

**BIOGAS
WORLD**



Biogas Community

PREVIEW Biomethane Report

Market Intelligence

March 2024

USA

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Table of Content

04	A Word From The BiogasWorld Team	28	Gas Utilities Programs & Incentives
05	Notice to Readers	41	Selected References
06	Market Overview	42	Appendix
12	Market Drivers		

A Word from the BiogasWorld Team

Dear BiogasWorld members,

In the year 2023, the biomethane market continued to exemplify its ability to innovate and the potential to valorize all segments along its value chain. New players are continuing to enter this fruitful market and grow alongside existing industry powerhouses. New regulations and standards of practice continue to favour market development and assert the role of biomethane in the decarbonization of industry. Indeed, the biomethane industry is uniquely positioned within international methane pledges and holds a vital role within the global waste management sector. The year 2023 was a significant year for the announcement of new facilities and the commitment of major industry stakeholders for building out their capacities with hundreds of new facilities by 2030.

The present document is our sixth edition of the RNG Market Intelligence Report – USA, which became for our members a key reference and an influential part of their decision-making for their marketing and business development activities. We believe that the information included in this report plays an important role in our members' success in the biomethane market and we strive to increase its value to our clients.

What is new in this edition?



New RNG Projects

Analysis of [REDACTED] facilities across the USA



Updated Analysis

Updated information on legislative activity at the federal and state levels



Updates on Utility Programs

Gas utility initiatives to support the development of the RNG sector

In summary, this document and all BiogasWorld actions aim to help the industry connect and grow worldwide. We now have over 170 clients and partners in 30 countries. Join us and take advantage of this professional network or use our continually expanding services to reach your own business goals.

Sincerely,
Your BiogasWorld Team

Notice to Readers

Energy Conversion

The report uses a number of energy units to present the information due to the fact that different sources of information may use various units of energy. When reading the report, you will find helpful the following table containing approximate energy conversions for RNG as reference.

Table 1. Energy Conversion

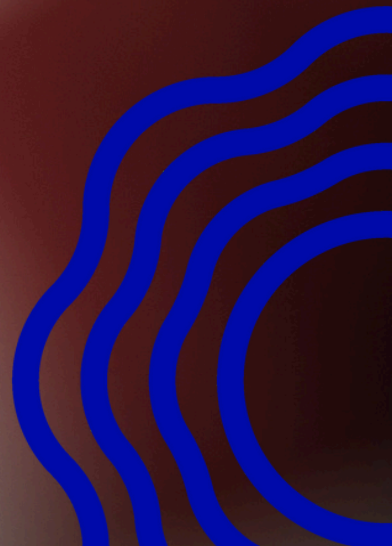
Unit of Energy	Conversion
1 PJ	1 000 000 GJ
	0,9478 TBTU
	947 817 MMBTU
	277 780 TWh
	26 518 000 m3 Biomethane (RNG)
	0,9478 Bcf

Abbreviations

PJ	Petajoule
GJ	Gigajoule
TBTU	Trillion British Thermal Units
MMBTU	Metric Million British Thermal Unit
TWh	Terra Watt hours
Bcf	Billion cubic feet

The background of the slide is a close-up, slightly blurred image of the United States flag, showing the stars and stripes. The text is centered over the flag.

Market Overview



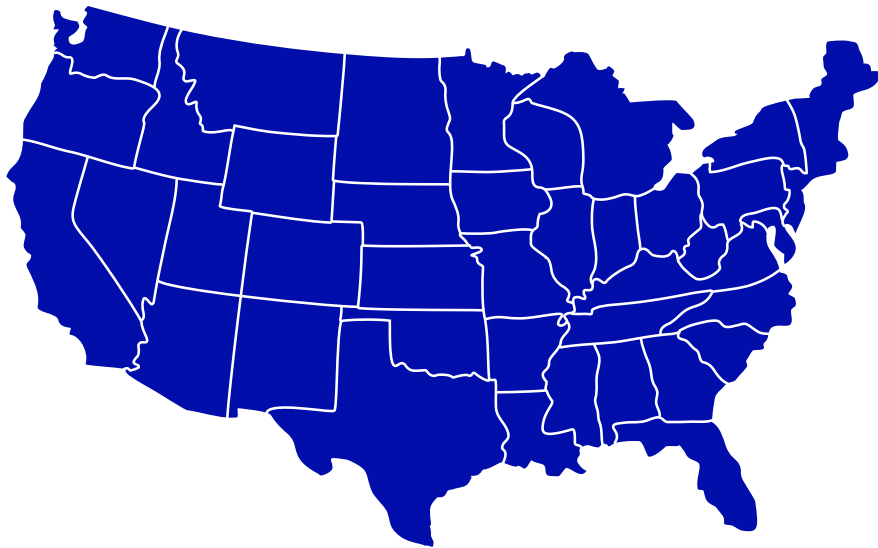
Current Market Overview

There are [REDACTED] operating RNG facilities[1] in the US with most facilities injecting the upgraded RNG into the gas grid to be used as vehicle fuel. The overall increase in operating facilities is [REDACTED]% as compared with 2022 statistics.

The biggest growth in 2023 occurred in the agricultural sector, where the number of operational plants increased by [REDACTED], to [REDACTED] as compared to the end of 2022. The majority of RNG facilities remain landfills ([REDACTED] plants), however, the number of agricultural digesters has rapidly increased since the start of the decade and may surpass landfill stations in the coming years. The states with the most RNG production are Wisconsin, Texas, Pennsylvania, Ohio, and California.

The Renewable Fuel Standard remains one of the driving credit markets for RNG. The EPA reported nearly [REDACTED] RINs were generated over 2023, up from [REDACTED] generated in 2022. Of the total, approximately [REDACTED] were generated for domestic producers of compressed RNG, and another [REDACTED] RINs were generated for liquified RNG.

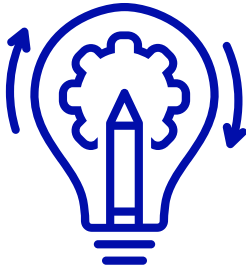
Although the rate of agricultural development is quickly outpacing the rate of landfill project development, landfills remain some of the lowest-cost projects with a sizable environmental benefit. The main drawback is that landfill gas output will likely decline over time as more food waste is diverted from landfills. A 2023 report published by [Industrious Labs](#) found that MSW landfills remain the largest methane emitters in [REDACTED] US states. The EPA has since targeted the increase in the development of OFMSW digesters to curb these emissions and efficiently valorize these gases.



