



Charlottesville Gas Decarbonization Study – Next Steps

March 3, 2025

AGENDA

- Charlottesville Gas Background
- Decarbonization Goal
- Decarbonization Study and Timeline
- Benchmarking Lessons
- Customer-led Pathways
- Pathways Under Charlottesville Gas Control
- Decarbonization System Modeling
- Next Steps

CHARLOTTESVILLE GAS

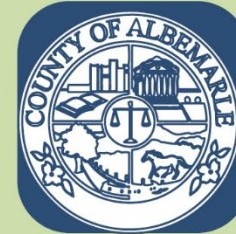
- **City-owned gas system** - one of three municipal natural gas utilities in Virginia
- **Gas operation established in 1876**



21,050
CUSTOMERS
SERVED



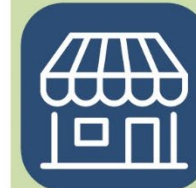
11,700
IN THE
CITY



9,350
IN THE
COUNTY



18,700
RESIDENTIAL



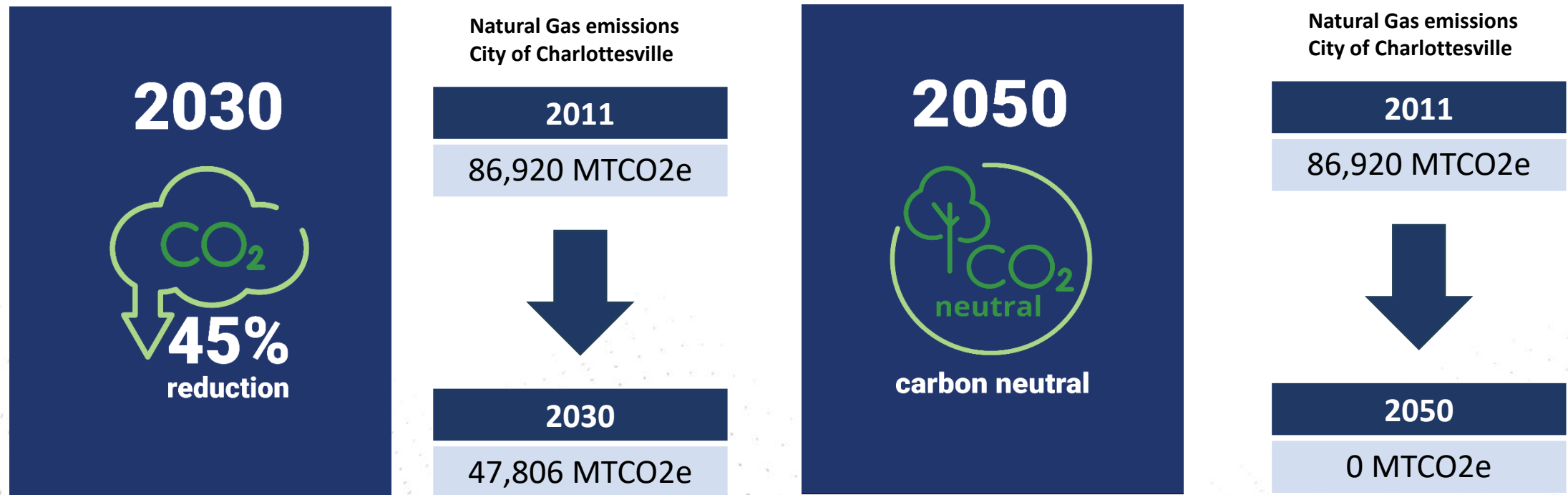
2,334
COMMERCIAL



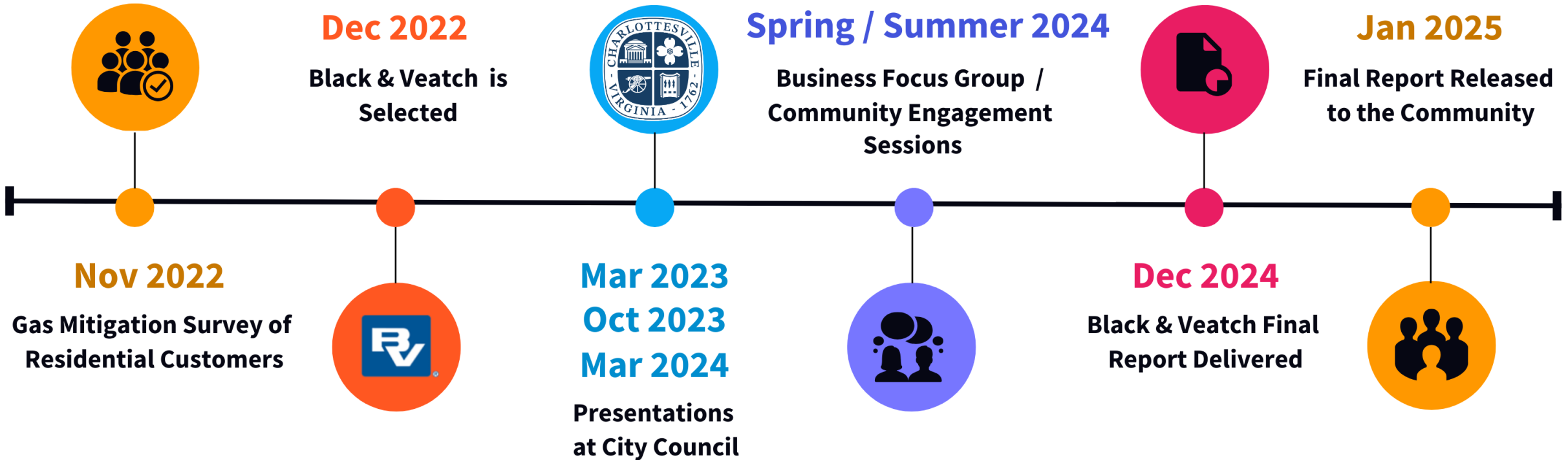
16
INDUSTRIAL

DECARBONIZATION STUDY GOAL

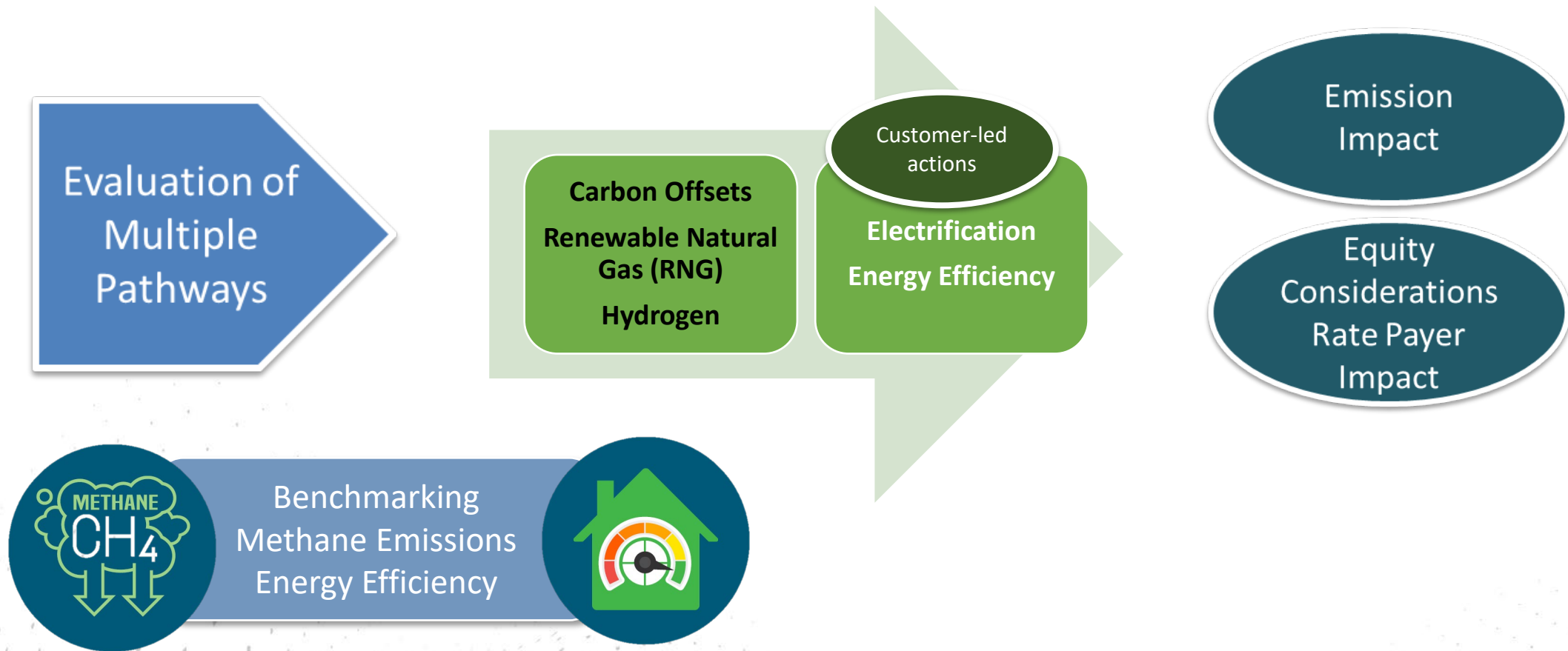
- The Department of Utilities initiated and funded this study as part of ongoing work to address the challenges of decarbonizing energy-related emissions in the community.
- It was a voluntary initiative that supported two city-wide greenhouse gas reduction goals adopted by City Council in 2019.



