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**GOVERNMENT OF THE DISTRICT OF COLUMBIA**
**OFFICE OF THE ATTORNEY GENERAL**

**KARL A. RACINE**
**ATTORNEY GENERAL**

**Public Advocacy Division**
**Public Integrity Section**

**ELECTRONIC FILING**

June 15, 2020

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

**Re: Formal Case No. 1154 – In the Matter of Washington Gas Light Company's Project Pipes 2 Application**

Dear Ms. Westbrook-Sedgwick:

On behalf of the District of Columbia Government, please find the enclosed Direct Testimony of Edward P. Yim – Exhibit DCG (A). If you have any questions regarding this filing, please do not hesitate to contact the undersigned.

Respectfully submitted,

KARL A. RACINE
Attorney General

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**BEFORE THE**

**PUBLIC SERVICE COMMISSION**

**OF THE DISTRICT OF COLUMBIA**

| | | |
|---|---|---|
| **IN THE MATTER OF THE APPLICATION OF WASHINGTON GAS LIGHT COMPANY FOR APPROVAL OF PROJECT PIPES 2 PLAN** | ) | **Formal Case No. 1154** |

# Direct Testimony of

# Edward P. Yim

## On Behalf of

## The District of Columbia Government

## June 15, 2020

## Exhibit DCG (A)

**PLEASE STATE YOUR NAME, OCCUPATION, AND BUSINESS ADDRESS**

My name is Edward P. Yim, and I serve as the policy advisor in the Energy Administration of the District of Columbia Department of Energy and Environment (DOEE). My work address is 1200 First St. NE, Washington DC, 20002.

**ON WHOSE BEHALF ARE YOU APPEARING**

I am appearing on behalf of the District of Columbia Government (DCG or the District).

**HAVE YOU PREVIOUSLY PROVIDED TESTIMONY TO THE PUBLIC SERVICE COMMISSION OF THE DISTRICT OF COLUMBIA?**

I have previously provided testimony before the Public Service Commission of the District of Columbia (Commission) on behalf of the District in Formal Case No. 1142 on the topic of the proposed merger application between Washington Gas Light Company (WGL or the Company) and AltaGas Ltd., and its impact on the District's energy and climate goals and targets.

**PLEASE DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL EXPERIENCE**

I received a Bachelor of Architecture degree from Virginia Tech. I received a Juris Doctor degree from Villanova University School of Law, and I am licensed to practice law in Pennsylvania and New Jersey. I have a certificate in Executive Leadership from George Washington University. I have over 10 years of experience in energy and environmental policy and in the electricity and natural gas sectors. Before joining DOEE, I advised energy companies and municipal governments on regulatory matters, and I served as legal counsel for the Pennsylvania House of Representatives Committee on Environmental Resources and Energy. At DOEE, I led the technical development of the Clean Energy DC plan, which provides a roadmap

to achieving the District's 2032 energy and climate goals and identifies policy measures to help achieve carbon neutrality by 2050. Much of the Clean Energy DC plan was codified in the 2018 Clean Energy DC Omnibus Amendment Act.

**WAS THIS TESTIMONY PREPARED BY YOU OR UNDER YOUR DIRECT SUPERVISION AND CONTROL?**

Yes.

**PLEASE DESCRIBE THE PURPOSE OF YOUR TESTIMONY**

The purpose of my testimony is to describe the impacts that WGL's proposed Project Pipes 2 program (Pipes 2) is likely to have on the District's efforts to meet its climate change and energy goals and targets.

**CAN YOU SUMMARIZE YOUR TESTIMONY?**

Yes, my testimony is that Pipes 2, as a part of PROJECTpipes, is at odds with the District's climate change goals and the District's current efforts to fight climate change, and that it does not consider alternative safety measures. Pipes 2 will result in very small reductions of greenhouse gas (GHG) emissions despite the high cost of the program, and it entails enormous cost and equity implications for District of Columbia ratepayers by over-investing in natural gas infrastructure that, given the District's climate change policy on shifting away from fossil fuels and market trends in the building sector, natural gas will be used increasingly less and the costs invested in new infrastructure may become stranded. Pipes 2 does propose to explore the use of advanced leak detection, which should be commended, as should the Company's continuing commitment to safety. Nonetheless, Pipes 2, as formulated in this application, does not represent

a prudent investment for District of Columbia residents and businesses. Consequently, the Commission should not authorize new expenditures on Project Pipes for now because, as I discuss in my testimony, these expenditures may become stranded costs.

