American Gas Association

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RE: Colorado Greenhouse Gas Pollution Reduction Roadmap

To Whom It May Concern:

The American Gas Association (AGA), founded in 1918, represents more than 200 local energy companies that deliver clean natural gas throughout the United States. There are more than 75 million residential, commercial and industrial natural gas customers in the U.S., of which 95 percent — more than 71 million customers — receive their gas from AGA members. Today, natural gas meets more than 30 percent of the United States' energy needs. Colorado natural gas companies serve over 1.95 million customers in the state, delivering clean, safe, and reliable natural gas.[1]

Thank you for extending the comment deadline and allowing for more robust stakeholder feedback. AGA appreciates the opportunity to comment on the Greenhouse Gas Pollution Reduction Roadmap ("Roadmap") and for the work you are doing to help Colorado meet its emissions reduction goals while ensuring Coloradans continue to have access to affordable, reliable sources of energy.

As businesses, policymakers, and stakeholders develop and implement strategies to pursue a significantly lower-carbon energy economy, natural gas utilities are committed to being solutions providers. AGA and the nation's natural gas utilities are committed to delivering natural gas cleanly and more efficiently and to utilizing our infrastructure to distribute the energy sources of the future in a safe and cost-effective manner.

These industry commitments and principles for policy action are reflected in AGA's Climate Change Position Statement.[2]

As utilities continue to modernize natural gas infrastructure and connect homes and businesses to the system, new opportunities arise to achieve low-cost greenhouse gas emission reductions by leveraging new and existing natural gas infrastructure, advanced technologies, and the nation's abundant natural gas resources. The natural gas system's ability to integrate high-value sources of energy like renewable natural gas (RNG) and hydrogen make it a critical component of our nation's, and Colorado's, ability to reach

[1] American Gas Association, Gas Facts, Tables 8-5, 8-6, and 8-7.
[2] Available at: https://www.aga.org/policy/environment/.

ambitious greenhouse gas reductions goals. AGA believes that America's gas pipeline network can and should be leveraged to enable the delivery of RNG and hydrogen to customers as a method of reducing greenhouse gas emissions.

AGA strongly urges Colorado to consider the following factors when developing long-term energy policy given the state's decarbonization goals:

- The market challenges associated with the key assumptions for achieving emission reductions
- The impact on consumer choice and cost
- The actual emissions reduced
- The impact on market sectors and consumer segments that do not have readily available options for electrifying energy applications
- The impact on current energy infrastructure assets and the required build-out of new energy infrastructure assets
- The impacts on the energy system's ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats and incidents
- How the cost of emission reductions compares to other lower-carbon pathways

Natural Gas Delivery Systems Are Safe, Reliable, and Resilient

Unquestionably, pipeline safety is the natural gas industry's number one priority. The industry works through critical partnerships with state and federal regulators, legislators, and other stakeholders to continually improve pipeline safety. Gas utilities continue to advance system integrity and support increased access to natural gas service for homes and businesses nationwide. The natural gas distribution pipelines operated by AGA member natural gas utilities or "local distribution companies" (LDCs) are the last link in the natural gas delivery chain that brings natural gas from the wellhead to the burner tip. As such, gas utilities are effectively the "face of the gas industry." AGA member companies are embedded in the communities they serve and interact daily with customers and in collaboration with state regulators who oversee local pipeline safety.

Natural gas utilities invest $824 every second of every day—$32 billion each year—on enhancing the safety of natural gas distribution and transmission systems. [3]The industry and AGA take very seriously the responsibility of continuing to deliver natural gas to our families, neighbors, and business partners as safely, reliably, and responsibly as possible.

AGA's and its members' safety efforts go far beyond regulation and are driven by the industry's dedication to the continued enhancement of pipeline safety. All AGA member

[3] American Gas Association, Gas Facts, Tables 11-5, 12-1.

utilities have signed on to AGA's *Commitment to Enhancing Safety,*[4] a public declaration that natural gas utilities are committed to proactively collaborating with federal and state officials, emergency responders, excavators, consumers, safety advocates, and the public to continue improving the industry's longstanding record of providing natural gas service safely, reliably and efficiently. In 2019 AGA's Board of Directors approved a resolution recommending that all members implement Pipeline Safety Management Systems (PSMS), or API RP 1173[5], a holistic approach to improving pipeline safety that includes the identification, prevention and remediation of safety hazards. At the heart of PSMS is a safety culture promoting non-punitive reporting and consistent self-evaluation to help identify and reduce top-priority risks in a proactive effort to help prevent incidents from occurring. AGA has created a PSMS Discussion Group, will continue to hold an annual PSMS workshop, and has published "Guidelines for Understanding Pipeline Safety Management Systems. "Safety is intrinsic to the natural gas utility core business functions, including pipeline design and construction, operations, maintenance and training, and more public-facing programs like workforce development, pipeline planning, stakeholder engagement and first responder outreach. While these business activities will vary with each operator, it is the consensus of AGA members that implementing these priorities will help enhance pipeline safety, improve natural gas utility operations, reduce greenhouse gas emissions and provide better public accountability.