TIMELINE



DECARBONIZATION STUDY



BENCHMARKING LESSONS



Black & Veatch reviewed Charlottesville Gas Department of Transportation PHMSA data. Using this data, the city's **natural gas system methane emission** leakages were compared to utilities with similar operation characteristics.



Black & Veatch reviewed **energy efficiency programs** offered by other municipal gas utilities located along the East Coast of the United States and compared programs to inform areas where Charlottesville Gas can enhance energy efficiency offerings.

BENCHMARKING LESSONS

Methane Reduction Recommendations



Continue to complete **leak surveys** of the residential gas system every 3 years, which is more frequent than the required PHMSA 5-year interval.



Install **Excess Flow Valves** on service lines which shut when a service line is severed during excavation damage.



Continue investing in the **Public Awareness Program** to prevent 3rd party excavation damage leaks, especially important in plastic systems.



Continue to emphasize the existing **training and the Operator Qualification Program**.

These measures are
already being implemented
by Charlottesville

BENCHMARKING LESSONS

Methane Reduction Recommendations



Develop and implement preemptive pipeline and equipment **maintenance or repair**

- Replace the **last mile of cast iron** from our system, which is located in the **West Main/UVA area**.
- **\$7.1 million grant** from the U.S. Department of Transportation and its Pipeline and Hazardous Materials Safety Administration through the Natural Gas Distribution Infrastructure Safety and Modernization (NGDISM) grant program.
- According to the EPA, the average mile of a cast-iron distribution main loses nearly 240 thousand cubic standard feet (MCSF) of natural gas per year compared to 9 MCSF per year for one mile of plastic main.

By 2050, an estimated
3,607 MTCO₂e is expected
to be **reduced** because of
the replacement.

BENCHMARKING LESSONS

Energy Efficiency Recommendations



Charlottesville Gas should modify its existing appliance rebate program. The program should include rebates and incentives to encourage its existing customers to adopt high-efficiency natural gas appliances.



Charlottesville Gas should discontinue any incentives or rebates promoting switching from electric to gas service.



Charlottesville Gas should offer custom incentives tailored for specific customer segments. Custom commercial, industrial, and multifamily programs have successfully reduced gas consumption in other large utility programs.

\$200

Towards the purchase and installation of a tankless water heater



A tankless or on demand water heater conserves energy by heating water when you need it. Enjoy the benefit of an uninterrupted supply of hot water. From the shower to the dishwasher, you will notice the difference a tankless water heater makes in your home and your utility bills.

Discontinued in July 2024

Westhaven Attic Insulation Improvement with LEAP

BENCHMARKING LESSONS

Energy Efficiency Recommendations



Increase awareness of rebate programs.

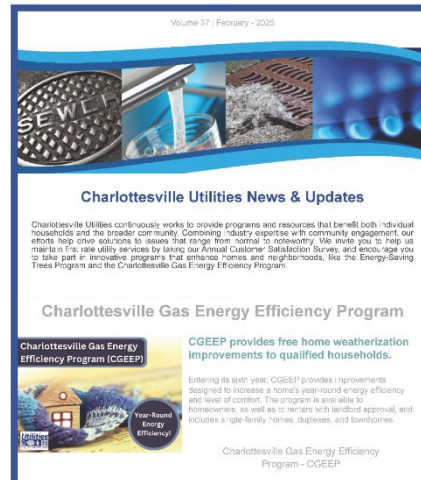
Low awareness of
our current energy
efficiency programs

Existing Outreach Efforts include postcards and the
Utilities Monthly e-newsletter

Postcards



E-newsletter



Not at all familiar*	Percent
Attic Insulation Rebate	68%
Programmable Thermostat	57%
Free Home Weatherization Program	49%

*UVA's Center for Survey Research (CSR) BeHeardCVA survey results from 303 panelists

BENCHMARKING LESSONS

Energy Efficiency Recommendations



Charlottesville Gas should consider expanding building envelope incentives and exploring offering incentives that further increase building efficiency, such as ductwork and other insulation rebates.