**WHAT ARE THE DISTRICT'S CLIMATE AND ENERGY GOALS AND TARGETS?**

The District is committed to doing its part to meet the challenge, as described in the 2015 Paris Climate Accord, of keeping the rise of global warming to well below 2ºC from pre-industrial levels and to pursue efforts to limit the increase to 1.5 ºC. Although the United States formally withdrew from the Accord under the Trump administration, more than 20 states and 80 major cities in the U.S., including the District of Columbia under the leadership of Mayor Bowser, pledged to abide by the Accord. The District is a recognized leader in fighting climate change, as it seeks to set an example for figuring out how to make communities truly sustainable.

Under the District's Sustainable DC Plan 2.0, the District has a goal to cut its GHG emissions by 50% from 2006 levels, as measured in accordance with the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories. With respect to renewable energy, 50% of the District of Columbia's electricity must come with renewable energy certificates from eligible generation sources by 2032, with 5% of the total electricity having the renewable energy certificates generated by solar generation systems located within the District of Columbia. With respect to energy efficiency, the plan calls for reducing energy consumption by 50% from the 2006 levels on a per-capita basis; establishing stringent energy efficiency programs for existing buildings and establishing net-zero energy building codes for new buildings are key components.

The 2018 Clean Energy DC Omnibus Amendment Act (the Act) establishes additional targets and enhances some of the Sustainable DC plan's targets. Under the Act, 100% of the District's

electricity must come with renewable energy certificates from eligible sources by 2032, with 10% of the total electricity having the renewable energy certificates generated by solar generation systems located within the District of Columbia. In addition, the Act subjects all buildings larger than 10,000 square feet, representing about 65% of the total building square footage in the District of Columbia, to an energy efficiency standard called the Building Energy Performance Standards, which mandates better efficiency performance from inefficient buildings. The Act also requires all public buses to be zero-emission vehicles by 2045.

Additional targets are established for the building sector under the Clean Energy DC plan, which recommends that the District adopt a net zero energy building code for the residential sector by 2022 and for the commercial sector by 2026. Net-zero energy in this context means that the amount of energy a building consumes will be equal to the amount of renewable energy that the building will generate onsite or procure from nearby sites. The US Department of Energy defines a net zero energy building as "an energy-efficient building where, on a source energy basis, the actual annual delivered energy is less than or equal to the on-site renewable exported energy." Currently, the District is progressively moving toward adopting a net zero energy code as the Clean Energy DC plan recommends. The District recently adopted a "net-zero ready" code, preparing the pathway to move toward the adoption of the net zero energy code in the next code cycle -- about 5 years from now -- which is expected to prohibit the onsite combustion of fossil fuels for residential and commercial buildings except in emergency situations. Indeed, under the current code, a voluntary pathway for compliance with the net zero energy standard prohibits onsite combustion of fossil fuels.

One important and related trend to note is that, even without the prospect of net zero energy codes, most new buildings have been and are being built for electricity only, rather than a dual supply of electricity and natural gas; and DOEE's benchmarking data in the last several years confirms this trend, especially in the office building sector. This is owing in part to the fact that the upfront installation cost for electricity is cheaper than for natural gas. In any event, most new buildings will not use natural gas.

Lastly, in December 2018 Mayor Muriel Bowser adopted the goal of carbon neutrality by 2050 for the District of Columbia. DOEE currently interprets carbon neutrality as achieving net-zero GHG emissions from buildings, industry, energy supply, transportation, and waste generated in the District of Columbia on an annual basis. DOEE is in the process of finalizing a set of carbon neutrality policy measures, which prioritize the reduction of GHG-related consumption first, followed by the electrification of systems currently running on fossil fuels, and ultimately the purchase of electricity from 100% renewable sources, and any remaining GHG emissions associated with the District of Columbia can be offset through local carbon sequestration strategies or carbon offsets.

