

Economic Benefits of RNG: Decarbonization, Investment, Job Creation, Energy Resilience and a More Sustainable Circular Economy

Renewable natural gas (RNG) is made from organic wastes (food waste, sewage, livestock manure) that are inevitable by-products of human, plant and animal life. In oxygen-free environments, such wastes naturally release a methane-laden biogas as they decompose (“anaerobic digestion”). This biogas can be captured, clean and conditioned to RNG.

RNG is an Important Part of Decarbonizing the Energy Sector

RNG is interchangeable with conventional natural gas and is available *now*. It is used *today* to fuel vehicles, make electricity, heat buildings and produce hydrogen. Its flexibility allows for energy system decarbonization across multiple sectors, while supporting greater consumer energy choice—both now and into the future, as the sustainable economy grows and evolves.

- RNG is clean. Composed of biogenic carbon, all associated emissions are already part of the natural carbon cycle.¹ The burning of fossil fuels actually puts carbon that has been sequestered underground for millenia *back* into today’s environment.
- Depending on the waste feedstock used to make it, the lifecycle Carbon Intensity² of RNG compared to geologic gas ranges from a 20%+ reduction to significantly *carbon-negative* — meaning that RNG prevents more emissions than it releases.³
- RNG is a true “drop-in” fuel that can be substituted for conventional natural gas across a range of applications, with no changes required to existing equipment.
- Because it can be stored and used in dispatchable generation resources, RNG (and RNG-derived hydrogen) can support more intermittent electricity sources like wind and solar.
- Modeling by jurisdictions leading the push to electrification shows significant gas demand through 2050,⁴ illustrating a clear long-term need for RNG in a wide variety of end uses.
- Renewable gases will be a long-term necessity in industrial heating applications, where electrification is unlikely to be technically feasible due to temperature requirements.⁵
- Even where alternatives do exist, renewable gases are often the most cost-effective decarbonization option on a dollar-per-ton of reduction basis.⁶

RNG Brings Investment to Local Economies

RNG has experienced unprecedented growth in recent years, adding over 200 new facilities across North America since 2011.

- At the end of 2022, **there were 277 operating RNG facilities in North America**, and over **260 additional facilities under construction or in development**.⁷
- Every new RNG project brings millions of dollars in capital investment to local economies.⁸
- Through public-private partnerships to convert local waste streams to RNG, municipalities can generate significant revenue and shift risk and operating costs to a third party.⁹

¹ University of California at Davis, August 2020. [Science & Climate Definitions – Biogenic Carbon](#).

² Life Cycle Accounting (LCA) measures all emissions from producing, transporting, distributing and consuming a fuel. “Carbon intensity” (CI) quantifies the GHG emissions of a fuel, usually in grams of CO₂-equivalent per megajoule of energy consumed (CO₂e/MJ).

³ Argonne National Laboratory, 2021. “[Renewable Natural Gas for Transportation](#).”

⁴ California Energy Commission, April 2020. [The Challenge of Retail Gas in California’s Low Carbon Future](#).

⁵ Bataille et al. (2018, June 20). [A Review of Technology and Policy Deep Decarbonization Pathway Options...](#)

⁶ Ibid.

⁷ RNG Coalition, [RNG Production Facilities in North America](#).

⁸ ICF. (2017, May). [Economic Impacts of Deploying Low NOx Trucks fueled by Renewable Natural Gas](#).

⁹ Ameresco. (2019, December). [Making Your Organization Carbon Neutral with Renewable Natural Gas](#).

- On-farm and municipal digesters (e.g., at wastewater plants) can process organic waste from external sources (like inedible food waste), creating revenue streams from the sale of additional RNG produced and from the disposal (tipping) service provided.¹⁰

RNG Creates Jobs

RNG creates domestic, clean energy sector jobs in construction, operations, maintenance, manufacturing and engineering.

- Each new RNG facility creates 5-7x more jobs than a petroleum refinery of the same scale.¹¹
- Every direct job created by RNG creates two jobs in supporting industries (technology, manufacturing, finance, etc.).¹²
- RNG facilities provide clean energy jobs for those who have previously worked in fossil-fuel related industries; the technological similarities between the two industries means this transition can often be made with little or no retraining.

RNG Provides Energy Resilience

RNG and RNG-derived hydrogen are storable and dispatchable creating an on-demand reliability that even the most critical energy users can rely on.

- Such reliability holds significant value for food storage, universities, hospitals, and other mission critical facilities where loss of power could have catastrophic impacts
- RNG-powered microgrids¹³ provide economic benefit as sustainable, local energy sources.
- The United States could produce as much as 1,425.3 tBtu/yr of RNG by 2040, which is enough RNG to supply all current commercial gas demand nationwide, or 75% of current residential demand, or 45% of industrial demand.¹⁴

RNG Creates Useful Products from Waste

RNG production yields a valuable by product— “digestate”— from the organic material left over after the anaerobic digestion process.

- Digestate contains all the nutrients of the original organic material, but in a form more accessible by plants than, for example, raw animal manure, making it a more effective fertilizer. Digestate is also more easily absorbed into soil, reducing run-off into local water bodies.
- Digested solids can be recycled for use as animal bedding on farms, or even incorporated into construction materials.¹⁵
- Direct use or sale of AD by-product materials can add an important revenue stream (or create savings) for farmers or local governments.
- Recycling and using digestate by-products creates a more environmentally responsible and sustainable circular economy.

¹⁰ U.S. EPA. (2020, August 18). [The Benefits of Anaerobic Digestion](#).

¹¹ RNG creates 8.5 – 11.2 jobs per million diesel gallon equivalents (DGE); petroleum refining yields 1.6 jobs/million DGE. ICF, [Economic Impacts...](#)

¹² Ibid.

¹³ Microgrid Knowledge, op. cit.

¹¹ American Gas Foundation. (2019, December). [Renewable Sources of Natural Gas: Supply and Emissions Reduction Assessment](#), pg. 14.

¹⁵ [Farm Energy Extension, Uses of Solids and By-products of Anaerobic Digestion](#), April 2019.