70% of homes in the City were built before 1970

Within the past three years, have any significant energy upgrades been made to your home?	Percent
Yes	31%
No	67%
Don't Know	2%

What would be the main reason for you not to apply for the attic insulation rebate?	Percent
The amount of the rebate is insufficient to offset the majority of the cost of the attic insulation	13%
My house already has appropriate attic insulation	68%
Other	19%

*UVA's Center for Survey Research (CSR) BeHeardCVA survey results from 303 panelists

CUSTOMER-LED PATHWAYS

Energy Efficiency

Customer-led actions

Electrification Energy Efficiency

Carbon Offsets
Renewable Natural Gas (RNG)
Hydrogen

- Energy efficiency is **largely dependent on end-use customers' willingness to invest or modify behavior.**
- It is hard to forecast the impact of energy-efficiency initiatives.
- Based on natural gas usage between 2010 and 2022 (weather-normalized), the average consumption per residential customer has declined by 1% per year.

CUSTOMER-LED PATHWAYS

Electrification

Customer-led actions

Carbon Offsets
Renewable Natural Gas (RNG)
Hydrogen

Electrification
Energy Efficiency

- The report does acknowledge the potential of emission reductions through electrification.
- Customer-led initiatives such as fuel switching are **largely dependent on end-use customers' willingness to invest or modify behavior.**
- As a natural gas-only utility, Charlottesville Gas cannot use the natural gas enterprise funds to subsidize a private utility.
- The Office of Sustainability promotes renewable energy and electrification opportunities, as well as energy efficiency programs within the community and municipal operations.

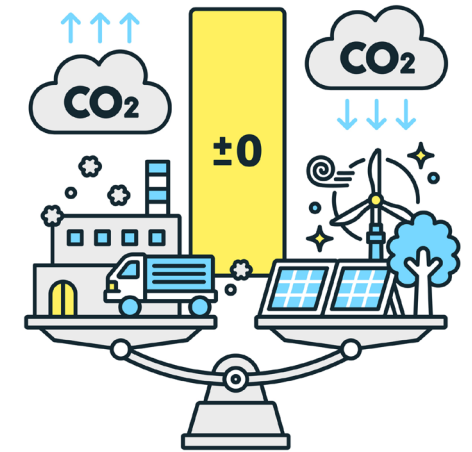
PATHWAYS UNDER CHARLOTTESVILLE GAS CONTROL



Carbon Offsets
Renewable Natural Gas (RNG)
Hydrogen

Carbon Offsets - Background

- Existing Carbon Offsets program: Presented to City Council June 2021; 5-year contract executed November 2021; equivalent to 25% of gas system emissions.
- Certification process checks that the carbon offsets meet the Real, Additional, Verifiable, and Permanent criteria.
- All offset credits purchased are from projects that have already occurred and created permanent GHG reductions or removals.



**Carbon offsetting is
a reduction of GHG emissions
to make up for emissions that
occur elsewhere**

PATHWAYS UNDER CHARLOTTESVILLE GAS CONTROL

Carbon Offsets - Mixed Feedback

Survey Results

I believe the carbon offset program should be...	Percent
Greatly expanded	43%
Slightly expanded	28%
Should continue as is	12%
Slightly reduced	2%
Greatly reduced	3%
Completely eliminated	12%

