CLIMATE BUSINESS PLAN & REGIONAL RNG STUDY

AltaGas

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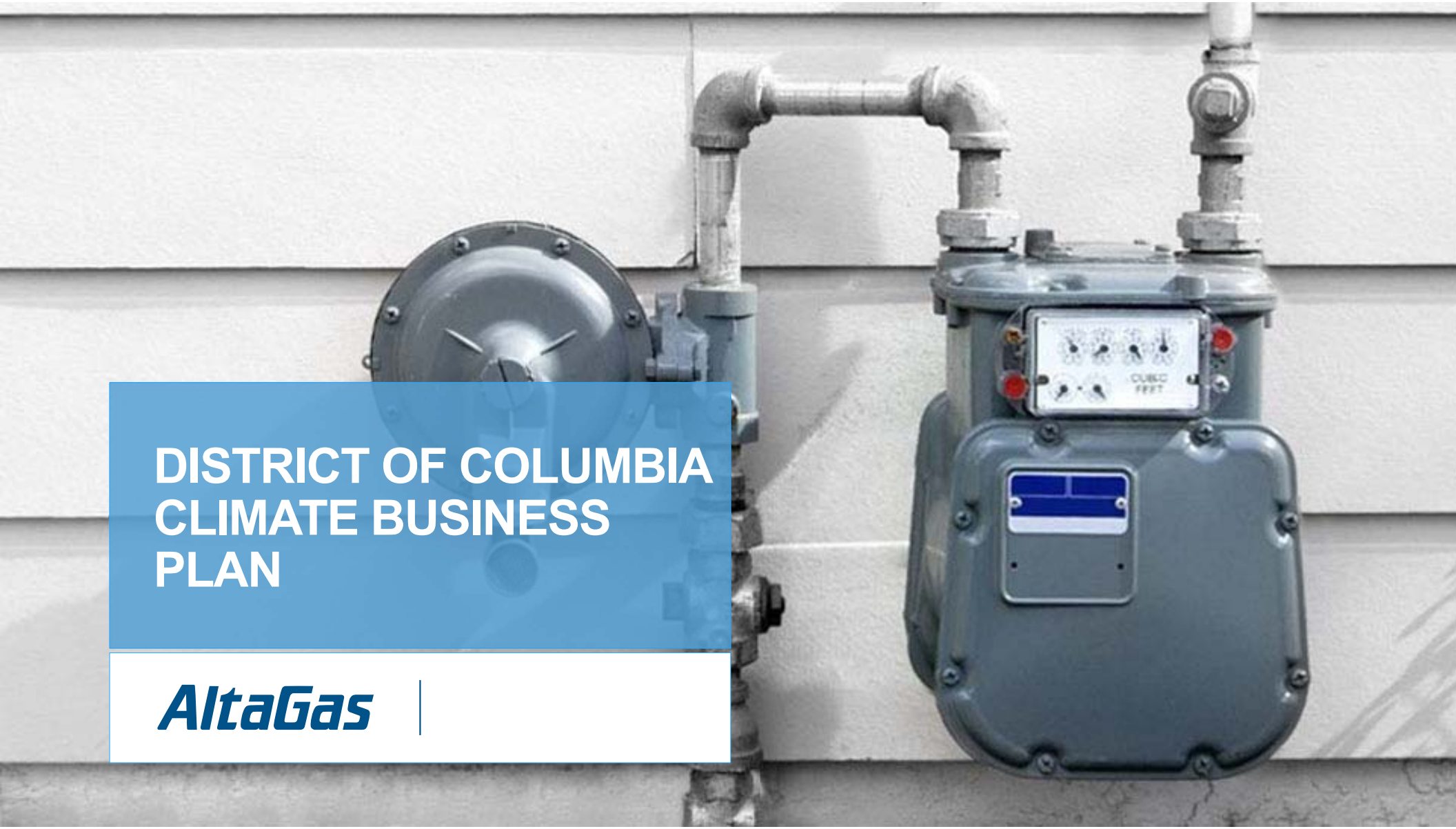


DISTRICT OF COLUMBIA CLIMATE BUSINESS PLAN

AltaGas

About Us: Washington Gas - A Recognized Climate Leader

"WGLH demonstrates consistent values with the District when it explicitly acknowledges and embraces the scientific findings of the Intergovernmental Panel on Climate Change, considers emission reductions to be a matter of corporate policy, and has exceeded its targets for GHG emission reductions, which in turn exceed those required by regulation or mandate."
-- Asa S. Hopkins, Merger testimony, September 29, 2017

Climate Business Plan Context

D.C. Merger Commitment # 79

AltaGas will file with the Commission a long-term business plan on how it can evolve its business model to support and serve the District's 2050 climate goals (e.g., providing innovative and new services and products instead of relying only on selling natural gas).