¹ It is important to note that operating units in clusters are not counted separately; cluster is considered as one project.

Current Market Overview

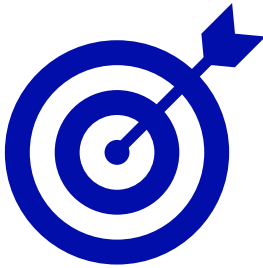
Projects in Development



According to BiogasWorld's database, there is currently [REDACTED] RNG facilities under construction and another [REDACTED] at various stages of development, scheduled to be online within the next [REDACTED]. The majority of facilities are planning to inject the RNG into the grid to use as vehicle fuel.

The US is the largest end-user of RNG as vehicle fuel. Across the US, there are estimated to be [REDACTED] CNG, and [REDACTED] LNG vehicle refuelling stations. Future projections predict the Pacific US to produce between [REDACTED] of RNG per year (representing [REDACTED] % of SoCalGas' projected 2035 consumption).

Market Opportunities



The EPA released [REDACTED] significant reports in 2023, the [Landfilling Report](#) and the [Food Waste Management Pathways](#) Report. The reports work alongside the White House's new food waste reduction strategy to assign a new directive for waste management through the establishment of a new waste hierarchy for landfilled materials. The hierarchy designates the AD of organic waste as a beneficial use pathway and supports the use of digesters for managing food waste across the US.

During the summer of 2023, the EPA released its new [SET Rule](#), which introduced the ability to split [REDACTED] RINs. This change makes it financially viable for farm waste or sewage sludge digesters to process food waste. The new SET Rule further aims to double RNG supplies over the next three years.

Following the passage of the IRA, major opportunities exist for the development of new RNG projects, which increase with the usage of American-made materials and unionized labour.

Current Market Overview

RNG Potential



Recent studies have estimated the US could decarbonize between █ and █% of national gas demand through RNG ([McKinsey, 2023](#); Deloitte, 2024). ANL has identified one important route of development to be WWTPs, █% of which are located in close proximity to NG pipelines and █% of which are large-scale facilities ([ANL, 2022](#)).

Recent predictions from the [IEA](#) forecast that the US supply of RNG will increase █ fold over the next █ years.

To promote the development of new projects, the US Department of Energy published a [map of US Brownfield sites](#), which developers can utilise for the Energy Community ITCs contained within the IRA.

Upgrading Snapshot

Out of [redacted] operating RNG projects, the information on upgrading technology utilized is available for [redacted] units. The results are presented in the Figures below. Figure 1 presents the available information based on the number of installations, whereas Figure 2 presents the data based on the installed capacity.

Note that the category “Other” includes the information combined for [redacted] plants: [redacted] using the mix of water scrubbing and PSA, another [redacted] membrane and PSA. For more details, please see Appendix 1.

