future of Gas*, <https://buildingdecarb.org/decarbation-issue-2> (containing a summary and tracker e on future of gas proceedings).

⁴⁵ Groundwork Data, *Thermal Transition Strategy Study: Non-Pipeline Gas Alternatives to Gas Pipeline Replacement* (May 2024), <https://static1.squarespace.com/static/62e94d16a77e1e191eafe4ae/t/664b5646b24bad05ce98ad9b/1716213320738/Thermal+Transition+Strategy+Study+5.14.24.pdf>.

1 Ground-source heat pumps and thermal energy networks are additional technologies that
2 can serve as alternatives to gas pipe replacement and deserve further study.⁴⁶ An analysis
3 similar to the one presented here can be invaluable in assessing the tradeoffs of NPAs. The
4 California Clean Energy Commission’s work to develop a framework for evaluating and
5 selecting pipe segments for decommissioning and NPA deployment is the most advanced
6 development by a state entity in this space.⁴⁷

7 **Q DOES THIS CONCLUDE YOUR TESTIMONY?**

8 **A** Yes.

⁴⁶ HEET & BuroHappold Engineering, *Geothermal Networks: 2019 Feasibility Study* (revised 2023), https://cdn.prod.website-files.com/649aeb5aaa8188e00cea66bb/656f8ad67bbc7df081e3fe17_Buro-Happold-Geothermal-Network-Feasibility-Study.pdf.

⁴⁷ Aas, et al., *An Analytical Framework for Targeted Electrification and Strategic Gas Decommissioning: Identifying Potential Pilot Sites in Northern California’s East Bay Region* (June 2024), <https://gridworks.org/wp-content/uploads/2024/07/Targeted-Electrification-and-Strategic-Gas-Decommissioning.pdf>.

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE DISTRICT OF COLUMBIA**

IN THE MATTER OF)
THE INVESTIGATION INTO) **Formal Case No. 1179**
WASHINGTON GAS LIGHT COMPANY'S)
STRATEGICALLY TARGETED PIPE)
REPLACEMENT PROGRAM)

DECLARATION

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

Dated: December 10, 2024



Conor Lyman

QUALIFICATIONS

CONOR LYMAN

PROFESSIONAL EXPERIENCE

Groundwork Data (New York, New York) 2022 – Present

Senior Research Scientist

- Lead design and development of tool suite for energy infrastructure and gas transition planning
- Simulate and investigate gas transition scenarios and utility finances for research studies in multiple US states and cities in collaboration with universities, national labs, tool developers, non-profits, and government agencies

Blueprint Power (New York, New York) 2019 – 2023

Modeling and Simulation Engineering Manager, Modeling Engineer, Consultant

- Led team of engineers developing energy modeling and simulation tools for distributed energy resources (DERs)
- Designed and implemented Python-based models for DER projects that forecast long-term project economics and optimized DER dispatch in response to market signals

Lockheed Martin Skunk Works (Palmdale, California) 2017 – 2019

Research Scientist

- Developed Python code for signature management trade studies that programmatically develops parametric CAD designs

EDUCATION

Cornell Tech 2023

Jacobs Technion-Cornell Dual Master of Science Degrees – Urban Tech Concentration

The George Washington University 2017

Bachelor of Science, Mechanical Engineering

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EXHIBIT LIST

Exhibit SC (C)-1	CV's of the Gas Technical Panel
Exhibit SC (C)-2	NYSEARCH Project Summary Presentation

1

2

I. INTRODUCTION & BACKGROUND

1 **Q. PLEASE STATE YOUR NAMES AND INTRODUCE THE GAS TECHNICAL**
2 **PANEL.**

3 A. The Gas Technical Panel (the “Panel”) is comprised of Jim Crowley and Jeremy
4 Walker. Jim Crowley is an Associate at Rod Walker & Associates (“RWA”), a
5 Management Consultancy and Technical Advisory firm based near Atlanta, GA and
6 Jeremy Walker is the Chief Operating Officer of RWA.

7 **Q. PLEASE SUMMARIZE YOUR EXPERIENCE.**

8 A. Jim Crowley has over 30 years of experience in the natural gas industry with more
9 than 20 years as Manager of the Gas, Meter and Safety Departments at Easton Utilities, a
10 municipal natural gas utility in Maryland. His responsibilities and experience span from
11 gas procurement; federal, state, and local regulatory code compliance; budgeting; system
12 planning and design; gas/electric and water metering systems; and Occupational Safety
13 and Health Administration (“OSHA”) training and safety. He served several terms on the
14 Miss Utility of Delmarva Board and the Maryland Gas Operations Advisory Committee,
15 and was an active member on many committees for the American Public Gas Association.
16 Mr. Crowley, through his industry tenure, engineered and managed pipeline replacement
17 programs and oversaw safety, reliability, compliance, and general operations at a
18 combination utility.

19 Jeremy Walker is an expert in the analysis of gas technical and operations issues
20 in regulated natural gas utilities and has gained extensive knowledge and familiarity with
21 the natural gas regulatory process through his work serving as lead for RWA in more than
22 40 regulatory proceedings in the states of Arkansas, Arizona, California, Colorado,

1 Delaware, Rhode Island, Illinois, Massachusetts, Maryland, New Jersey, and the District
2 of Columbia. For these proceedings, he sponsored or supported testimony and expert
3 analysis regarding various gas technical issues, such as operations, integrity management,
4 and capital and operation and maintenance (“O&M”) spend for RWA’s work on rate
5 cases, large project prudence reviews, infrastructure and climate programs/plans, and
6 other similar regulatory proceedings. Specific to this case, Jeremy supported RWA’s
7 efforts in a number of rate case and PROJECT*pipes* (“PIPES”) proceedings in DC on
8 behalf of the Office of People’s Counsel and the Sierra Club.

9 **Q. ON WHOSE BEHALF ARE YOU APPEARING?**

10 A. We are submitting this testimony on behalf of the Sierra Club.

11 **Q. HAVE MEMBERS OF THE PANEL EVER TESTIFIED BEFORE A PUBLIC**
12 **UTILITY COMMISSION?**

13 A. Yes. We have submitted or supported testimony before various state utility
14 commissions and similar bodies, including:

- 15 • The Arkansas Public Service Commission
 - 16 • The Arizona Corporation Commission
 - 17 • The California Public Utilities Commission
 - 18 • The Delaware Public Service Commission
 - 19 • The District of Columbia Public Service Commission
 - 20 • The Illinois Commerce Commission
 - 21 • The Maryland Public Service Commission
 - 22 • The Massachusetts Department of Public Utilities
 - 23 • The New Jersey Board of Public Utilities
 - 24 • The Regulatory Commission of Alaska; and
 - 25 • The Rhode Island Division of Public Utilities and Carriers.
- 26

1 An account of our experience is attached as Exhibit SC (C)-1.

2 **Q. WAS THIS TESTIMONY PREPARED BY THE YOU OR UNDER YOUR**
3 **SUPERVISION AND CONTROL?**

4 A. Yes.

5 **II. SCOPE AND SUMMARY OF TESTIMONY**

6 **Q. WHAT IS THE SCOPE AND PURPOSE OF YOUR TESTIMONY IN THIS**
7 **PROCEEDING?**

8 A. On September 27, 2024, Washington Gas Light Company (“WGL” or the
9 “Company”) filed a Revised Application for Approval of The District Strategic
10 Accelerated Facility Enhancement (“District SAFE”) Plan (“Application”) seeking
11 authorization to undertake replacement of certain vintage materials on its system in the
12 District and to recover the costs associated with doing so through the previously
13 approved surcharge mechanism for the Company's accelerated pipe replacement program.
14 The District SAFE Program is, essentially, a re-branded PIPES program and WGL has
15 not proposed to change the pace of capital spend nor the targets of that spend in any
16 material way that is inconsistent with previous PIPES applications.

17 In this testimony, the Panel presents its findings and recommendations to the
18 Public Service Commission of the District of Columbia (“Commission” or “PSC”)
19 regarding its analysis of the prudence of WGL’s proposed approach to this accelerated
20 pipe replacement program and its probable impact on ratepayers and safety within the
21 District. The testimony is organized into four primary sections:

- 22 1. A discussion of WGL’s work to date managing pipeline safety on its system
and risk mitigation practices, including an analysis of WGL’s plan to increase

1 the current pace of pipeline replacement, including aged, corroded, and
2 leaking cast iron mains, bare and unprotected steel mains and service, and
3 copper services in its distribution system.

4 2. Analysis and discussion of WGL’s proposed District SAFE Program approach
5 to pipeline replacement, including its risk ranking and consideration of
6 alternatives.

7 3. Discussion of the future uses of the WGL distribution system, such as WGL’s
8 suggested future use to carry hydrogen and renewable natural gas.

9 4. Discussion of WGL’s proposed customer choice program.

10 **Q. PLEASE SUMMARIZE THE PANEL’S CONCLUSIONS AND**
11 **RECOMMENDATIONS.**

12 A. Based on a review of the Company’s Application, data responses produced in this
13 proceeding, and other publicly available information, the Panel’s conclusions are as
14 follows:

15 1. Despite Research and Special Programs Administration (“RPSA”) Alert Notices ¹
16 issued in 1991 and 1992, WGL’s slow historic pace has allowed its current cast
17 iron pipe within the District to still make up a disproportionately high percentage
18 of its distribution gas main inventory.

19 2. WGL has an obligation to maintain a safe and reliable system and to retire its cast
20 iron mains regardless of cost recovery structures.

¹ RSPA Alert Notice 91-02 and RSPA Alert Notice 92-02.

- 1 3. Between 2013 and 2023, WGL only retired 25.5 miles² of cast iron gas main.
- 2 4. WGL’s PIPES program has been fraught with challenges—some of which were
- 3 outside of its direct control. It is unclear how the proposed District SAFE Program
- 4 will address these challenges and increase the pace of mitigating leaking pipes.
- 5 Therefore, WGL’s proposed plan to accelerate its pipeline replacement project
- 6 appears likely to be ineffective.
- 7 5. WGL’s commentary on readying its system for potential hydrogen and RNG
- 8 deployment is both speculative and irrelevant, respectively.
- 9 6. The proposed Customer Choice program appears unlikely to have any material
- 10 impact on any of the District’s goals and may result in imprudently incurred costs.