The significant investments the industry makes each year to enhance the safety of the gas system have also contributed to the increased resilience of the system. The gas system's physical characteristics lend themselves to providing resilience. Most pipeline infrastructure is underground and looped, creating flexibility in a delivery system that is shielded from many major disruptive events. Much of the gas delivery system also runs on its own supply, making it self-reliant. The ability to store natural gas further strengthens the self-reliant attributes of the natural gas system, enabling it to respond to disruption or an extreme peak in demand in the event of a severe climate event. Unplanned outages only affect about 1 in 800 (1:800) natural gas customers per year.[6] By comparison, electric distribution systems have an average of one outage per year per customer (1:1).[7]

The resilience attributes of the natural gas system also provide resiliency benefits to the electric grid. The International Energy Agency's 2020 World Energy Outlook highlighted that there are services that gases provide, such as winter heating for buildings and seasonal flexibility for power systems, that would be difficult to deliver cost-effectively using other energy sources.[8] Not only is the existing gas infrastructure a high-value asset

[4] Available at: https://www.aga.org/globalassets/safety--standards/commitment_to_enhancing_safety_february2016.pdf.
[5] *See* https://flipflashpages.uniflip.com/3/94156/1106646/pub/html5.html.
[6] Gas Technology Institute, *Assessment of Natural Gas and Electric Distribution Service Reliability*, at 2 (July 19, 2018), https://www.gti.energy/wp-content/uploads/2018/11/Assessment-of-Natural-Gas-Electric-Distribution-Service-Reliability-TopicalReport-Jul2018.pdf.
[7] *Id*.
[8] International Energy Agency, *World Energy Outlook 2020*, at 50, (Oct. 2020), https://www.iea.org/reports/world-energy-outlook-2020.

with significant storage capacity for low and zero-carbon gases, but it also provides an added level of resiliency for the energy system compared with an approach that relies exclusively on electricity.[9] The COVID-19 pandemic has demonstrated the value of flexibility and responsiveness to sudden changes in energy demand – qualities which give the natural gas system a comparative advantage.[10]

Policymakers evaluating decarbonization pathways should consider the implications to energy system resilience for each pathway and the enormous benefits the natural gas distribution system provides.

The Use of Natural Gas and the Industry's Commitment to Energy Efficiency Has Reduced Greenhouse Gas Emissions

AGA and its members are committed to reducing greenhouse gas emissions through smart innovation, new and modernized infrastructure, robust energy efficiency programs and advanced technologies that maintain reliable, resilient, and affordable energy service choices for consumers. All sectors of the economy should contribute to reducing greenhouse gas emissions. Furthermore, an effective climate change program must be flexible and recognize the differences in sectoral contributions and potential sectoral reduction strategies. AGA supports thoughtful emission reduction pathways that are technology and fuel neutral and seek to balance costs while ensuring a reliable and resilient energy system.

The use of natural gas has led the reduction in United States greenhouse gas emissions. Moreover, the natural gas delivery system is flexible, reliable, and versatile, and enables increased integration of renewable energy. The use of natural gas, in combination with renewable energy and efficiency programs, has contributed to U.S. energy-related carbon dioxide emissions declining to the lowest levels in nearly 27 years.[11] Colorado has added more than 189,000 residential, commercial, and industrial gas customers since 2010 at a rate nearly 50% greater than the national average.[12] And yet, during the same period CO2 emissions from Colorado's residential, commercial, and industrial fuel use declined by more than five percent.[13] Colorado policymakers must consider the clear consumer preference for natural gas when finalizing the Roadmap's recommendations and not pick winners or losers.

Natural gas utilities are recognized as leaders in the energy industry for their successful history of reducing emissions spending almost $4 million a day on energy efficiency

[9] *Id*.
[10] *Id*. at 187, 192.
[11] U.S. Energy Information Administration, Monthly Energy Review, available at: https://www.eia.gov/totalenergy/data/monthly/.
[12] Based on a comparison of EIA data detailing the number of residential natural gas consumers in Colorado and nationally.
[13] Colorado Department of Public Health & Environment, Colorado 2015 GHG Inventory Update, (Dec. 2019), available at: https://drive.google.com/file/d/1TxyoktxCOLFd6CaUKZzeqsKgEIHMjdqt/view.

