



NARUC

National Association of Regulatory Utility Commissioners

Certified Natural Gas: Primer, Regulatory Landscape, and Contributions Toward a Low-Carbon Future



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*U.S. Department of Energy–National Association of
Regulatory Utility Commissioners Natural Gas Partnership*

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Executive Summary

The rapid expansion of domestic natural gas production has had massive impacts on the U.S. energy sector. Starting around 2008, advances in hydraulic fracturing and horizontal drilling made vast quantities of previously uneconomic natural gas accessible to producers. As a result, U.S. dry natural gas production has nearly doubled (**Figure 1**) from 19 trillion cubic feet per year (tcf/y) in 2007 to more than 35 tcf/y in 2022 (U.S. Energy Information Administration 2023c). Natural gas consumption has also grown by approximately 50 percent over the previous 15 years (**Figure 2**). The electric power generation sector has led this growth, consuming 6.8 tcf/y in 2007 and 12.12 tcf/y in 2022 (U.S. Energy Information Administration 2023b).

Figure 1: U.S. Dry Natural Gas Production
(U.S. Energy Information Administration 2023c)

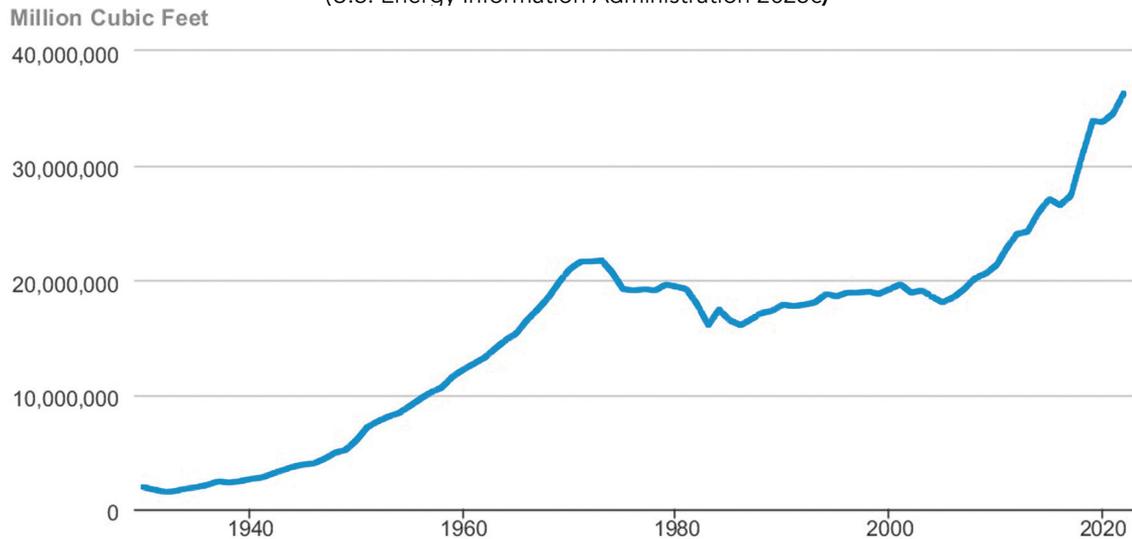
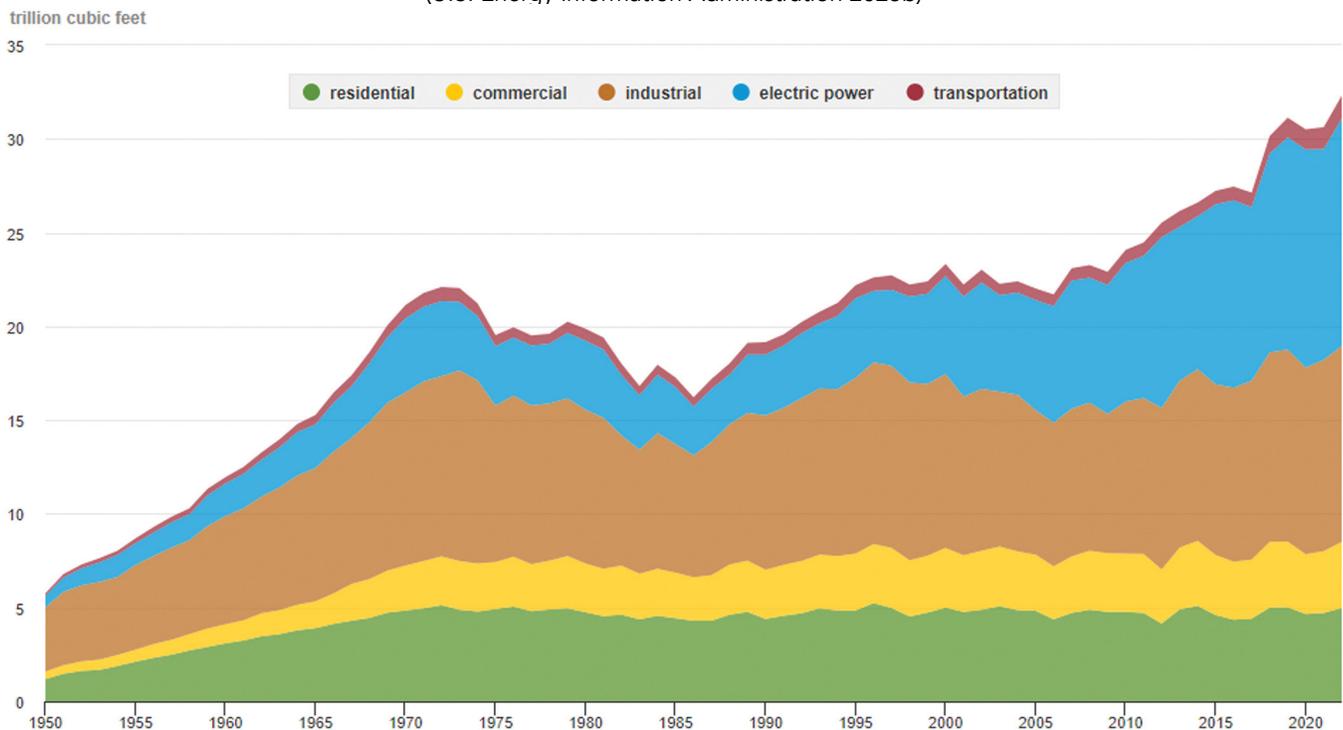


Figure 2: U.S. Natural Gas Consumption by Sector
(U.S. Energy Information Administration 2023b)



Growth in natural gas has impacted U.S. greenhouse gas (GHG) emissions in positive and negative ways. Natural gas-fired power emits approximately half of the carbon dioxide (CO₂) emissions as electricity from coal. The Congressional Budget Office (2022) estimates that coal-to-gas switching accounts for two-thirds of the 36 percent decline in emissions from the electric power sector since 2005, with the remainder coming from renewable generation additions. On the other hand, natural gas is made up primarily of methane (CH₄), a potent GHG with 27 to 30 times the global warming potential of CO₂ over a century—but also a shorter lifetime in the atmosphere of approximately 10 years, compared to thousands of years for CO₂ (EPA 2023c). Intentional (e.g., venting natural gas during production) and unintentional (e.g., leaks from gathering, transmission, and distribution pipelines) releases of natural gas exacerbate global warming.

As the Biden administration, state and local governments, and corporations move toward clean energy targets, there is increased attention on the climate impacts of natural gas and the ability to meet long-term GHG reduction goals while continuing to rely on natural gas in the near term to meet needs for electricity generation and thermal demand. Natural gas producers and consumers, including gas distribution utilities, have demonstrated interest in reducing the climate footprint of natural gas production and consumption. One method of doing so is through certified natural gas (CNG).

Multiple definitions for CNG exist. Generally, CNG is acknowledged as natural gas that has undergone independent certification to verify that methane monitoring and emissions reduction practices have been employed. CNG thus has lower methane emissions than non-CNG. Some certification approaches incorporate other environmental attributes as well as social and/or governance criteria. Gas certification is a recent effort that has quickly grown over the past five years, with multiple third-party certification providers serving growing portions of the upstream, midstream, and downstream markets.

The U.S. Department of Energy (DOE)–National Association of Regulatory Utility Commissioners (NARUC) Natural Gas Partnership exists to provide impartial, informational resources to state regulators to aid public utility commissions (PUCs) in understanding the rapidly changing natural gas technologies, policies, and regulations impacting the utility sector. This report seeks to provide basic information about CNG, thus preparing PUCs to make sound decisions regarding CNG offerings impacting utility customers.

Utility customers are key stakeholders in the growing CNG market. As the regulators overseeing the affordability, reliability, and safety of utility services by setting just and reasonable rates, state PUCs will play a major role in the future of the CNG market. In order to make decisions in the public interest, it is critical for PUCs to fully understand the costs and benefits of CNG, as well as the incentives for regulated utilities to pursue CNG as a decarbonization strategy. Absent regulatory approval to recover cost premiums associated with CNG purchases, regulated utilities may be unlikely to give CNG serious consideration alongside supply- or demand-side decarbonization alternatives. This report cites examples from a growing body of state regulatory decisions on utility CNG proposals.

The following sections provide background information about the natural gas sector and its role in decarbonization, approaches of major third-party certification companies, and examples of utility partnerships with certifiers. Subsequent sections discuss how CNG intersects with utility regulation, how the market might evolve, and considerations for PUCs considering CNG proposals. Examples of previous approaches are offered as opportunities for learning from outcomes, not as recommendations for replication. Individual PUCs are best suited to make decisions in the interest of utility customers in their states. This report aims to help PUCs build familiarity with CNG offerings to assist with their future decision-making.

I. Background Information

Natural gas provides electricity and heat to U.S. homes and businesses. As a baseload fuel supporting round-the-clock power generation with approximately half of the CO₂ emissions as coal, natural gas has gradually overtaken coal to become the biggest source—nearly 40 percent—of U.S. electricity. Natural gas is also transported and sold by natural gas local distribution companies (LDCs) to residential, commercial, and industrial customers using gas for space and water heating and cooking.