After the business plan is filed, AltaGas will hold bi-annual public meetings to report on and discuss its progress on the business plan.

DC's Climate Goals

- 50% GHG emissions reduction by 2032 (from 2006 baseline)
- 100% Renewable electricity by 2032 per DC Clean Energy Omnibus Act of 2018
- Carbon neutral by 2050

A Message from Randy Crawford

President
and Chief
Executive Officer

- Our Climate Business Plan provides a sensible path forward. Collaborating with the District to implement the steps toward decarbonization gives us the opportunity to continue to leverage our resilient, vast and established energy delivery and storage system to reduce emissions while providing affordable and reliable energy.
- Our Plan promotes customer energy efficiency and savings, builds and maintains a modern infrastructure for today and tomorrow, and introduces carbon-free fuels, such as renewable natural gas (RNG) and hydrogen.
- Looking 30 years into the future means that we have to do our best to anticipate what's ahead. While many factors are unknowable over that long timeframe, there are emerging, disruptive and breakthrough technologies that are showing tremendous promise and are expected to impact everything from sourcing to distribution, to how effectively we use energy in the future.

The Climate Business Plan

- Adopts reductions proportional to DC's Climate Goals – 50% by 2032; carbon neutral by 2050
- Demonstrates that a science-based, 'fuel neutral' approach, which includes natural gas as well as electricity, transportation fuels, etc. is **the most cost-effective** way to reach the District's GHG emissions reduction targets
- The Plan evolves Washington Gas' business, including decarbonizing the mix of gases delivered, with an expanded focus on high-efficiency equipment, adoption of CHP, et al.
- The Plan preserves the vital role of the natural gas delivery infrastructure, continuation of PROJECT*pipes* replacement, enhanced leak detection and response, etc.

Aligns With and Supports DC Public Service Commission Vision* for Modernizing the District's Energy Delivery System

SUSTAINABLE

Meets the GHG reduction targets on time

WELL-PLANNED

Preserves energy availability during both normal and peak demand conditions

SAFE & RELIABLE

99.9%

Leverages the reliability of our natural gas system

SECURE

Protects against service interruptions by having multiple systems rather than relying on one

AFFORDABLE

$2.7 B

Less than electrification

INTERACTIVE

Advanced leak detection, internet of things, monitoring, etc. included in the plan

NON-DISCRIMINATORY

non-prescriptive approach allows opportunities presented by future innovations and technological advances

* Adopted February 14, 2018

Washington Gas' Vital Role Today and in the Future

Promotes Social Equity – Leverages Innovation

- **Preserving Affordability** - 27 percent of the District population District is eligible for the Low-Income Housing Energy Assistance Program (LIHEAP). Today direct gas use is $879 less than electric. CBP is lowest cost pathway to meet District's 2050 reduction goals..
- **Maintaining Resilience** during increasingly frequent and severe weather-related events due to Climate Change, through a **Diverse and Reliable Energy Portfolio**
- **Protecting the Vulnerable from Cold Weather -** 17 percent of District residents over 65 live below the poverty line. Older adults are particularly affected by energy poverty and cold weather, according to NIH. The Centers for Disease Control and Prevention (CDC) found: "cold-related deaths are more prevalent than heat related."
- **Enabling Renewable Power –** The reliability of natural gas direct use and power generation and the ability of our vast infrastructure to function as a huge, low cost battery back-stops the intermittency of renewable electricity.
- **Leveraging Innovation –** By offering a 'fuel neutral' framework the Plan allows for and encourages a wide range of innovation and new technology.

The Climate Business Plan

An optimized strategy for reducing natural gas emissions in support of the District's climate goals.