programs.[14] This exceptional record can be traced to gas utilities continuing to make safety their top priority and remaining deeply committed to systematically upgrading infrastructure through risk-based integrity management programs. Distribution systems owned and operated by local natural gas utilities emit less than 0.1 percent of produced natural gas emissions according to EPA's most recent Greenhouse Gas Inventory.[15] These annual methane emissions declined 73 percent between 1990 and 2018, even as more than 20 million customers and more than 769,000 miles of pipeline were added to the distribution system during this same period.[16]

AGA Members Are Committed To Continued Emissions Reductions

Greenhouse gas emissions from natural gas customers have declined rapidly as more energy-efficient appliances, consumer conservation, and tighter building envelops have reduced energy demand. In fact, the average US residential gas customer's CO2 emissions have been cut in half since 1970, a downward trend that is expected to continue,[17] and largely a result of improvements in energy efficiency including contributions from utility efficiency programs. Nationally, natural gas utilities are spending almost $1.4 billion a year on energy efficiency programs.[18] Natural gas utilities operating in Colorado invested over $21 million in 2018 in efficiency programs, a 27 percent increase from program year 2014, savings customers money and avoiding 47,890 metric tons of greenhouse gas emissions which is equivalent to keeping over 10 thousand vehicles off the road for a year.[19] Fifty percent of Colorado's efficiency budget was spent on the residential programs while another 25% was invested in low-income programs. Looking forward, the adoption of emerging natural gas direct-use technologies can contribute significantly to achieving public policy goals, including deep reductions in GHG emissions in the residential sector, with much lower costs than other options under consideration.[20]

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[14] Consortium for Energy Efficiency & American Gas Association, *Natural Gas Efficiency Programs Report*, July 2020. Available at: https://www.aga.org/contentassets/414ebaffb292409497088b98847af9b4/aga-ngefficiency-report-final.pdf.

[15] U.S. Environmental Protection Agency, Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2018, at 3-84, available at: https://www.epa.gov/sites/production/files/2020-04/documents/us-ghg-inventory-2020-main-text.pdf.

[16] *Id*.; Understanding Updates to the EPA Inventory of Greenhouse Gases, June 17, 2020, available at: https://www.aga.org/research/reports/epa-updates-to-inventory-ghg/.

[17] Based on AGA calculations of weather-normalized residential gas consumption per customer.

[18] Consortium for Energy Efficiency & American Gas Association, *Natural Gas Efficiency Programs Report*, July 2020. Available at: https://www.aga.org/contentassets/414ebaffb292409497088b98847af9b4/aga-ngefficiency-report-final.pdf.

[19] Consortium for Energy Efficiency & American Gas Association, *Natural Gas Efficiency Programs Report*, July 2020, Appendix C. Available at: https://www.aga.org/contentassets/414ebaffb292409497088b98847af9b4/ng-energy-efficiency-appendix-a-2019_-expen-budget--savings-by-state-final-9-2020.pdf; Consortium for Energy Efficiency & American Gas Association, *Natural Gas Efficiency Programs Report*, January 11, 2016, Available at: https://www.aga.org/research/reports/natural-gas-efficiency-programs-2014-program-year-/.

[20] American Gas Foundation, Opportunities For Reducing Greenhouse Gas Emissions Through Emerging Natural Gas Direct-use Technologies (2019), available at: https://gasfoundation.org/2019/12/18/opportunities-for-reducing-greenhouse-gas-emissions-through-emerging-natural-gas-direct-use-technologies/.

Furthermore, gas utility companies reduce methane emissions each year through voluntary measures, including the EPA Natural Gas STAR and Methane Challenge programs. AGA has been an early and strong supporter of the EPA Natural Gas STAR program since its inception in 1993. All the current natural gas distribution partners are AGA member companies, as are most of the natural gas transmission and storage partners of Natural Gas STAR. The Gas STAR program facilitates technology transfer, allowing operators to learn best practices and technologies developed by other participants in methane reduction pilot projects.

EPA's Methane Challenge is a next step program that takes lessons learned in Natural Gas STAR pilot projects to incentivize implementing company-wide actions to reduce methane emissions. Participants enter into a commitment agreement with EPA. There are two commitment tracks within Methane Challenge. AGA and 41 of its members are founding partners of EPA's Methane Challenge Best Management Practice (BMP) commitment track, in which participants set target year goals for implementing specific methane reduction BMPs across their company. Several AGA members are also members of ONE Future and founding participants in the Methane Challenge ONE Future track, which instead calls on participants to set sector-based target methane intensity goals for their company. This approach allows them to select the most cost-effective mix of best practices for different parts of their operations, rather than applying the same BMP everywhere. The ONE Future sector-based targets add up to no more than one percent of annual production across the value chain. Voluntary programs have been key to the success of emissions reductions in the natural gas distribution sector. While not all AGA members engage in each program, all AGA members engage in a variety of voluntary actions that help modernize their systems, improve safety and reduce methane emissions.