83%

Listening Sessions Feedback

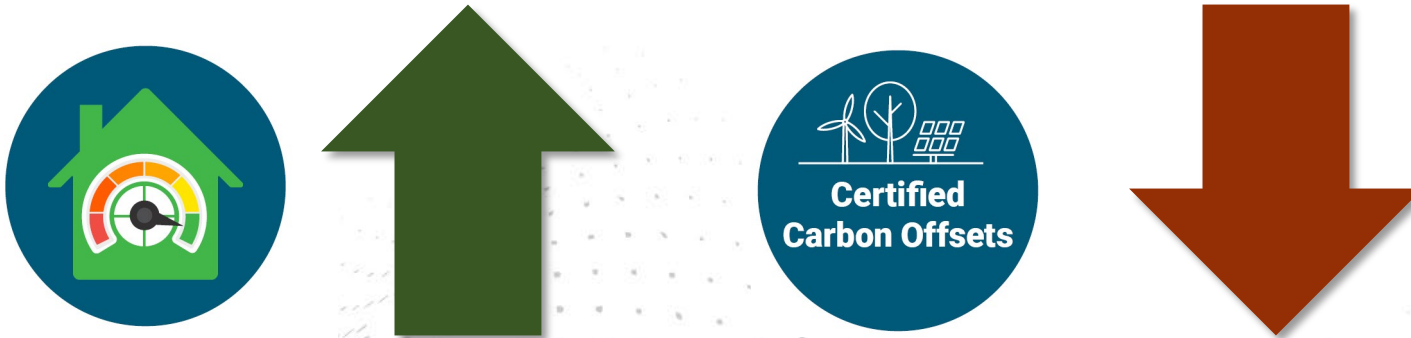
- General concerns surrounding the potential of greenwashing
- Interest in sourcing more local offset projects

*UVA's Center for Survey Research (CSR) BeHeardCVA survey result from 303 panelists

PATHWAYS UNDER CHARLOTTESVILLE GAS CONTROL

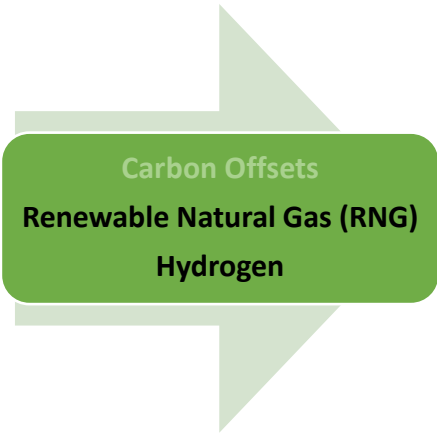
Carbon Offsets - Considerations

- Relatively low cost per carbon removed
- The current carbon offset program increases the average gas bill by 60 cents
- Carbon offsets are readily available to meet goals
- Carbon offsets complement our energy efficiency initiatives
- Successful implementation of energy-efficiency initiatives could reduce our dependence on carbon offsets
- No local projects meet the criteria to be a certified carbon offset



PATHWAYS UNDER CHARLOTTESVILLE GAS CONTROL

Low Carbon Fuels



Green Hydrogen

Green hydrogen is created from electrolysis powered by renewable energy.



Blue Hydrogen

Blue hydrogen is created from steam methane reformation (SMR) with carbon capture.



Renewable
Natural Gas

Renewable Natural Gas (RNG) is a pipeline-quality biogas developed using sources from landfills, livestock operations, wastewater treatment plants, food waste, and other organic waste.

PATHWAYS UNDER CHARLOTTESVILLE GAS CONTROL

Low Carbon Fuels



Green Hydrogen

Commercialized low-carbon fuel is being used in small volumes today.

Currently, hydrogen can be blended up to 15% by volume directly into natural gas pipelines with minimal disruption to end users.

In October of 2023, DOE awarded \$7 Billion USD for 7 hydrogen hubs across the U.S. Hubs are expected to be operational between 2030 – 2037.



Blue Hydrogen

Fuel prices are significantly higher than natural gas prices but are expected to decline dramatically in approximately 10 years.