11

12 Given the above conclusions, the Panel’s recommendations are as follows:

- 13 1. That the Commission not approve WGL’s District SAFE program as proposed.
- 14 2. That the Commission direct WGL to file with its annual project plan a
- 15 demonstration that the utility gave fair and reasonable consideration to
- 16 alternatives to the replacement of leak-prone pipe. This demonstration shall
- 17 include:
 - 18 a. A list of mitigation alternatives considered;
 - 19 b. Estimated costs for each alternative considered; and

² *Formal Case No. 1179, In the Matter of the Investigation into Washington Gas Light Company’s Strategically Targeted Pipe Replacement Plan (“Formal Case No. 1179”), Washington Gas Light Company’s Revised Application for Approval of the District Strategic Accelerated Facility Enhancement Plan at 10, filed Sept. 27, 2024 (“District SAFE Plan”).*

- 1 c. Reasons for rejecting or choosing each alternative, including but not limited to
2 cost, feasibility, engineering considerations, and timing.
- 3 3. That the Commission direct WGL to consider the implementation of targeted
4 repair techniques to extend the life of its cast iron and bare steel assets. To
5 demonstrate this, WGL shall identify, at the very least, the following:
- 6 a. Leak rates from cast iron joint;
7 b. Estimated cast iron joints by type;
8 c. Unit costs to perform joint encapsulation; and
9 d. Unit costs to perform patch-type main repairs.
- 10 4. That if the Commission does find any proposed accelerated capital recovery
11 mechanism to be just and reasonable, the Commission direct WLG to perform
12 materially similar capital work, to be recovered within base rates at a pace equal
13 to 25% of that of the work performed within the District SAFE program (if
14 approved). This stipulated base spend shall only affect cost recovery and not
15 create a second program or redundant operational structures. This shall not
16 increase the total size of capital spend on District SAFE-type work, but instead
17 would be an allocation of recovery methods.
- 18 5. That the Commission direct WGL to separately track direct and indirect costs for
19 the Customer Choice Program and to track adoption rate (*i.e.* services retired), all
20 on an annual basis. Further, that this data be publicly reported to the Commission
21 and that the Commission rely on the cost-benefit ratio of this data to inform
22 WGL's ongoing implementation of the Customer Choice Program.

1

III. MANAGING PIPELINE SAFETY

2 **A. *Summary of WGL’s Attempts to Date to Manage Safety***

3 **Q. WHAT REVIEW DID YOU PERFORM REGARDING WGL’S PIPELINE**
4 **REPLACEMENT PLANS?**

5 A. We reviewed material made available in WGL’s filing. We also issued discovery;
6 however, despite diligent efforts to pursue responses to this discovery, WGL has objected
7 and delayed responding to some of these questions. Given the compressed timeline of this
8 proceeding, critical responses to discovery will not be received before this testimony is
9 filed or will be received shortly before it is filed. Thus, this review was not inclusive of
10 all documents and records required to perform a complete and thorough evaluation and
11 audit of the Company’s request, and is subject to revision. We also reviewed publicly
12 available data regarding the performance and nature of WGL’s distribution system,
13 technology and utility data in other states, and WGL’s public statements.

14 **Q. DESCRIBE WGL’S DISTRIBUTION SYSTEM ASSETS AND ITS WORK TO**
15 **DATE MANAGING THOSE.**

16 A. Among medium-large gas distribution system operators, WGL operates a
17 distribution system with the second highest percentage of cast iron main in the country
18 and twelfth largest quantity of miles of cast iron main.³ As acknowledged repeatedly by
19 the U.S. Pipeline and Hazardous Materials Safety Administration (“PHMSA”)⁴, the DC

³ 2023 PHMSA F7100.1-1 Annual report. The term “[s]econd highest” sets aside two small utilities with only 60 miles of main.

⁴ See, e.g., DOT News Release, “US Transportation Secretary Ray LaHood Announces Pipeline Safety Action Plan,” <https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/docs/dot4111.pdf>.

1 PSC, WGL itself⁵, and industry at large, this disproportionately high percentage of cast
 2 iron main likewise represents a disproportionately higher chance of failure or leak and
 3 thus a greater risk to public safety, property, and system reliability due to the inherent
 4 material properties of the material, as well as the age of the pipe, which was among the
 5 first gas piping materials used in the country. The safety threat of this pipe is uncontested.
 6 In addition to cast iron, WGL’s system also contains additional pipe that is prone to leaks,
 7 such as steel pipe that was never coated when it was installed or never had cathodic
 8 protection systems installed, and thus is more prone to accelerated corrosion.

9 To date, WGL has invested heavily in retiring leak-prone mains and services in its
 10 distribution system. Despite this investment, WGL has been unable to accelerate its
 11 progress, with the average annual total Leak Prone Pipe (“LPP”) retirement being a mere
 12 3.5-5 miles per year and cast iron retirements averaging 2.5-3 miles per year.⁶

10-Year LPP Main Retirement Summary				
Year	BS	UPS	CI	Total LPP Main
2012	27.9	66.6	419.2	513.7

2019	22.5	55.7	404.9	483.1
2020	22.0	54.7	402.5	479.2
2021	21.6	54.0	398.8	474.3
2022	20.9	53.2	396.6	470.7
2023	19.8	53.1	392.6	465.5
5-year annual change (avg)	0.5	0.5	2.5	3.5
10-year annual change (avg)	0.8	1.3	2.7	4.8

Figure 1: Main Retirement Summary

⁵ District SAFE Plan at 4.

⁶ WGL’s 2012-2023 PHMSA F7100.1-1 Annual Report data.

1 **B. WGL’s Proposal for Pipeline Replacement Within the District SAFE Program Is Unlikely**
2 **to Materialize**

3 **Q. HOW IS WGL PROPOSING TO ADDRESS THIS ISSUE OF PACE IN ITS**
4 **APPLICATION FOR A DISTRICT SAFE PROGRAM?**

5 A. Recognizing the importance of retiring these assets faster, WGL has proposed to
6 accelerate its pace of LPP retirement beginning in the final year of this initial SAFE
7 Application, as summarized in the figure below.

Year Starting	Estimated Miles of Main	Estimated Services Relaced / Remediated		
		Service Only Repl.	Service Repl. with Main	Service Transfers ⁴⁰
CY 2025 ⁴¹	2.2	1,036	155	39
CY 2026	2.5	1,298	217	116
CY 2027	7.7	278	624	399
Total	12.4	2,612	996	554

8

9

Figure 2: Proposed SAFE pace⁷

10

The moderately increased main mileage in 2027 appears to coincide with a large
11 decrease in service replacement, but nonetheless is a small increase over the last decade
12 of work. In addition to this increase in 2027, WGL expects to “further accelerate”⁸ in
13 future years, but does not specify what this means. In support of its accelerated pace,
14 WGL proposes a 2045 completion target and references a required 23 miles per year
15 retirement pace to meet that target.⁹

16

17

⁷ District SAFE Plan at 29.

⁸ *Id.* at 39.

⁹ *Id.* at 40.

1 **Q. HOW DOES WGL PROPOSE TO MEET THAT ACCELERATED COMPLETION**
2 **TARGET?**

3 A. Despite its initial commitment to a 2054 timeline for replacement of high-risk
4 main, we concur with WGL’s forecast that on its current trajectory, remaining high-risk
5 main will not be retired until almost 100 years past its committed end date—or close to
6 the year 2150.¹⁰ This is, of course, unacceptable and all parties involved agree that, to the
7 extent that the District continues to rely on WGL’s gas system, this timeline must be
8 moved up to avoid highly-probable large-scale pipeline leaks and failures.

9 WGL proposes very few changes beyond what it is already doing to support its
10 approach of an escalated pace. Primary among these changes appear to be the following:

- 11 1. WGL proposes to bring on additional contractor resources.¹¹
12 2. WGL laments the impact of District requirements on its operations and plans to
13 engage with the District’s Department of Transportation (“DDOT”).¹²

14 **Q. DO YOU HAVE CONCERNS WITH WGL’S PROPOSED APPROACH?**

15 A. Yes. There are three primary areas of concern.

16 Firstly and as an initial matter, WGL’s proposed change in pace reflects neither a
17 “reasonable ramp up in pace”¹³ nor a “significant” accelerat[ion].”¹⁴ The Company’s
18 characterization of this ramp up as being in the first three years of the District SAFE
19 program ignores the decade of opportunity WGL already had for a ramp up in pace

¹⁰ *Id.* This assumes 477 miles remaining and uses a 5-year average historic retirement pace.

¹¹ Direct Testimony of Witness Jacas, Exhibit WG(C) at 12.

¹² Exhibit WG(A)-1 at 25.

¹³ Direct Testimony of Witness Jacas, Exhibit WG(C) 12:9-11.

¹⁴ *Id.* at 19:1-2.

1 within PROJECT *pipes* and the over three decades of opportunity WGL had to address
2 cast iron replacements on an accelerated basis in support of PHMSA’s recommendations
3 in 1991. This “reasonable ramp up period” includes two years of work at half the (already
4 slow) pace of previous years and one year at less than a third of the pace needed to meet
5 WGL’s 2045 completion target. It does, however, still involve an escalation of unit
6 costs—with the cost per mile of main replacement estimated by WGL to be starting at
7 \$8m per mile.

8 Secondly, regarding the specific approaches WGL is taking to increase its pace, to
9 our knowledge, WGL has never cited the availability of contractor resources as a limiting
10 factor to its ability to get work done. Contractor resources are a staple of most utilities’
11 operations and WGL’s implication that by ramping up external resources, it will
12 automatically be able to get more work done is inconsistent with its historic performance.
13 Further, WGL’s implication that “regulatory uncertainty”¹⁵ has caused it to drop
14 contractors and require a ramp up appears, at face value, entirely unreasonable. WGL’s
15 obligation to provide a safe system is independent of regulatory certainty and cost
16 recovery. To the extent that WGL has let contract resources go, leading to a slowing in
17 the pace of work, and is implying that it will only be able to ramp up resources with
18 regulatory certainty, we strongly refute that approach. WGL has a large inventory of leak-
19 prone pipe and associated workload that it must do regardless of its rate recovery
20 mechanism.

21 Regarding the District’s policies on work restrictions, these restrictions do indeed
22 have an impact on operations. The framework of the issue that WGL describes is that

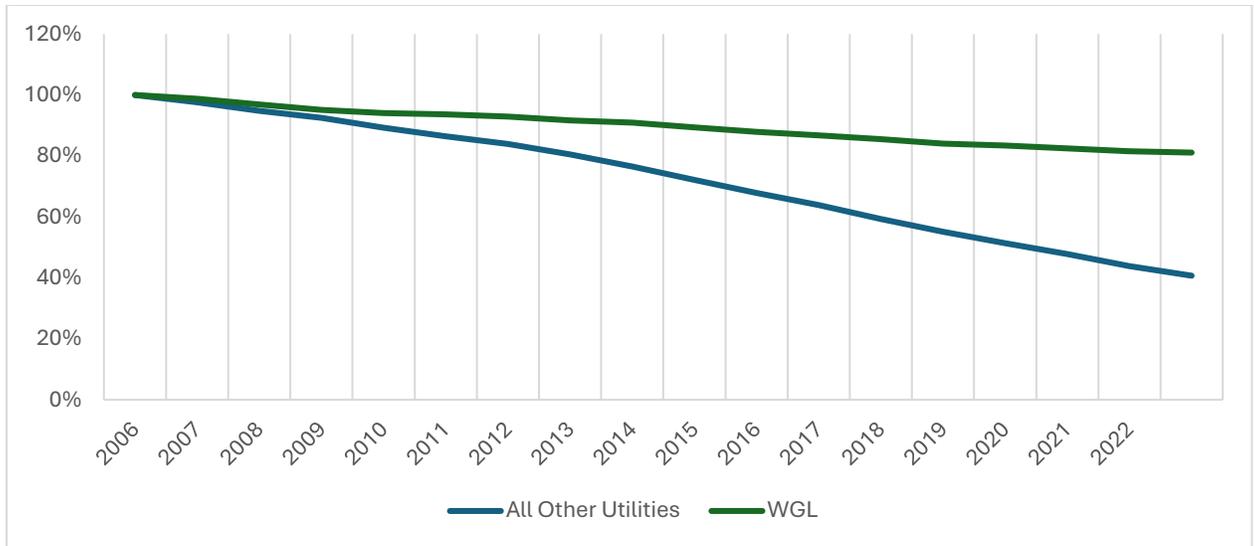
¹⁵ *Id.* at 12:14-20.

