



# Clean Energy Future: The Role of Natural Gas

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**Natural gas is a critical and abundant energy source in the U.S. It has been a key factor in lowering U.S. greenhouse gas emissions and holds great promise as a contributor to the nation's lower emission energy future. With our industry's enormous investments in new technologies, we are seeing the development of natural gas products with even lower emission profiles becoming a greater part of the energy mix, underscoring the critical role that natural gas will continue to play in a reliable and clean energy future.**

NGSA supports the ambition of achieving economy-wide, net zero GHG emissions by 2050. Achieving that climate goal will require in-depth examination of how all forms of energy resources can work together to reduce emissions:

- Natural gas provides a cleaner alternative to coal. It's use has reduced U.S. power sector CO<sub>2</sub> emission to 25-year lows, making it the fuel of choice historically in the power sector to achieve emissions reductions.
- Natural gas performs a crucial role in the power sector because of its quick-ramping capabilities and contribution to balancing the grid. This will become increasingly important as more variable energy resources come online.
- In addition to its role in power generation, natural gas is also an important feedstock for products essential to modern life and helps fuel important industrial and manufacturing processes. These hard-to-abate, energy-intensive industries will especially benefit from investments and innovation in technologies and approaches that can reduce emissions in the production, transportation, and consumption of natural gas.

More is and will be asked of our industry as we pursue our climate goals. Our industry is already tackling this challenge, introducing numerous ways that natural gas

can continue to be utilized with an even lower emissions footprint. Industry is helping to facilitate a lower emissions future by ardently progressing lower or zero emission natural gas technologies and products.

These include Certified Natural Gas, Renewable Natural Gas, Carbon Capture, and Hydrogen. These advancements will increasingly be a part of our nation's lower emissions energy mix, making natural gas less carbon-intensive by reducing methane emissions.

Below, we highlight in more detail these promising advances in natural gas products and technologies. While independently at a unique stage of development, they each have the potential to play a critical role in securing our nation's clean energy future.

## 1. Certified Natural Gas

- Certified natural gas specifically refers to natural gas that has undergone a formal process, including a comprehensive evaluation of the company's production practices. If these practices determine whether that gas meets a pre-defined threshold of criteria, which typically puts an emphasis on reductions in methane emissions, the produced natural gas is thereby "certified" as meeting those standards.
- Certified gas is a subset of a much broader category of differentiated natural gas products that producers are working on their own to lower emissions and/or lower methane intensity of production and receiving third-part validation for those efforts.
- Certified natural gas can help society reach net zero because it gives producers and buyers an understanding of a product's methane intensity and sources of emissions, which enables ongoing and additional methane emissions reductions.
- Certifying the process through which natural gas is produced creates transparency regarding emissions, differentiates the supply of natural gas, and helps operators make the right investments to further reduce emissions.

**Timeline and Potential Market Impact:** Several producers have been or are in the process of having their production certified by independent certifiers, while others are using their own certification processes. Certification is happening on a voluntary basis: currently 26% of U.S. production is considered certified. There is growing interest from buyers in purchasing certified gas, and a variety of platforms are being developed to track, transfer, and trade certified natural gas attributes. Currently, there is no government oversight or standardized criteria for how to certify natural gas, although DOE has approached stakeholders to “identify key elements” and “harmonize approaches” to provide greater emission clarity. There is great potential for the market to grow and become formalized.



## 2. Renewable Natural Gas (Biogas/Biomethane)

Renewable natural gas (RNG) is a gaseous product from the decomposition of organic matter (landfills, livestock operations, wastewater treatment facilities, etc.) that has been cleaned and conditioned to remove or reduce non-methane elements and meet pipeline purity standards.

- RNG, once cleaned, is pipeline-quality natural gas that is fully interchangeable with conventional natural gas. RNG can be used to generate electricity, heat, and vehicle fuel.
- RNG projects can help society reach net-zero because they capture and recover methane from organic matter that would otherwise be released into the atmosphere.

**Timeline and Potential Market Impact:** RNG is currently being produced and used. According to the Environmental Protection Agency, as of 2022, there were almost 200 landfill and agriculture RNG projects in the U.S. The market for RNG is likely to grow and is aided by the inclusion of RNG in Renewable Fuel



**Standards and Low Carbon Fuel Standards.** The RNG market is relatively small in scale versus traditional production and is unlikely to reach the same potential magnitude of impact as other future lower emission gas products because it is more limited in the scale and size on a per project basis. However, emission reduction impact is greater per MMBtu when compared to certified natural gas.

## 3. Carbon Capture

- Carbon capture utilization and storage are a suite of technologies that help abate industry’s carbon dioxide emissions from various industrial sources. These technologies capture and store or use carbon dioxide, preventing its release into the atmosphere.
- Carbon capture is essential to helping society achieve a net-zero emission future because it enables emission reductions in sectors that are hard to decarbonize. These sectors include industrial processes and power plants.

**Timeline and Potential Market Impact:** Commercial facilities are currently applying carbon capture technologies as part of their operations on a very small scale for industrial processes, fuel transformation, and some power generation. The application of carbon capture systems to large scale generation facilities is still developing. In terms of achieving the full benefit of carbon capture technology, there are currently almost two dozen large carbon capture projects constructed globally. The

International Energy Agency (IEA) estimates the world will need 2,500 large carbon capture facilities to achieve Paris targets. Legislation enacted in 2022 (the Inflation Reduction Act) provides incentives to further develop this technology, which should result in considerable growth in carbon capture in the coming years.

## 4. Hydrogen

- Hydrogen, while abundant, is rarely found in its pure form. Rather, hydrogen is produced through chemical reactions. Most hydrogen today is produced through natural gas-fuel reforming, a process involving a reaction between natural gas and steam. Hydrogen can also be produced from renewable sources.
- When hydrogen is produced using natural gas steam reforming, its byproducts are water and carbon. When carbon capture is applied, the carbon produced is either stored or utilized, becoming an important decarbonization tool. This type of hydrogen production process produces what is referred to as blue hydrogen. For large-scale production of hydrogen from natural gas to be adopted, carbon capture technology must also be implemented to meet climate goals.
- Blue hydrogen will be imperative to reduce emissions from hard-to-decarbonize sectors. These include feedstock and heat sources for refining, manufacturing, and heavy-duty transportation.



**Timeline and Potential Market Impact:** Hydrogen with carbon capture is in its infancy. Currently companies are just beginning to develop and stand-up hydrogen plants with carbon capture. Hydrogen hubs are in development in the United States to create networks of hydrogen producers, consumers, and local connective infrastructure, all of which will be necessary to establish a robust market for hydrogen.

While each of these new natural gas products and technologies has great potential, they are all in different stages of development. Further, securing wide availability in a reasonable timeframe depends on governments, industry, and other stakeholders working together to ensure they can be developed and deployed at scale cost-effectively. Critical enablers include:

- Government policies that encourage research and development into low emission natural gas products and technologies.
- Finding ways to stimulate investment, especially in the early stages before markets emerge, and supporting efforts to scale low emission natural gas products and technologies.
- Transparency and collaboration with government, business, and customer stakeholders to drive progress and aid development of low emission natural gas products and technologies.
- A clear permitting process for low emission natural gas products, infrastructure (CO<sub>2</sub>, H<sub>2</sub> pipelines) and technologies.

Working hand-in-hand, we can pave a path forward to maximize the potential of our country's most abundant energy resource.