**HOW ARE THESE GOALS AND TARGETS RELEVANT TO THIS CASE?**

The central issue in the Pipes 2 application is not whether the Company has identified an appropriate set of pipes to be replaced and whether the proposed price tag of $374 million is a reasonable amount for the task. Rather, the central issue is whether this type of pipe replacement designed to mitigate future safety risks as determined by statistical modeling, rather than enhancing the current effort to identify and eliminate actually observed leaks, is a prudent investment given the District's efforts to phase out the use of natural gas in buildings by 2050.

In that regard, the District's policy context for Pipes 2 is an essential factor in evaluating the reasonableness and prudence of WGL's Pipes 2 application.

**IS THE PIPES 2 APPLICATION ALIGNED WITH THE DISTRICT'S CLIMATE AND ENERGY POLICY?**

Unfortunately, no. To the contrary, given the District's goals and targets, it is my opinion that the proposed Pipes 2 application is very likely to hinder the District's efforts to meet its climate and energy targets.

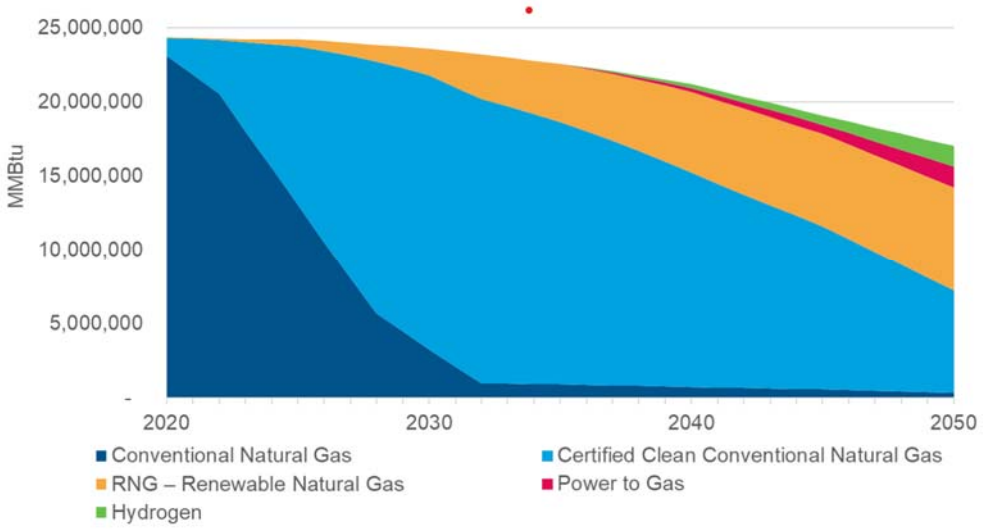
Generally, the key issue lies in the fundamental premise of the PROJECTpipes program, which is that the use of natural gas for the buildings in the District of Columbia is assumed to continue well past 2050. I should note that AltaGas, the Company's parent, recently filed a Climate Business Plan (CBP) in Formal Case 1142, to demonstrate that some portion of the gas sold in the District of Columbia can come from carbon neutral sources, and the CBP identifies PROJECTpipes, i.e. leak reduction from the distribution system, as a measure for lowering the GHG footprint of the Company's business. However, even the CBP projects not only assume that the Company will continue to sell natural gas for consumption in the building sector by 2050, but that the majority of the gas sold in 2050 will likely come from carbon-intensive natural gas, delivered through these pipes that will last for 100 years, a significant portion of the new pipes lasting well into the middle of the 22$^{nd}$ century. Therefore, the very posture of PROJECTpipes stands in conflict with the District's goal of achieving carbon neutrality by 2050.

More specifically, the Pipes 2 application is highly likely to push the District off course in its fight against climate change by misallocating ratepayer funds toward (1) activities that do not significantly reduce the GHG emissions attributable to the District of Columbia; and (2) a natural

gas pipe infrastructure that is likely to be used increasingly less, turning these new costly pipes into unused, stranded assets.

**CAN YOU ELABORATE?**

Yes. Regarding my statement that the Company plans on selling natural gas through 2050 and beyond, AltaGas's Supplemental Technical Information accompanying the CBP provides a graph (Slide 5, 4/21/2020), shown below, illustrating its assumption that even their most optimistic, least carbon-intensive scenario consists of non-renewable natural gas (blue portions) providing nearly half of the supply to the District of Columbia.