In response to growing interest in the role of natural gas in a sustainable energy future, AGA has partnered with Edison Electric Institute (EEI) to develop a voluntary reporting template with the goal of helping electric and gas companies provide the financial sector with more uniform and consistent ESG/sustainability data and information. The EEI-AGA Version 2 ESG Template[21] released in August 2019 includes a quantitative methane intensity metric for natural gas utility operations that is based on emissions reported to EPA under the GHG Reporting Rule and qualitative metrics for describing a company's methane reduction strategy and climate change scenario planning. AGA is now working with EEI to develop an updated Version 3 ESG Template that will incorporate the more comprehensive methane intensity metrics from our Natural Gas Sustainability Initiative (NGSI). The NGSI Methane Protocol, expected to be released by early 2021, will allow participants to disclose their methane intensity or emissions rate from operations across the natural gas supply chain, from production and gathering, processing, transmission pipelines and storage, and natural gas local distribution. It will include both methane emissions reported to EPA and sources and emissions that fall below the EPA reporting

[21] *See* ESG Template and a list of links to ESG and methane data posted by participating AGA member companies: https://www.aga.org/policy/natural-gas-esgsustainability/.

thresholds. The purpose of NGSI is to provide consistent, comparable company-specific disclosures of methane intensity and to recognize (and thus encourage) progress in reducing emissions.

Natural Gas Is An Abundant and Affordable Clean Energy Solution

Any realistic plan for a clean and secure energy future must include natural gas as a cornerstone. Natural gas is a foundational fuel source that is clean, reliable, affordable, and safe. Furthermore, the natural gas resource base is abundant. The Potential Gas Committee, with the support of the Potential Gas Agency at the Colorado School of Mines, indicates that the United States possesses a total mean technically recoverable resource base of 3,374 trillion cubic feet (Tcf) as of year-end 2018. This resource assessment is 20 percent higher than the 2016 assessment and represents the highest resource evaluation in the PGC's 54-year history.[22]

The domestic shale production revolution has resulted in an abundant supply of clean, affordable, domestically produced natural gas. In turn, robust supply coupled with an extensive delivery infrastructure has translated into stable natural gas prices, delivering significant value to the increasing number of utility customers who use this resource in their homes and businesses for heat, hot water, cooking, fireplaces, BBQs, dryers, distributed and backup electricity generation, and other applications. On average, a typical new household that uses natural gas for space heating, water heating, cooking, and drying saves about $900 per year compared with a home that uses electricity for the same applications.[23]

When implementing the goals of the Roadmap, Colorado regulators and policymakers should consider a broad range of solutions that can achieve the state's environmental goals while also maintaining safe, affordable, reliable, resilient, and secure energy choices for consumers. All solutions should be considered. Singular pathways, such as policy-driven electrification, to reduce greenhouse gas emissions from building energy use in pursuit of overall greenhouse gas emission reduction goals are counterproductive. Often, these electrification policies are proposed based on insufficient analysis on overall costs, benefits, the market implications of such policies, and without due consideration of alternative pathways.

[22] Potential Gas Agency, Potential Supply of Natural Gas in the United States (December 31, 2018), available at: http://potentialgas.org/biennial-report.

[23] AGA Analysis Comparison of Energy Use, Operating Costs, and Carbon Dioxide Emissions of Home Appliances, available at: https://www.aga.org/contentassets/5689dcf5e6b04fb68e33542e0c653886/ea-2019-03-appliance-cost-and-emissions-comparison-20192.pdf.

In 2018, AGA engaged a cross-functional team of experts at ICF to assist in the evaluation of policy-driven electrification of the U.S. residential sector. The study, Implications of Policy-Driven Residential Electrification,[24] identified numerous challenges including:

- Cost-effectiveness
- Consumer impacts
- Transmission capacity constraints on the existing electrical system
- Current and projected electric grid emissions levels
- Requirements for new investments in the power grid to meet new growth in peak generation demand during winter periods

The study found that a policy targeting the electrification of the U.S. residential sector would result in a small fraction of greenhouse gas emissions reductions; could be financially burdensome to consumers; could have profound impacts and costs on the electric sector; and could be a very costly approach to emissions reductions.

The study examined the potential impacts of widespread residential electrification policies coupled with a renewables-only mandate for electricity generation. The study reported regional results including a Rockies region that includes Colorado, Utah, Wyoming, and Montana.