Figure 1. Operational RNG upgrading plants in the US, number of plants

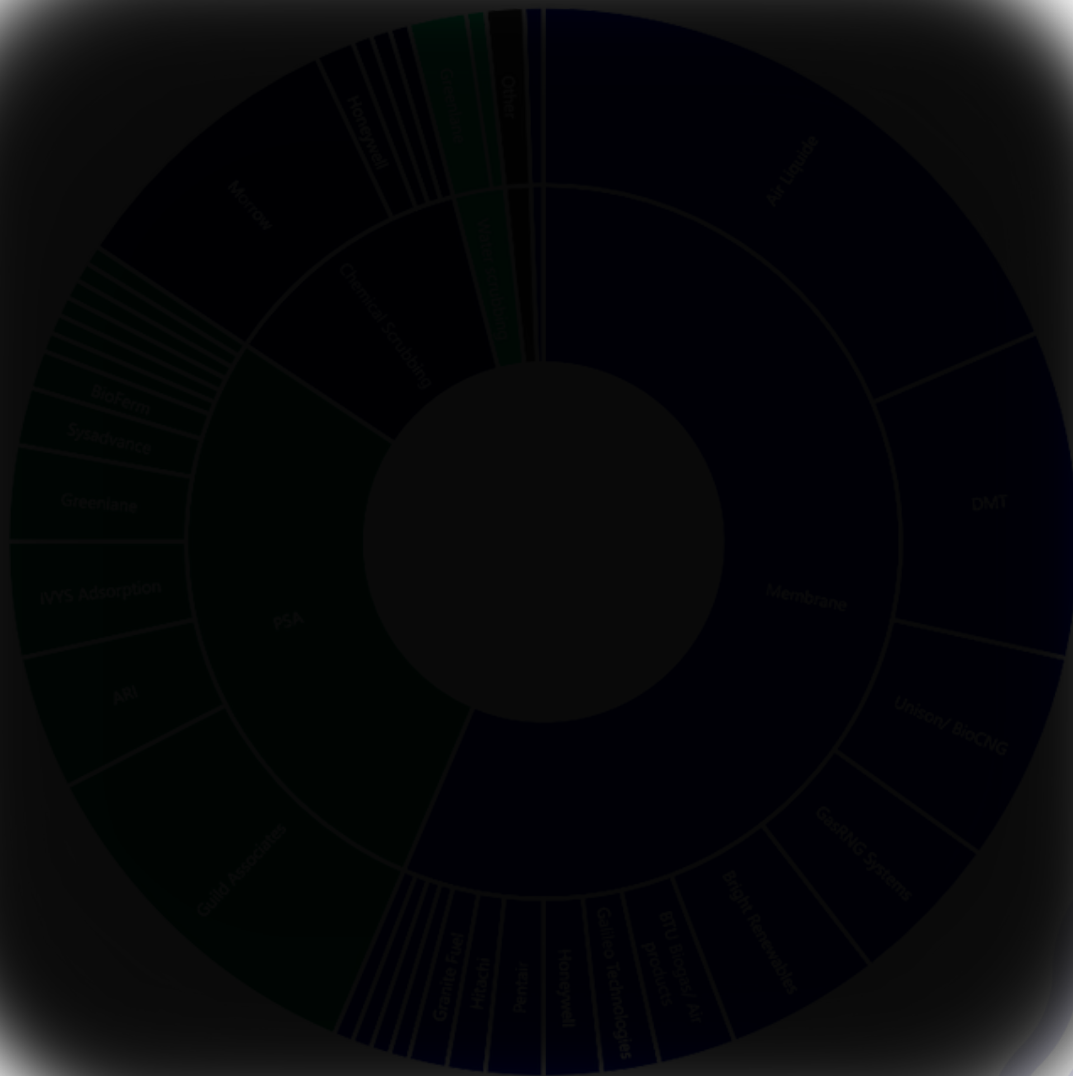
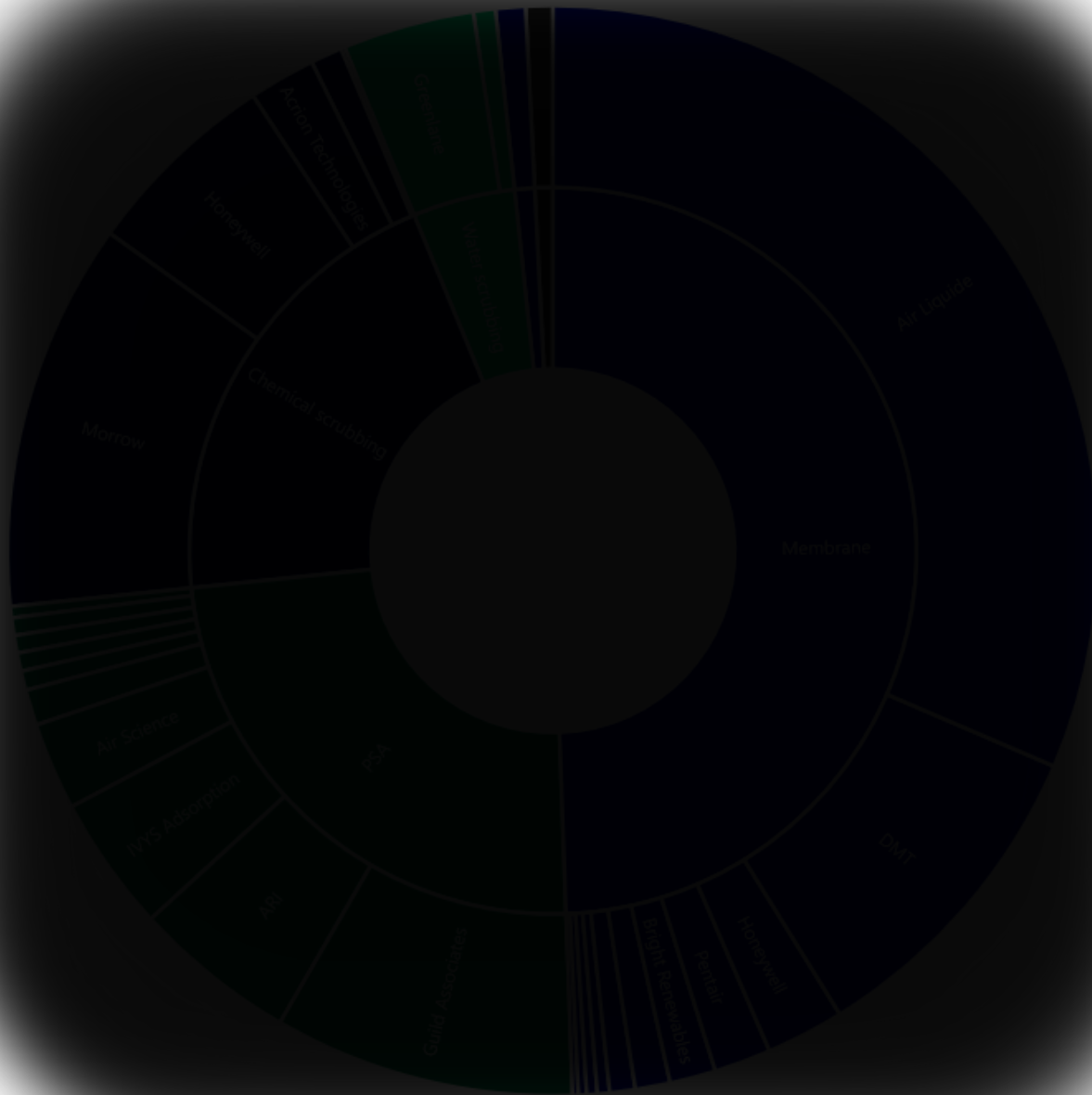


Figure 2. Operational RNG upgrading plants in the US, capacity, m3/hr



A low-angle, upward-looking photograph of a complex industrial facility. The scene is dominated by large, cylindrical metal tanks and a network of thick, polished pipes. The metal surfaces are highly reflective, showing highlights and shadows that emphasize their three-dimensional form. The background is a clear blue sky with scattered, wispy white clouds. The overall color palette is a mix of metallic blues, greys, and the natural blue of the sky. In the bottom right corner, there is a decorative graphic element consisting of several overlapping, wavy blue lines that resemble a stylized wave or a modern logo element.

Market Drivers

Federal and Multi-State - Market Drivers (Continued)

- [Rural Energy for America Program \(REAP\)](#) (OneRD Guarantee Loan Initiative)
 - [REDACTED] has been designated for anaerobic digesters and other underutilized renewable energy technologies
 - The IRA has added approximately USD [REDACTED] in additional funding for REAP
- [Landfill Methane Outreach Program \(LMOP\)](#): voluntary program encouraging the recovery and beneficial use of MSW biogas
 - The LMOP has developed a [National Map](#) to facilitate project development.
- The Renewable Natural Gas Incentive Act of 2022 creates a USD [REDACTED] tax credit on the sale of RNG fuel used in transportation.
- Landfilling Report and the Food Waste Management Pathways (October 2023), which establish a new emphasis on the prevention of food waste. The new [Wasted Food Scale](#) establishes anaerobic digestion as a preferred disposal option.
 - The new scale, in combination with the D3/D5 credit split, will likely influence the role AD plays in municipal and state legislation on organic waste.
- States with food scrap collection mandates to prevent landfilling include [REDACTED]
[REDACTED]
[REDACTED]
- States with yard debris bans from landfills include [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
 - Some states with landfill yard waste bans provide an exemption for landfills with gas collection systems, these states include [REDACTED]
- The EPA (2022) released a proposal for the guidance of some key biogas areas under the RFS, including multi-year fuel volumes for RNG and biogas used for electricity.
 - The proposal included a framework for the creation of “eRINs”, electric vehicle credits for biogas CHP, as well as the inclusion of a new method for accounting, which the ABC believes will increase food waste recycling
 - The eRIN was not included in the finalized SET Rule, however, the ABC and other industry groups are still advocating for this new credit.
- The [Growing Renewable Energy and Efficiency Now \(GREEN\) Act](#) was introduced to the House in 2021. If passed, it will allow certain types of renewable sources (including biomass and municipal waste) to be claimed as energy property for the purpose of claiming energy tax credits. The Bill also includes the extension of a number of tax credits not encompassed within the BBB, and further expands tax credits which benefit the development of energy storage technologies.
 - As of January 2024, there has been no update to the status of this bill.