In addition, the CBP's introduction section contains a table (shown in part below) illustrating that the leak reductions from PROJECTpipes is identified as a GHG reduction measure.

| Detailed Estimated Climate Business Plan Emissions Reductions* | 2032 | 2050 |
|---|---|---|
| **1) End-Use** | | |
| Energy Efficiency (including Behavioral Programs and Gas Heat Pumps) | 4% | 14% |
| CHP and Distributed Energy Systems | 5% | 5% |
| Dual Fuel Systems (Hybrid Heating) | 3% | 13% |
| Emerging Technology and Offsets | 0% | 4% |
| **Total End-Use Reductions** | **12%** | **36%** |
| **2) Transmission and Distribution** | | |
| Distribution (Emissions reductions including second phase of PROJECT*pipes*) | 2% | 4% |
| **Total Transmission and Distribution Reductions** | **2%** | **4%** |

Lastly, the very notion of seeking to replace all pipes in the District of Columbia through 2054, with each new pipe expected to last for 100 years, implies an intent of the Company to sell natural gas well past the District's carbon neutrality deadline.

On the issue of GHG emissions reductions through PROJECTpipes, Company Witness Jaca testified that the Company spent $78 million in the Pipes 1 program, which was approved in August 2013, resulting in a reduction of 5,674 MT $CO_2e$ as of September 2018 (p.6-7, 12/7/2018 testimony, Exh WG (A)). Just in terms of the GHG emissions associated with the direct use of natural gas in residential, commercial, and federal buildings, that reduction represents roughly less than 0.1% of the GHG emissions attributable to the direct use of natural gas in the buildings during the Pipes 1 period.

| GHG emissions (MT $CO_2e$) during Pipes 1 | Total GHG Emissions | Reductions from Pipes 1 |
|---|---|---|
| Buildings (RES, COMM, GSA)<br>Direct Use of Natural Gas | 7,284,520 | 5,674 |

Given the cost of the Pipes 1 program at $78 million, these small reductions are astronomically expensive, by several orders of magnitude, in comparison to prevailing costs of carbon in use today, which generally range from $20 to $125 per ton of $CO_2e$.

Similarly, Witness Jaca states that Pipes 2 will reduce leaks from the distribution system, resulting in GHG reductions by 17,017 MT $CO_2e$ (p.11, 4/23/2020 testimony, WG Exh (2A)). According to AltaGas's CBP, AltaGas's most optimistic case for GHG emissions associated with the consumption of natural gas in the District of Columbia's building sector from 2020 to 2024 may be approximately 3.9 million MT $CO_2e$. Again, the GHG reductions from Pipes 2 represent about 0.43% of the emissions during the Pipes 2 period, at an approximate cost of $22,000 per ton of $CO_2e$. These small reductions of GHG emissions could not possibly be used to justify the $374 million expenditures.

I note here that in citing the figures from AltaGas's submittals in Formal Case 1142 in this testimony, I am not stipulating to the accuracy of the calculations or the validity of assumptions and methodologies used in their submittals; instead I merely refer to them to illustrate my point. DOEE's evaluation of the CBP will be submitted in Formal Case 1142 in accordance with the procedural schedule set by the Commission.

Further, Witness Jaca states that the cumulative emissions reductions during the remaining portion of PROJECTpipes through 2054, i.e. Pipes 3 through Pipes 7, are expected to be 1,015,488 MT $CO_2e$ (p.12, 4/23/2020 testimony, WG Exh (2A)). In comparison, I note that according to the Company's consultant Jacobs Consultancy, which produced the cost benefit analysis of PROJECTpipes, estimated the baseline GHG emissions reductions from PROJECTpipes to be 100,387 MT $CO_2e$ (p. 27, Table 18 – AAR Greenhouse Gas and Leak Reductions), a mere fraction of the Company's own estimate.