Policymakers, regulators, corporations, and customers have increasingly looked to natural gas infrastructure as a key area from which to reduce emissions as decarbonization goals are pursued, viewing methane emissions from the oil and gas industry as “low-hanging fruit ... it is seen as the best opportunity to reduce near-term global warming” (Highwood Emissions Management 2022). National methane emissions are based on estimates of emissions factors from different types of infrastructure, not actual measurements, due to the challenges associated with quantifying emissions from the nation’s vast natural gas network. As decarbonization advances and more attention is paid to emissions associated with the natural gas supply chain, policymakers, regulators, and market participants could benefit from increased visibility into quantified emissions, a standard method of tracking and verifying methane emissions, and ultimately a market mechanism to incentivize investments to reduce methane emissions from a baseline.¹

This paper details a nascent strategy to reduce emissions from the full natural gas supply chain: the use of CNG, also referred to by some stakeholders as responsibly sourced gas or differentiated gas.² CNG involves the use of standards developed by independent third parties to directly measure and calculate methane emissions, quantifying the impacts of emissions reduction methods and facilitating transactions that pay a premium for lower-emission gas.

CNG lacks a universally accepted, standard definition. Definitions from various stakeholders are provided below. In general, definitions of CNG stress the application of methane monitoring and emissions reduction practices, independence between the organization providing certification and the organization receiving certification, and distinction from non-CNG.

- Xcel defined CNG in an August 2023 filing with the Colorado Public Utilities Commission as “geologic natural gas that is produced on a site that exceeds all state and federal legal requirements that is attested to be produced meeting the criteria for methane monitoring and implementing best practices to reduce emissions ... CNG is produced with a certified methane intensity defined as is the calculated percentage representing the volume of methane emissions from the certified gas (mcf) divided by the total certified production from the facility (mcf)” (Lieb 2023b).
- Highwood Emissions Management, a consulting firm tracking voluntary emissions reduction initiatives in the oil and gas industry, starts with the definition of a differentiated product as “a product (e.g., natural gas) that is distinguished from others on the basis of some attribute (e.g., emissions intensity), making it more attractive to a particular market,” and further defines certification as “an initiative that holds participants to binding standards that may include emissions reduction performance targets, use of specific technologies, and/or adoption of methodologies. Certifications entail an explicit declaration of achievement from the administering organization to the participant” (Highwood Emissions Management 2023).
- The Environmental Defense Fund (EDF) defines CNG as “natural gas that is purported by operators as having undergone independent third-party certification and that the gas has been produced under

1 According to the EPA, natural gas and petroleum systems are responsible for 29 percent of U.S. methane emissions. Enteric fermentation is responsible for 25 percent, landfills for 15 percent, and manure management 8 percent. See <https://www.epa.gov/ghgemissions/overview-greenhouse-gases#methane>.

2 Due to the common use of the term “certified natural gas” in regulatory filings, NARUC has elected to use CNG throughout this report, while acknowledging that other stakeholders may prefer other terms with similar meanings.

specified best practices around methane mitigation” (Lackner and Mohlin 2022). The New York State Department of Public Service (DPS) defined CNG similarly in a July 2023 filing, using “certified” and “differentiated” interchangeably (New York DPS 2023a).

- The Differentiated Gas Coordinating Council (DGCC), a coalition of natural gas supply chain stakeholders formed to advocate for the expansion of “differentiated gas,” defines CNG as “a product that is distinguished from others on the basis of emissions intensity, making it more attractive in an emissions-trading market” (DGCC n.d.).

A methane intensity of 0.2 percent or less is often cited as the threshold for low-methane natural gas. The Inflation Reduction Act applies a methane fee to oil and gas facilities that exceed a 0.2 methane intensity (Congressional Research Service 2022). The 0.2 intensity target also appears in Project Canary’s TrustWell standard, the Oil and Gas Climate Initiative, and the Virginia Energy Innovation Act, all of which are discussed in subsequent sections.

A. Overview of the Natural Gas Supply Chain and Associated GHG Emissions

The natural gas supply chain can be divided into upstream, midstream, and downstream segments (Energy HQ 2017). Each segment has associated infrastructure and emissions. Natural gas is ultimately used by a variety of customers, which also produces emissions via combusting the gas for electricity, heating, or industrial uses. While natural gas can be produced, refined, and used alongside oil and other petroleum products, this paper focuses solely on terms related to natural gas.

- **Upstream** refers to the extraction of natural gas from underground, also known as development, exploration, and production.
- **Midstream** refers to the trading, transportation, and storage of natural gas in pipelines, tanks, railcars, trucks, ships, and other methods.
- **Downstream** encompasses the processing of raw natural gas into products for end users and distributing finished products to customers.
- **End users** are diverse and include industrial (e.g., petrochemical plants, refineries, power generators), commercial (e.g., retail outlets, natural gas distribution utilities), and residential (e.g., residential customers of gas distribution utilities).

The upstream segment accounts for the majority of methane emissions from the oil and gas sector—60 percent—according to the most recent U.S. Environmental Protection Agency (EPA) data (**Figure 3**), plus an additional 3 percent from abandoned oil and gas wells. Midstream (transmission and storage) accounted for 19 percent, followed by downstream (processing, distribution) at 12 percent. End users (post-meter emissions) accounted for 5 percent. Natural gas distribution utilities account for approximately 6 percent of total U.S. GHG emissions, plus an additional 5 percent attributed to post-meter emissions (**Figure 4**).

Natural gas is mostly methane, which causes 84 times the global warming effect of CO₂ over a 20-year period (Kelly 2022), equivalent to 27 to 30 times over a 100-year period (EPA 2023c). The GHG impacts of natural gas are driven by methane leaks throughout the natural gas supply chain. As determined by the EPA’s Greenhouse Gas Reporting Program (GHGRP), emissions factors are used to estimate leak rates as a percentage of production.³ Production leakage rates differ by basin due to a combination of engineering practices, implemented technology, and production rates. Many peer-reviewed academic publications, environmental advocacy organizations, and certification providers claim that the EPA’s emissions factor severely underestimates the magnitude of natural gas leaks (e.g., Garg et al. 2023; Watson 2022; Lackner and Mohlin 2022; Alvarez et al.

³ In contrast, continuous emissions monitoring systems are in place at power plants, giving policymakers, regulators, and stakeholders far greater certainty over the direct emissions involved in power generation.

Figure 3: Petroleum and Natural Gas Operations Covered by the GHG Reporting Program (EPA 2017)

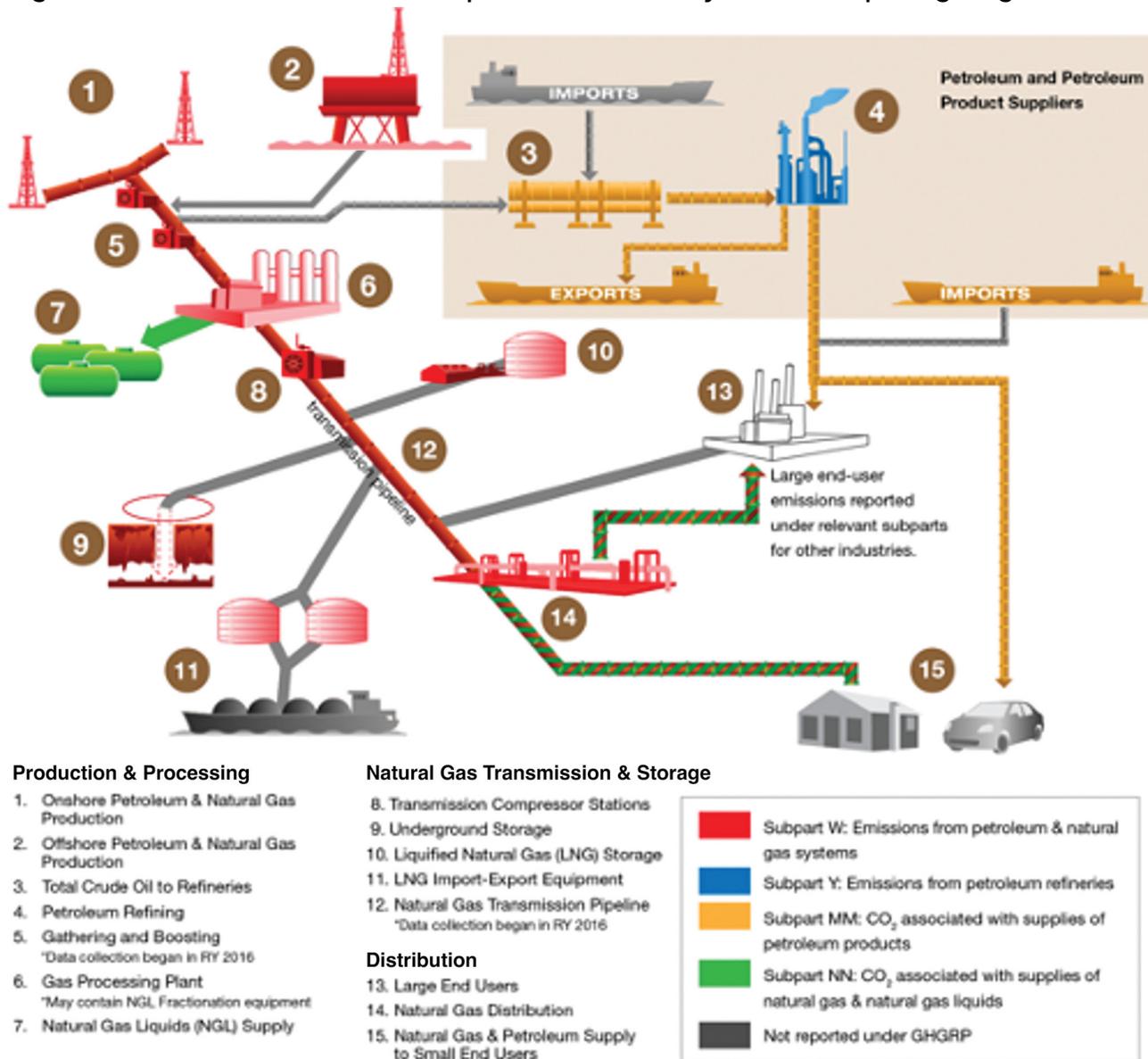
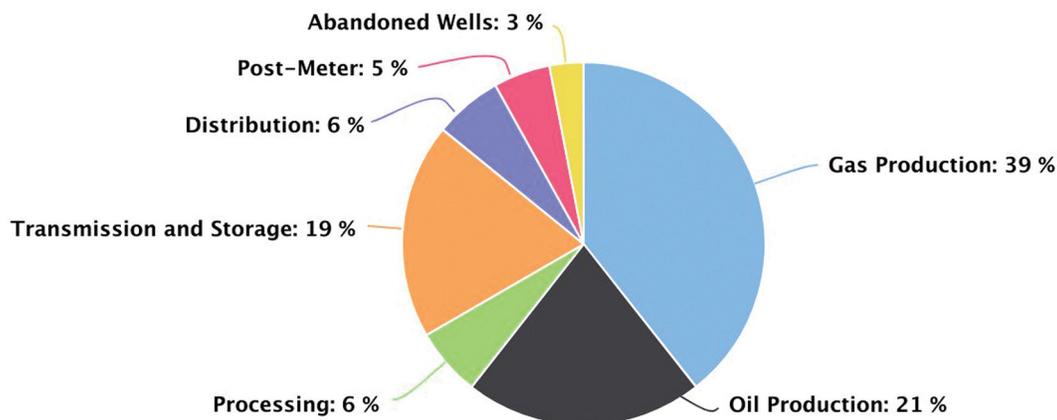