Offers an objective analysis of alternative pathways to carbon reduction

Illustrate the costs, effectiveness and impacts of multiple scenarios including impacts on affordability, reliability, resilience, equity identified as essential elements of the District's energy planning

Provides recommendations

The CBP demonstrates how and why the public interest is best served by an energy portfolio that retains the benefits of natural gas and its infrastructure

- Most affordable to customers
- Cost-effective decarbonization options
- Unmatched reliability
- Provides ***both*** energy and storage
- Supports DC's mandated 100% reliance on renewable electricity by 2032

Outlines tactics, required policies and potential timeframe to achieve reductions

Four Scenarios Evaluated

Summary of Scenarios, Benefits and Costs

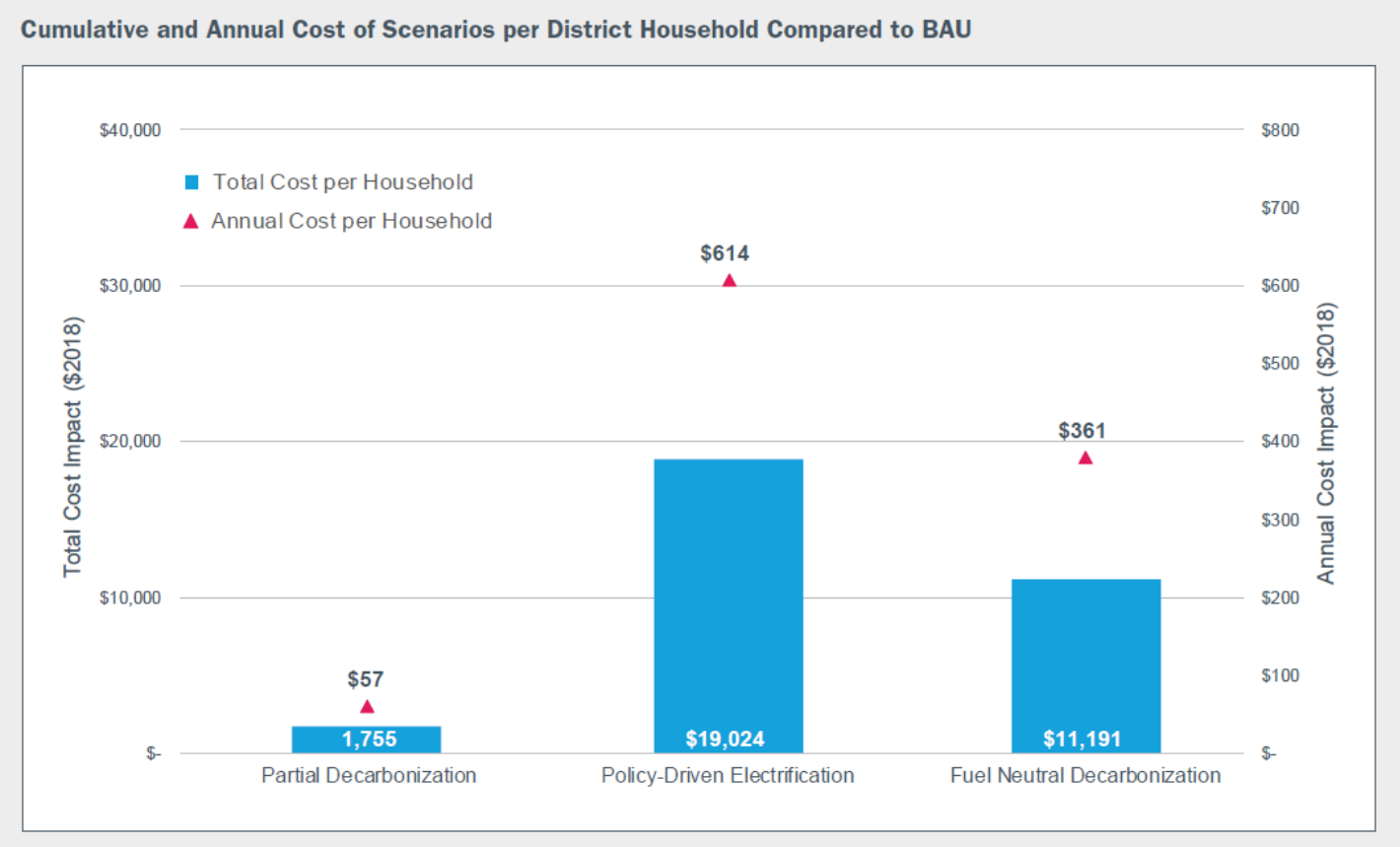
	2050 GHG reduction since 2006	Additional cumulative cost (above BAU)
Business as Usual (Reference Case) Based on the 100 percent renewable portfolio standard (RPS), retains natural gas	75%	–
Partial Decarbonization BAU plus: ▪ moderate market penetration of EVs ▪ increased energy efficiency ▪ modest decarbonization of gas supply including introduction of RNG and certified gas	82%	$603 Million
Policy-Driven Electrification BAU plus: ▪ requires homes and businesses using natural gas to convert to electricity ▪ electrification of all new construction ▪ aggressive market penetration of electric vehicles ▪ small volume of offsets (not included in costs)	100%	$6.5 Billion
Fuel Neutral Decarbonization BAU plus: ▪ aggressive energy efficiency programming including gas heat pumps ▪ moderate introduction of dual fuel heating systems ▪ substantial decarbonization of gas supply introduction of renewable natural gas, certified gas, and green hydrogen ▪ leverages new and emerging technologies ▪ aggressive market penetration of electric vehicles ▪ small volume of offsets (not included in costs)	100%	$3.8 Billion