Renewable Natural Gas

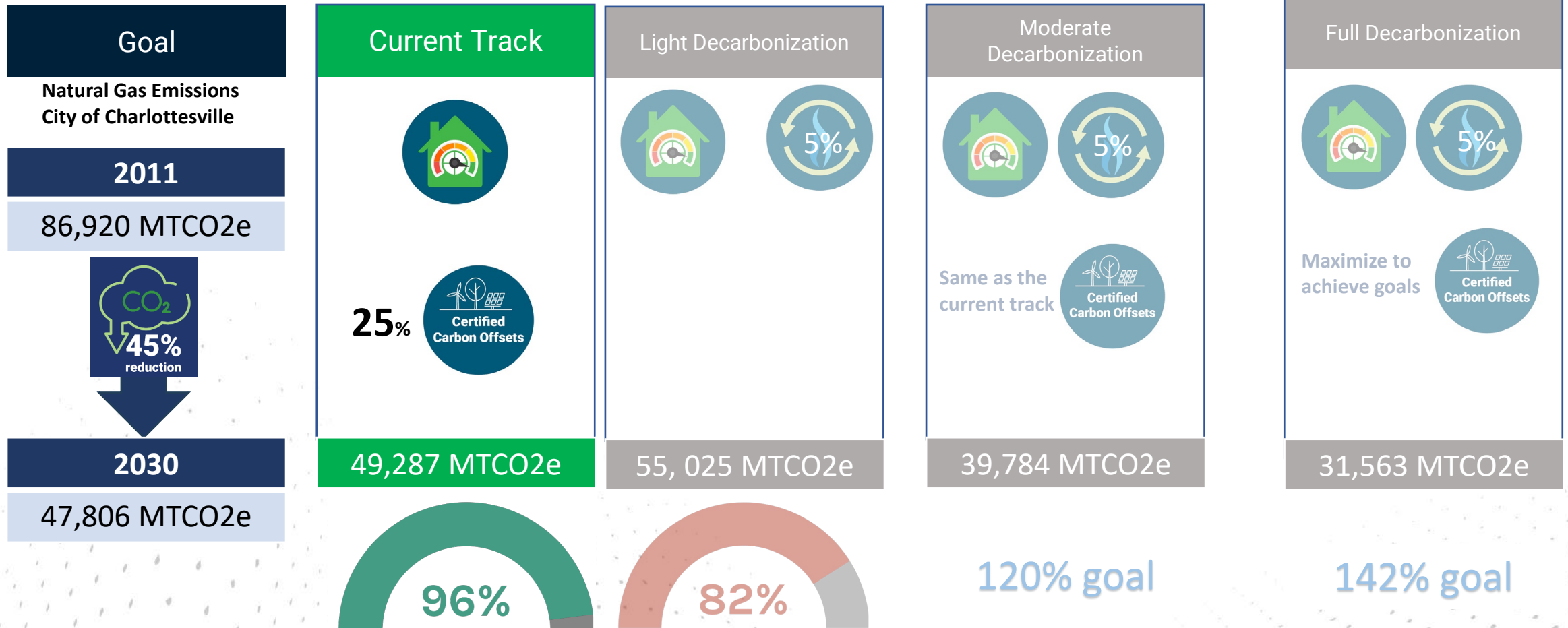
Access to supply is currently limited by source availability. For the study, it was capped on a 22% blend into the pipeline.

Locally sourced RNG may be a possibility. - RWSA sewer treatment plant study

Fuel unit costs are still far higher than natural gas but are expected to decline in the mid to long-term.