1 recent DDOT changes have led to a slowing of work. Looking below to Figure 3,
2 however, which shows WGL lagging behind industry norms for cast iron replacement
3 since 2009, this raises questions as to the impact of these restrictions. Regardless, we
4 support WGL's efforts to negotiate alternatives to work restrictions where the Company
5 can improve pace and cost. That said, WGL has not proposed a solution or negotiated
6 changes in District policy that it can point to as truly new efforts in support of its
7 proposed accelerated pace.

8 **Q. HOW DOES WGL'S PROPOSAL COMPARE TO ITS PERFORMANCE?**

9 A. This latest iteration of WGL's plan, while somewhat aspirational, is entirely
10 inconsistent with decades of performance and based on non-substantive changes. WGL
11 has been aware of the need to retire cast iron pipes for decades and has been under the
12 direction of PHMSA to retire these assets since 1991. Since 1991, WGL has only retired
13 about an average of 6.5 miles per year. Aside from a few early years in which dozens of
14 miles of cast iron pipe were retired,¹⁶ WGL's consistent sluggish pace relative to the rest
15 of the industry has lagged. PHMSA tracks cast iron inventories of utilities around the
16 country. An export of that database allows an easy comparison between WGL and the
17 industry as a whole. When trending this data in percentage change from baseline to
18 account for system size, it is clear that WGL underperforms and has done so both for a
19 long time, and in an escalating manner.

¹⁶ For instance, this includes 32 miles of cast iron retirement from 1994-1995.



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Figure 3: CI Inventory: Percent change from baseline (2005)

The figure above represents a percent change in inventory from the baseline.

While this normalizes a dataset spanning all sizes of utilities and is a more fair way to look at the data, this does not display actual miles retired. The figure below, however, does just that—with the lines illustrating annual miles of cast iron main retired.¹⁷ The figure clearly shows that the industry as a whole has escalated its retirement of cast iron, while WGL has actually slowed its pace.

¹⁷ This was calculated as a change in miles (i.e., year 2 miles minus year 1 miles and so on). The industry average is total change in miles divided by the number of operators with cast iron in each year.

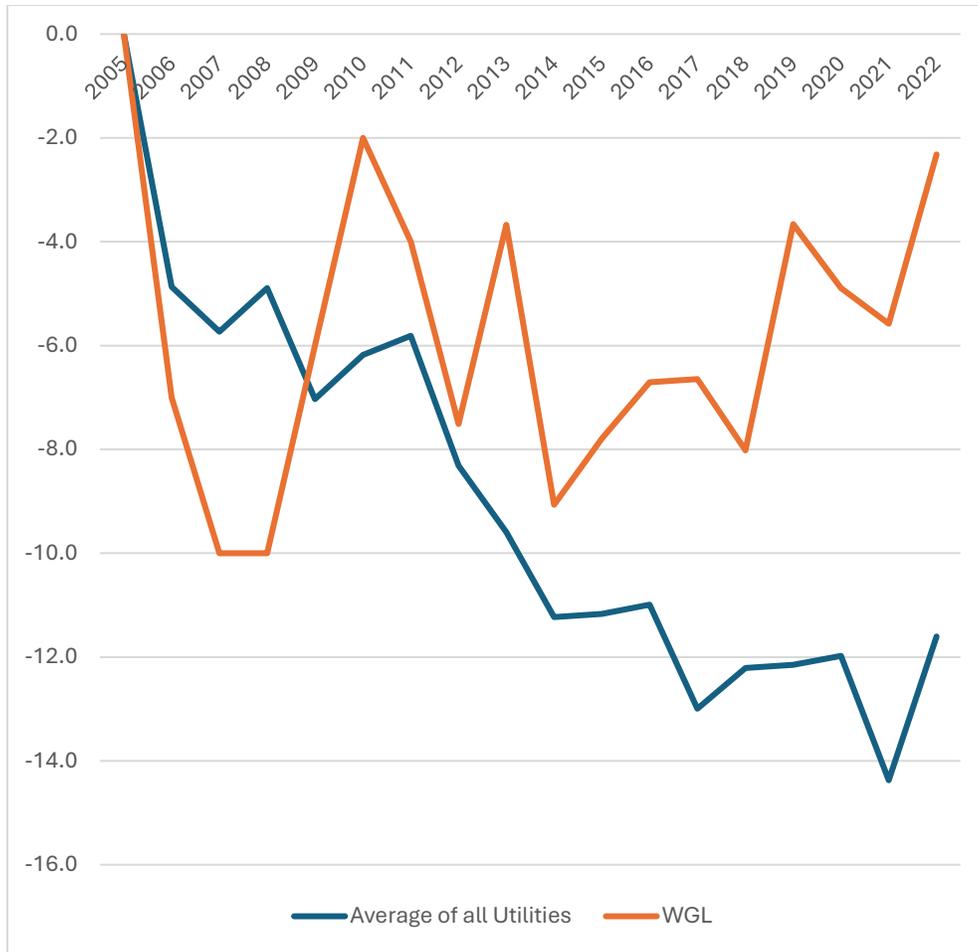


Figure 4: Change in cast iron main inventory (miles)

Q. WHAT DO THESE TRENDS DEMONSTRATE?

A. They demonstrate that WGL has been consistent in its historic approach to cast iron retirement and that its performance has lagged that of the industry and is worsening relative to other utilities and relative to its own historic performance, as measured by cast iron retirements. This has led to the deferral of pipeline replacement costs to the present and future that, according to WGL’s own analysis, are more than double what they were

1 as recent as 2014 and have reached approximately \$8,000,000 per mile of pipeline
2 replaced.¹⁸

3 **Q. HOW IS THIS RELEVANT TO WGL'S CURRENT PROPOSAL WITHIN THIS**
4 **CASE?**

5 A. As a preliminary item, the cost itself is enormous. Even with no assumed unit cost
6 inflations, WGL will spend over \$4.6 billion dollars just to retire its remaining inventory
7 of leak-prone pipe,¹⁹ which is about \$220 million dollars a year on average. This cost is
8 simply unacceptable and would not be the forecasted reality if WGL had performed this
9 work at a similar rate to the rest of the industry.

10 WGL proposes a few changes in approach to achieve its target pace; however, the
11 argument that these will be effective in improving the pace of retirements is not
12 convincing. WGL has consistently demonstrated its inability to at least maintain pace
13 with the industry in addressing the risk of LPP over a period that spans many changes in
14 work restrictions, District regulations and requirements, urban vehicle density, and policy
15 initiatives. WGL's promises to increase its pace without increasing spending and without
16 materially changing its operational approach appear unlikely to materialize without some
17 external incentive.

18 WGL has estimated a pace of LPP retirement (23 miles per year) in order to
19 achieve full retirement by 2045, which appears unlikely to succeed. This pace of work
20 and spend includes the three upcoming years, as summarized below.

¹⁸ Exhibit WG (A)-1 at 23, Figure 12.

¹⁹ *Id.* at 23, 24, 31 [The calculation is $(\$8,000,000 * 477) + (\$25,000 * 32,167) = \$4,620,175,000$].

Year	Program Funding
2025 ³⁸	\$50,000,000
2026	\$75,000,000
2027	\$90,000,000
Total	\$215,000,000

Figure 5: Annual SAFE Costs

This level of spend is enormous and would still result in minimal leak prone pipe retirements below or marginally above historical retirements.

Q. WHAT DO YOU PROPOSE THE COMMISSION DO TO MITIGATE THESE CONCERNS AND INCENTIVIZE THE UTILITY TO MEET ITS PERFORMANCE GOALS?

A. We propose that the Commission reject WGL’s District SAFE program as proposed. Instead, we recommend that WGL be directed to take the following three categories of action:

1. File with its annual project plan a demonstration that the utility gave fair and reasonable consideration to alternatives to replacement of leak-prone pipe. This demonstration shall include:
 - a. A list of mitigation alternatives considered;
 - b. Estimated costs for each alternative considered; and
 - c. Reasons for rejecting or choosing each alternative, including but not limited to cost, feasibility, engineering considerations, and timing.

This filing requirement would be consistent with the Commission’s request that utilities, “[o]ther than pipe replacements, identify techniques, technologies,

1 strategies, or other options the Company considered to reduce the leak rates and
2 risk of the aging leak-prone pipes in the distribution system.”²⁰ WGL has not
3 adequately demonstrated in its Application or testimony in this case that it has
4 given fair and adequate consideration to any of those techniques, technologies,
5 strategies, or other options, as requested by the Commission.

- 6 2. That the Commission direct WGL to consider the implementation of targeted
7 repair techniques to extend the life of its cast iron and bare steel assets. To
8 demonstrate this, WGL shall identify, at least, the following:
- 9 a. Leak rates from cast iron joint;
 - 10 b. Estimated cast iron joints by type;
 - 11 c. Unit costs to perform joint encapsulation; and
 - 12 d. Unit costs to perform patch-type main repairs.

13 This recommendation is consistent with the Commission’s directives for WGL to
14 take a “narrowly focused approach [to fixing its] aging highest-risk pipe
15 segments[...].”²¹ Further, utilizing targeted repair techniques has been
16 demonstrated to be vastly superior in terms of cost²²—allowing WGL to mitigate
17 more risk for fewer dollars and with less pipe replaced. While not possible in

²⁰ *Formal Case No. 1179*, Order No. 22003 at 51, (f).

²¹ *Id.* at 49.

²² *Formal Case No. 1167, In the Matter of the Implementation of Electric and Natural Gas Climate Change Proposals, Formal Case No. 1156, In the Matter of the Washington Gas Light Company’s Application for Approval of a PROJECTpipes 2 Plan, Formal Case No. 1130, in the Matter of the Investigation into Modernizing the Energy Delivery System for Increased Sustainability*, DC Department of Energy and Environment, *Strategic Electrification in Washington, D.C.: Neighborhood Case Studies of Transition from Gas to Electric-based Building Heating* at 9, filed February 28, 2023.