Only considered pathways that reached the GHG emissions targets

… but the cost difference is dramatic

$2.7 Billion
less for Fuel Neutral

Cumulative and Annual Cost of Scenarios per District Household



Plan Highlights

End Use

Energy Efficiency

- Expand DC SEU programs
- Develop WG programs that support
  - Behavioral demand reductions
  - High-efficiency appliances
  - Building envelope upgrades
  - Deep penetration of gas heat pumps
  - Demand response IOT automation
  - CHP deployments
  - Electric /Gas Hybrid Heating
- Explore approaches, such as Energy-As-A-Service, to ease financial burden
- Reduce economic disincentives through decoupling / RNA adoption
- Accelerate advanced technology development / adoption via partnerships & pilots with National Labs/OEMs

Distribution

Despite comparatively low emissions, odor, noise and disruptions due to repairs, planned construction, and proactive pipeline replacement programs make fugitive emissions the most visible GHG source to people living in our communities.

- Prioritize Accelerated Pipeline Replacement Programs projects based on GHG emissions using data analytics
- Promote advanced leak detection and enhanced response solutions
- Recover gas during maintenance, repair and replacement projects using drawdown compressors
- Evaluate the efficacy of several promising airborne and vehicle based methane detection systems

Sourcing and Supply

Certified Gas provides

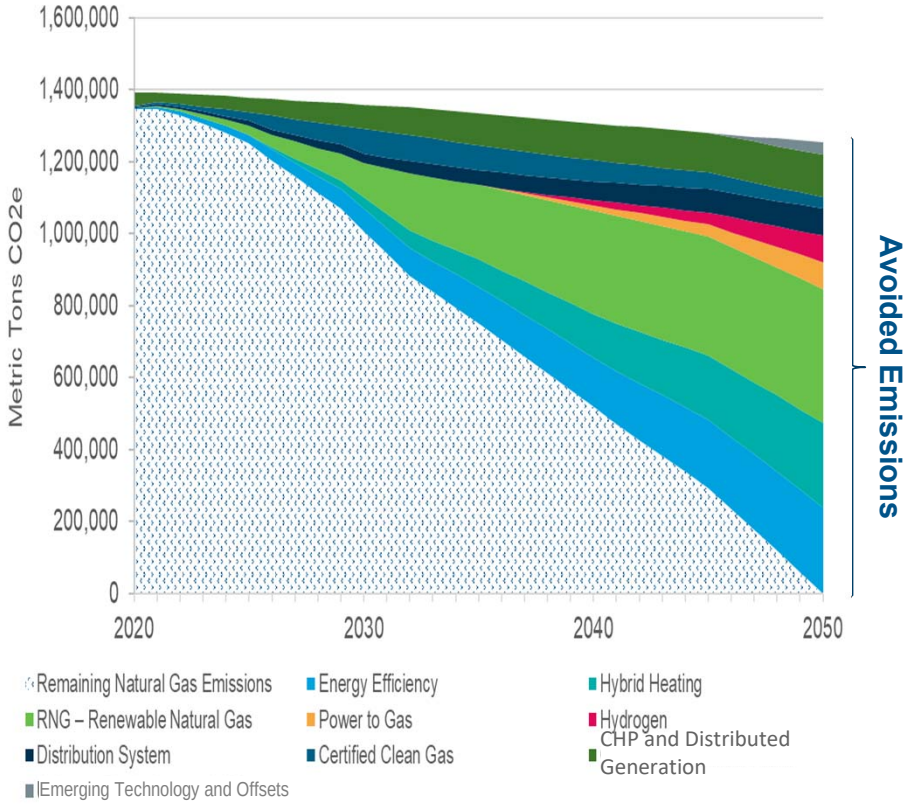
- Low cost emissions reduction
- Ready now strategy ~ 1–2% reduction
- Pending study with RMI to validate emissions reductions