Arkansas - Market Drivers

- [SB 136](#) (2021): allows gas utilities to purchase NG alternatives including RNG and hydrogen if it is deemed to be in the public's interest.

California - Market Drivers

- State renewable energy goal: █% by 2035, █% by 2045
- The CPUC set RNG targets for California utilities, [13-02-08 \(CA Renewable Gas Standard\)](#), approved in 2022, which requires a percentage of all gas used to originate from certain types of RNG.
 - The programs focus is on developing the necessary infrastructure and utilizing municipal organic waste, and sets a limit on the use of dairy gas.
- [SB1383](#): California target of organic waste reduction - █% by 2025
 - Expanded upon AB1826: an Organic Waste Ban for commercial generators (should either compost or digest anaerobically)
- [Low Carbon Fuel Standard \(LCFS\)](#): █% reduction in transportation fuel carbon intensity by 2030
- [Short-lived Climate Pollutants \(SLCP\) strategy](#): Aims to reduce GHG emissions across California from compounds such as black carbon (soot), methane (CH₄), and fluorinated gases (e.g., hydrofluorocarbons or HFCs).
 - February 2022, [the CPUC](#) set further targets for reducing SLCPs to █% below 2013 levels by 2030.
 - Waste, landfills, agriculture, and forest management were identified as priority sectors.
 - [Short Lived Climate Pollutants organic waste and food collection regulation](#) (2022)
 - Requires municipalities to create and operate organics diversion plans.
- [Cap-and-trade program](#): extended until 2030.
- [SB1352](#): Mandatory RPS for gas utilities
 - Requires utilities to establish a RNG procurement program and supply █% of total volume in RNG by 2022 and █% of total volume by 2030.

California - Market Drivers (Continued)

- AB2313: [Biomethane Interconnector Monetary Incentive Program](#) covering up to █% of the interconnection costs with a cap of USD █ per project.
 - Program is available until December 31, 2026, or until program has exhausted USD █ cap.
 - It is funded by California utility customers and administered by Southern California Gas Company.
- [Alternative and Renewable Fuel and Vehicle Technology Program](#) – concluded January 1, 2024
- AB3163: adds non-combustion thermal conversion of organic wastes as method to generate RNG as of 2022.
- SB 1109 (2022), extends the requirement for electric utilities to purchase energy from biomass facilities.

Colorado - Market Drivers

- [SB 21-264](#): gas utilities must file a clean heat plan with the Public Utility Commission, targeting █ reduction below 2015 GHG levels by 2025 and █% by 2030. RNG may only account for █ of the 2025 target and █ of the 2030 target.
 - Utilities within the state offer voluntary RNG programs for meeting carbon reduction goals.
- Sales tax exemption for anaerobic digestion equipment (HB14-1159)
- The city of Boulder has implemented a landfill organics ban.

Connecticut - Market Drivers

- Connecticut [Dept. of Energy and Environmental Protection \(DEEP\)](#) targeting **███**% zero-carbon energy by 2040
- [Docket No. 19-07-04](#) (2021): includes gas quality and interconnection standards for the injection of RNG into the gas network
- [HB 6664](#) (2023): Organic waste from commercial and industrial sector food manufacturers and processors producing over **██████**/**████** must be source-separated and disposed of appropriately.
- CT HB 5118: allows DEEP to direct utilities to enter purchase agreements with RNG suppliers on behalf of networks and allows for (specified) cost recovery.
 - Introduced in 2022, referred to House Committee on Environment, no update.
- [HB 5250](#): introduced in 2020 aims to increase the use of RNG, reintroduced 2021 as [CT HB 6409](#)
 - No status update.
- [CT SB 60](#): introduced January 2021, streamlines the permitting and siting processes of anaerobic digesters.
 - No status update.
- Adopted [interconnection standards](#) for biogas derived from organic materials in 2021
- [HB 5118](#): creates a grant program available to municipalities for the reduction of solid waste and the implementation of waste mitigation measures, such as anaerobic digestion.
 - No status update.
- [Special Act No. 22-8](#): 2022, launches a hydrogen task force, which includes an examination of sources of clean hydrogen including biogas.

Florida - Market Drivers

- [SB 1162](#) (March 2023): creates incentives for developing RNG and hydrogen infrastructure, and allows utilities to add construction costs to rate payer bills.
- [SB 896](#) (2021): biogas and renewable natural gas were added to the existing definitions of renewable energies under state law. Additionally, cost recovery measures for utilities were put in place to levelized the cost between RNG and NG within a 'reasonable and prudent' range.

Hawai'i - Market Drivers

- [SB 289](#) (2022): gas RPS is required according to renewable portfolio requirements of █% of sales by 2030, █% by 2040 and █% by 2045.
- [SB 2768](#): (Mar. 2024), if passed would establish a clean fuel standard in the state.
 - Passed in Senate, referred to House committees
- The [RPS](#) supports the development of renewable electricity (from sources including, but not limited to, biomass, MSW, CHP, LFG, and anaerobic digestion).

Illinois - Market Drivers

- [HB 3115](#): introduced 2021, would allow NG utilities to seek authorization from ICC for RNG infrastructure investments and supply contracts, and would allow consumers to purchase RNG directly from their utilities.
 - No status update.
- HB 3315 also includes portfolio goals of █% RNG supply by 2030 and at least █% by 2035 for utilities.
- [SB 1556](#): (introduced in 2023), if passed would establish a clean fuel standard in the state.

Iowa - Market Drivers

- [HF 522](#): (2021), alters regulations to allow manure to be stored and processed via anaerobic digestion for the production of biogas as an alternative to current requirements.