Figure 4: 2021 Oil and Gas Methane Emissions by Segment (EPA 2023a)

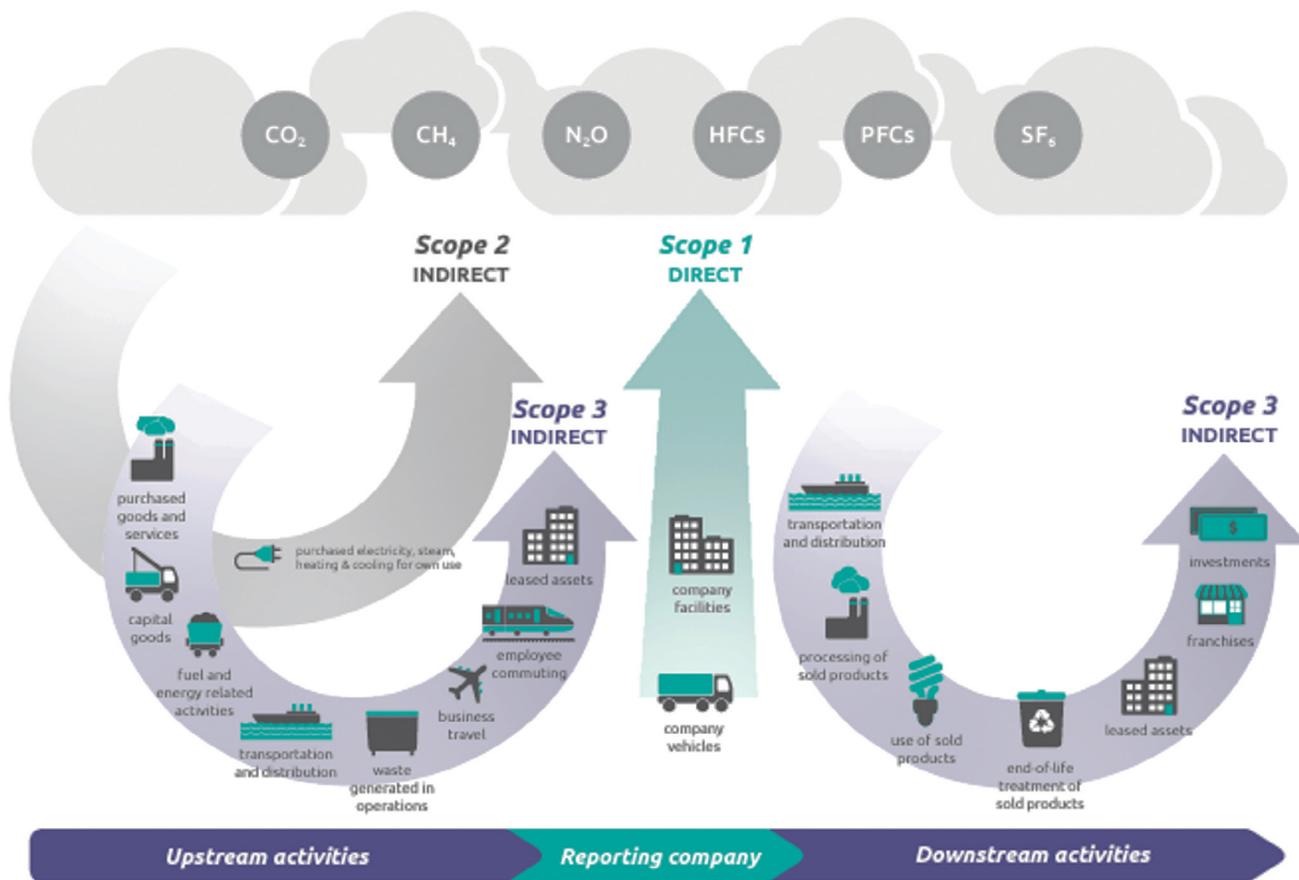


Source: Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 – 2021, US EPA, April, 2023

2018; Brandt et al. 2014). The EPA estimates that approximately 1.4 percent of natural gas leaks, with 0.45 percent coming from gas production, based on data reported by pipeline mileage and leak data reported by operators through the GHGRP. EDF estimates that onshore gas pipeline methane leakage is between 3.75 and 8 times greater than EPA estimates (McVay 2023). MiQ and Highwood Emissions Management estimated a methane emissions intensity of 1 percent leakage for the production sector and 2.2 percent for the entire natural gas supply chain. These intensities were based on a review of 300,000 top-down measurements from six U.S. basins (MiQ and Highwood Emissions Management 2023).

GHG emissions can be divided into three categories, known as scopes (**Figure 5**). Scope 1 emissions are direct GHG emissions resulting from sources that are controlled or owned by an organization. Scope 2 emissions are indirect GHG emissions associated with the purchase of electricity, steam, heat, or cooling (EPA 2022b). Scope 3 emissions are indirect GHG emissions resulting from value chain activities (World Resources Institute and WBCSD 2013).

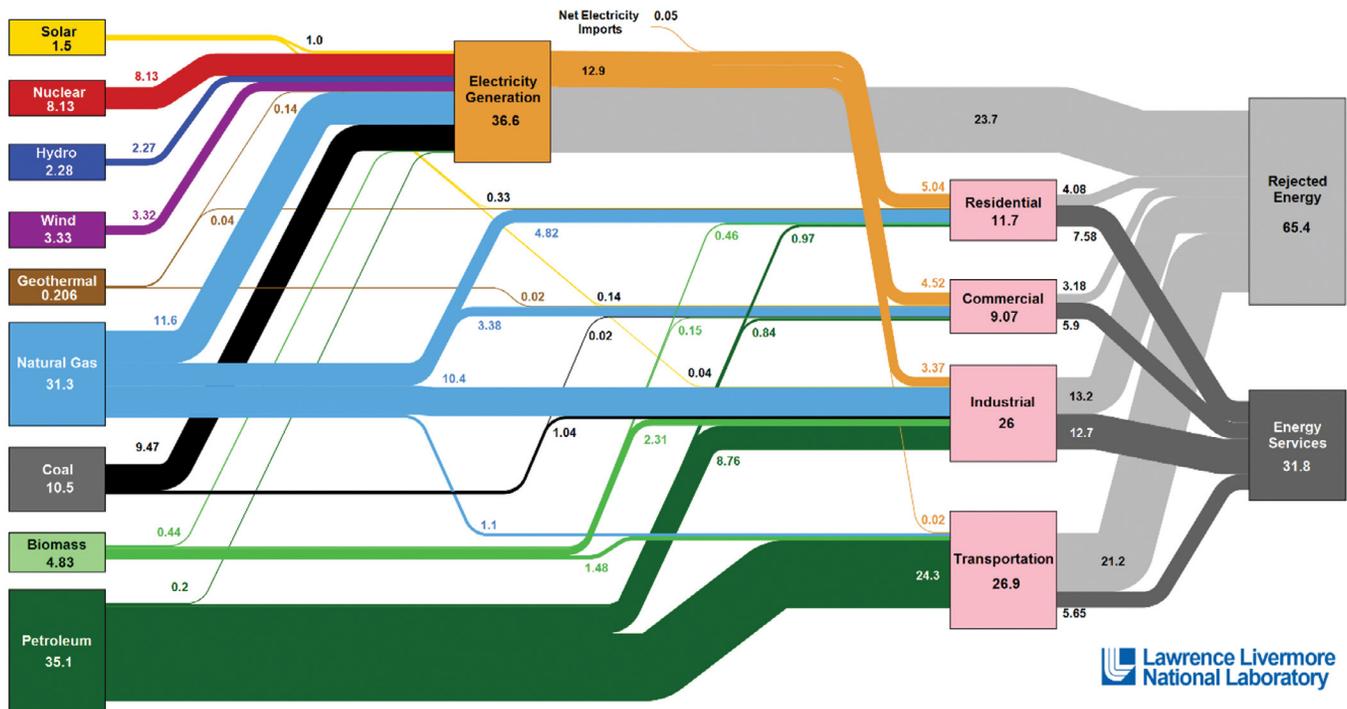
Figure 5: Overview of GHG Protocol Scopes and Emissions Across the Value Chain
(World Resources Institute and WBCSD 2013)



B. Role of Natural Gas in the U.S. Economy

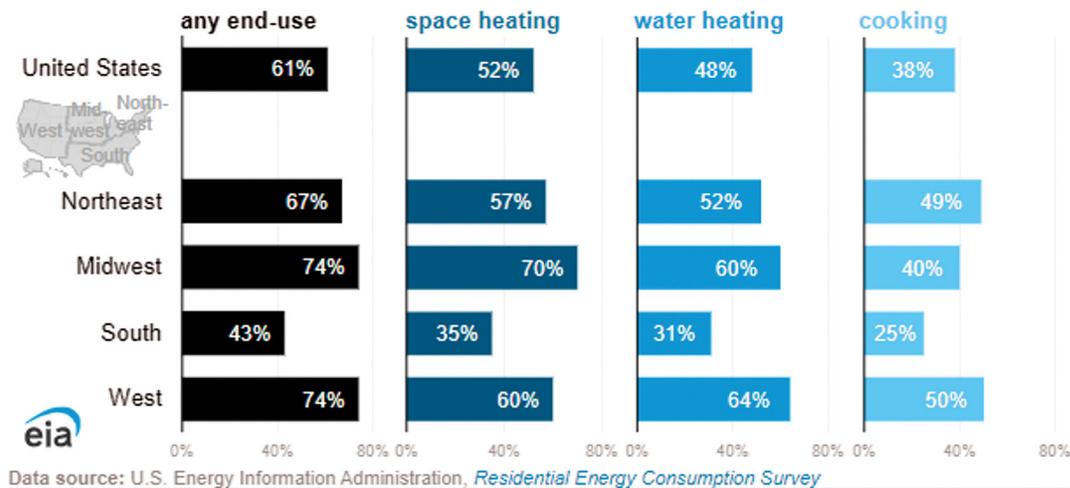
Natural gas is a major component of the U.S. energy portfolio. In 2021, natural gas accounted for one-third of total energy consumption and was the second-largest source of raw energy after petroleum (**Figure 6**). Of the 31.3 quadrillion (10^{15}) British thermal units (BTUs) of natural gas that was consumed, 37 percent generated electricity, while 59 percent went directly to residential (4.82 quads), commercial (3.38 quads), and industrial (10.5 quads) customers that use natural gas for space and water heating, cooking, combined heat and power, and other industrial processes. The remaining 4 percent (1.1 quads) was used in the transportation sector, mainly for vehicles using compressed natural gas as a fuel (Lawrence Livermore National Laboratory n.d.).