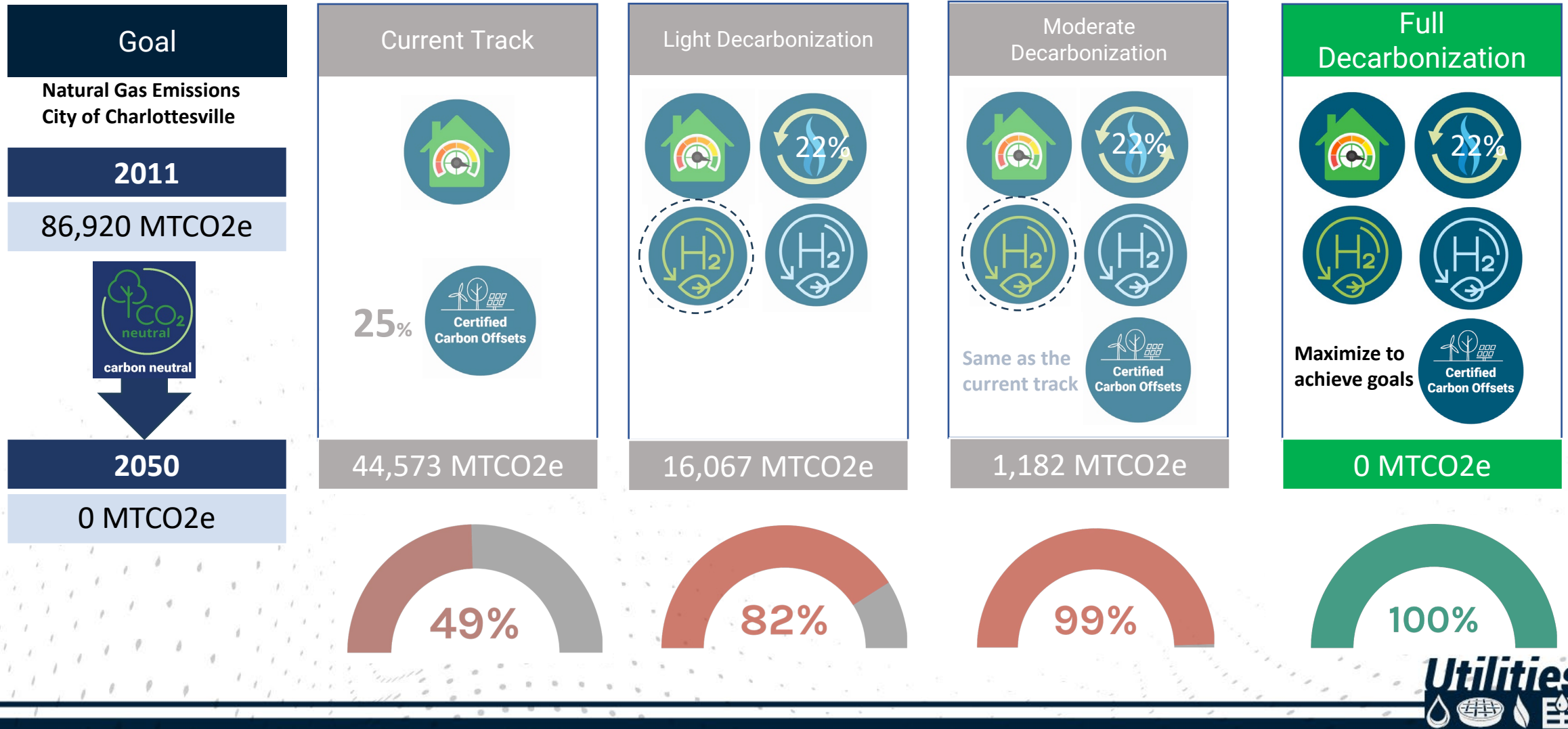
DECARBONIZATION SYSTEM MODELING

City-only emissions – 2030 Goal




DECARBONIZATION SYSTEM MODELING

City-only emissions – 2050 Goal




DECARBONIZATION SYSTEM MODELING

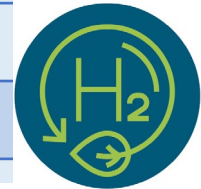
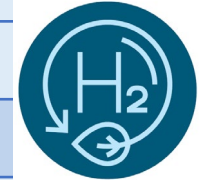
Cost Comparison

2030  45% reduction	Current Track	Light Decarbonization	Moderate Decarbonization	Full Decarbonization
	\$80.70*	+13.0%	+14.4%	+15.2%

* Monthly Average Bill

2050  carbon neutral	Current Track	Light Decarbonization	Moderate Decarbonization	Full Decarbonization
	\$360.30*	+24.4%	+26.4%	+26.7%
	Current Track	Light Decarbonization	Moderate Decarbonization	Full Decarbonization
	\$360.30*	+25.2%	+27.2%	+27.4%






* Monthly Average Bill



Assumptions for current track price: Increase 7% per year due to operational cost and inflation of 3% per year