Maryland - Market Drivers

- [HB 1379](#): (February 2024), the bill proposes the establishment of an RNG pilot program for the state, for use in transportation and commercial sectors.

Massachusetts - Market Drivers

- [Massachusetts long-term climate plan](#) targets a █% reduction by 2025, compared to 1990 levels, ramping up to █% by 2030.
- [Renewable Portfolio Standard](#) requires █% of energy by 2030 to be sourced from renewables, increased by █ each year thereafter.
 - AD and LFG are categorized as Class I in the RPS.
- [H 5060](#) (2022): allows some AD facilities to collect energy credits under the [Clean Peak Standard](#) starting in 2023.
- The [Clean Heat Standard Draft Framework](#) recently closed its public commentary period. The draft framework would add an electrification mandate for public heating and open the possibility for RNG and hydrogen to be included come 2028.
- [Organic waste ban](#): any waste generator producing more than █ per week, unlike other bans, there are no exceptions based on proximity to processing facilities.

Michigan - Market Drivers

- State renewable energy standard voluntary goal: █% by 2025, █% by 2030.
- [HB 5083](#): introduced in October 2023, the bill introduces a Clean Fuel Standard for the state and requires fuel producers and suppliers to reduce carbon emissions, opens opportunities for cleaner fuels, and focuses on domestic fuel production.
- [SB 138](#): introduced 2021, would require the PSC to develop and keep updated an inventory of biogas and RNG resources available in the state.
 - No update as of February 2024.
- [HB 6036](#) (2020): extends PACE financing program to include anaerobic digestion.
- [SB 271](#) (passed Nov. 2023): sets forth new renewable electricity targets, biogas systems generating electricity qualify.
- [SB 82](#) (2021): earmarks USD █ in the state budget for the PSC to conduct a study of RNG potential in the state.
 - The report found █ theoretically available, █ technically feasible, and █ easily achievable in Michigan by 2050, with the ICF estimating production costs between USD █ per █

Minnesota - Market Drivers

- [HF 6](#) (2021): allows gas utilities to propose innovative resource plans, defined to include biogas, RNG, and power-to-hydrogen. Up to █% of revenue requirements can be invested for RNG and it may also apply for an additional green tariff.
- [SF 2584](#): (Mar. 2024), a clean fuel standard is under debate within the state legislature.
- [SF 3336](#) / HF 3681: provides research funding for AD feedstock availability by directing grant funding from the Agricultural Utilization Research Institute.
- Hennepin County has implemented a landfill organics ban, and is in the process of developing a new anaerobic digester for the processing of MSW.

Missouri - Market Drivers

- [HB 734](#) (2021): requires utilities to develop and implement a voluntary RNG program for customers, and recover incurred costs.

Nevada - Market Drivers

- [SB 154](#): requirement for Public Utilities Commission of Nevada to adopt regulations authorizing LDCs to engage in RNG activities, with a target of █% of RNG of total amount of gas sold by 2025, █% by 2030 and █% by 2035.

New Hampshire - Market Drivers

- [SB 424](#) (2022): allows PUC to procure RNG and qualified RNG infrastructure if deemed to be in the public interest.
 - Cost of RNG cannot exceed █% of the utilities total gas volume delivered and cannot exceed █% annually.
- [SB 577](#): allows biologically derived thermal energy to generate credits under the states RPS carve-out.

New Jersey - Market Drivers

- [A3726](#): classifies landfills with gas capture technology as recycling facilities, and classifies methane captured from landfills, biomass, or anaerobic/aerobic facilities as a “Class 1 renewable energy.”
- [NJ A 577](#): directs the BPU to establish an RNG program and invest in RNG infrastructure by the gas utility and allows the utility to invest up to █% of the total revenue requirement annually.
- [NJ S3526/ A5655](#): introduced in 2021, if signed would encourage the procurement and investment of RNG by gas utilities. It sets portfolio targets at █% by 2024, increasing by █% every █ years to █% by 2050.

New Mexico - Market Drivers

- [HB 41 \(2024\)](#): Clean Transportation Fuel Standards, establishes a Clean Fuel Standard within the state.
 - Passed in February 2024, awaiting Governor's signature.
 - Fuels within the state will now be required to reduce their CIs by █% by 2030, and █% by 2040.
 - Implementation for the legislation is set for July 2026.

New York - Market Drivers

- [Clean Energy Standard 2.0](#) (2020)
- Food scraps recycling requirement took effect in 2022, requiring designated generators of over █/week to donate surplus food and to divert the remaining for organics processing.
- New York City has implemented a landfill organics ban.
- Currently, NY [Climate Leadership and Community Protection Act](#) excludes biogas and RNG from renewable energy due to the current differentials in potential supply and desired demand
- [NY A 9392](#): introduces waste-to-energy within the state's acceptable definitions of renewable energy.
- In 2022, the state governments of NY and NJ [established](#) a █ grant, administered through the EPA, for the development of AD technology.
- In 2022, NY DEC [proposed](#) draft regulations which would reduce the waste sent to landfills and limit LFG emissions.
 - The plan was [updated](#) in January of 2024, with the goal of reaching an █% recycle rate of the states waste streams by 2050.
- In 2019, legislation was introduced that would require New York State to adopt a Low Carbon Fuel Standard aimed at reducing the overall carbon intensity of State's transportation fuel supply. This bill has been stalled in environmental committees since 2020.
 - The bill has [been re-introduced](#) for the 2023-24 legislative session with the goal of reducing carbon intensity by █% by 2032, with added reductions introduced based on technological advancements.

North Carolina - Market Drivers

- [Renewable Energy Portfolio Standard](#) (2021) includes a specific requirement for a portion of renewable energy from swine and poultry farming wastes.
 - Credit multipliers are also available for facilities located in cleanfields renewable energy demonstration parks.
- [SB 605](#): Streamlines permitting processes for turning hog waste into RNG, and creates 'general permits' for livestock farm owners to construct and operate manure digesters.

Ohio - Market Drivers

- [HB 166](#): allows gas utilities to recover investment costs as part of a normal rate case.

Oklahoma - Market Drivers

- [HB 1815](#): requires the OCC to issue a report, including recommendations, to the legislature on the ability of utilities to offer RNG to customers by December 1, 2021. The report must include associated costs of transport infrastructure.
 - Gas utilities within the state, including ONG, have released their voluntary programs.