Figure 6: Estimated U.S. Energy Consumption in 2021
(Lawrence Livermore National Laboratory n.d.)



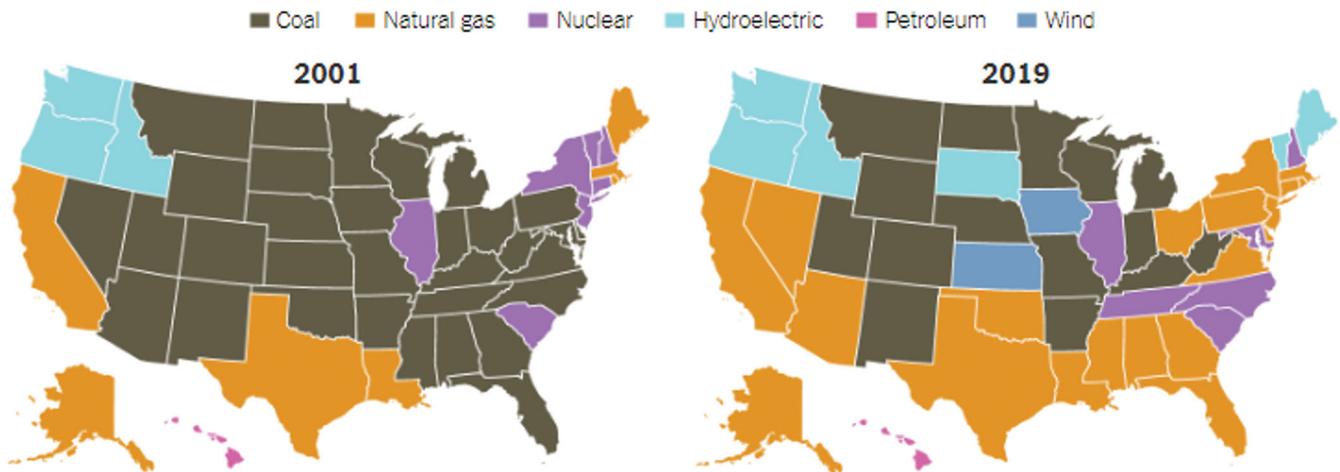
Source: LLNL March, 2022. Data is based on DOE/EIA NER (2021). If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports consumption of renewable resources (i.e., hydro, wind, geothermal and solar) for electricity in BTU-equivalent values by assuming a typical fossil fuel plant heat rate. The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 65% for the residential sector, 65% for the commercial sector, 23% for the transportation sector and 45% for the industrial sector, which was updated in 2017 to reflect DOE's analysis of manufacturing. Totals may not equal sum of components due to independent rounding. LLNL-MI-110527

Figure 7: Percentage of Households that Used Natural Gas in 2020
(Energy Information Administration 2023a)



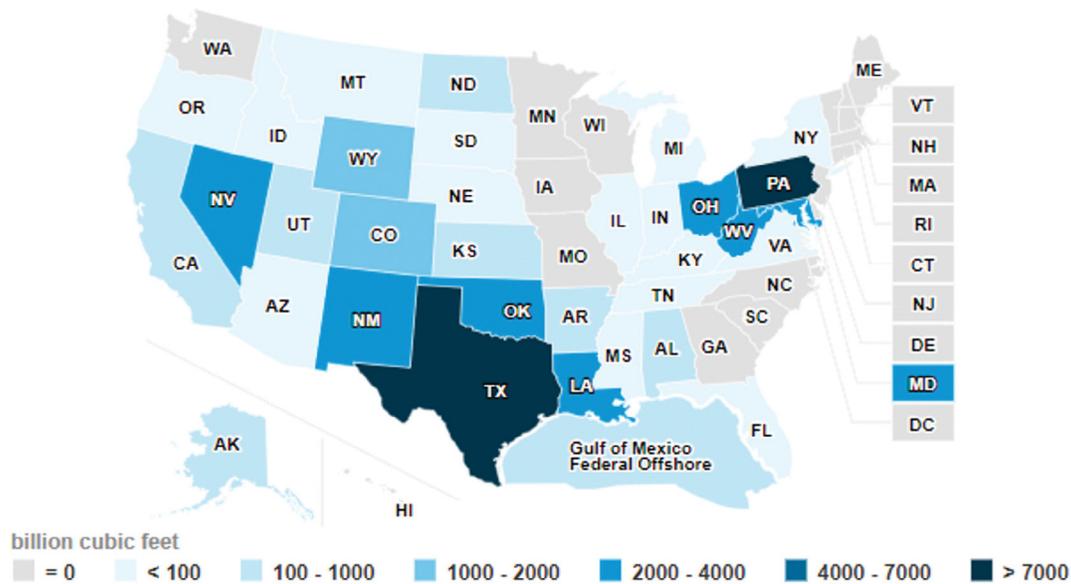
In the residential sector, natural gas is primarily used for cooking and space and water heating. Nationally, 61 percent of U.S. households used natural gas in 2020 (Figure 7). However, differences in climate and infrastructure across regions mean that reliance on natural gas is concentrated in the Northeast, Midwest, and West, with most households in the South relying on electricity for those services. Natural gas has become the dominant source of electricity generation across much of the Southwest, South, Mid-Atlantic, and Northeast (Figure 8), reflecting growing production in many of the same states (Figure 9).

Figure 8: Largest Source of Electricity Generation by State, 2001–2019 (Popovich and Plumer 2020)



Source: United States Energy Information Administration

Figure 9: U.S. Dry Natural Gas Production by State in 2021 (U.S. Energy Information Administration 2023b)



Data source: U.S. Energy Information Administration, *Natural Gas Annual*, September 2022

C. Natural Gas and Decarbonization Goals

Around the world, more than 100 countries, including the United States, have pledged to reduce methane emissions by 30 percent of 2020 levels by 2030 via the Global Methane Pledge (International Energy Agency 2022; White House Office of Domestic Climate Policy 2021). The Biden administration has set a goal of 100 percent clean electricity by 2035 and a net-zero energy economy by 2050 (White House 2021). Secretary of Energy Jennifer Granholm requested that the National Petroleum Council, a federal advisory committee, produce a study on reducing methane emissions from the natural gas supply chain, due in April 2024 (Granholm 2022). Twenty-two states plus the District of Columbia and Puerto Rico, collectively home to more than half of the U.S. population, have 100 percent clean energy goals (Clean Energy States Alliance n.d.).

States⁴ and the federal government are increasing regulatory oversight of emissions from oil and gas production and providing incentives to reduce upstream waste of natural gas. DOE's Office of Fossil Energy and Carbon Management has conferred with industry representatives and foreign countries to explore governmental standards for certified gas (Gardner and Renshaw 2023), although these discussions have not resulted in any regulatory action to date.

Texas House Bill 591, enacted in 2023, offers tax exemptions for companies that utilize gas that would otherwise be flared or vented (Texas Legislature 2023).

In July 2023, **Colorado's** Air Quality Control Commission finalized a rule requiring oil and gas operators to use direct measurement to report GHG emissions beginning in 2025. The rule also requires certain operators to obtain independent verification of methane emissions data. The rule aligns with state GHG reduction goals for the oil and gas industry of 36 percent by 2025 and 60 percent by 2030 (Colorado Department of Public Health and Environment 2023).

New Mexico passed rules in 2021 banning routine venting and flaring and requiring oil and gas operators to capture 98 percent of methane by 2026 (New Mexico Department of Energy, Minerals, and Natural Resources, Oil Conservation Division 2021); in 2022, another rule was enacted requiring operators to check and certify emissions, perform monthly leak checks, fix leaks within 15 days, and maintain records to demonstrate compliance (New Mexico Office of the Governor 2022). The state has issued fines of more than \$40 million to operators in violation of the flaring ban (Webb 2023).

In July 2023, **Louisiana's** Department of Natural Resources filed a notice of intent to ban routine natural gas venting and flaring (Louisiana Department of Natural Resources 2023).

Also in July 2023, the EPA and DOE announced \$700 million in grant funding through the Inflation Reduction Act to locate and repair methane leaks from oil and gas wells. Half of the funding will be available on a formula basis to states to reduce emissions from depleted conventional oil wells, with the other half available through competitive grants for monitoring and mitigating methane leakage (EPA 2023b).

The EPA has proposed revisions to methane reporting requirements to rely more on direct measurements of methane emissions, in preparation for a forthcoming methane fee rule under the Inflation Reduction Act. Updated Clean Air Act rules limiting methane from new and existing oil and gas operators are also expected by the end of 2023 (Webb 2023).

Numerous corporations, including many electric and natural gas utilities, have set voluntary net-zero goals. Among all U.S. electric utilities, voluntary commitments are so widespread that three in four customer accounts are served by a utility with a 100 percent carbon reduction target, and an additional 9 percent are served by utilities with carbon reduction targets below 100 percent⁵ (Smart Electric Power Alliance n.d.).

The American Gas Association (AGA), which represents natural gas distribution utilities, notes that member companies accounting for more than 80 percent of U.S. customers participate in EPA's Methane Challenge program to report actions to reduce methane emissions, with 37 gas utilities participating in the Natural Gas STAR program to adopt cost-effective technologies and practices to improve efficiencies and reduce methane emissions (AGA n.d.).