Given that AltaGas's most optimistic scenario, again without conceding the accuracy of its methodology, assumptions, and calculations, purports to produce 16.3 million MT $CO_2e$ from

2025 to 2050 just from the building sector alone, the GHG reductions from the pipe replacement program represents merely 6% reduction of the GHG emissions from the building sector. If we used the 100,387 MT $CO_2e$ estimate from Jacobs Consultancy, the percentage would be 0.6%, rather than 6%. Alternatively, if AltaGas's GHG reduction efforts in areas other than PROJECTpipes fall more in line with the business-as-usual scenario with 33.5 million MT $CO_2e$ from 2025 to 2050, the GHG reductions from PROJECTpipes would represent an even smaller portion, ranging from 0.3% to 3%.

In either case, what remains true regarding the GHG reduction estimates from PROJECTpipes is that they represent an unjustifiably small portion of the emissions reduction that is needed to achieve the District's climate and energy targets, especially given the huge costs of PROJECTpipes, which range from nearly $3 billion to $4.5 billion.

Reducing or eliminating fugitive emissions from the pipe system, as well as from the extraction and production segment of the supply, is very important because (1) methane has a much greater Global Warming Potential than carbon dioxide on a shorter time horizon; (2) methane can interact with other pollutants in the atmosphere such as nitrogen oxides and degrade the District of Columbia's air quality. But it is important to point out that the amount of projected leak reductions for the multi-billion dollar price of PROJECTpipes are so small that leak reductions cannot be viewed as a meaningful driver of PROJECTpipes.

**ARE THERE OTHER ASPECTS OF PROJECTpipes THAT ARE MISALIGNED WITH THE DISTRICT'S CLIMATE GOALS?**

Yes, the Company's request for ratepayers to invest billions of dollars into a gas infrastructure is directly at odds with the District's efforts to phase out the use of gas for heating in buildings, as recommended by authoritative climate change scientists.

Consistent with the District's climate goals and targets outlined earlier, the 2018 Special Report by the International Panel on Climate Change, titled "Global Warming of 1.5ºC", clearly stated with a "high level of confidence" that the pathways to limit warming to 1.5ºC require that carbon neutrality must be achieved globally around 2050. Further, the report states that such pathways are characterized by (1) reducing energy demand, (2) decarbonizing electricity and other fuels, (3) electrifying end-use equipment, (4) reducing agricultural emissions, and (5) using some form of $CO_2$ removal.

Similarly, the Deep Decarbonization Pathway Project, which is a project of energy research teams from 16 countries with the largest GHG footprint, brought together through a United Nations initiative, stated that any pathway to achieve deep decarbonization contains "three pillars": (1) highly efficient end use of energy in buildings, transportation, and industry; (2) nearly 100% decarbonization of electricity; and (3) electrification where possible. These three pillars are found in most climate change mitigation plans developed by the states and cities that have pledged to abide by the Paris Agreement.

Largely adopting the deep decarbonization pathway framework, the Obama administration issued the United States Mid-Century Strategy for Deep Decarbonization in 2016 for submittal in accordance with the 2015 Paris Agreement. In that document, the Mid-Century Vision for the Building Sector identifies only two items: Energy Efficiency and Electrification.

Lastly, several states are moving to electrify buildings, as evidenced by New Jersey's 2020 Energy Master Plan seeking to electrify water and space heating in 90% of buildings by 2050, and the California Energy Commission's report in 2019 concluding that electrification of buildings represents a lower-cost, lower-risk, long-term strategy compared to renewable natural gas in achieving deep decarbonization.

In alignment with these clearly articulated findings and consensus on essential components to achieve deep decarbonization, the Clean Energy DC plan was developed based on these three pillars of the deep decarbonization pathway. Indeed, most of the District's regulatory and legislative efforts on climate change—the most recent example being the Act—are directed at energy efficiency, clean electricity, and electrifying buildings and transportation.

Specifically, the Clean Energy DC plan states that achieving the District's 2050 GHG carbon neutral target will require the District to phase out the use of natural gas in buildings. Therefore, it is readily apparent that the Company's effort to completely rebuild a natural gas delivery system by 2054 with $3 - $4.5 billion in ratepayer funds is directly at odds with the District's climate goals.