Oregon - Market Drivers

- State renewable portfolio standard outlines that for large, investor-owned utilities, by 2025 at least █% of aggregate electrical capacity must be derived from renewable energy, scaling up to █% by 2040.
- Clean Fuels Program (CFP, 2016): █% reduction in transportation fuel carbon intensity in █ years.
 - [CFP Expansion, 2022](#): clarifications for Green-e requirement for biogas to electricity projects.
- [SB 98](#): legislates RNG targets of █% by 2025, █% by 2030, █% by 2035, and █% by 2050.
- [SB 314](#): allows gas utilities to recover some of the costs of establishing infrastructure which supports alternative fuels for transportation vehicles.
- [AR 5.10-4000](#): Any business that “cooks, assembles, processes, serves, or sells food” must source-separate its food waste and send it to an authorized facility for processing.
- The city of Portland has implemented a food scrap collection program.

Pennsylvania - Market Drivers

- [Alternative and Clean Energy Program](#)
- ICI food waste diversion programs in the state are estimated to divert █ of food waste, with an estimated █ of additional capacity.
 - The city of Philadelphia has implemented a food waste diversion program.
 - No official reduction regulation exists within the state.
- [HB 1740](#) (introduced Oct. 2023): would target a █% shift to renewables by 2050 for the state.

Rhode Island - Market Drivers

- State [renewable energy standard](#) voluntary goal: ■■■% in 2035
- [Organic waste ban](#): industrial, commercial, and institutional sectors

Tennessee - Market Drivers

- [SB 1959](#): authorizes gas utilities to apply for cost recovery on RNG and hydrogen.
 - Rate adjustment cannot exceed ■■■% of the annual revenue requirement, and third-party procurements cannot exceed ■■■% of total annual cost of gas.
- [Objective 4 of the 2015-2025 Tennessee Solid Waste and Materials Management Plan](#) outlines statewide goals for the reduction of organic wastes within landfills, through the implementation of source reduction and recycling (use of anaerobic digesters to be included in future discussions).

Texas - Market Drivers

- The city of Houston piloted a ■■■■ food waste collection program between January and February 2024.

Vermont - Market Drivers

- State renewable energy standard voluntary goal: ■■■% in 2017, increasing by ■■■%/year until reaching ■■■% by 2032.
- [SB 5](#) (2023): establishes a Clean Heat Standard within the state, with the goal of reducing the GHG emissions of the thermal sector.
- Organic waste ban: all generators of organic waste, including residents.
 - Food scraps must be diverted to organics processors, regardless of distance.

Virginia - Market Drivers

- [HB 558](#) (2022): allows the VCC to approve utility applications for the incorporation of RNG, hydrogen, and low-emission gases into their network.
 - Also allows for the cost recovery of expenses related to biogas infrastructure.
 - No project can supply gas that exceeds the more than █% the utilities annual demand, and no combination of projects can exceed an annual supply volume of █%.
- [HB 461](#): aims to establish the tax credit for renewable energy property.
 - Left in finance.
- The [2022 Virginia Energy Plan](#) includes several recommendations for the development of new energy infrastructure in the state, including the use of federally available funds for the development of biogas infrastructure.

Washington - Market Drivers

- [Low Carbon Fuel Standard \(2021\)](#) aims to reduce GHG emissions from transportation fuels █% below 2017 levels by 2034.
- [HB 2580](#): provides a tax incentive for digesters and promotes the investment in RNG.
- [HB 1257](#): requires utilities to offer voluntary RNG program, with a charge not greater than █% of the charge to retail customers.
- [E2SHB 1799](#): requires food which would otherwise be landfilled to be donated, composted, or anaerobically digested.
- The city of Seattle has implemented a curbside organics collection program.
- [HB 2069/SB 5919](#) (introduced 2024): would allow Public Utility Districts to sell biogenic CO₂ and other co-products of biogas.
- In October of 2023, the [WA Department of Ecology](#) proposed a new rule which would require all landfills within the state to reduce their methane emissions. The rule would apply to all active and closed landfills which have received waste since 1992.
 - The ruling received comments in December of 2023.
- [HB 1070](#): introduced in 2020 aims to provide tax exemption for sales of RNG when used as transport fuel.

Washington - Market Drivers (Continued)

- [HB 2301](#): (passed Mar. 2024, awaiting governor signature), establishes new grants for the reduction of emissions associated with landfills and WtE facilities.
 - Starting in 2026, businesses producing over ████████ of ████████/██████ must arrange for proper disposal
 - Starting April 2027, municipalities are responsible for the collection and disposal of residential SSO

Wisconsin - Market Drivers

- [Focus on Energy](#): utilities program for renewable energy.
- [SB 409/AB 419](#) (2023-2024): if adopted would create an online calculator tool available for farmers to measure their emissions.
- The [2021-2023 executive budget](#) allocates grant funding for the DATCP to establish regional biodigesters for the produce RNG or electricity.
- [LRB 3473](#) (2021): establishes a USD ████████ grant program for the development of regional biodigesters.
- [AB 1072](#) (2022): PSC is directed to establish an interconnect standard and issue a report on methods for the state to support financing of RNG infrastructure.
- [Energy Innovation Grant Program](#): the 2021 EIGP round is due March 1, 2024.

Gas Utilities Programs & Incentives



Gas Utilities - Programs & Incentives

The gas utilities with RNG programs are presented in this section of the report.

ATMOS ENERGY

- State: [REDACTED], [REDACTED]
- Developed a Clean Heat Plan, as required by the state of Colorado. The program targets an RNG procurement of USD [REDACTED] over [REDACTED]

Avista

- States: [REDACTED]
- September 2023, Avista opened [RFPs](#) for long-term RNG supply contracts.
- In March 2022, Avista began seeking PUC approval for voluntary RNG program in Idaho
 - Program would entail the voluntary purchase of [REDACTED] blocks for USD [REDACTED]

BGE First Maryland

- State: [REDACTED]
- Received approval for G-9: RNG Interconnection Service in 2021, allowing an RNG interconnection tariff.

Black Hills Energy

- State: [REDACTED]
- In January 2024, Black Hills submitted a demand-side management plan to the PUC, which would allow the utility to use its Clean Heat Plan to expand programs including incentives for gas reduction.
 - In 2027, Black Hills would begin procuring RNG sourced from within [REDACTED]
- Integrated RNG into its Clean Heat Plans, which would cover [REDACTED]% of the utilities's 2030 emissions reduction targets.
- Offer customers a voluntary RNG and carbon offset program, purchased in blocks (available to both Nebraska and Colorado customers).
 - Blocks sold for USD [REDACTED] each and offset approximately [REDACTED]% of average residential gas use and began in January 2023.