According to the EPA, emissions from the natural gas distribution system have decreased by 69 percent since 1990 due to increased use of plastic piping in new pipelines and to replacements of older, leak-prone materials

4 At the state level, oil and gas production is generally not regulated by PUCs, with the exception of the Kansas Corporation Commission and Oklahoma Corporation Commission.

5 These statistics include individual utilities with carbon reduction targets and utilities owned by parent companies with carbon reduction targets.

in existing pipelines as well as upgrades at metering and regulating stations (EPA 2022a). Concurrently, natural gas consumption has increased, with gas utilities serving 900,000 new residential customers and 21,000 new business customers in 2020 (AGA 2022).

II. Voluntary Reporting Frameworks and Industry Initiatives

The energy sector and other stakeholders have developed numerous initiatives to facilitate standardized reporting on the climate impacts of natural gas. The leading international initiative is the United Nations Environment Programme (UNEP) Oil and Gas Methane Partnership (OGMP) 2.0 (Kelly 2022). OGMP 2.0 is a comprehensive, measurement-based reporting framework for the oil and gas sector, with the tagline: “If you can’t measure it, you can’t fix it.” OGMP members include 106 major upstream and midstream companies active in more than 60 countries,⁶ representing 35 percent of global oil and gas production, as well as partners from governments and nongovernmental organizations (OGMP 2023).

Companies participating in OGMP at its highest level, Level 5, commit to annual reporting on scope 1 emissions using science-based measurement frameworks rather than imprecise emission factors as well as a methane reduction target by 2025 and implementation plan. OGMP has five levels of reporting (**Figure 10**). Data reported through OGMP informs the UNEP-administered International Methane Emissions Observatory’s efforts to reduce methane.

Figure 10: OGMP 2.0 Reporting Levels (OGMP n.d.a, “Frequently Asked Questions.”)

Levels					 GOLD STANDARD
LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	
Venture/Asset Reporting <ul style="list-style-type: none"> • Single, consolidated emissions number • Only applicable where company has very limited information 	Emissions Category <ul style="list-style-type: none"> • Emissions reported based on IOGP and Marcogaz emissions categories • Based on generic emissions factors 	Generic Emission Source Level <ul style="list-style-type: none"> • Emissions reported by detailed source type • Based on generic emissions factors 	Specific Emission Source Level <ul style="list-style-type: none"> • Emissions reported by detailed source type using specific emissions and activity factors • Based on direct measurement or other methodologies 	Level 4 + Site Level Measurement Reconciliation <ul style="list-style-type: none"> • Level 5: Integrating bottom-up source-level reporting (L4) with independent site-level measurements • Site-level measurements: direct measurement technologies at a site or facility level on a representative sample of facilities 	<p>Reporting all material assets at Level 4 with demonstrable efforts to move to Level 5.</p>

The Edison Electric Institute, a membership organization for investor-owned electric utilities, collaborated with the AGA to launch the Natural Gas Sustainability Initiative (NGSI) in 2018. The purpose of the NGSI is to develop “a consistent, transparent, and comparable method for measuring and reporting methane emissions throughout the natural gas supply chain... [to] improve the quality of information available from the industry and help companies more effectively identify ways to reduce methane emissions and communicate progress” (Edison Electric Institute 2023). The NGSI released methane emissions intensity protocol and reporting templates for emissions from various sectors of the natural gas supply chain, including distribution infrastructure, in April 2023.

⁶ OGMP members include major U.S. companies such as Shell, BP, Williams, PureWest, Pioneer, Occidental, Jonah Energy, EOG Resources, EQT, Diamondback Energy, ConocoPhillips, Devon Energy, Cheniere, and Civitas Resources.

III. Natural Gas Certification and Providers

Voluntary reporting frameworks and industry initiatives have contributed to the increased availability of data about natural gas. CNG builds on quantification efforts to develop broadly accepted methods of calculating the climate intensity of natural gas, moving toward the establishment of markets to facilitate purchases of CNG. Washington Gas, an LDC offering CNG to customers, likens CNG to LEED certification for buildings or ENERGY STAR designations for appliances—in essence, a transparent, widely accepted way for stakeholders to understand the carbon impacts of natural gas (Washington Gas 2020). Certification can cover individual wells or entire production regions (i.e., basins). Gas producers or marketers can include information about certification to customers, who may be open to paying a premium for gas with a lower carbon intensity.

CNG is one of multiple strategies to reduce the climate impacts of natural gas production and consumption. The AGA considers differentiated gas to be a methane emissions reduction measure alongside more conventional methods such as leak detection and repair programs (Figure 11). In analysis for AGA, consulting firm ICF estimated that total geologic natural gas upstream GHG emissions could be reduced by 25 percent by 2030 through reliance on differentiated gas (AGA 2022).

Figure 11: Examples of Gas Utility Approaches to Reducing Emissions (AGA 2022)



EDF notes that environmental advocates and other stakeholders have brought up concerns about the potential of CNG to be used as a “greenwashing” tool by oil and gas producers, utilities, or other companies: “While it is possible that high-integrity certification programs can deliver some methane emission reductions, current certification programs are developed on an ad hoc basis without any standard certification requirements. This raises legitimate concerns around the abatement potential of these programs” (Lackner and Mohlin 2022). Highwood Emissions Management made a similar point in its August 2022 review of industry emission reduction initiatives:

“[W]e have found that less rigorous initiatives can enable broader participation and serve as a gateway to higher standards. Yet some worry that lower rigor may undermine the credibility of other efforts ... Despite a rapid increase in the number of certifications, initiatives that require more work,

expense, and transparency remain less popular. A preference remains for less stringent initiatives that protect company data, lower exposure, and require less investment of time and money—despite increased risk of greenwashing.” (Highwood Emissions Management 2022)

The challenges of certification programs include a lack of established measurement, reporting, and verification standards; limited (and voluntary) participation; and the ability to cherry-pick higher-performing assets within one company’s portfolio. EDF developed a set of five program design criteria for certification providers to mitigate such concerns:

1. “Certification should require and verify that best practice work practice standards are met;
2. Certification must be based on high-integrity monitoring and reporting consistent with OGMP 2.0 Level 5;
3. Certification must be accompanied by verification from a credible and independent third party;
4. Certification must be based on an intensity standard that is no greater than the Oil and Gas Climate Initiative’s metric of 0.20 percent and declines over time; and
5. Companies seeking certification must specify which of their assets they are certifying, the share these assets represent relative to their entire portfolio, and the emissions intensity of the certified assets. In addition, companies seeking certification must report a company-wide emissions intensity” (Lackner and Mohlin, 2022).

A. Certification Providers

Multiple companies provide independent, third-party certification for natural gas companies. The major players include Equitable Origin, MiQ, and Project Canary. Together, these three organizations certified 32 billion cubic feet per day (bcf/d) (approximately 30 percent) of U.S. natural gas production as of early 2022 (Washington Gas 2022) and more than 42 bcf/d as of mid-2023 (Highwood Emissions Management 2023).

Table 1 provides a synopsis of distinguishing details with links for more information.

Equitable Origin is a nonprofit organization offering an EO100 Standard for Responsible Energy Development consisting of five principles: (1) corporate governance, transparency, and ethics, (2) community engagement and human rights, (3) indigenous peoples’ rights, (4) occupational health and safety and fair labor, and (5) climate change, biodiversity, and environment. Each principle contains between 40 and 180 performance targets, for which operators are given scores of “meets,” “exceeds,” or “leads.” These indicators form an overall EO100 certification. The overall certification is in the form of a letter grade ranging from A+ to C, with a C requiring an operator to “meet” 70 percent of the performance targets (Mills 2023).

MiQ is a nonprofit organization focused on three pillars for certification: calculated methane intensity, monitoring deployment, and company practices related to methane intensity. Four entities are involved in MiQ certification: the operator, the certifier (MiQ), the technology provider, and the verifier or auditor (selected by the operator from a list of auditors approved and trained by MiQ). MiQ does not require the use of particular monitoring technologies but does require a combination of source-level and top-down monitoring, with all detected emissions for an entire facility included in the methane intensity score. This framework allows for a full supply chain emissions profile using MiQ’s interoperable standards for each section of the gas supply chain. Facility-level certification avoids the potential to selectively include high-performing equipment, according to the organization. MiQ currently certifies more than 20 percent of U.S. onshore gas production.

Project Canary is a for-profit B-corp that offers an enterprise emissions data platform to help companies identify, measure, understand, and act to reduce emissions across the energy value chain. Project Canary has developed their Low Methane Rating (LMR) previously referred to as the Low Methane Verified Attribute (LMVA). Operators who receive the LMR have achieved a methane intensity of 0.2 percent or less at both the basin and facility level, in addition to implementing engineering-based practices to mitigate or eliminate

emission sources (Project Canary, 2023). Project Canary’s assessment, known as TrustWell, is a site-level environmental rating resulting in a platinum, gold, silver, or rated grade and a methane intensity metric. The assessment includes policy, plan, and execution level document review, subject matter expert interviews, and site visits to every wellbore or facility to produce a full representation of environmental impacts. Assets are evaluated annually and include recommendations to improve operations in the future. TrustWell inputs consider a variety of monitoring technologies,⁷ ranging from satellites and aerial monitoring to low-resolution, granular, ground-level measurement tools.

Table 1: Snapshot of Distinguishing Characteristics among Three Major Certifiers
(Highwood Emissions Management 2023; Washington Gas 2022)

Certifier Certification	Portfolio	Emissions data	Emissions monitoring/ measurement & reconciliation level	Qualitative ESG criteria*	Certified entity scope	Auditor	Public disclosure
Equitable Origin , nonprofit organization The EO100 Standard for Responsible Energy Development provides an independently audited full environmental, social, and governance (ESG) reporting suite that considers impacts to all areas of ESG, including a focus on indigenous peoples’ rights.	25 companies 13.3 bcf/d North America (U.S., Canada, Mexico), South America, Europe	Carbon dioxide equivalent, scopes 1, 2, and 3	None	Yes	Asset-level (facility wide)	Third-party auditor	List of participants and their achieved ratings
MiQ , nonprofit organization The MiQ Standard Certification process evaluates the deployment of methane monitoring technology and alignment of company policies to methane management. Certificates are issued, transferred, tracked, and retired through the MiQ Registry. The certificates provide buyers an audited assurance of differentiated gas production.	50 companies 19 bcf/d U.S.	Methane, scope 1	Site-level	No	Asset-level (facility wide)	Third-party auditor	List of participants
Project Canary , for-profit B-corp TrustWell Environmental Assessments 2.0 differentiates companies and their operations by evaluating their overall approach to responsible operations, with a specific focus on operational excellence and environmental stewardship.	30 clients 10 bcf/d U.S. & Western Canada	Methane intensity metric	Site- and source-level	Yes	Pad-level (site-level)	In-house	List of consenting parties
*Qualitative ESG criteria refer to scores reflecting a company’s broader impacts on issues including indigenous people’s rights, corporate governance and ethics, fair labor and working conditions, climate and biodiversity, and community engagement.							