In the Rockies region, the cumulative incremental increase in consumer energy-related costs per converted household totaled $25,060, or an annualized increase of $1,680 per converted household. The primary driver for policy-driven residential electrification is GHG emissions reductions. To assess the effectiveness of residential electrification for this purpose, the study calculated the cost implications of the policies based on the cost per metric ton of reduction. For the Rockies region, the total cost of emissions reductions from the modeled policy scenario was $794 per metric ton of CO2 reduced ($2016)which may be well above the cost ranges associated with other decarbonization options.

The electric capacity needed to support winter heating in the residential sector resulting from a widespread residential electrification policy could lead to significant increases in peak electric demand. On a nationwide basis, electrifying the entire residential sector by 2035 would increase peak electric system demand and could require the size of the entire U.S. power generation sector to almost double.[25] These significant increases in electric power demand would require massive new investments in new electric generation, transmission, and distribution infrastructure. The total economy-wide increase in energy-related costs from policy-driven residential electrification could be significant. Nationwide, average household annual energy costs would increase by an average of 71 percent over

[24] American Gas Association Study prepared by ICF, Implications of Policy-Driven Residential Electrification, available at: https://www.aga.org/globalassets/research--insights/reports/aga_study_on_residential_electrification.pdf. AGA engaged a cross-discipline team of experts at ICF to assist in the evaluation of AGA's residential electrification policy scenarios focused on space and water heating.

[25] *Id*. at 3.

the lifetime of the appliance equipment.[26] The cost of emissions reductions associated with the residential electrification policy modeled ranged from $572 to $806 per metric ton of CO2 reduced ($2016).[27]

AGA acknowledges that the regional costs of a policy-driven approach to residential electrification and the applicability of these national results can vary. The AGA study was focused on national level impacts of potential policies requiring electrification of residential energy load. AGA did not evaluate the impact on natural gas distribution system costs to other customers or the impact on electric distribution system costs. A consideration of these costs would likely add to the overall costs of a residential electrification approach. Furthermore, the study did not address electrification policies targeted at other sectors of the economy, including the transportation sector, and the interactions of a residential electrification policy with other sectors. Given the complexity of the issues surrounding electrification policies, a full accounting of the benefits, costs, and implications of electrification policies would need to reflect all local conditions related to and including the differences in natural gas and electricity prices even within the same region, including, differences in housing stock, differences in the electric grid, and inclusion of distribution system cost impacts.

Pathways of emissions reduction that only emphasize electrification of the residential sector may be counterproductive and create significant challenges to quickly and effectively addressing the challenge of climate change.

As such, the AGA residential electrification study suggests that integrating natural gas solutions in a more diverse approach to achieve emissions reduction goals would help meet growing energy needs; provide customers more choices; and improve affordability, reliability, resiliency and comfort. Many innovative natural gas technologies are available today in the residential and commercial sectors.[28] These technologies offer a significant efficiency improvement potential which can contribute to achieving near-term emissions reductions. At the same time, natural gas utilities are working with policymakers to enhance energy efficiency programs designed to reduce energy consumption and emissions. Emission reductions are also being realized through pipeline safety-driven infrastructure modernization. Looking ahead, increased funding for research, development, and deployment of next-generation natural gas technologies and advancing renewable sources of gas supply provides further opportunities for achieving lower carbon goals.

Last year, AGA put together an energy analysis reviewing the effects of the 2014 polar vortex and how it impacted gas customers in the Midwest and how households would have been impacted if they had used electrical resistance or heat pumps instead of natural

[26] *Id*.
[27] *Id*. at 7.
[28] *See* American Gas Foundation, *supra* note 16.

gas.[29] Using available data from EIA, AGA estimated the average household consumption for natural gas space heating and converted that energy load to an electric-equivalent demand.

The findings from the model show that in many cases, a heat pump back up heater is still an essential driver for both costs and consumption in Colorado as well as consumer comfort. Based on the 2018 AGA study on the *Implications of Policy-Driven Residential Electrification,*[30] the typical heat pump efficiency is best when the outside source air is above 35 degrees Fahrenheit. It is at these temperatures that an advanced heat pump can achieve 300% or better efficiency. However, as temperatures begin to drop below 35 degrees, the efficiency rating and heat output begin to drop. Using hourly weather data, heat pump efficiency and performance for a given hour can be estimated and the share of household energy load needs to be handled by a back-up device such as an electrical resistance unit can be determined.

Unique to other analyses done before, AGA added to the model the possibility of a gas hybrid-air source electric heat pump system. As an alternative to an all-electric pathway, a hybrid gas-electric option could provide an efficient pathway that would meaningfully reduce emissions associated with home heating and minimize energy costs for customers compared to an all-electric system.