**ARE THERE ELEMENTS OF PIPES 2 THAT YOU CAN SUPPORT?**

Yes, the Company should be commended for adding a pilot program for Advanced Leak Detection (ALD). ALD is a method that could be used to identify high-volume leaks, thereby reducing a greater amount of GHG emissions from pipe leaks at a lower cost, and it has the potential to find more leaks than the typical survey method of using handheld methane detectors. Several utilities in other jurisdictions have adopted ALD with high-sensitivity leak detectors mounted on cars to map the leaks and their density throughout the service territory. A similar

practice should be adopted in the District of Columbia to enhance the Company's current leak identification and repair practices in the Distribution Integrity Management Program.

**CAN YOU ADDRESS PROJECTpipes FROM A SAFETY PERSPECTIVE IN RELATIONSHIP TO THE DISTRICT'S CLIMATE CHANGE GOALS AND TARGETS?**

Yes, it is critically important to DOEE, both as an energy office and an environmental agency, to ensure that District of Columbia residents and businesses have access to safe and clean energy. Many District of Columbia residents currently rely on the supply of natural gas to heat their homes, and until they can have reasonable access to safer and non-polluting means of heating their homes, we fully support the Company to identify leaks that are currently occurring and to eliminate or minimize these leaks as much as practically feasible.

In January 2014, an independent team composed of scientists from Duke University, Stanford University, Boston University, and Gas Safety, Inc. published their research findings concerning the frequency and extent of natural gas leaks actually occurring in the District of Columbia based on a field survey of 1500 road miles. They found 12 locations with Grade 1 leaks, which are highly hazardous, and they conveyed this information to the Company. Their findings can be found in their research paper, titled "Natural Gas Pipeline Leaks Across Washington, DC" in *Environmental Science & Technology*. DOEE supports this type of effort to identify actual leaks that pose a hazard to District of Columbia residents and businesses.

The Company has always had an emergency leak repair program to respond to complaints about leaks and odor and to make necessary repairs, and we appreciate the Company's efforts to respond to these leak reports in a timely manner. But my understanding is that this program

unfortunately does not include a field/road survey, similar to the one that the research team performed in 2014, to proactively identify ongoing, hazardous leaks; rather, it reacts to calls and concerns from residents and businesses about possible leaks. Importantly, PROJECTpipes also does not include a field/road survey.

**IF THE AIM OF PROJECTpipes IS NOT TO IDENTIFY AND REPAIR CURRENTLY OCCURRING LEAKS, HOW DOES IT ENHANCE SAFETY?**

This is the key point regarding PROJECTpipes, the purpose of which is not about identifying and fixing actual leaks that are occurring. Rather, the purpose of PROJECTpipes is to prevent or mitigate *potential future* leaks, and the method of future leak mitigation chosen by the Company is to replace all pipes. And the Company prioritizes the replacement of certain pipes over others, using statistical algorithms—based on the Company's historical data of leak incidents for each type of pipe (e.g., material, size, year) in the Company's distribution system—to forecast the likelihood of leaks in the future. This means that some, if not many, pipes subject to replacement under PROJECTpipes may not be producing any leaks at the present moment or in the near future. Therefore, replacing such pipes that are currently not producing leaks will do very little to enhance the present safety condition of the pipes.

**HOW DOES THE COMPANY'S CHOICE TO MITIGATE POTENTIAL FUTURE LEAKS THROUGH A PROGRAM LIKE PROJECTpipes IMPACT THE DISTRICT'S EFFORTS TO ACHIEVE CARBON NEUTRALITY?**

The main impact is cost, and more specifically, stranded costs totaling several billion dollars. The cost of PROJECTpipes will be paid by ratepayers. Many gas ratepayers also have electric bills. In the context of climate change, building and maintaining an electricity system that

delivers safe and clean electricity is an absolutely unavoidable task that carries a cost. In pursuing the District's ambitious climate goals, it is essential that we optimize our investments in the energy infrastructure to maximize benefits and minimize waste. Therefore, it becomes critical that District of Columbia ratepayers are asked to invest only in those measures and programs that are unavoidable and that harmonize various policy goals if the public interest is to be served faithfully.

As a result, the key question becomes whether PROJECTpipes is the *only* method of mitigating potential future leaks, or, to phrase it in another way, whether the Company can prevent leaks in the future without PROJECTpipes. The answer is that PROJECTpipes is *not* the only way to reduce or eliminate leaks in the future leaks, albeit the alternative may be unconventional.