⁷ Many emerging site-level measurement technologies are new, with more work needed to demonstrate performance and understand limitations. Colorado State University’s Methane Emissions Technology Evaluation Center (METEC) is one facility dedicated to this mission (Highwood Emissions Management, 2022).

IV. Technical Protocol Provider

GTI Energy, a nonprofit energy research and training organization, has developed technical protocols to provide guidance to operators to quantify their methane emissions. Known as **Veritas**, the protocols support a transparent, consistent, and technology-neutral approach to calculating and reporting emissions. Veritas is not a certification or performance standard, and the use of Veritas does not mean that gas is differentiated or responsibly sourced. However, the flexible nature of the protocols can enable operators to use Veritas as a tool to achieve other certifications and performance standards.

GTI Energy notes three challenges to high-quality methane measurement: the diverse applications and performance characteristics of different technologies, lack of transparency, and uncertainty associated with sampling strategy and temporal variability. Veritas includes five technical protocols covering measurement, reconciliation of emissions factor inventories with actual measurements, methane emissions intensity, supply chain summation to add segmented methane intensity measurements to a total emissions intensity, and assurance to verify emissions inventory. The protocols cover all segments of the natural gas supply chain, from production to distribution. Liquefied natural gas (LNG) is also included.

GTI Energy partnered with 36 companies, including operators, technology vendors, regulators, academic experts, and other stakeholders to develop the protocols, which were published in February 2023. A 1-year demonstration phase was completed across all six supply chain segments in October 2022. In the future, GTI Energy plans to implement the protocols at more sites, continue to gather feedback, and further refine the protocols based on operational experience with version 2 of the protocols scheduled to be released in December 2023, following another testing phase in summer 2023. Working groups are addressing uncertainty in emissions measurement and quantification and alignment with OGMP 2.0 and other similar initiatives, as well as conducting outreach to stakeholders (GTI Energy 2023).

Many emerging site-level measurement technologies are new, with more work needed to demonstrate performance and understand limitations. Colorado State University's Methane Emissions Technology Evaluation Center is one facility dedicated to this mission (Highwood Emissions Management 2022).

V. Current Utility Customers of Certified Gas

CNG customers can include a broad range of stakeholders: oil and gas producers, electric generators interested in reducing emissions associated with natural gas-fired electricity, natural gas utilities looking to offer lower-emission gas to customers, industrial customers pursuing voluntary decarbonization targets, and others. Oil and gas producers and industrial customers might purchase CNG either to meet corporate decarbonization goals or to be able to sell products at a premium to customers interested in lower-emissions goods and services (Lackner and Mohlin 2022). This primer, written primarily for an audience of state utility regulators, focuses on regulated utility customers. Utilities are using CNG to address clean energy policies and satisfy environmental, social, and governance (ESG) commitments through measurably reducing methane emissions.

The North American Energy Standards Board's (NAESB) Base Contract for Sale and Purchase of Natural Gas (NAESB Base Contract) facilitates the vast majority of gas transactions in the United States. Recognizing emerging interest in both CNG and renewable natural gas and desire from both buyers and sellers to facilitate transactions for those products, NAESB convened a stakeholder group to develop two addendums to the base contract with language relating to CNG and renewable natural gas. The addendums include standardized terms, conditions, and definitions to support transactions. NAESB formally adopted the addendums in March 2023, and both are now available for use, along with frequently asked questions documents describing how to use the addendums (NAESB 2023).

A. Xcel Energy

In May 2021, Xcel Energy announced a partnership with Crestone Peak Resources to purchase 5,000 Dekatherms/day (Dth/day) of gas certified by Project Canary over a 1-year period (CBS Colorado 2021). Xcel, a natural gas distribution and electric utility, serves 2.1 million gas customers and 3.7 million electric customers across eight states in the Midwest, Central, and Southwestern United States. In November 2021, Xcel announced a goal to achieve net-zero GHG emissions from its natural gas business by 2050, making it the first major U.S. energy provider to announce comprehensive GHG targets for electricity, natural gas, and transportation.⁸ Xcel emphasized the use of CNG, continued improvements in natural gas distribution infrastructure, clean hydrogen production and blending, renewable natural gas, and conservation programs as its primary methods for achieving net-zero gas delivery (Xcel Energy 2021). Xcel planned to procure 100 percent of its natural gas for both gas distribution and electricity generation from producers and across midstream infrastructure meeting certification standards by 2030.

On August 1, 2023, Xcel submitted a clean heat plan to the Colorado PUC, including a request for approval of the recovery of prudently incurred costs associated with CNG procurement and a CNG Market Transformation Initiative "designed to drive the industry to a transparent and standardized certification process" (Lieb 2023b). Xcel proposed a 1-year (2026) CNG partnership with Williams and Context Labs to purchase 25,000 Metric Million British Thermal Units/day (MMBtu/day) of physical natural gas and associated environmental attributes, for which Xcel would pay a premium, to cost-effectively demonstrate and incentivize upstream emissions reduction. The partnership with Williams and Context Labs corresponds to a reduction of 330,000 Metric Tons (MT) carbon dioxide equivalent (CO₂e) over a 5-year period, assuming the program extends past the 1-year pilot. Methane emissions would be measured by on-ground direct monitoring, satellite, and plane over-flight measurement to provide continuous methane monitoring. Following the 1-year pilot, Xcel intends to purchase additional CNG environmental attributes. The company proposed a CNG budget of \$2.4 million in 2026, \$4.6 million in 2027, and \$6.2 million in 2028. The cost of the physical gas would be recovered through the existing Gas Cost Adjustment; the cost of the CNG environmental attributes would be recovered through a proposed

⁸ In 2018, Xcel announced a goal to deliver 100 percent carbon-free electricity to customers by 2050. In 2020, Xcel pledged to power 1.5 million electric vehicles in its service territory by 2030.

Clean Heat Support Gas Adjustment. Consulting firm E3 analyzed Xcel's clean heat plan and estimated that the company's CNG proposal would represent approximately 34 percent of 2030 emissions reductions, assuming Xcel procures the entirety of its gas supply in 2030 (approximately 117 million Dth) from CNG (E3 2023).

A challenge associated with Xcel's reliance on CNG to reduce methane emissions is the lack of a reliable estimate of average methane intensity of gas currently produced in Colorado, as well as in other states Xcel purchases from (Oklahoma, Texas, Utah, and Wyoming). The company noted its reliance on a national average methane intensity from DOE and encouraged DOE and Colorado to develop basin-specific methane emission intensities based on direct measurement. With that barrier in place, Xcel stressed that CNG procured under its proposal would have a methane intensity below the state's average.

B. Énergir

Énergir received regulatory approval from the Québec energy regulator, the Régie de l'énergie, to offer CNG to its customers in its 2019–2020 rate case, R-4076-2018 (Énergir 2019). In 2017, Énergir launched an initiative for the Responsible Procurement of Natural Gas to examine the life-cycle emissions of the natural gas it was procuring for customers. The initiative developed two objectives: (1) in the short term, to buy directly from specific producers to make it easy to track natural gas supply, and (2) in the long term, to buy from producers who can demonstrate implementation of ESG practices. Énergir received input from stakeholders including American and Canadian gas producers and the Pembina Institute, an environmental nongovernmental organization that advised Énergir on responsible procurement criteria and a method to evaluate gas production practices. Following the Pembina Institute's development of a list of environmental and social impacts associated with natural gas production, Énergir considered two independent, third-party evaluation methodologies for their ability to measure performance across impact categories, ultimately selecting the EO100 Standard. Énergir noted that the EO100's highest level of performance met or exceeded American or Canadian regulations, particularly for biodiversity management and relationships with indigenous peoples.

In the spring of 2018, Énergir launched a pilot project with a gas producer to validate the use of the EO100 Standard and developed a two-phase process for responsible gas procurement: first, producer evaluation according to the EO100 Standard, and second, disclosure of additional key indicators⁹ of interest to Énergir and its stakeholders. Énergir proposed implementing the two-phase process for four years initially (April 2019 through March 2023) with an opportunity to reassess the initiative in 2021–2022. The Régie de l'énergie approved the program in its November 2019 decision. Énergir noted that gas supply represents a significant part of bills for its customers and calculated the bill impact for a typical residential customer to be less than \$2 per year (0.11 percent increase). It should be noted that the bill impacts are based on Énergir's pursuit of a very gradual approach, initially purchasing the equivalent of 40,000 gigajoules/day (GJ/d) from one certified producer in 2019–2020. Cost caps were included in the regulatory filing, although the caps and price premium for CNG are redacted.

Énergir recorded its first transaction with an eligible producer, Alberta-based Seven Generations Energy Ltd., in February 2020. The utility has since engaged five additional producers¹⁰ as responsible suppliers that customers who purchase their own natural gas can contract with.

9 Indicators include the intensity of methane production, intensity of GHG emissions from operators, intensity of water usage for operations, percentage of water recycled, percentage of serviced land on the company's leases, and soil usage area by natural gas production volume.

10 Suppliers are listed on Énergir's website at <https://energir.com/en/major-industries/natural-gas-price/rates-in-quebec/other-natural-gas-suppliers/>. As of May 2023, responsible suppliers include Seven Generations Energy, EQT, Northeast Natural Energy, Pacific Canbriam Energy, Seneca Resources Company, and Vermilion Energy.