RNG

- Purchase / distribute RNG and other low carbon fuels including biogas, power-to-gas, and hydrogen
  - 13% by 2032; 58% by 2050
- Seek regulatory approval to pass on additional costs
- Evaluate equitable socialization of cost across customer base
- Encourage marketers to provide additional opt-in RNG offering
- Facilitate development of and access to non-fossil supply

Climate Business Plan GHG Reductions Over Time

Emission Reductions Attributable to Natural Gas



Energy Efficiency

- Behavioral programs/"smart'" devices
- Building shell and appliance improvements
- New technologies -- gas heat pump heat/hot water

Low/No Carbon Gas

- RNG – Renewable Natural Gas, P2G, hydrogen blending, certified gas

Hybrid Heating

- Advanced technology under development; needs scaling
- Substantially reduces throughput; retains meters

CHP and Distributed Generation

Offsets / Emerging Technologies

- Direct Air Capture
- Necessary to get to 100%

GHG Reduction Contributions By Tactic

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%**
3) Sourcing and Supply		
Certified Gas Production (of geological gas) and Transmission	4%	2%
Renewable Natural Gas (RNG)	9%	21%
Power-to-Gas and Green Hydrogen	0%	8%
Total Sourcing and Supply Reductions	**13%**	**31%**
Total Climate Business Plan Emissions Reductions	**27%**	**71%**
+ Net emissions reduction from natural gas achieved 2006 - 2017	27%	27%
+ Net change in Business as Usual emissions after 2017	-3%	2%
= Total Reduction in GHG Emissions against Business as Usual*	**50%**	**100%**

*Numbers do not sum due to rounding

Recognized Analytical Approach & System-wide Thinking

EDF ENVIRONMENTAL DEFENSE FUND
Finding the ways that work

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Proceeding on Motion of the Commission To Investigate Denials of Service Requests by National Grid USA, The Brooklyn Union Gas Company d/b/a National Grid NY and KeySpan Gas East Corporation d/b/a National Grid	)))))	**Case 19-G-0678**