**CAN YOU ELABORATE?**

Yes, the push to accelerate the replacement of aging pipes to mitigate potential future leaks was triggered in part by the disastrous explosion of the transmission pipeline in San Bruno, California in 2010, which was followed by another explosion in Allentown, Pennsylvania in 2011. At that time, natural gas was still believed to be a necessary "bridge fuel"—until renewable energy supply can catch up—on account of the fact that gas-fired combined cycle generation units produced less GHG emissions than coal-fired generation units, and that the hydraulic fracturing method to extract gas from unconventional reservoirs unlocked an abundant supply of cheap gas.

Such a view existed because insufficient attention was given to the fugitive emissions of methane in the supply chain, and its impact on determining whether natural gas is delivering actual climate benefits. Further, electrifying buildings at that time posed significant challenges: higher

cost of efficient electric heat pumps and viability of cold-weather electric heat pumps, as well as higher cost of renewable energy and its relative scarcity.

In short, 10 years ago, adequate substitutes for natural gas and gas appliances may not have been clearly visible. In that context, replacing an aging gas delivery system may have made sense, since the belief was that nothing could replace natural gas over the next few decades. However, innovation, market efficiency, and policy intervention in the last 10 years brought unexpectedly rapid and positive changes to the renewable electricity sector and the electric heat pump industry, which removed many of the barriers to electrification. As a result, now there is an alternative option to using natural gas in buildings and to eliminating potential leaks in the future.

**WHAT WOULD BE AN ALTERNATIVE OPTION FOR ELIMINATING POTENTIAL FUTURE LEAKS?**

In the context of ensuring safety, electrification of buildings could be a non-pipe safety alternative, particularly for mitigating leaks from costly service lines, based on a positive cost-benefit analysis and with the informed consent of the gas customer. In short, the surest option one could take to completely eliminate the risk of explosion due to potential leaks in the future is to disconnect from the gas service line.

Although such an alternative approach admittedly may not be in the financial interest of the Company under the current regulatory framework, it could and should be considered from a safety perspective, and, similar to the electric utility sector, an alternative regulatory framework for natural gas utilities could be devised to incentivize the Company. To illustrate, such a framework could include innovative performance incentive mechanisms that will allow the

Company to earn an attractive rate of return on its expenditures associated with using electrification as a safety measure.

For example, according to the data response the Company provided as Attachment A in OPC DR No. 5-01, the Company is proposing to spend $179.8 million to replace 8,494 bare steel service lines over the next 5 years. Given the very high unit cost of replacement for this type of service line at $21,172, it might prove cheaper to electrify some of the buildings' heating equipment connected to these lines at no cost to the gas customer, provided that the customer agrees to such a switch. The general price of a high-performance electric heat pump ranges well below $10,000. Of course, more information about the building will be needed to determine whether electrification would indeed be more cost-effective as a safety solution well under the price of $21,172, but such an alternatives analysis should be performed. A similar analysis could be done for other service lines with an equally high cost for unit replacement, such as unprotected wrapped steel service lines, copper service lines, vintage mechanically coupled service lines, all of which cost $21,172 per unit replacement.

This approach would be quite analogous to what is happening in the electric utility sector. In providing safe and reliability electricity, investor-owned electric utilities are currently being challenged to consider non-traditional solutions to providing capacity and reliability. Such an approach has been called "non-wires alternatives" to traditional procurement of power, i.e. building more transformers, substations, and transmission lines. The idea is that if customer-owned generation assets and customer behavior control can be utilized to reduce the need for traditional, utility-owned assets at a much lower cost, then electric utilities should embrace such solutions and be financially incentivized to do so.

Identifying the type of buildings that are easily convertible to electrification is critical to using this approach. DOEE's preliminary analysis indicates that electrifying heating may be more cost-effective for single-detached homes rather than large multi-family buildings. Given that there are 61,437 single-detached homes subject to the entire PROJECTpipes program, there will be ample opportunity to explore the use of electrification as a cost-effective safety/risk mitigation measure.