C. Washington Gas

In December 2022, Washington Gas announced it would purchase CNG from Chesapeake Energy Corporation and Ascent Resources for its customers during the 2022–2023 winter heating season. Washington Gas expects the initiative to reduce CO₂e emissions by 28,000 metric tons compared to business as usual (MiQ 2022). Washington Gas serves customers in the District of Columbia, Maryland, and Virginia, all of which have carbon neutrality goals (by 2050 for DC) or net-zero targets (by 2045 for both Maryland and Virginia). Washington Gas set voluntary climate targets for its operations by 2030: a 30 percent GHG reduction from operations (scope 1 and 2 emissions), 10 percent low- or zero-carbon fuels (scope 3), and the procurement of CNG (scope 3).

Washington Gas began by issuing a request for information and request for proposals in summer 2021 to gather data on the costs of CNG for customers. Based on this experience, Washington Gas estimated a cost impact of between 0 and 2 cents per MMBtu (less than 1 percent of the cost of gas). This was found to be cheaper for customers than other methods of reducing emissions associated with natural gas use. Washington Gas pointed out that statutory changes may be needed to enable regulators to consider factors other than cost to select fuel sources, noting its support of the Virginia Energy Innovation Act (discussed in section VI). Washington Gas signed a contract with Chesapeake Energy to procure CNG at zero premium between 2021 and 2025, reducing carbon emissions by 4,600 metric tons.¹¹ The utility intends to eventually seek cost recovery for the procurement of CNG, noting that future costs will depend on market conditions (Washington Gas 2021).

In justifying the initiative, Washington Gas emphasized that the majority of emissions from the natural gas sector occur upstream, beyond the direct control of buyers like natural gas distribution utilities, and that purchasing CNG can reduce upstream GHG emissions by up to 80 percent (Washington Gas 2021). Upstream companies have an array of commercially proven, cost-effective methods to reduce emissions (Kelly 2022) but lack a financial incentive to implement these tools. The International Energy Agency wrote in a July 2022 publication, “almost all of the options to reduce emissions from oil and gas operations worldwide could be implemented at no net cost” (International Energy Agency 2022). S&P Global Commodity Insights stated in December 2022 that “more than 70 percent of the vented, fugitive and flared gas, representing a volume of ~80 bcm, could be economically captured and commercialized” (S&P 2022). The EPA estimates that addressing leaks in gas production comes out to a cost of slightly more than \$2 per ton of CO₂e abated, accounting for 0.2 percent of industry revenues (Project Canary 2023). By expanding the CNG market, Washington Gas hopes to make a clear case for why upstream companies should take steps to reduce emissions and meet the needs of their downstream customers (Adams 2022).

D. Virginia Natural Gas

Virginia Natural Gas is another utility that began purchasing CNG in October 2019 as it pursued a commitment to seek gas that has been sourced, transported, and distributed by companies with pledges to reduce GHG emissions to less than 1 percent across the gas supply chain. In December 2022, Virginia Natural Gas announced agreements with several suppliers to procure approximately one-third of its total customer demand from sources certified by MiQ (Virginia Natural Gas 2022). In Virginia State Corporation Commission (SCC) Case No. PUR-2021-00298, the SCC authorized Virginia Natural Gas to purchase CNG (referred to by the utility as “NextGen Gas”) and renewable natural gas at a cost of up to 5 percent of what the company normally spends on gas purchases (Virginia SCC 2022).

11 Washington Gas calculated the emissions reduction potential of certified gas at 5.01 kg/CO₂e/MMBtu based on its contract with Chesapeake Energy.

E. New York Utilities

New York's municipal utility, the New York Power Authority (NYPA), and investor-owned utilities Central Hudson Gas & Electric, Orange & Rockland, ConEdison, Rochester Gas & Electric, and New York State Electricity & Gas have filed for or received regulatory approval of CNG pilot programs, described in **Figure 12**. As a municipal utility, NYPA is not subject to regulation by the New York DPS, but the other utilities listed are investor-owned and state-regulated. The DPS approved Orange & Rockland's December 2022 proposal to offer a CNG pilot program in May 2023 (New York DPS 2023b) and ConEdison's certified gas pilot program in July 2023 (New York DPS 2023a), aligning with a May 2022 order to monitor implementation of the state's Climate Leadership and Community Protection Act (CLCPA). Both orders enabled the utilities to recover incremental CNG costs from customers, up to a limit, and to submit annual progress reports to the commission.

Figure 12: Recent RFPs, Pilots, and Public Decarbonization Goals (Project Canary 2023)

- **New York Power Authority (NYPA)**
 - 3 x 30-day RFPs in 2022, \$0.00-\$0.05 premium/MMBtu
- **Central Hudson Gas & Electric**
 - 6-month pilot May-Oct 2022 for 20% of total volume, \$0.035/MMBtu
- **Orange & Rockland** – PUC approved RSG pilot with cost recovery, \$100k/yr cap for premiums
- **ConEdison** – Filed for permission to pilot RSG with cost recovery, \$800k/yr cap for premiums
- **New York State Electricity & Gas and Rochester Gas & Elec (Avangrid)** – Filed for pilots with cost recovery, \$250k/yr cap

F. Vermont Gas

Vermont Gas serves 53,000 homes and businesses and is pursuing a commitment to net-zero operations by 2050. In November 2020, the company announced the purchase of EO100-CNG from Seven Generations Energy representing 10 percent of its total customer demand (Vermont Business Magazine 2020). Today, Vermont Gas procures approximately 20 percent of its gas supply from certified production (Project Canary 2023).

G. Tennessee Gas Pipeline

Tennessee Gas Pipeline, owned and operated by Kinder Morgan, is subject to Federal Energy Regulatory Commission (FERC) regulation as an interstate natural gas pipeline. In December 2021, Tennessee Gas requested FERC approval of a new pooling service for CNG, which would be reflected in its tariff. The proposal included Project Canary, MiQ, and Xpansive Data Systems as certifiers. Stakeholders brought up concerns about Tennessee Gas selecting specific certification providers in its proposal, prompting the company to seek FERC approval. In May 2022, FERC rejected the proposal, stating: "To date, based on the record in this proceeding, there are neither industry nor government-established standards that could guide the commission's review given the nascent market." FERC's rejection was without prejudice, inviting the company to submit an amended proposal addressing FERC's concerns and uncertainties in the future. FERC noted that industry standards (i.e., set by NAESB) or federal regulations on oil and gas methane emissions would have aided the commission in approving Tennessee Gas's proposal, should the companies Tennessee Gas selected to perform certification meet industry and/or federal standards (Weber and Hallahan 2022). Indeed, by July 2022, Tennessee Gas had received approval from FERC to offer CNG aggregation pooling, making it the first pipeline system to facilitate CNG transactions (Kinder Morgan 2022).

VI. Certified Gas and Regulatory Frameworks

State utility regulators are charged with overseeing the safe, affordable, reliable provision of utility services. Generally, statutes require commissions to approve the acquisition of fuel based on the lowest cost. This least-cost requirement is a barrier to the expansion of CNG (AGA 2022), which carries a price premium, albeit often a small one based on evidence to date.

The **District of Columbia** Public Service Commission (PSC) has two active dockets regarding CNG: Formal Case No. 1167, “In the Matter of the Implementation of the Climate Business Plan,” and Formal Case No. 874, “In the Matter of the Gas Acquisition Strategies of the District of Columbia Natural Gas, a Division of the Washington Gas Light Company.” PSC Order No. 21128 directs Washington Gas to submit periodic reports to the commission regarding the utility’s use of renewable natural gas and CNG. The most recent report was submitted in October 2022 and presented updated contracting terms for gas to flow to customers between November 2022 and March 2023, although terms were redacted from the public filing.

Two states have enacted legislation specifically allowing for the regulatory approval of cost recovery mechanisms for CNG. The **Virginia** Energy Innovation Act included provisions to facilitate the expansion of CNG as a decarbonization tool. The law defined low-emission natural gas as having a methane intensity of 0.20 or less, which could be verified through the EPA’s Gas STAR Methane Challenge program, OGMP 2.0, or a Qualified Attribute Commodities Platform (i.e., a trading platform for CNG). The law specified that the SCC “shall allow natural gas utilities to include in their fuel portfolios supplemental or substitute forms of gas sources that meet the natural gas utility’s pipeline quality gas standards and that reduce the emissions intensity of its fuel portfolio” in addition to the preexisting requirement for the SCC to monitor all fuel purchases, transportation costs, and utility contracts to achieve lowest costs (Virginia Legislative Information System 2022).

The **Tennessee** Natural Gas Innovation Act, passed as HB 2315/SB 1959 in February 2022, found that “it is in the public interest to capture excess methane for beneficial use.” The law defined responsibly sourced gas as “conventional natural gas that has been produced by companies whose operations have been independently verified as meeting certain ESG standards set by the Sustainability Accounting Standards Board, including primarily air emission reductions” and included responsibly sourced gas as one of multiple “innovative natural gas resources” alongside renewable natural gas, hydrogen, carbon capture, and energy efficiency. The law invited public utilities to request the PUC to authorize a cost recovery mechanism to use or develop infrastructure to facilitate innovative natural gas resources for customers, with a cost cap set at 3 percent of the annual cost of gas (State of Tennessee 2022).

A bill under consideration in **California** (SB 781, “Out of State Natural Gas Emissions”) would require state agencies to prioritize reducing methane emissions from imported natural gas. The bill’s author, Senator Harry Stern, notes that the California Air Resources Board (CARB) has had regulations in place since 2017 to reduce methane emissions from in-state oil and gas production (Stern 2023); however, because almost all of California’s natural gas is imported, SB 781 would require CARB to:

- Request information from utilities and large gas users regarding purchases of CNG having a methane emissions intensity of 0.2 percent or less across the natural gas supply chain;
- Beginning in 2025, quantify and publish an annual estimate of potential GHG reductions associated with the use of CNG or other “best practices” having at least 80 percent lower methane emissions than average at the point of production; and
- “Encourage natural gas procurement on behalf of the state to shift to CNG producing low methane emissions, where feasible, cost effective, and in the best interests of ratepayers as determined by the Public Utilities Commission” (California Legislative Information 2023).

As of publication, SB 781 remained under consideration in the legislature (California Legislative Information 2023). Project Canary and several environmental advocacy organizations have expressed support for the bill (Stern 2023).