1 every single instance, deployment of these types of efforts may help overcome
2 WGL's inability to increase its pace of LPP mitigation.

- 3 3. That the Commission direct WGL to perform capital work, to be recovered within
4 base rates at a pace equal to 25% of the work performed within the SAFE
5 program. This shall only affect cost recovery and not create a second program or
6 redundant operational structures. This shall not increase the total size of capital
7 spend on District SAFE-type work, but rather is an allocation of recovery
8 methods. This recommendation and structure is consistent with regulatory
9 structures in other states²³ and would share the cost burden of this enormous
10 amount of capital WGL intends to invest by placing only 75% of it within
11 accelerated recovery mechanisms, rather than WGL's proposed 100%. This
12 stipulated base spend on work materially similar to that of the District SAFE
13 program would, of course, ultimately end up in rates if it is approved as prudent
14 by the Commission in the Company's next rate case. As such, this would not be a
15 disallowance of cost recovery, but rather the delay of a small percentage of it as a
16 means of cost sharing.

17 These proposals reflect the severity and criticality of the need for WGL to
18 increase its pace of mitigating the risk of its LPP through any means necessary, are
19 consistent with recent Commission directives and positions, many of which WGL has not
20 addressed sufficiently, and serve to align the goals of the District and its ratepayers with

²³ For example, New Jersey's IIP structure has a stipulated base spend that utilities are required to make and that is tied to capital spend within their accelerated recovery mechanism.

1 the utility’s obligation to operate a safe system by considering less costly alternatives,
2 expediting the mitigation of risk, and reducing the cost of investment into the system.

3

IV. **APPROACH TO REPLACEMENT WITHIN THE DISTRICT SAFE PROGRAM**

4 **A. Risk Ranking**

5 **Q. SUMMARIZE WGL’S PROPOSED PROGRAMMATIC APPROACH TO**
6 **IDENTIFYING, RANKING, AND REPLACING PIPES.**

7 A. WGL has always utilized some form of risk ranking on its pipelines in order to
8 identify segments for replacement. In and around this current proposal, WGL is making
9 some changes to its process, which it claims will improve its performance over that of
10 previous PROJECT*pipes* efforts using lessons learned.²⁴ WGL did not provide specifics
11 as to what those lessons learned were or how it would measure improved performance
12 and refused to clarify when asked in discovery.²⁵

13 Notwithstanding the vague nature of WGL’s statements, there a couple of notable
14 changes that WGL intends to make.

15 **Risk Ranking Model:** As mentioned above, WGL has always utilized some form
16 of risk ranking in its pipeline replacement efforts. In conjunction with the Application,
17 WGL states that it intends to use its newly deployed risk model JANA Lighthouse
18 (“JANA”) to choose segments for replacement going forward. The JANA model

²⁴ District SAFE Plan at 2.

²⁵ See WGL’s Notice of Objection to Sierra Club Data Request No. 1-17, filed October 29, 2024.

1 considers a number of factors and WGL states that it has done sensitivity testing to
2 confirm the accuracy of the model.²⁶

3 **Service Grouping:** In addition to its main segment ranking and selection process,
4 WGL proposes to address its services in a somewhat different way. For services that are
5 not connected to LPP, WGL proposes to group its services into geographic zones and
6 risk-rank those for separate replacement or retirement independent of main work.

7 **Q. WHAT ARE THE RESULTS OF YOUR ANALYSIS OF THE IMPACT OF THE**
8 **COMPANY’S CHANGES TO ITS RISK RANKING MODEL?**

9 A. The efficacy of the risk ranking model cannot be evaluated fully until it is
10 implemented. Future leaks and failures can be used to measure the efficacy of the risk
11 ranking platform to identify the highest-risk pipes. WGL’s move to include a risk-spend
12 efficiency metric in its project selection process, in order to gain the greatest risk
13 reduction for each dollar spent,²⁷ should result in further reduction of leaks and failures.

14 Despite the obvious critical nature of this system to the efficacy of the District
15 SAFE program, WGL refused to allow any assessment of the function of the system and
16 did not answer any questions on this topic. WGL stated that the risk factor inputs, the
17 weighting used on those inputs, the level of disaggregation of risk within the model, and
18 the mathematical calculations underlying the process are “irrelevant.”²⁸ WGL would not
19 even permit us to review the output of the model, preventing us from making any
20 determination of the ability of the program to effectively rank risk.

²⁶ District SAFE Plan at 7.

²⁷ Direct Testimony of Witness Jacas, Exhibit WG(C) at 15.

²⁸ See WGL Notice of Objection to Sierra Club Data Request No. 2.3, (a) through (e), filed November 19, 2024.

1 To the extent that leaks worsen over the first SAFE period, immediate and
2 thorough analysis of the drivers of those increases will be critical. Given the nature of
3 WGL’s system and the Commission’s directive to strategically focus its pipe replacement,
4 and to target the highest-risk segments of the aging, leak-prone mains, and services in the
5 District,²⁹ extreme care must be taken to ensure that it is effectively identifying the
6 riskiest pipelines for repair or retirement.

7 Lastly, on the topic of the new JANA model, while the Company is not requesting
8 approval to make this change, the veracity of the model and efficacy of it when placed in
9 practice must be carefully scrutinized. Initial validation by the Company is acceptable for
10 a pre-deployment check, but regular and ongoing oversight (ideally in a transparent
11 manner) is necessary to ensure that WGL does not take a backwards step that it cannot
12 afford in identifying and mitigating high-risk pipes. We concur with WGL that its
13 proposed efforts should result in “a reduction of leaks across the system.”³⁰

14 **Q. WHAT ARE THE RESULTS OF YOUR ANALYSIS OF THE IMPACT OF THE**
15 **COMPANY’S CHANGES TO ITS SERVICE PROJECT GROUPING?**

16 A. The Company’s plans to address service-only projects recognizes the potential
17 risk of stranded high-risk services (services not on LPP main). The plan for geographic
18 grouping that the Company proposes, however, is opaque. It is unclear whether these
19 geographic zones are small enough to sufficiently disaggregate risk across areas.
20 However, grouping can lead to more efficient replacement of stranded services. An

²⁹ *Formal Case No. 1179*, Order No. 22003 at 47, 49.

³⁰ *Id.*, at 21:3-5.

1 appropriate balance between efficiency and efficacy must be struck, and insufficient data
2 was provided in the Company’s Application to determine if this is the case.

3
4
5
6 ***B. Repair vs. Remediation vs. Retirement vs. Replacement***

7 **Q. SUMMARIZE THE DIFFERENCES BETWEEN REPAIR/REMEDICATION,**
8 **REPLACEMENT, AND RETIREMENT OF LPP.**

9 A. Pipelines that have been identified as needing action, such as cast iron pipes, can
10 be remediated in several ways:

- 11 • Repair can take the form of the replacement of a small (usually leaking) section of
12 pipe, a number of patch-type repairs such as clamps, sleeve or composite repairs,
13 or the form of permanently improving the pipe’s ability to safely function in some
14 way (often referred to as rehabilitation). “Patch type” does not mean that the
15 repair is necessarily temporary or that the pipeline will need to be replaced in the
16 short term. It refers to localized repairs that are limited to a relatively small
17 segment of pipe.
- 18 • Replacement is self-explanatory—the old pipe is removed and replaced with a
19 new pipe of the same or similar size, which is then connected to the system and
20 put in service.
- 21 • Retirement is simply the first half of replacement—the pipe is disconnected from
22 the system and abandoned in place or removed from the ground and no
23 replacement is installed.

1 **Q. WHAT APPROACHES DOES WGL USE AND INTEND TO USE IN THE**
2 **DISTRICT SAFE PROGRAM?**

3 A. While WGL has used all of these methods, it has historically relied most heavily
4 on replacement and appears to intend to rely most heavily on replacement in this
5 Application.

6 Regarding repair, WGL takes the position that repair is not an appropriate solution
7 at scale.³¹ It appears that the Company makes a distinction between repair and
8 rehabilitation, however, and that when the Company discusses repair, it is referring to
9 small section replacement or patching as needed. Rehabilitation, on the other hand, is the
10 addition of materials, coatings, or equipment to more permanently enhance the material
11 properties of the pipeline.

12 Regarding rehabilitation, WGL has rehabilitated approximately 5 miles of its cast
13 iron—the most recent of which was a 1500 ft section in 2018.³² Rehabilitation (as
14 distinguished from repair above) can take the form of cured-in-place liners (“CIPL”), cast
15 iron joint encapsulation, cast iron sealing, or other technologies. These are employed by
16 operators of systems with a large amount of cast iron pipe to mitigate the risk of failure
17 faster and, generally, at a lower cost. Despite acknowledging that rehabilitation is an
18 option set forth by PHMSA several times in its Application and supporting testimony, the
19 Company does not discuss any plans to utilize rehabilitation or other “repair” type
20 rehabilitation work to mitigate its LPP.

³¹ Direct Testimony of Ms. Quarterman at 17-18.

³² 2018-2023 PHMSA F7100-1.1 Annual Reports, “MMILES_RCI.”

1 Regarding replacement, WGL proposes replacement as its primary means of
2 mitigating risk, as it has done in the past.

3 Regarding retirement, WGL has identified approximately 15 miles of cast iron
4 main segments without any active services that it may be able to retire without
5 replacement.³³ The Company did not provide any analysis on what percentage of these
6 main segments can actually be retired, but it is ‘evaluating’ them.

7 **Q. WHAT ARE YOUR FINDINGS REGARDING WGL’S APPROACH?**

8 A. Since the question of pace is at the forefront of this case, it is the most prudent
9 course of action for WGL to give fair and adequate consideration to any and all means of
10 retiring high-risk pipe and mitigating the risk of remaining pipe, and to consider which of
11 these are the least costly alternatives.

12 WGL does not appear to consider rehabilitation options, such as pipeline relining
13 or cast iron joint encapsulation, to be options to mitigate risk. These may be highly cost-
14 effective ways of mitigating risk—even if not always permanently (in the case of cast
15 iron joint encapsulation).

16 WGL’s estimates regarding the retirement of main segments without replacement
17 (and to a lesser extent services within the Customer Choice Program discussed later in
18 our testimony) are a potential source of the increased pace of LPP retirement. This,
19 however, may be unsustainable beyond a few miles of segments with the current
20 inventory WGL has identified for retirement and the approach to identifying candidate
21 segments. To the extent that District policy leads to fuel switching of government

³³ Direct Testimony of Witness Jacas, Exhibit WG(C) at 19.