NEXT STEPS

Proposed Actions – FY2025 Recommendations

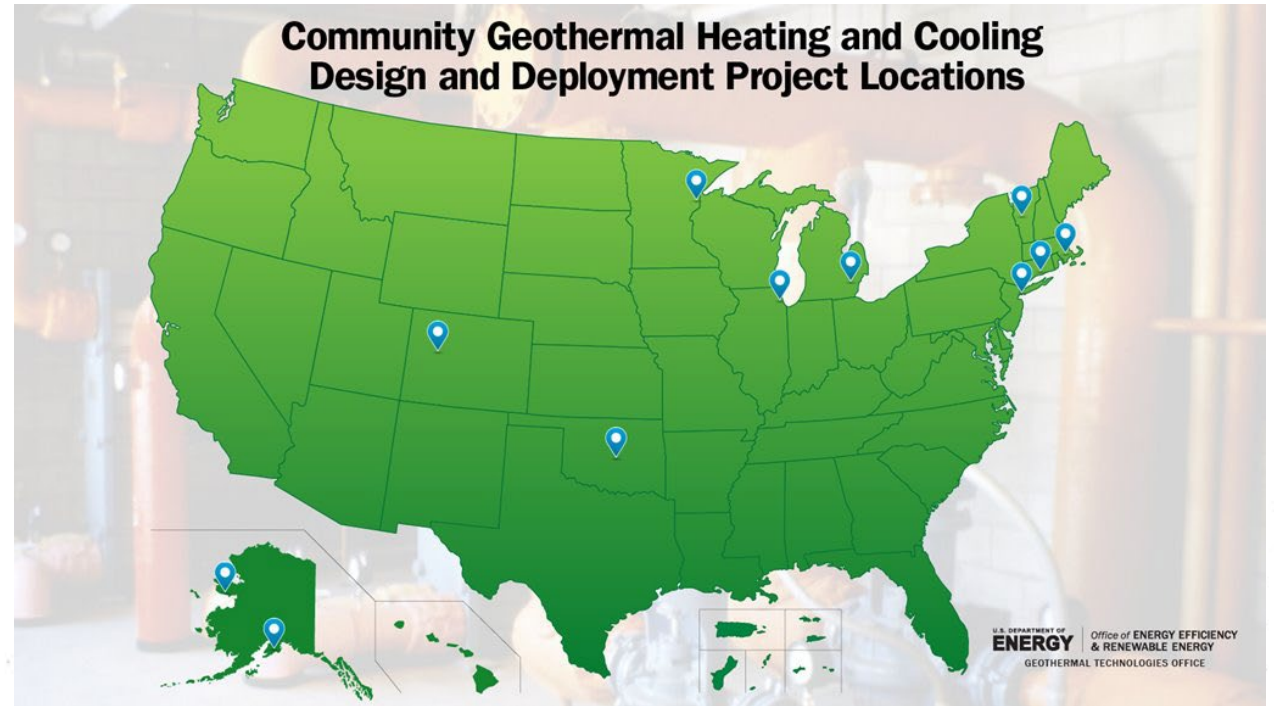
-  Establish a new fee structure to disincentivize new gas connections – revenue source will fund the expansion of new Utilities’ energy efficiency programs Implemented January 2025
-  Develop a new weatherization program To be launched Spring 2025
-  Evaluate existing rebates Increased value of the Attic Insulation Rebate February 2025
-  Partner with the Office of Sustainability to select annual carbon offset projects Ongoing
-  Increase the frequency of the Energy-Saving Trees Program (Spring and Fall) Launched October 2024

NEXT STEPS

Emerging Technologies






There are emerging decarbonization technologies and solutions that we should monitor and could potentially implement once they develop into a more mature stage and become economically feasible. One of the technologies is Community Geothermal.

- ✓ 11 projects selected by the DOE to receive funding
- ✓ 6 of the locations are urban/suburban communities, 4 are located in rural communities and 1 is located in a remote-isolated community
- ✓ A total of \$13 Million from DOE in support of these programs



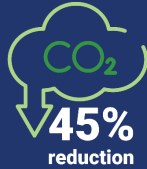
NEXT STEPS

Energy-Efficiency Initiatives

-  New Outreach Campaigns leveraging the same successful strategies used by gas safety campaigns
 - TV Commercials and targeted on-demand streaming ads
-  Promote Charlottesville Gas Incentives in the newly launched Energy Resource Hub
-  Increase awareness of attic insulation by offering **online attic insulation self-assessment tool** (in partnership with LEAP)
-  Increase the Attic Insulation Rebate to \$500 and in combination with a 30% tax credit to maximize savings
-  Explore custom incentives tailored for specific customer segments
 - Multifamily and Commercial Customers

NEXT STEPS

2030



- Invest in energy-efficiency initiatives
- Maintain 25% Carbon Offsets

2050



carbon neutral



- Track Renewable Natural Gas availability, including the RWSA sewer treatment plant study
- Monitor the development and deployment of the nation's hydrogen hubs, especially the Mid-Atlantic Clean Hydrogen Hub (MACH2)
- Continue to do research on Carbon Offsets
- Monitor emerging technologies and potentially implement them once they become more mature and economically feasible
- Collaborate with the Office of Sustainability to track other decarbonization strategies that can be considered for Charlottesville Gas

QUESTIONS?