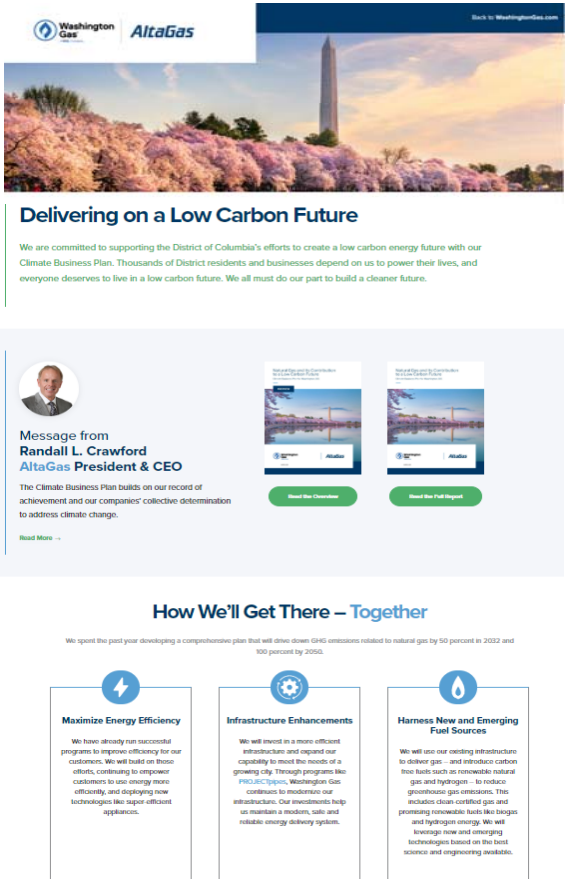
COMMENTS OF
ENVIRONMENTAL DEFENSE FUND

For example, Washington Gas Light Company's recently filed Climate Business Plan[19] before the District of Columbia Public Service Commission identifies three building blocks to decarbonization: end use, transmission and distribution, and sourcing and supply.[20] This type of broad, system-wide thinking is critical to maximize emissions reductions.

Next Steps

- Climate Business Plan filed on March 16, 2020
- Merger commitment requires biannual public meetings
  - Microsite https://washingtongasdcclimatebusinessplan.com/ includes Plan, Fact Sheets, FAQs, Technical Study, RNG Technical Study, etc., Video
  - Brief key stakeholders, gather input and questions
  - Introduce initial decarbonization proposals to activate the Plan
- Expect high engagement from the public and activists
- First meeting July 29, 2020

Productive stakeholder dialogue and collaboration is critical to achieving the District's climate goals and preserving the long-term well being of its residents, businesses and institutions



REGIONAL RNG STUDY

AltaGas

RNG Study: Overview

- ALA engaged ICF to assess the potential for developing biogas facilities in the Greater Washington, D.C. metropolitan area
- The study assessed the potential environmental benefits of repurposing locally sourced waste streams to create renewable natural gas that can be used for vehicle fueling and onsite energy usage
- The study included a comprehensive evaluation of production supplies, cost structures, economic viability, and operational challenges as well as regulatory and market approaches
- The full RNG study is available at: https://washingtongasdcclimatebusinessplan.com/wp-content/uploads/2020/04/200316-WGL-RNG-Report-FINAL.pdf

RNG: Key Takeaways from ICF study

1. RNG is carbon neutral and in some cases carbon negative

2. RNG is available now and significant quantities will be available both regionally and nationally for the foreseeable future

3. Although RNG is more expensive than geologic natural gas, it can be 20% the cost of full residential electrification and 10% the cost of full industrial

4. RNG is an important tool for reaching GHG emission reduction goals and needs regulatory support to reach meaningful levels

RNG: Carbon Neutral and Can be Carbon Negative

1

- AGA: Pipeline quality gaseous fuel derived from biogenic or other renewable sources that has lower lifecycle carbon dioxide equivalent (CO_2e) emissions that geologic natural gas (smaller footprint)
- Lifecycle approach: GHG emissions vary depending on feedstock, collection and upgrading processes (dairy)
- Combustion approach: CO_2 emissions are considered zero, or carbon neutral
- This is consistent with IPCC guidelines which state that emissions from biogenic fuel sources should not be included when accounting for emissions in combustion

RNG: Available Now and Will Have Ample Sources

2

RNG Production Potential in the Greater Washington, DC Metropolitan Region

RNG Feedstock		Geography		
		Greater D.C.	Regional	National
Anaerobic Digestion	Landfill Gas	17.0	145	866
	Animal Manure	--	63	462
	WRRFs	2.5	5	34
	Food Waste	6.2	13	64
Thermal Gasification	Agricultural Residue	--	27	641
	Forestry and Forest Product Residue	--	75	236
	Energy Crops	--	77	838
	Municipal Solid Waste	29.8	136	695
	Total	**55.5**	**542**	**3,834**