1 buildings or other properties served by LPP, WGL may be able to capitalize on this to
2 gain additional inventory of LPP that is ready for retirement without replacement. WGL
3 may also be able to broaden the scope of its approach to identifying candidate segments
4 and doing so would be a very effective way to eliminate LPP.

5 **Q. WHAT MIGHT BE THE IMPACT OF SOME OF THESE ALTERNATIVES,**
6 **SUCH AS REHABILITATION OR REPAIR?**

7 A. Based on our experience with other utilities in the northeast with cast iron, while
8 not always feasible, these alternatives can be both cost effective and time effective—two
9 variables that WGL’s accelerated pipeline replacement program is very sensitive to and
10 very poorly performing in.

11 Regarding cast iron joint encapsulation—this technology addresses cast iron
12 joints, which are often a source of leaks due to failed gaskets or packing material or pull
13 out as pipes shift in frost heave cycles or other natural events. These targeted repairs can
14 be accomplished cheaply and allow WGL to perform work in a more cost-effective
15 manner by being able to group pipeline segments in larger groups, rather than chasing
16 many active leaks and doing single repairs. Further, this work can often require relatively
17 little excavation and can certainly be done far faster than full pipeline replacement.

18 Analysis by the Public Service Electric & Gas Company (“PSE&G”) in New Jersey
19 (another operator with a large amount of cast iron) indicated that even taking into account
20 the costs of joint encapsulation, less total money was spent on leak-prone service
21 replacement when utilizing this repair technique than without due to the utility’s ability to

1 be less reactive to leaking services, thanks to the leak prevention and life extension of the
2 repairs.³⁴

3 Regarding CIPL relining, throughout the northeastern United States, this
4 technology is used and can result in a pipe with over 100 years of service life and be cost
5 effective.³⁵ This technology is the most commonly used rehabilitation technology by
6 utilities with pipes similar to WGL’s cast iron.

7 Regarding joint sealing, Rhode Island Energy reports costs in the \$4.5m/mile
8 range for its work using the “CISBOT”³⁶ Robotic Internal Cast Iron Joint Remediation
9 technology,³⁷ which is far less than WGL’s current \$8m/mile for replacement.³⁸

10 **Q. DO YOU HAVE ANY RECOMMENDATIONS TO THE COMMISSION ON THIS**
11 **TOPIC?**

12 A. Yes, we recommend that the Commission direct WGL to demonstrate fair and
13 adequate consideration of rehabilitation and repair options to mitigate the risk of its LPP
14 within the SAFE Program in its annual project plan filings. Specifically, WGL should
15 include analysis of leak rates due to joint failures, and the cost effectiveness of CIPL
16 relining or joint sealing compared to replacement for various pipeline diameters and
17 installation situations.

³⁴ *NJ B.P.U. Docket GR23030102*, Petition at 71.

³⁵ Exhibit SC (C)-2, *NYSEARCH CIPL Project Summary Presentation* at 23; see also PHMSA, *Technology Transfer, Demonstrations and Post-Mortem Testing of Cast Iron and Steel Pipe Lined with Cured-in-Place Pipe Liners*, <https://primis.phmsa.dot.gov/matrix/PrjHome.rdm?prj=502>.

³⁶ ULC Technologies, *Robotic Internal Cast Iron Joint Remediation in Live Mains*, <https://ulctechnologies.com/services/cisbot-robotic-cast-iron-joint-sealing/>.

³⁷ *Rhode Island Pub. Util. Comm’n Docket No. 22-54-NG*, Gas Infrastructure, Safety, and Reliability Plan, The Narragansett Electric Company FY2024 Quarterly Update, Third Quarter – Ending December 31, 2023 at 10, <https://ripuc.ri.gov/sites/g/files/xkgbur841/files/2024-02/2254-RIE-GasISR-Q3-FY2024.pdf> (1.36 miles), and Attachment B (\$6.058m).

³⁸ District SAFE Plan, Exhibit WG(A)-1 at 23.

1

V. FUTURE USES OF THE DISTRIBUTION SYSTEM

2 **Q. WHAT COMMENTARY DID WGL OFFER REGARDING THE DISTRICT SAFE**
3 **PROGRAM AND FUTURE USES OF THE DISTRIBUTION SYSTEM?**

4 A. WGL referenced future uses of its newly installed pipe, including for alternative
5 energy carrier fuels such as hydrogen,³⁹ presumably in the form of gas that would be
6 combusted as a blended fuel, or as a form of energy storage.

7 **Q. WHAT COMMENTARY DO YOU OFFER ON THIS TOPIC IN RESPONSE TO**
8 **WGL'S STATEMENTS?**

9 A. While WGL's remarks were made in passing, they highlight a topic of interest to
10 utilities around the country as they look to potential ways to leverage existing and new
11 infrastructure to transport blended hydrogen and other alternative fuels, such as methane
12 sourced from biological-based feedstock material (often called Renewable Natural Gas or
13 "RNG").

14 WGL is not proposing any investments that are directly tied to hydrogen blending
15 or RNG, but rather identifies it as a becoming more accessible via the work proposed
16 within the District SAFE Program. This relies on several assumptions that are not stated,
17 but are critical and cannot be ignored.

18 1. RNG is methane—and the source of the methane (whether biological or
19 geological) is irrelevant to the replacement of WGL's LPP. The risks posed and

³⁹ District SAFE Plan, Exhibit WG(A)-1 at 36.

1 enormous costs of mitigating LPP do not change with the introduction of pipeline-
2 quality RNG vs. geologically sourced methane.

3 2. Hydrogen blending and similar technologies are nascent and not implemented at
4 scale in any U.S. distribution system. As such, future statements about hydrogen
5 are speculative.

6 3. Distribution of blended hydrogen/methane gas through leak-prone pipes such as
7 cast iron appears ill advised, nor is it being pursued by WGL. In fact, it is the
8 retirement of those leak-prone piping materials that make the system “hydrogen
9 ready.” What is left unsaid, however, is that these newly installed assets cannot be
10 utilized for hydrogen blending until the entire system is replaced with modern
11 materials.⁴⁰ WGL’s statements that hydrogen is “important for DC to consider”
12 may be true, but they are inactionable until the system is fully or almost fully
13 modernized.⁴¹

14
VI. WGL’S PROPOSED CUSTOMER CHOICE PROGRAM

15 **Q. SUMMARIZE THE CUSTOMER CHOICE PROGRAM.**

16 A. As part of the District SAFE Program, WGL proposes a Customer Choice Program that
17 will provide certain customers with the choice to decline to have their service replaced
18 when WGL is in the area doing service replacements. This would occur on an

⁴⁰ This is the case unless WGL isolates portions of its distribution system.

⁴¹ An exception to this statement is isolated point use applications.

1 opportunistic basis and be limited to those services that are already identified for
2 replacement via the Company’s risk ranking process.⁴²

3 **Q. WHAT ARE YOUR FINDINGS REGARDING THE CUSTOMER CHOICE**
4 **PROGRAM?**

5 A. The program’s scope is limited to two categories of customers:

- 6 1. Currently inactive services with no usage for 2 years,⁴³ and
- 7 2. Customers that choose to refuse gas service when a service replacement is
8 being done.⁴⁴

9 As such, in order for a service retirement to occur, the customer must 1) have the
10 financial means to electrify and have already done so, 2) have the desire to terminate their
11 home’s access to gas service, and 3) happen to be at a location that WGL is working to
12 retire LPP on.

13 Even in instances where those three things overlap, the gas main serving the area
14 will still need to be active and in service and will remain so until all downstream
15 customers are no longer active for one reason or another. Even in a “dead-end”
16 neighborhood configuration, the gas main running down the street would need to remain
17 in service if even a single customer remains at the back of the neighborhood. Thus, the
18 idea or potential implication that this program would or could lead to the shrinking of the
19 gas system is most likely inaccurate.

⁴² District SAFE Plan, Exhibit WG(A)-1 at 36-37.

⁴³ This is redundant to WGL’s policy to evaluate services for retirement after 12 months of service. *See* WG Response to Sierra Club Data Request No. 2-2(c).

⁴⁴ District SAFE Plan, Exhibit WG(A)-1 at 37.

1 **Q. WHAT CONCERNS DO YOU HAVE REGARDING THE CUSTOMER CHOICE**
2 **PROGRAM?**

3 A. Concerns remain with the cost-benefit ratio of the administration of this program,
4 relative to its ability to offer any meaningful advancement of the District's goals. As such,
5 we do not propose that the Commission disallow this program, but instead that cost
6 tracking be made transparent as part of subsequent filings.

7 We recommend that the Commission direct WGL to separately track direct and
8 indirect costs for the Customer Choice Program and to track adoption rate (services
9 retired), all on an annual basis. Further, we recommend that this data be publicly reported
10 to the Commission and that the Commission rely on the cost-benefit ratio of this data to
11 inform WGL's ongoing implementation of the Customer Choice Program.

12 To the extent that WGL cannot demonstrate proportional benefit, the Commission
13 may consider the prudence of ongoing implementation of this program at a future date.

14 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

15 A. Yes, however, we reserve the right to revise this testimony as new information is
16 made available or reviewed, including addressing additional topics raised in pending or
17 recent discovery requests.

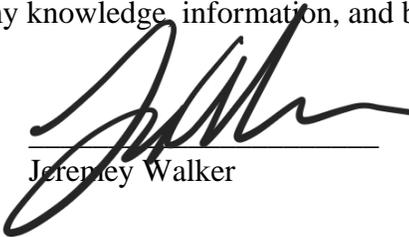
**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE DISTRICT OF COLUMBIA**

IN THE MATTER OF)	
THE INVESTIGATION INTO)	Formal Case No. 1179
WASHINGTON GAS LIGHT COMPANY'S)	
STRATEGICALLY TARGETED PIPE)	
REPLACEMENT PROGRAM)	

DECLARATION

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

Dated: December 10, 2024



Jeremy Walker

TECHNOLOGY TRANSFER, DEMONSTRATION, & POST- MORTEM TESTING OF CIPL FOR CAST IRON AND STEEL PIPE



CIPL Workshop, Roosevelt Hotel, NYC

August 20, 2015

Presented by: David W. Merte, PE

Project Objective

- The primary objective of this project is to advance a broad understanding of field aged cured-in-place (CIP) liners as they interact with host steel or cast iron pipe. CIP lined pipe, removed after more than a decade of gas service, will be tested using a foundation of protocols established by Cornell University.