With such an alternative, the Company could have a hybrid approach to mitigating potential leaks in the future. With the help of relevant stakeholders, the Company could identify the buildings that are least suited to electrification in the near future, and focus on identifying and replacing actual leaky pipes that serve those buildings. Concurrently, the Company could identify a list of homes that would be cheaper to electrify than it would be to replace the pipes that serve those homes, and offer the home owners the option to disconnect from the service lines and to electrify their homes instead. And the Company should be handsomely rewarded for each homeowner that agrees to electrify. If the homeowner does not agree, the Company would default to the business-as-usual pipe repair activity.

Such an approach can ensure that the limited financial resources of District of Columbia ratepayers will be spent on investments that can harmonize multiple policy goals: having access to energy that (1) does not add GHG emissions, (2) does not pollute the air, (3) is safe, and (4) is cost-effective.

**IF THE COMPANY CONTINUES WITH PROJECTpipes AND DECLINES TO CONSIDER ALTERNATIVES, WHAT IMPACT WOULD THAT HAVE ON THE DISTRICT'S CLIMATE EFFORTS?**

There are two possible outcomes, both of which are quite negative. One outcome is that District of Columbia ratepayers pay $3 billion to $4.5 billion to replace all of the Company's pipes, but decide to electrify their homes anyway in order to fight climate change in accordance with the deep decarbonization pathway framework. In this case, District of Columbia ratepayers will have wasted their financial resources, and the Company will have created an enormous stranded asset.

A troublesome and ensuing consequence is that as the Company loses more customers due to building electrification, the increases in distribution charges will accelerate, which could cause more customers to electrify their homes, thereby triggering what is known as a "utility death spiral." In such a scenario, it is always those who can least afford to defect—low income customers who cannot afford to electrify their homes or do not own their own homes—that remain as gas customers to pay an ever-increasing share of the distribution service charges. Therefore, this outcome could be dire in terms of equity and fairness for those customers. It is for this reason that the Commission should consider prioritizing the electrification of low-income ratepayers, in order to lower the equity risk of this scenario.

Another possible outcome is that because District of Columbia residents have invested so much money toward replacing and upgrading the Company's pipe system, they will refuse to switch to a cleaner electric system, and stay connected to the gas pipe system. In this case, the District's climate mitigation efforts will be significantly slowed and stymied, and District of Columbia residents will have to continue to stay vigilant in mitigating pipe leaks as well as addressing adverse health impacts from such leaks.

In short, the first outcome produces negative equity and economic consequences, and the second outcome produces equally negative consequences for climate change and public health. A full pursuit of PROJECTpipes, including Pipes 2, invites these potential negative consequences.

**DO YOU BELIEVE THAT PIPES 2 IS A PRUDENT INVESTMENT FOR THE DISTRICT?**

No, I do not, at least not in this current formulation, for the reasons I provided. And because this application has long-reaching consequences, I respectfully urge the Commission to evaluate the Company's proposal carefully, considering all of the public interests that are at stake: climate change, equity, public health, and the financial resources of District of Columbia ratepayers.

**WHAT IS YOUR RECOMMENDATION?**

The Commission should not authorize any new expenditures on Project Pipes for now because, as I discussed in my testimony, these expenditures may become stranded costs. Given that Pipes 2 is a proposal to reduce the future risks of pipe leaks, I think there is time to revisit the best way to meet this objective. My recommendation is first to map all of the leaks in the District using ALD with car-mounted high-sensitivity leak detectors, then prioritize the replacement of pipes based on the map's findings, and based on the non-pipe safety alternative analysis that I described earlier.

**DOES THIS CONCLUDE YOUR TESTIMONY?**

YES

**CERTIFICATION**

I certify on this 15th day of June 2020, that the foregoing Direct Testimony is true and correct to the best of my knowledge, information and belief.

/s/ *Edward P. Yim*
Edward P. Yim

**CERTIFICATE OF SERVICE**

I certify that on June 15, 2020, a copy of the *Direct Testimony of Edward P. Yim – Exhibit DCG (A)* was served on the following parties of record by hand delivery, first class mail, postage prepaid or electronic mail:

Brinda Westbrook-Sedgwick
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Public Service Commission
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Christopher Lipscombe
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