VII. Evolution of Certified Gas

In its June 2022 order in the Tennessee Gas Pipeline docket, FERC emphasized the existing ability of buyers and sellers to voluntarily negotiate price premiums reflecting the value of CNG absent any further federal or state regulatory action: “We recognize that, as EDF asserts, gas qualifying under the PCG Criteria could sell at a premium compared to non-certified gas... parties are still able to engage in bilateral certified gas transactions... and, in doing so, may agree to any price (including premiums) and any forms of certification they desire” (FERC 2022). Highwood notes slow and steady growth across most programs and interest from regulators in integrating regulatory requirements with voluntary certification initiatives (Highwood Emissions Management 2023). Highwood proposes six knowledge gaps that act as barriers to broader industry uptake of voluntary initiatives: an absence of harmonization between regulations and voluntary initiatives; uncertainty around benefits and costs of certification initiatives; the difficulty of balancing transparency and accountability with company engagement and its costs; disagreements over determining an appropriate level of effort and best approach for a credible measurement-informed inventory; company reluctance to understand their complete emissions profile through direct measurement; and the lack of a centralized, publicly accessible database housing data from the different initiatives.

EDF calls on state and federal regulators to take actions to address emissions from assets not captured in voluntary certification programs. Further, EDF advocates for the EPA, Pipeline and Hazardous Materials Safety Administration (PHMSA), and state environmental regulators to establish baseline practices and definitions for methane emissions, and for financial regulators (e.g., Federal Trade Commission, Securities and Exchange Commission, state attorney generals) to ensure accuracy of statements by operators and certifiers. EDF notes that state utility regulators, FERC, and the Commodity Futures Trading Commission should act to protect the public interest when CNG is transacted through regulated markets and/or paid for by utility customers (Kelly 2022).

DOE, national laboratories, and recipients of federal research and development (R&D) funding can continue to develop cost-effective tools for methane emissions measurement that can further increase faith in certification programs (Kelly 2022). In March 2023, DOE announced \$47 million in funding for 22 research projects to advance innovative measurement, monitoring, and mitigation technologies to detect, measure, and reduce methane emissions across oil and natural gas producing regions (DOE 2023a). The following month, DOE released a request for information on strategies and technologies that natural gas and LNG companies are using or could use to reduce GHG emissions associated with LNG exports (DOE 2023b). Learnings from the request for information will be used to enhance DOE R&D and regulatory activities. In the long term, DOE intends to develop a common metric to calculate the emissions intensity of LNG exports (Dabbs 2023).

The use of digital registries to facilitate purchases of CNG—whether as a commodity or a certificate separate from the actual commodity—is an area ripe for growth. Williams, a pipeline operator with approximately 15,000 miles of interstate natural gas pipelines, established a NextGen Gas process using blockchain technology to certify gas from the production through transmission phases. Although not an independent third-party certification in the style of the providers discussed in section III.A, Williams’s goal is to use NextGen Gas to sell low-carbon and net-zero gas to utilities, LNG exporters, and other customers (Williams n.d.). Williams utilizes KMPG LLP to perform verification for NextGen Gas and Context Labs to track and measure emissions with blockchain. Williams has partnered with producers PennEnergy Resources and Coterra Energy, LNG exporter Cheniere Energy, and distribution utility Dominion Energy Virginia on a NextGen Gas transaction (Williams 2022a, 2022c). In its August 2023 clean heat plan filing, Xcel proposed a 1-year pilot to purchase 25,000 MMBtu/day of gas with environmental attributes from Williams, with calculation and tracking provided by Context Labs and auditing provided by KPMG or another auditing organization (Lieb 2023b).

DOE is funding an implementation test by the Tennessee Valley Authority (TVA) and its trading partners to evaluate how the utilization of a digitalized version of the NAESB Base Contract could bring efficiency and security to transactions under the contract. NAESB subcommittees reached consensus on standards supporting the use of distributed ledger technologies (i.e., blockchain) after a 2-year development effort beginning in October 2018, and the standards were formally adopted by NAESB in July 2020 (NAESB 2020a). The TVA test will demonstrate how distributed ledger technologies can facilitate the rapid settlement of natural gas transactions. Through current reconciliation practices, many trading partners utilize manual actions to complete trade and settlement accounting processes. Utilization of distributed ledger technologies can shorten the process from weeks to days (NAESB 2020b), and TVA is currently testing how these efficiencies can be applied to CNG transactions.

VIII. Considerations for State Utility Regulators

CNG presents a unique set of questions for state utility regulators overseeing the safety, affordability, and reliability of utility services. The primary regulatory issue around CNG is treatment of the price premium, if one exists, compared to non-CNG. As the AGA states, “most states have a regulatory prudence requirement for ‘least cost’ gas supply acquisition that does not leave discretion for companies to select lower-emitting gas supplies, even if these amount to relatively cost-effective emission reduction measures on a \$/tCO₂e basis” (AGA 2022, p. 70). Natural gas, whether certified or not, is a uniform product consisting mostly of methane. Certification does not imply any difference in energy content. Given regulators’ imperative to authorize the purchase of fuels at least cost to customers, certification alone may not provide adequate justification for regulators to approve cost recovery. Legislation in Virginia and Tennessee and pending legislation in California can serve as examples for other state legislatures to consider; however, absent this kind of explicit statutory permission, many regulators may be hesitant to pass the costs of CNG along to customers. The question that then arises is whether investor-owned utilities can finance the incremental costs of CNG from shareholders in the absence of ratepayer funding. Increased attention toward ESG performance and sustainable investing may make CNG an attractive option for utilities looking to attract capital from climate-conscious investors; however, shareholders may balk at the price premium of CNG. There is no single answer to whether ratepayers, shareholders, both, or neither should pay for CNG. Utilities and regulators operate in unique state policy and regulatory environments, and decisions about CNG programs should be made within those contexts.

Utility offerings of CNG to customers on a voluntary basis may offer a more realistic path for the short-term deployment of CNG. NARUC noted multiple examples of state regulators approving voluntary customer tariffs to purchase combinations of renewable natural gas and carbon offsets to reduce the environmental impacts of their natural gas use (Zitelman 2021). Customers can choose to enroll in these programs and pay a premium for a percentage or the entirety of their natural gas consumption. Program benefits are clearly explained to customers, commissions approve rates and terms, and utilities report on enrollment and can file for approval of program changes in the future. Such an approach may work well for commercial and industrial customers seeking to achieve corporate goals to reduce emissions. Absent the availability of a voluntary program approved by a commission, customers served by distribution utilities would be unable to procure CNG.

Another aspect of CNG is its alignment with state decarbonization goals, and the confidence regulators can have in its impacts on GHG reductions. State regulators weigh the costs and benefits of decarbonization tools and processes and must have accurate information about the actual carbon reduction contributions of CNG, in addition to the costs of certification borne by ratepayers. In accordance with maintaining reliability, regulators may wish to compare the cost per ton of CO₂e reductions from CNG with the cost per ton reduced from other resources such as renewable generation, clean hydrogen, renewable natural gas, demand response, and energy efficiency programs. Utilities may choose to issue requests for information or requests for proposals

to let market competition dictate their steps toward decarbonization goals, as DTE Energy elected to do in February 2022 for CNG procurement (DTE Gas Company 2022).

Xcel included publicly available pricing data from other regulatory filings in its August 2023 clean heat plan CNG proposal. Premiums ranged between \$0.01 and \$0.06 per MMBtu on top of the normal gas commodity cost (Lieb 2023a). CNG procurements from UGI Electric and Washington Gas Light Company (WGL) in Pennsylvania and Washington, DC, respectively, were also included; however, neither procurement had a price premium for CNG. In filings, both utilities noted that these procurements were on a pilot basis and that premiums in the future would depend on market conditions.

Utility	Docket	Period	Premium (\$/MMBtu)
DTE	Michigan PSC Case No. U-21064	2022–2023	\$0.032
Virginia Natural Gas	Virginia SCC Case No. PUR-2021-00298	2019–2022	\$0.01–\$0.06
PECO	Pennsylvania PUC Docket No. R-2022-3032250	2022	\$0.04

In its analysis of Xcel’s clean heat plan, E3 estimated CNG’s marginal abatement cost per ton of CO₂e at between \$16.68 and \$41.24, assuming a conservative price premium of \$0.10/MMBtu or an optimistic premium of \$0.05/MMBtu (**Figure 13**). There is significant uncertainty around the price premium for CNG procurements in the future; Xcel witness testimony cited the above examples of premiums between \$0.01 and \$0.06/MMBtu, well below the conservative assumption of \$0.10/MMBtu. A lower price premium for CNG would translate into a lower marginal abatement cost.

Figure 13: Certified Natural Gas Costs, Volumes, and Marginal Abatement Costs (E3 2023)

Outlook	Year	Price premium (\$/MMBtu)	Incremental volume (MMBtu)	Cumulative volume (TBTU)	Avoided emissions (tCO ₂ e)	Marginal abatement cost (\$/tCO ₂ e)
Conservative	2025	\$0.10	20,000	0.02	87	\$33.36
	2026		35,715,961	36	133,652	\$36.16
	2027		35,432,952	71	111,091	\$38.41
	2028		29,252,336	100	84,317	\$39.74
	2029		28,065,553	128	75,219	\$40.68
	2030		16,722,337	145	40,590	\$41.24
Optimistic	2025	\$0.05	20,000	0.02	87	\$16.68
	2026		35,715,961	36	133,652	\$18.08
	2027		35,432,952	71	111,091	\$19.20
	2028		29,252,336	100	84,317	\$19.87
	2029		28,065,553	128	75,219	\$20.34
	2030		16,722,337	145	40,590	\$20.62

Last, state regulators should be informed about the differences between major certification providers, particularly the focus of some companies solely on methane emissions while others incorporate a broader variety of ESG metrics. With increased political focus on the impacts of energy use on society (e.g., environmental justice, energy equity, and just transition initiatives), commissions may be able to leverage certification programs to align with broader state policy goals. Alternatively, commissions may find that broader goals are best pursued independently of any considerations of CNG.

IX. Conclusion

CNG is a rapidly growing industry. From the first CNG transaction in 2018, nearly one-third of U.S. production is now certified, with a steady stream of new partnership announcements between certification providers, operators, and customers continuing to expand the market. CNG can very well contribute to decarbonization in the energy sector by meaningfully reducing upstream methane emissions; however, there are roles for state utility regulators, state policymakers, and the federal government to play in setting appropriate baselines to build trust and confidence in the climate benefits of certification. This paper aims to provide a basic understanding of the CNG market to state utility regulators while highlighting likely questions and concerns from regulators for the awareness of gas industry participants and other stakeholders.

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