Project Work Scope

- Conduct a literature search and complete peer reviewed CIPL reports
 - North America and Europe (NYSEARCH)
 - Japan (SwRI)
- To select and extract – (4) jointed & (2) straight in-service CIPL CI lined 8' segments >10 years field aged
- Cornell University - Conduct cyclic load testing (truck traffic loading, trenching event, freeze/thaw pullout) and liner residual properties testing (tension, lap shear, peel)
- Conduct a live demonstration of CIPL with current standard operating procedures

Project Status

- Literature search completed in April 2014
- 6" field aged lined CI joint (cement/jute) segments extracted from PSE&G in May 2014
- 12" field aged lined CI (mechanical) joint segments extracted from National Grid in August 2014
- CIPL live demonstration held in October 2014 at Con Edison in Mt. Vernon, N.Y.
- Cornell University testing (mechanical aging & liner residual properties) completed this month

Literature Search Reports

Cured-in-Place Pipe Lining Literature Compilation Report

Prepared by:

David W. Merte, P.E.
Senior Project Manager
NYSEARCH/Northeast Gas Association
20 Waterview Boulevard, 4th Floor
Parsippany, New Jersey 07054

Project Title:

Technology Transfer Demonstrations and Post-Mortem Testing of
Cast Iron and Steel Pipe Lined with Cured-In-Place Pipe Liners

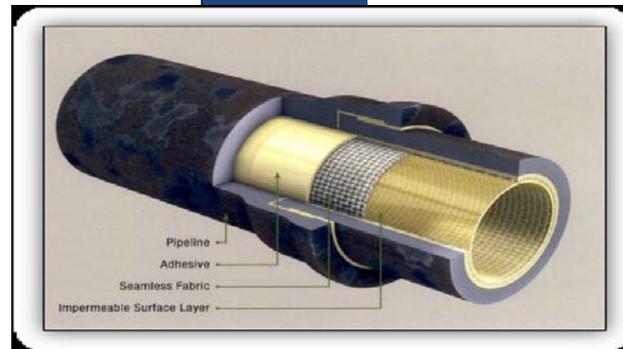
NYSEARCH Project #T-770

PHMSA Transaction Agreement #DTPH56-13-000013

Prepared for:

NYSEARCH/Northeast Gas Association
Pipeline Hazardous Material Safety Administration (PHMSA)

April 24, 2014



Cured-in-Place Pipe Lining in Japan

Author

Jay Fisher, Sc.D.

FINAL REPORT
SwRI® Project No. 18.19711

Prepared for

David Merte
Northeast Gas Association
20 Waterview Blvd, 4th Floor
Parsippany, NJ 07054

April 22, 2014

Report - Highlights

- North America and Europe Literature
 - GRI, IGT, Battelle, Cornell
 - AMEX, Paltem and Starline®2000 installed (last three decades)
 - Economic benefits (e.g. PSEG, PECO, Con Edison)
 - Reliable functional integrity (e.g.-TPD w/no leak)
 - Cleaning procedures & technologies (optimized liner/pipe adhesive bond)
 - Drilling & tapping (conducted w/o de-bonding)
 - Traffic loading, breaks w/deflection, cyclic loading \geq 50 yrs. field service equivalence
 - Acceptable technique for cast iron replacement in Germany
 - CIP lined pipe as new PE pipe for leak detection



Japan Report- Highlights

- Japanese Literature/Company Interviews
 - Interviews conducted in Japan by Jay Fisher (SwRI)
 - Early adopters of CIPL technology
 - Osaka Gas (1980's-CI & Steel)
 - Tokyo Gas (44 psi – 145 psi up to 12" diameter)
 - Ashimori Industry Company (PALTEM)
 - 1983 study on durability of earthquake damaged pipe joints
 - Based on joint deformation and breaks after Nihonaki-Chubu earthquake
 - Concluded that CIP liner would not rupture under 1983 Japanese Gas Association (JGA) previous publication for medium pressure gas transmission (5 cm axial deformation)

Japan Report- Highlights

- Follow Japan Gas Association voluntary industry guidelines (40-50 year criterion)
- JGA leakage prevention (recommended tests - workability, flexural properties, creep, gas & chemical resistance, thermal acceleration (corrosion & joint), and large deformation (earthquakes))
 - Pre-existing cracks or breakage (CI and steel)
 - Precaution against through-holes that might form (steel)
 - Joints due to sealing degradation (CI and steel)
 - Potential earthquake damage (CI and steel)
- Most CIPL installations by Ashimori Industry Co., (Paltem)
 - 732 miles installed in Japan by 2013 (2"-36" diameter)

FIELD AGED CIPL EXTRACTION – PSE&G

- After a thorough review of funder CIPL in-service pipe segments >10 years old
 - Elmwood Park (Palsa Avenue, N.J.) selected
 - 6” (low pressure) CI installed in 1949
 - Lined with Starline®2000 in 1998
 - Cement/Jute joints (2)
 - 8’ segments removed



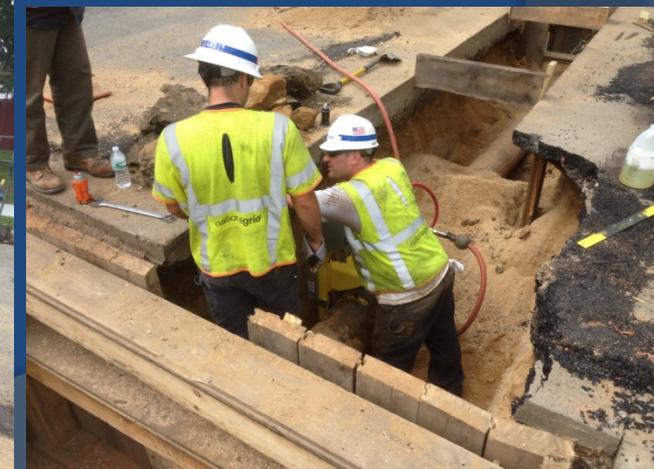
FIELD AGED CIPL EXTRACTION – PSE&G

- 16 years of active field service
 - Two 6" CI cement/jute joints



FIELD AGED CIPP EXTRACTION – NATIONAL GRID

- Garden City South, N.Y.
 - Main selected on 5th Place S.
 - 12” (60 psig) CI installed in 1951
 - Lined with Starline®2000 in 2004
 - Mechanical joints (2)
 - 8’ segments removed



FIELD AGED CIPP EXTRACTION – NATIONAL GRID

- 10 years of active field service
 - Two 12" mechanical joints
 - One section w/o joint
 - Crated and shipped to Cornell University



LIVE DEMONSTRATION

- Conducted on October 21 at Con Edison
- Access pit & pipe preparation
- Initial pipe inspection
- Surface preparation
- Post cleaning inspection
- Adhesive preparation
- Liner wet-out/adhesive application
- Liner inversion
- Curing & pressure monitoring
- Post Lining Inspection
- 8" and 6" low pressure cast iron



Live Demonstration (cont'd)

- 1st location – E Sidney Av B/T N 3rd Av & Crary Av (Mount Vernon)
- Lining Length – 380 feet
- Material – Cast Iron
- Size – 8 inch
- Pressure – Low
- Misc. – 13 Keyhole Repairs, 2 Clamps, drip
- 2nd location – William St B/T N Terrace Av & Locust St (Mount Vernon)
- Lining Length – 190 feet
- Material – Steel
- Size – 6 inch
- Pressure – Low
- Misc. - Coupled

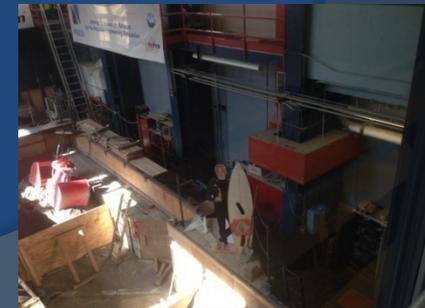


Live Demonstration (cont'd)

- Cut and cleaned both locations prior to day of demonstration
- Inspected, cleaned and prepared for lining
- Lined William St. main prior to day of demonstration and simulated “Day After” camera inspection
- Lined E. Sidney Ave. main on day of demonstration (1 hour and 15 minutes)
- Before & after cleaning- sections displayed

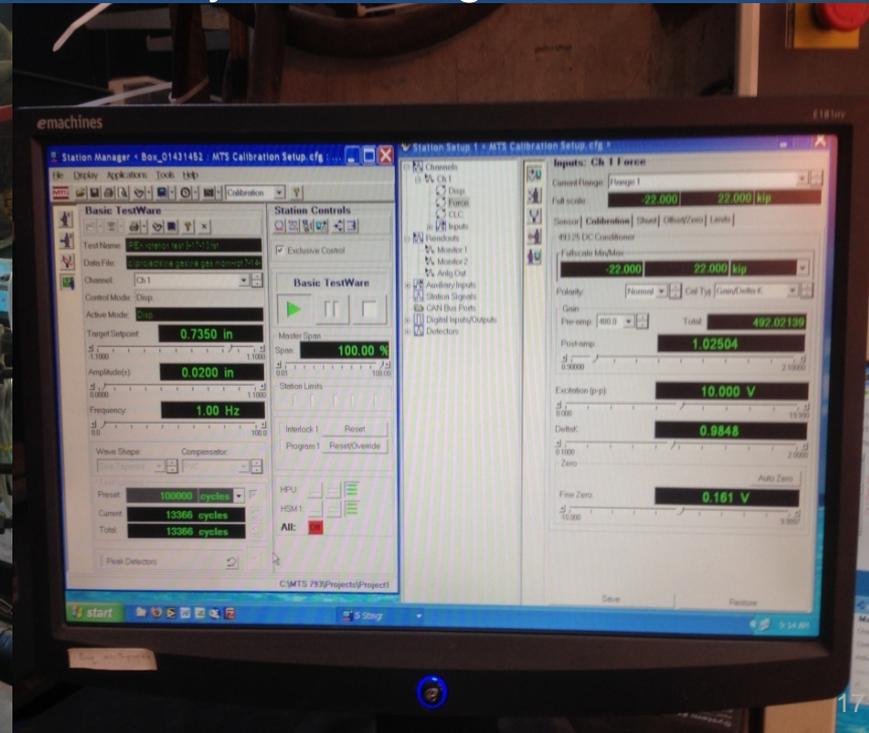
Cornell Mechanical Aging

- Traffic cycle loading
 - 1,000,000 cycles (50 years)
 - 100,000 cycles subsequent to undermine/backfill event
 - Thermal push/pull cycles (50 years)
 - Repeat above testing (100 year field service equivalent)



Cornell Mechanical Aging

- Each segment subjected to 2,000,000 traffic load cycles (100 yrs.)
- Each segment to (2) undermine events w/additional 100,000 cycles
- Pull-out testing w/weakened (drilled) cement/jute joints (100 yrs.)
- Tension, peel, and lap shear testing performed on each segment liner after extraction and subsequent to all cyclic testing