In 2018 high-efficiency space heating with electricity in Colorado cost approximately 100% more ($613 for space heating in 2018) than natural gas did despite using a higher efficiency heat pump. Any customer who recently converted from gas to electric saw a heat pump bill for the coldest day of the year of nearly $9.62 on average. On the other hand, any customer using a heat pump with gas as a back-up source saw bills of $441 a year for space heating or $4.19 on the peak day. These prices reflect a marginal price of energy and assume any gas homes affected still have some other gas appliances present.

The natural gas system provides a considerable amount of energy at very low costs to customers today. On an energy basis, the gas system provides 2-3 times the energy as that of the electric sector during peak winter months. Efforts to advance policy-driven electrification could exacerbate equity concerns and raise costs for low-income groups that can least afford a bill increase. Since 2005, natural gas prices have dropped 25.7% for residents and businesses while electricity prices have increased.[31] Natural gas remains the lowest cost source of energy for households according to the Department of Energy's August 2020 forecasts making it the most immediate way to reduce the energy burden for

[29] American Gas Association, *A Comparison of Space Heating Appliance Costs During Extreme Cold Weather Events*, (Feb. 19, 2019), available at: https://www.aga.org/contentassets/7faaee5687274c0fa688b328953f1725/ea-2019-01-polar-vortex-space-heating-jan-2014-data.pdf.

[30] American Gas Association Study prepared by ICF, Implications of Policy-Driven Residential Electrification, https://www.aga.org/research/reports/implications-of-policy-driven-residential-electrification/.

[31] *See* https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_SCO_m.htm.

low-income households.[32] The retail price of electricity for Colorado homeowners is 4.7 times greater than natural gas on an energy equivalent basis.[33] Even before the COVID-19 pandemic, and the resulting economic difficulties, nearly one in three U.S. homes faced a challenge in paying energy bills or sustaining adequate heating and cooling in 2015.[34] The continued availability of clean, low-cost natural gas will ensure that Colorado families still reeling from the continuing fallout of the COVID-19 pandemic can heat their homes and cook their food affordably.

As Colorado works to achieve its emissions reduction goals, AGA urges policymakers to recognize the ongoing contributions of natural gas utilities to lowering emissions. AGA strongly encourages the state to account for these efforts, while leveraging the existing pipeline network to support utilities in their mission to further drive down emissions. To that end, many natural gas utilities are looking toward renewable and lower sources of carbon-based fuel to reduce emissions and lower the carbon footprint of their customers. RNG and hydrogen gas provide such opportunities.

Customers Should Have Access to RNG & Emerging Natural Gas Technologies

Innovation is at the core of the natural gas industry including advancements in safety, leak detection and pipeline replacement, the development of next-generation gas appliances, and advancing technologies to reduce the carbon content of delivered natural gas.

RNG is pipeline-compatible gaseous fuel derived from biogenic or other renewable sources that has lower lifecycle CO2e emissions than geologic natural gas. It can come from a variety of sources including wastewater treatment facilities, landfills, and agriculture and farming operations. These examples use anaerobic digestion technology to harness the biogas generated through the natural decomposition of waste. The gas is captured, processed, and cleaned, and can be injected into the existing natural gas pipeline system. Anaerobic digestion is a well-established production technology with more than 110 facilities in operation throughout the U.S. and Canada. And nearly 100 more projects are under development.[35]

Since RNG can be used interchangeably with today's natural gas, it represents tremendous opportunity to reduce emissions in homes, businesses, vehicles, manufacturing and heavy industry. But anaerobic digestion technology is not the only means of producing RNG. As new production technologies for RNG are commercialized, they will expand and diversify

[32] Energy Conservation Program for Consumer Products: Representative Average Unit Costs of Energy, 85 Fed. Reg. 49646 (Aug. 14, 2020).
[33] Gas Technology Institute, Assessment of Natural Gas and Electric Decarbonization in State of Colorado Residential Sector, Sept. 3, 2020, available at: https://www.dora.state.co.us/pls/efi/efi_p2_v2_demo.show_document?p_dms_document_id=932610&p_session_id=.
[34] Energy Information Administration, *One in three U.S. households faces a challenge in meeting energy needs*, Sept. 19, 2018, https://www.eia.gov/todayinenergy/detail.php?id=37072.
[35] *See* http://www.rngcoalition.com/rng-production-facilities.

the feedstocks eligible to turn waste into renewable energy and increase RNG's emission reduction potential.

Thermal gasification, one developing RNG production technology, recycles low-moisture carbon-based materials such as crop waste and forestry residue by subjecting them to high pressure, thereby producing a series of synthetic gases, including methane, which can be captured and blended into the natural gas system.