Cascade Natural Gas Corporation

- States: [REDACTED]
- Per Cascade's [2023 Integrated Resource Plan](#), the utility plans to purchase RNG and other offsets for meeting its GHG reduction targets and establish a voluntary RNG program by its 2025 IRP.

Chesapeake Utilities Corporation

- State: [REDACTED]
- Interstate RNG gas quality tariff has been approved
- In 2020, formed partnerships with [REDACTED] and [REDACTED] to develop anaerobic digestion facilities and distribute RNG to its customers.
- Acquired Plant Found Energy in 2022, granting access to their chicken litter RNG technology and [REDACTED] facilities in MD.
- Develops, constructs, owns, and operates facilities via its subsidiaries, including [REDACTED].

Centerpoint Energy

- States: [REDACTED]
- The RNG Program ([RNG Interconnection Tariff](#)) has been approved in January 2021 with slight [alterations](#) by Minnesota Public Utilities Commission.
- Submitted plans in June of 2023 under Minnesota's [Natural Gas Innovation Act](#) for a number of carbon reduction projects, including "made in Minnesota" RNG and Hydrogen.
- [Gas specification](#) is based on CA Rules 21 and 30, but has the right to make amendments to the requirements.

Con Edison

- State: [REDACTED]
- In 2020, it was approved to purchase RNG and was granted a recovery benefit for RNG interconnection costs.
- [Long-Range gas system plan](#) published in January 2022, [RNG sale and transportation guide](#) effective 2022.
- The [2023 Long-Range Gas System Plan](#) targets [REDACTED]% RNG within the gas supply by 2042 in their hybrid pathway, and [REDACTED]% RNG in their Deep Electrification pathway.
- RNG operators are responsible for the payment of imbalance charges.

Dominion Energy Carolina Gas

- State: [REDACTED]
- [Partnered](#) with [REDACTED] to create Align Renewable Natural Gas to convert biogas to RNG. The joint venture to operation in [REDACTED].
- Carolina's: established GreenTherm in September 2022, a new voluntary program to allow customers to purchase offsets and develop LFG collection for as low as USD [REDACTED] per month.
- [REDACTED]: established CarbonRight program in 2022, allowing the individual purchase of carbon offset blocks starting at USD [REDACTED] per month (one block is estimated to negate average residential gas use).
- The utility foresees up to [REDACTED] in gas distribution modernization and RNG investment up to 2035.

DTE Energy

- State: [REDACTED]
- Direct link to the Program: BioGreenGas Program (active since 2013), changed to [DTE CleanVision](#) in January 2021.
 - Allows customers to offset [REDACTED]%, [REDACTED]%, [REDACTED]%, or [REDACTED]% of their emissions since 2021.
- Main program objective is to capture landfill biogas and turn it into RNG, however DTE is making significant investments in the state's WWTPs, converting sludge to RNG (For example in [Grand Rapids, MI](#)).

Duke Energy (and its subsidiary Piedmont Natural Gas)

- State: [REDACTED]
- Offers voluntary RNG program to supply RNG to local customers, as blocks offered in \$[REDACTED] increments.
 - The [GreenEdge](#) program is also available to Piedmont customers.
- [Gas quality standard and alternative gas requirement](#) tariff was approved for a [REDACTED] pilot program in 2018. In 2021 the program was extended for an additional [REDACTED]
- Swine manure and wastewater approved as acceptable feedstocks and no longer fall under the pilot program.
- [Owns RNG](#) production facilities which supply Duke with RNG.
- Announced new RNG projects in 2022.

Hawai'i Gas

- State: [REDACTED]
- [Issued an RFP](#) for RNG procurement in April of 2023.
- Purchased by [Argo Infrastructure Partners](#), LP in 2022, a sale Hawai'i Gas president claimed will accelerate the companies RNG and hydrogen development.

Intermountain Gas

- State: [REDACTED]
- Provides RNG transportation through pipelines only

Liberty Utilities

- State: [REDACTED], [REDACTED]
- [DPU 22-32](#) (2022) allows Liberty to enter into [REDACTED] purchase agreement purchasing RNG at a fixed price, increasing annually and establish a voluntary RNG program for customers.
- [Petitioned](#) for the New Hampshire PUC to approve an RNG supply and transportation contract. Liberty currently has commitments to sell [REDACTED]% of the RNG and is exploring a voluntary tariff.

National Grid

- State: [REDACTED], [REDACTED]
- In 2019, National Grid proposed a [Green Gas Tariff](#) to enable voluntary purchase of RNG for its downstate customers: includes 4 tiers to select amounts of RNG.
- [Case 20-G-0381](#) (2022) authorizes National Grid to procure up to [REDACTED]% locally sourced RNG, increasing by [REDACTED]% per year for [REDACTED] years.
 - Also allows for long-term RNG supply contracts.
- Partnered with the NYC Dept. of Environmental Protection for the [Newton Creek Renewable Gas Demonstration Project](#), turning biogas from its WWTP to RNG.

Nicor Gas

- State: [REDACTED]
- Offers the [TotalGreen](#) (2021) pilot project offering customers a flexible carbon offset, as mixed RNG and carbon offset, between [REDACTED]% RNG.
- Piloting the [Renewable Gas Interconnection](#) service (2021), which offers parties a tariffed interconnection to their grid if they enter into service agreements if they are located within their zone (up to USD [REDACTED]/[REDACTED]).

Northwestern Energy

- State: [REDACTED]
- [NG22-006](#) (2022): Northwestern Energy was approved to inject RNG into its grid via virtual pipeline.

NW Natural

- State: [REDACTED]
- [Smart Energy](#) program allows businesses and residents to pay an additional tariff which contributes to the development of biogas projects.
- Issued RFP (2023), seeking RNG resources, and/or their associated environmental attributes.
- Signed agreements with various RNG producers to purchase approximately [REDACTED]% of Oregon's annual sales in RNG.
 - According to its [RNG Compliance Report](#), in 2022, this volume was just [REDACTED]%.
- In 2021, NW Natural entered into a [21-year RNG supply deal](#) with [REDACTED] for the environmental attributes equalling [REDACTED] of RNG annually.
 - Commenced at the beginning of 2022 and by 2025 the full quantity will be delivered yearly.
- Partnership with BioCarbN to convert methane produced at Tyson Foods facilities into RNG, investing in several projects.