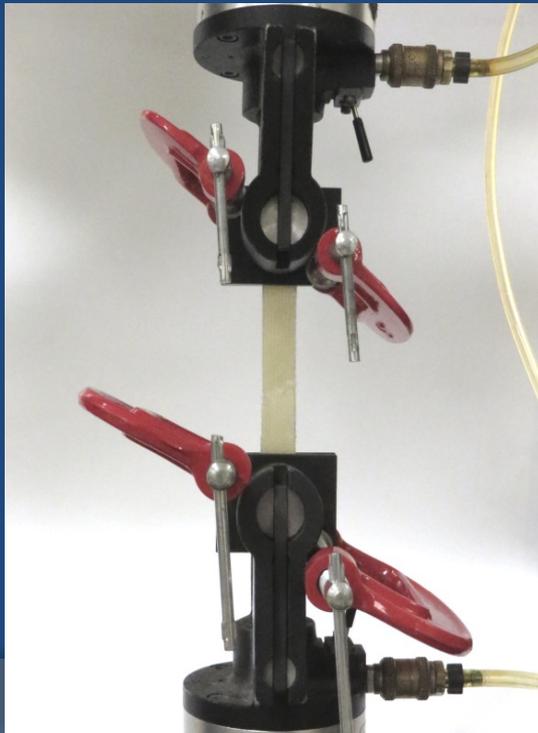
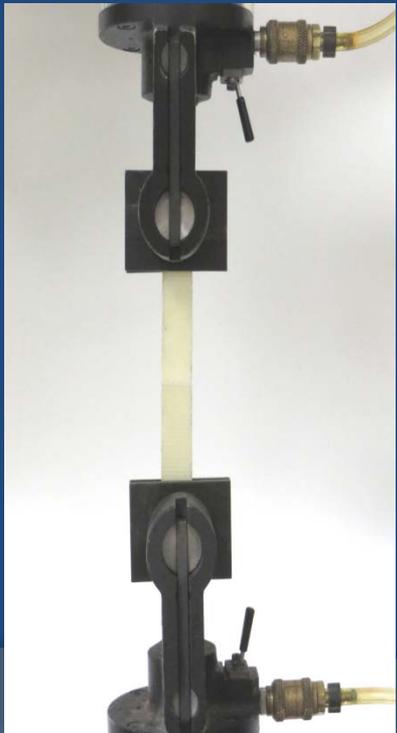
Cornell Liner Testing

- Each segment liner destructively tested after field extraction
- Each segment liner destructively tested in high stress joint area after all heavy traffic, undermine events, and thermal push/pull cycles



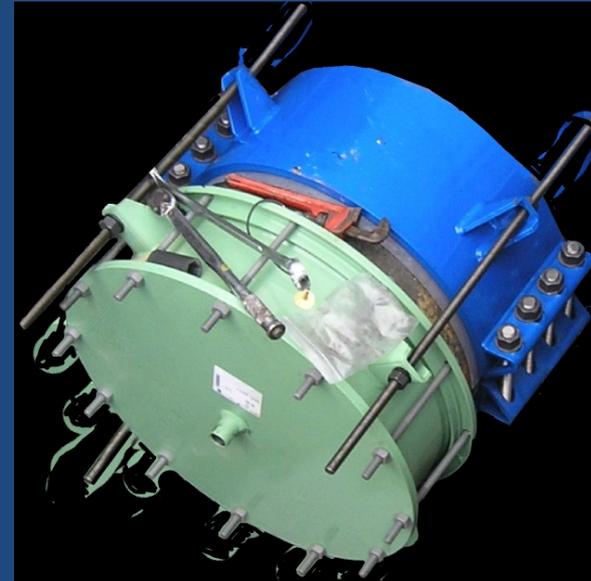
Cornell Liner Testing

- Tension (longitudinal and transverse directions)
 - High stress joint area
 - Bonded and de-bonded
- Lap Shear (primary adhesion test)
- Peel (longitudinal direction – secondary adhesion test)



Cornell Pressure Testing

- Dresser 711 end caps utilized for 6" Low pressure CI (not available for 12")
- Smith Blair EBR end caps utilized for 12" CI- 60 psig MAOP restraint



- All four segments under pressure during all mechanical aging tests and tested to 90 psig (1.5 X MAOP) after >100 yr. aging

Cornell Pressure Testing

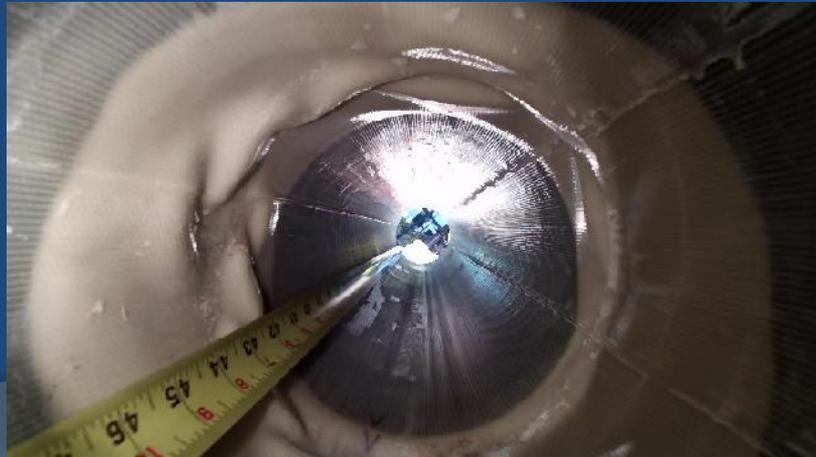
6" Diameter Field Extracted Lined Segments	Specimen			
	6-1 ^a		6-2 ^a	
	No. Cycles	Internal Pressure (psi)	No. Cycles	Internal Pressure (psi)
Pre-Test Photos	✓		✓	
Vehicle loadings/bending cycles	1,000,000	15 in. water column	1,000,000	15 in. water column
Excavation event	1	15 in. water column	1	15 in. water column
Additional vehicle loadings/bending cycles	100,000	15 in. water column	100,000	15 in. water column
Thermal expansion/contraction cycles	50	15 in. water column	50	15 in. water column
Vehicle loadings/bending cycles	1,000,000	15 in. water column	1,000,000	15 in. water column
Excavation event	1	15 in. water column	1	15 in. water column
Additional vehicle loadings/bending cycles	100,000	15 in. water column	100,000	15 in. water column
Thermal expansion/contraction cycles	50	15 in. water column	50	15 in. water column
Pressurization test	1	150 psi (water)	1	

Cornell Pressure Testing

12" Diameter Field Extracted Lined Segments	Specimen			
	12-1 ^a		12-2 ^a	
	No. Cycles	Internal Pressure (psi)	No. Cycles	Internal Pressure (psi)
Pre-Test Photos	✓		✓	
Vehicle loadings/bending cycles	1,000,000	15 psi (water)	1,000,000	15 psi (water)
Excavation event	1	15 psi (water)	1	15 psi (water)
Additional vehicle loadings/bending cycles	100,000	15 psi (water)	100,000	15 psi (water)
Thermal expansion/contraction cycles	50	15 psi (water)	1, depressurize and take photos, pressure check to 60 psi (water), pressurize to 15 psi (water), complete 49 cycles	15 psi (water)
Vehicle loadings/bending cycles	1,000,000	15 psi (water)	1,000,000	15 psi (water)
Excavation event	1	15 psi (water)	1	15 psi (water)
Additional vehicle loadings/bending cycles	100,000	15 psi (water)	100,000	15 psi (water)
Thermal expansion/contraction cycles	50	15 psi (water)	50	15 psi (water)
Pressurization test	1	90 psi (nitrogen)	1	90 psi (nitrogen)

Project Overall Status

- All >100 year mechanical aging cyclic testing completed (4 field aged extracted lined segments-heavy traffic, undermine, thermal)
- Initial extracted segment (liner tension, lap shear, and peel testing completed)
- All >100 year equivalent field service destructive liner tension, lap shear, and peel testing at the joints completed
- Results



Gas Technical Panel: Summary of Experience & Qualifications

Jim Crowley



Accomplishments

- Engineered and managed the effort to replace all of Easton's bare steel, cast iron and ductile iron gas main.
- Instituted Safety Programs & Training. Developed and present in-house safety training.
- Upgraded and reinforced the Easton gas system thereby reducing our leak occurrence rate, improving cathodic protection, and lowering our lost and unaccounted for gas.
- Oversaw compliance with PHMSA/Maryland PSC required O&M regulatory requirements.
- Built a lean and cost-efficient gas department consistently meeting the needs of our customers.
- Responsible for project management, budget, and procurement
- Drafted and implemented Easton Utilities Incident Response and Communication Plan.

Industry Experience

Manager, Gas Department, Meter Department, and Corporate Safety –Easton Utilities, Easton, MD ▪ May 2001– 2022 (Retired)

- Responsible for the safe and efficient operation of Easton Utilities Natural Gas System. Duties included:
 - The purchase and safe delivery of natural gas to the Town of Easton within the operating parameters of ERMOC.
 - Ensure PSC/PHMSA compliance with all reporting, operational and maintenance requirements.
 - Identify capital improvement and upgrade projects.
 - Create annual Capital/O&M budgets.
 - File required monthly and year-end reporting with appropriate regulatory bodies.
 - Track FERC pipeline filings that may affect Easton.
 - Stay abreast of industry trends and technology through active involvement with APGA, AGA and MdGOAC.
- Responsible for the efficient and safe operations of the Meter Department
- Responsible for Corporate Safety. Duties Included:
 - Ensure compliance with MOSH, OSHA and industry safety practices.
 - Conduct companywide safety messaging and training.
 - Management Representative on the Safety Committee.
 - Interact with insurance provider Risk Management representatives.
 - Maintain and file required OSHA reports.

Gas Department Superintendent – Borough of Chambersburg, Chambersburg ▪ April 1989– May 2001

- Responsible for the operations of the gas department, warehouse and dispatch functions.
 - Duties included daily natural gas nominations and monthly invoice reconciliations.
 - Scheduling and budgeting of capital projects. Creation of O&M budget
 - PSC/DOT compliance.
 - Oversight of 24hr dispatch function and coordination with month end reports and service order scheduling.
 - Proper and efficient operation of warehouse functions.
 - Represented Chambersburg on PA OneCall.
-

3rd Assistant Engineer—Apex Marine, Woodbridge, New Jersey/St.Croix▪ December 1986 – June 1988

- Responsible for the layup, maintenance and reactivation of oil tankers at HOVIC Marine Terminal in St Croix for Apex Marine.
- Liaison between local labor, HOVIC Marine Port Captain and Hess Oil (Woodbridge NJ).