Power-to-gas, another technology, relies on renewable electricity to produce hydrogen via electrolysis. The hydrogen can be methanated with a source of carbon to produce RNG and injected into the natural gas pipeline system, providing a long-term storage solution for renewable electricity, an option that today's battery technology cannot provide. While power-to-gas technology is not yet fully commercialized, several pilot projects exist in Europe, and in the U.S. a research and demonstration power-to-gas project has been operating for several years at the National Renewable Energy Laboratory in Golden, Colorado. In contrast, battery long term storage technology has yet to be developed in the lab, let alone in a demonstration pilot.

Demand for renewable sources of gas is real and growing. RNG use as a transportation fuel has increased 291% over the last five years, displacing close to 7.5 million tons of carbon dioxide equivalent.[36] In the distribution sector, natural gas utilities across the country are developing RNG programs to help their customers and communities achieve emission reduction goals. Today, 25 states have taken action to promote the use of RNG in the residential or commercial sector through either legislative, regulatory or utility led action, including Colorado.[37] Moreover, there are now ten natural gas utilities across the country, that are developing or have implemented voluntary green energy tariffs to enable their customers to purchase RNG.[38] This includes Xcel Energy which in May 2020 issued a request for information as a first step in developing a program across its footprint to bring RNG to its customers.[39]

AGA expects this trend to continue as more of our members' customers demonstrate a continued interest in reducing emissions. Importantly, each state or gas utility has taken a unique approach in devising a legislative or regulatory framework to encourage the use of RNG. Some states have supported a utility's ability to procure and sell RNG to customers that want it, passing along those costs to customers that elect into the program.[40] This is similar in concept to customers that opt-in to purchase renewable electricity from their

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[36] *See* http://www.rngcoalition.com/infographic.

[37] Based on tracking of state RNG initiatives by AGA staff.

[38] These utilities include CenterPoint Energy (MN); DTE Energy (MI); Dominion (UT); National Grid (NY); Northwest Natural (OR); Xcel Energy; San Diego Gas & Electric (CA); Southern California Gas (CA); Summit Utilities (ME); and Vermont Gas Systems (VT).

[39] Xcel Energy, Xcel Energy explores renewable natural gas for customers, May 26, 2020, https://www.xcelenergy.com/company/media_room/news_releases/xcel_energy_explores_renewable_natural_gas_for_customers .

[40] For example, see programs such as DTE's Smart Energy program in Michigan, Dominion Energy Utah's GreenTherm Program, or Vermont Gas' Renewable Natural Gas program.

electricity provider. Alternatively, some utilities are seeking to procure RNG as a percentage of their contracted supply, effectively reducing the carbon footprint of the fuel delivered within their service territory.[41]

As new markets develop, and demand for RNG continues to grow, states can support these developments through innovative rate mechanisms and policy proposals that leverage existing infrastructure to deliver new products like RNG. In Colorado, residents have invested billions of dollars into the state's safe and reliable natural gas infrastructure system. It is imperative that policymakers consider its natural gas pipeline delivery system as a critical resource, capable of evolving to meet the changing needs of a lower carbon economy during this process, particularly when implementing the proposals laid out in the Roadmap. Leveraging this existing energy infrastructure to deliver new, lower-carbon sources of fuel, creates an inherently more reliable and more resilient energy system.

Two recently released studies by the American Gas Foundation focus specifically on reducing GHG emission through the use of emerging natural gas direct use technologies and the development of RNG. These studies demonstrate how America's vast, reliable and safe natural gas infrastructure can be effectively used to deliver affordable energy and drive down emissions.

The first study, *Opportunities For Reducing Greenhouse Gas Emissions Through Emerging Natural Gas Direct-use Technologies,*[42] was conducted by Enovation Partners and demonstrates how widespread adoption of emerging natural gas direct use technologies could significantly contribute to achieving deep reductions in GHG emissions in the U.S. residential sector at much lower costs than other options under consideration. This study estimates that natural gas residential emissions could be reduced by approximately 40 percent at a very competitive cost of $66 per metric ton of CO2 emissions.[43] Additionally, consumers who install the emerging high-efficiency technologies modeled in the study would save $271 on average annually compared to existing technologies.[44]

The second study, *Renewable Sources of Natural Gas: Supply and Emissions Reduction Assessment*,[45] was prepared by ICF and outlines the potential domestic resource base for RNG, the corresponding potential for emission reductions and associated costs. Of note, this is the first study to examine power-to-gas technology as a production method for RNG. ICF estimates that, by 2040, approximately 4,513 trillion Btu of RNG could be