RNG: Available Now and Will Have Ample Sources

2

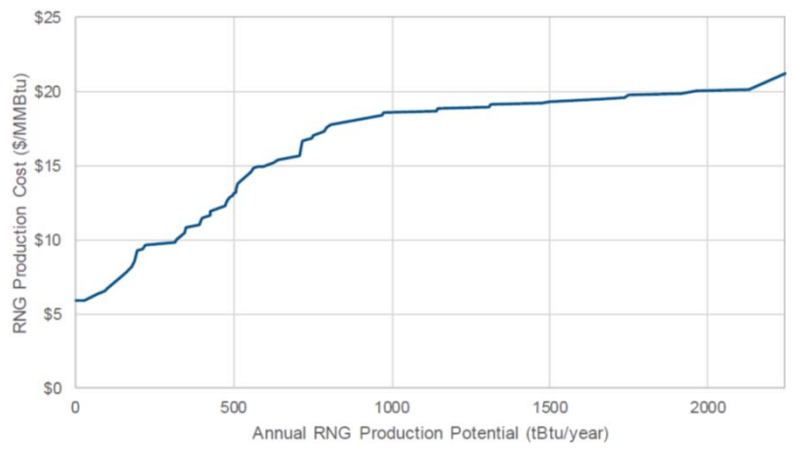
Greater Washington, DC Metropolitan Region Wastewater Resource Recovery Facilities

Name	County	Existing Flow (MGD)	Max. RNG Potential (tBtu/y)	AD System
DC Water Blue Plains	D.C.	370	0.95	Yes
Upper Occoquan WRRF	Prince William	45	0.14	Yes
AlexRenew STP	Alexandria	37	0.15	Yes
Lower Potomac STP	Fairfax	28	0.17	No
Arlington WPCP	Arlington	22	0.10	No
WSSC Piscataway WRRF	Prince George's	19	0.08	No
Western Branch WWTP	Prince George's	18	0.08	No
Broad Run Reclamation Facility	Loudoun	11	0.06	No
Mattawoman WWTP	Charles	8	0.06	No
Gas House Pike WWTP	Frederick (MD)	7	0.02	Yes
H.L. Mooney Advanced Water Reclamation Facility	Prince William	6	0.06	No
Parkway Wastewater TP	Prince George's	6	0.02	No
Opequon Regional Plant	Frederick (VA)	5	0.02	No
Ballenger/McKinney WWTP	Frederick (MD)	4	0.02	No
Total		**585**	**1.9**	

RNG: ICF Price Comparison

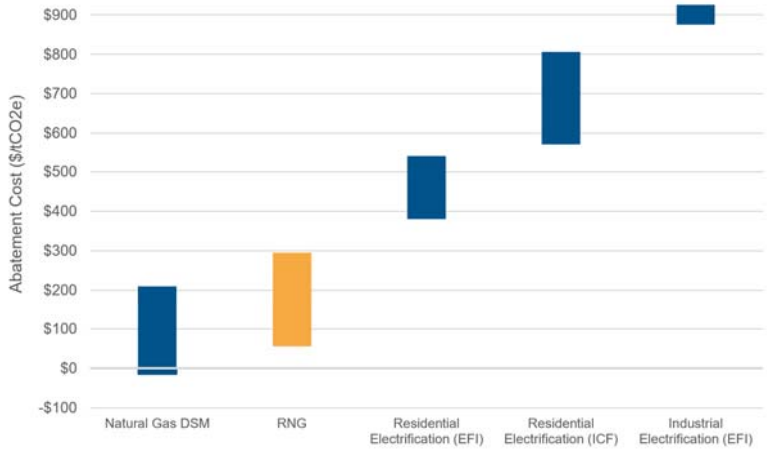
3

ICF COMBINED SUPPLY CURVE



ICF estimates RNG production cost of $7/MMBtu - $20/MMBtu by 2040

ICF GHG ABATEMENT COSTS



RNG is significantly less expensive than electrification

RNG: Part of a Balanced Carbon Abatement Approach

4

RNG Regulatory Support

ICF recommends a regulatory policy approach for RNG that will improve customer awareness, help foster market growth, and meet existing nascent demand:

- A distribution charge due to widespread system benefits
- Include third party suppliers and tracking mechanisms
- Layer in volumes over time beginning with 5-10%

RNG: Next Steps for WG

- WG will continue to coordinate the results from the ICF study with the RNG portions in the Climate Business Plan
- WG will continue to coordinate with key external stakeholders in the region such as regulators, developers, suppliers, associations and other fleet and corporate customers interested in utilizing RNG as a way to support state, local, and regional climate objectives
- WG will continue to evaluate potential policy approaches that will enable RNG to be a part of the larger supply portfolio