3rd Assistant Engineer—US Lines, New York▪ September 1985 – December 1986

- Responsible for mechanical and electrical maintenance on the container ship American Nebraska
-

Skills, Certifications & Education

-
- NACE Corrosion Technician, Basic, Intermediate and Advanced Corrosion Course Completion,
 - GTI Gas Distribution Engineer,
 - GTI Gas Regulator Station Design,
 - MD SHA Workzone Traffic Manager,
 - OSHA Outreach Trainer Certification,
 - OSHA 30 Course,
 - USCG Third Engineers License,
 - Shore Leadership (class of 2012),
 - Public Utilities Report Certification - Principles of Rate Making,
 - Shore Leadership Executive Board Member,
 - Past Executive Board Member USPCD,
 - Past Executive Board Member MdGOAC.
 - APGA and AGA Committee and Task Force Member. (various).
 - General competence and familiarity with mechanical systems.
-
- BS in Marine Engineering— Massachusetts Maritime Academy, Buzzards Bay, Ma. ▪ 1984
 - Online MBA courses - Kennedy Western University ▪ 1999 – 2000
-

Jeremy Walker



Bio Overview

Jeremy is an expert in the analysis of gas technical and operations issues in regulated natural gas utilities and has gained extensive knowledge and familiarity with the natural gas regulatory process through his work serving as lead for over 40 regulatory proceedings in the states of Arkansas, California, Delaware, Rhode Island, Illinois, Massachusetts, Maryland, New Jersey, and the District of Columbia. For these proceedings, Jeremy sponsored expert witness testimony, provided expert analysis and support for testimony, and led project teams for RWA's work on rate cases, large project prudence reviews, utility infrastructure and climate programs, and other similar regulatory proceedings. Jeremy's work has focused on the areas of gas engineering, operations, integrity management, safety & reliability, capital additions, O&M, and similar topics.

With a background in operations management, Jeremy has gained further experience in the last nine years working in the gas industry in the role of Technical Analyst, Project Manager, and now as COO of RWA. This work was done alongside former industry executives, scientists, and experts in the industry – giving Jeremy the opportunity to learn from these subject matter experts' combined centuries of experience. Notable projects include serving as part of the Independent Review Team (RWA and Los Alamos National Lab) for the review of SoCalGas' Hydraulic Modelling for Natural Gas reliability in California, as lead on RWA projects providing consulting services for due diligence purposes for both buy and sell-side clients for acquisitions of over \$2B in assets, and as expert witness for RWA's clients in a number of states around the country. Jeremy has provided analysis and draft independent engineer reports regarding technical aspects of utility operations as well as capital and O&M forecast analysis.

In addition to these, Jeremy has also been the primary author on several extensive research projects in the natural gas industry on emerging technologies like hydrogen blending and renewable natural gas production.

Industry Experience

COO – RWA, Atlanta, GA ▪ 2021-Present

- Responsible for oversight of business operations;
- Direct gas technical projects;
- Oversight of budget/forecasting/finances;
- Participate in RWA project work as a Subject Matter Expert;
- Draft reports and sponsor expert witness testimony on topics related to natural gas integrity management, operations, engineering, and similar gas distribution and transmission issues.

Dir. Project Delivery, RWA, Atlanta GA ▪ 2020-Present

- Responsible for project management of all of RWA's technical projects;
- Oversight on deliverables;
- Assist in analysis and preparation of expert witness testimony;
- Direct research & analysis teams
- Client management.

Technical Analyst – RWA, Chattanooga, TN ▪ 2015-2020

- Perform analysis of rate filings
-

-
- Develop and utilize models to forecast utility expenditures, gas usage, pipe leakage rates, risk models, etc.;
 - Prudence analysis of utility infrastructure programs;
 - Assist with RWA strategic planning, organization consulting projects;
 - Execute research project scope

Certifications & Education

- GTI Gas Distribution;
 - GTI Gas Transmission;
 - GTI Natural Gas Infrastructure and Gas Control Fundamentals;
 - ISO 14064
 - 2008-2011 - Toccoa Falls College – Humanities
-

RWA's Technical Panel of experts have provided expert witness and technical advisory to many clients in multiple states regarding a wide range of topics and proceedings – both in a support position and as testifying witnesses. The following summary contains cases that one or all members of the Technical Panel have worked on in the last 5 years.

Jurisdictions Supported

- L *State of **Arkansas**, Attorney General's Office*
- L *State of **California**, California Energy Commission*
- L *State of **Delaware**, Division of Public Advocate & Public Service Commission*
- L *State of **Illinois**, Office of the Attorney General*
- L *State of **New Jersey**, Division of Rate Counsel*
- L *State of **Rhode Island**, Division of Public Utilities and Carriers*
- L *State of **Massachusetts**, Office of the Attorney General*
- L ***District of Columbia**, Office of People's Counsel*
- L *Other Consumer advocate, Energy equity & Energy justice clients in the states of California, Colorado, Arizona, Nevada, Maryland, New Jersey, New York, and the District of Columbia.*

Refer to the appropriate regulatory entity's eDocket site and the docket numbers in bold below for non-confidential samples of work.

Recent & Current Work Examples

California – Public Utilities Commission

- Review of the reliability of energy (natural gas and power) including hydraulic modeling of the gas transmission backbone in California and effect on infrastructure issues on safety and rates to rate payers and the public in general.
- Presented at the Southern California Energy Reliability Workshop in 2019
- Served as part of the team that performed a [Safety Culture Assessment](#) on SoCalGas and Sempra Energy, filed in 2022 (**19-06-014**).

California – The Utility Reform Network (TURN)

- 2022 SoCalGas & SDG&E Rate Case (**22-05-015**)

Rhode Island – Public Utility Commission

- FY2020, 2021, 2022, 2023, & 2024 Gas Infrastructure, Safety and Reliability (ISR) Plan Reviews (**#4996, #4916, #5099, and #TBD respectively**)
- Investigation into Gas Outage on Aquidneck Island (**#4934**)
- Investigation to Examine Prudence of Maintenance Practices in Connection with Cumberland LNG Facility (**#4893**)

Arkansas – Attorney General's Office

- 2020 Centerpoint Arkansas FRP Review (**17-010-FR**)
- 2021 Centerpoint Arkansas FRP Review (**17-010-FR**)
- Various Utilities – Winter Storm Uri Extraordinary Cost of Gas Investigations (**07-044-U, 07-045-U, and 07-046-U**)
- Summit Utilities & Centerpoint Arkansas Sale Docket (**21-060-U**)
- 2021 Black Hills Energy – Arkansas Base Rate Case (**21-097-U**)
- 2023 Summit Utilities Arkansas – Cost of Gas Audit (**07-044-U**)

State of Delaware Public Advocate

- In 2019-2020, assisted in developing natural gas distribution system reliability and planning (ISR) regulations **(18-0935)**
- In 2021, reviewed Delmarva & Chesapeake's compliance with ISR regulations
- 2020 Delmarva rate case **(20-0150)**
- 2022 Delmarva rate case **(22-0002)**
- In 2022, reviewed Delmarva & Chesapeake's compliance with ISR regulations
- In 2023, reviewed Delmarva & Chesapeake's compliance with ISR regulations
- In 2024, reviewed Delmarva & Chesapeake's compliance with ISR regulations

State of Arizona's Residential Utility Consumer Office (RUCO)

- 2024 Southwest Gas Corporation – Arizona General Rate Case **(G-01551A-23-0341)**

District of Columbia Office of People's Counsel

- Reviewed the WGL Climate Action Plan for Reasonableness **(FC1142)**
- Reviewed WGL's compliance with mandates due to issues with mercury service regulators **(FC1157)**
- 2020 WGL gas rate case **(FC1162)**
- 2021 Review of WGL's PROJECTpipes 2 Plan **(FC1154)**
- 2022 WGL climate business plan compliance review **(FC1167)**
- 2022 WGL gas rate case **(FC1169)**

State of Massachusetts Attorney General's Office

- Expert Witness on the 2020 National Grid d/b/a Boston Gas & Colonial Gas Base Rate Case **(20-120)**
- Eversource Safety Assessment Review **(21-109)**

New Jersey Office of Ratepayer Advocacy

- Reviewed South Jersey Gas' proposed Vineland transmission line **(GE19121539)**
- Reviewed South Jersey Gas' Lawnside pipeline expansion in Camden NJ **(GE20090600)**
- 2021 South Jersey Gas IIP review **(GR20110726)**
- 2021 New Jersey Natural Gas' Rate Case **(GR21030679)**
- 2021 PSE&G IAP review **(EO21111211)**
- 2022 Review of Draft Revisions to Gas Regulations **(GX22020048)**
- 2022 Elizabethtown Gas Rate Case **(GR21121254)**
- 2022 South Jersey Gas Rate Case **(GR22040253)**
- 2023 PSE&G GSMP III Application **(GR23030102)**
- 2024 Elizabethtown Gas Rate Case **(GR24020158)**
- 2024 PSE&G Rate Case **(GR23120925)**
- 2024 NJNG Rate Case **(GR24010071)**

Illinois Attorney General's Office

- 2020 Ameren Illinois QIP Rider Reconciliation Docket **(21-0251)**
- 2023 Nicor Gas Rate Case **(23-0066)**
- 2023 Ameren Illinois Rate Case **(23-0067)**
- 2023 Peoples Gas & North Shore Rate Case **(23-0068/0069)**
- 2024 Peoples Gas SMP Investigation **(24-0081)**

Other Consumer Advocacy, Energy Equity & Energy Justice Clients

In addition to the state-specific clients above, RWA has provided subject matter expert services to various clients across the country on matters pertaining to the energy industry. These services have allowed RWA the opportunity to present a balanced and fact-based case for entities to use in negotiations with state regulators and energy companies.

- This work's goal has been to provide a data-based, industry perspective with technical expertise to non-utility and non-regulatory parties to further the best interests of consumers and society within the practical constraints of utility operations, maintenance, safety, and future goals – all within an ever-changing regulatory and legislative framework.

CERTIFICATE OF SERVICE

I hereby certify that on this December 10th, 2024, a copy of the foregoing was served on the following parties by electronic mail:

Brinda Westbrook-Sedgwick
Christopher Lipscombe
Public Service Commission
of the District of Columbia
1325 G Street, NW, Suite 800
Washington, DC 20005
bwestbrook@psc.dc.gov
clipscombe@psc.dc.gov

Cathy Thurston-Seignious
John Dodge
Washington Gas Light Company
1000 Maine Avenue, SW,
7th Floor,
Washington, DC 20024
cthurston-Seignious@washgas.com
jdodge@washgas.com

Frann Francis, Esq.
Apartment & Office Building Association
1050 17th Street, NW,
Suite 300,
Washington, DC 20036
ffrancis@aoba-metro.org

Brian Caldwell
Alec Bowman
District of Columbia Office of the Attorney
General
441 Fourth Street, NW,
Suite 450-N,
Washington, DC 20001
Brian.Caldwell@dc.gov
Alec.Bowman@dc.gov

Sandra Mattavous-Frye
Karen Sistrunk
Laurence Daniels
Kintésia Scott
Office of the People's Counsel
for the District of Columbia
1133 15th Street, N.W., Suite 500
Washington, D.C. 20005
smfrye@opc-dc.gov
ksistrunk@opc-dc.gov
ldaniels@opc-dc.gov
kscott@opc-dc.gov

/s/ Timothy R. Oberleiton
Timothy R. Oberleiton
Earthjustice