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[41] For example, Southern California Gas intends to replace twenty percent of its contracted natural gas supply with renewable natural gas by 2030. Legislation enacted in Oregon (SB 98 - 2019) and Nevada (SB 154 - 2019) provides natural gas utilities with the resources to cost-effectively procure increasing percentages of RNG over time. Similar legislation was introduced here in Colorado (SB 20-150) which proposed a mandatory renewable gas standard for large natural gas utilities and a voluntary program for small natural gas utilities.
[42] American Gas Foundation, *supra* note 16.
[43] *Id*. at 13.
[44] *Id*. at 14
[45] American Gas Foundation, Renewable Sources of Natural Gas: Supply and Emissions Reduction Assessment, (2019), available at: https://www.gasfoundation.org/2019/12/18/renewable-sources-of-natural-gas/.

produced annually.[46] This equates to a 235 million metric ton reduction in GHG emissions, or a 95 percent reduction in today's natural gas emissions from the residential sector.[47]

In addition to RNG, governmental agencies and utilities recognize the integral role that hydrogen can play in reducing the carbon footprint of the energy system. For example, the Department of Energy is in the process of assessing a research and development strategy related to hydrogen[48] and one of its labs has already issued a report on the blending of hydrogen into the gas system.[49] Several AGA members have committed themselves as anchor sponsors for the Electric Power Research Institute and Gas Technology Institute's Low-Carbon Resources Initiative (LCRI).[50] The LCRI represents a $100 million research initiative focusing on the near-term deployment of low-carbon electric generation technologies and low-carbon chemical energy carriers, such as hydrogen. Furthermore, AGA members have already begun demonstrating their Commitment to integrating hydrogen into their existing gas networks.[51] Today's gas pipeline infrastructure is essential to support the delivery of hydrogen tomorrow.

To maximize GHG emission reductions while maintaining reliable and safe energy delivery, Colorado should mobilize every tool at its disposal, including recognizing the contributions natural gas has made to emission reductions.[52] The industry continues to develop new and innovative technologies to improve safety and reduce emissions: new pipelines, new leak detection technologies, direct-use technologies to improve efficiency, and RNG.

The American Gas Association and its members are committed to reducing emissions through the smart and efficient use of our nation's abundant gas resources and our extensive energy delivery network. By integrating natural gas solutions into long-term resource planning, natural gas utilities can help states and localities achieve emission

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[46] *Id*. at 62.

[47] *Id*. at 47.

[48] *Hydrogen and Fuel Cell Technologies Office Research and Development Strategy Request for Information*, 85 Fed. Reg. 48682 (Aug 12, 2020); *see also*, H2@Scale 2020 Cooperative Research and Development Agreement (CRADA) Call, https://www.nrel.gov/hydrogen/assets/pdfs/h2-at-scale-2020-crada-call-072320.pdf.

[49] *See* Blending Hydrogen into Natural Gas Pipeline Networks: A Review of Key Issues, National Renewable Energy Laboratory (March 2013), available at https://www.nrel.gov/docs/fy13osti/51995.pdf.

[50] See https://www.epri.com/lcri.

[51] *See* History of Hawaii Gas' Hydrogen Activities, available at https://www.hawaiigas.com/clean-energy/hydrogen/; Southern California Gas, "Power-To-Gas Technology," available at https://www.socalgas.com/smart-energy/renewable-gas/power-to-gas; PG&E Gas R&D and Innovation Whitepaper Pipeline Hydrogen, available at https://www.pge.com/pge_global/common/pdfs/for-our-business-partners/interconnection-renewables/interconnections-renewables/Whitepaper_PipelineHydrogen.pdf; Southern California Gas 2019 Annual Report Research, Development and Demonstration Program, available at https://www.socalgas.com/sites/default/files/2020-04/2019%20SoCalGas%20RDD%20Annual%20Report.pdf.

[52] In addition to recognizing the past contributions of the gas system, Colorado should also not ignore the potential befits of natural gas as the power generation mix changes in the future. A recent report issued by the National Renewable Energy Laboratory states that there is potential for gas and power sector coordination to facilitate better renewable generation integration and carbon emissions reductions. *See* National Renewable Energy Laboratory, Electric Power Grid and Natural Gas Network Operations and Coordination, at 58-59 (September 2020), available at https://www.nrel.gov/docs/fy20osti/77096.pdf.

reduction goals and position themselves toward a cleaner energy future while not jeopardizing safe and reliable energy delivery. Through the expanded development of advanced natural gas technologies and RNG, a steep decline in emissions can be realized in a more cost-effective manner, that also preserves consumers' preference for natural gas.

Conclusion

AGA looks forward to sharing more about how natural gas utilities and our nation's pipeline infrastructure currently plays and will continue to play an integral role in reducing greenhouse gas emissions throughout this process. Thank you for the opportunity to share how the natural gas energy delivery network can help provide a clean, reliable, and affordable energy source to more Colorado residents well into the future.

Respectfully submitted,