One Gas

- States: [REDACTED]
- In 2021 ONE Gas entered a partnership with [REDACTED] developing and expanding farm-based RNG projects across [REDACTED].
- Currently exploring offtake options for RNG for large industrial and commercial emitters.
- Received permission from OK PUC to invest up to USD [REDACTED] in RNG infrastructure within the state.
- Allows customers to opt-into receiving RNG for a fixed-cost.

Pacific Gas and Electric Company - PG&E

- State: [REDACTED]
- PG&E bioenergy portfolio includes biomass (including woody biomass), digester gas, landfill gas, and municipal solid waste projects.
 - Additionally, the utility promotes the use of dairy RNG.
- Direct link to the program: [PG&E](#)
- In October 2023, PG&E launched an initiative to purchase California-derived RNG resources and procure enough RNG to serve [REDACTED]% of residential and commercial demand by 2030.
- PG&E's gas quality requirements are specified in its tariff [Gas Rule 21](#) and are summarized in the document.

Puget Sound Energy

- State: [REDACTED]
- Launched its voluntary RNG program in 2021, allowing the purchase of offset blocks, up to [REDACTED]% of household emissions.
 - As of June 2022, the program had [REDACTED] participants.
- Contract with [Klickitat PUD](#) to procure RNG (2020) (potentially up to [REDACTED]).

Roanoke Gas

- State: [REDACTED]
- Developing projects with the [REDACTED] Water Authority to produce commercial quality RNG. Approved in 2023.

SoCalGas

- State: [REDACTED]
- Direct link to the program: [SoCalGas Renewable Gas Program](#).
- [Biomethane Monetary Incentive Program](#) assists with RNG Interconnectors, and is available until either the end of 2026, or its USD [REDACTED] is exhausted.
- SoCalGas gas quality requirements are specified in its tariff [Rule 30](#).
- In 2020, SoCalGas got the approval to offer RNG to residential customers.

South Jersey Industries

- In September 2023, SJI [entered](#) into a new joint venture with [REDACTED] for the development and operation of new RNG facilities.
- 2021, SJI acquired a minority interest in REV LNG, LLC, and began looking to expand its portfolio of anaerobic digesters/RNG upgrading at a number of dairy farms.
- 2021, SJI committed to spending USD [REDACTED] over [REDACTED] years on up to [REDACTED] dairy RNG facilities.

Southwest Gas Corp

- State: [REDACTED]
- Offers RNG services, including biogas collection and upgrading, RNG interconnection and transport to the producers of RNG.
- In [REDACTED], the utility entered into partnership with the City of Las Vegas WWTP to procure biogas and offer RNG to customers.
- In 2021, it began the process of developing new RNG facilities and ensuring existing ones become connected to the grid.

Summit Utilities

- State: [REDACTED]
- [Voluntary RNG Attribute Program](#) has been approved to establish a voluntary RNG Program for customers that will be able to choose RNG annual usage, between [REDACTED] to [REDACTED] % of their average annual usage
 - Attributes derived from LFG
- Investing in RNG projects through its subsidiary Peaks Renewables

San Diego Gas & Electric Company

- RNG interconnection for SDG&E customers is managed by SoCalGas.
- Offers a voluntary RNG program for its customers.
- In 2018, SDG&E has issued a draft solicitation for dairy RNG pilot projects, jointly with SoCalGas, PG&E and SouthWest Gas.

Teco Peoples Gas

- State: [REDACTED]
- RNG program began in 2017 and is offered to RNG producers and offers biogas gathering, cleaning and conditioning, RNG transportation and interconnection.
- Owns and operates its own RNG facility in partnership with [REDACTED]

UGI

- State: [REDACTED] & [REDACTED]
- Purchases RNG to reduce the fossil CO2 emissions of its grid.
- In 2022, UGI entered into a [purchase and sale agreement](#) with [REDACTED] for RNG.
- In 2021, [UGI began](#) work on a commercial food waste digester near Cincinnati which will produce approximately [REDACTED] of RNG each year.

Vermont Gas

- State: [REDACTED]
- [VGS Renewable Natural Gas Program](#)
 - Offers [REDACTED] options for RNG purchase, general attributes or locally sourced.
- [Case No. 19-3529-PET](#): Received approval in 2021 to allow the blend of up to [REDACTED] % /year RNG into its gas grid.
- Voluntary customer participation through agreement with ability to choose % of RNG in their natural gas supply ([REDACTED]%, [REDACTED]%, [REDACTED] % or [REDACTED]%), either [REDACTED] or [REDACTED]
- [Case No. 22-2230-PET](#): signed a contract with a NY landfill to supply [REDACTED] % of RNG demand, increasing to [REDACTED] % by 2030.
 - Could increase rates by up to [REDACTED] % if all the gas is used by VGS, however, the utility can resale some to reduce overall impact.
- Vermont Gas and NG Advantage have [an initiative](#) to deliver RNG to business and institutional customers (pipeline and virtual pipeline).
- In January 2024, the PUC approved a controversial to import LFG from out of state.

Virginia Natural Gas

- State: [REDACTED]
- The Southern Company, via its regional subsidiary Virginia Natural Gas, introduced a pilot program in March of 2023 for introducing RNG into its grid.
- In February 2024, Virginia Gas, alongside Chattanooga Gas, entered [an RNG agreement](#), whereby the companies aim to increase their supplies of RNG and reduce their emissions.

WEC Energy

- State: [REDACTED]
- Received approval from the PUC in 2022 for the injection of RNG into their gas network to displace fossil gas use.
 - Allows direct injection from digesters rather than virtual pipelines to injection points.
 - WEC expects its first [REDACTED] contracts to supply enough gas to meet [REDACTED]% of its 2030 goal.
- Under the program, the utility pays for the construction, operation, and maintenance of facilities connected to digesters, and in exchange, would contract the sale of discounted gas for a period of [REDACTED] yrs.

XCEL Energy

- State: [REDACTED]
- In Colorado, Xcel has filed a [proposal](#) (Sept. 2023) with the PUC to double the renewables within its system, a USD [REDACTED] investment by 2030.
- In Minnesota, Xcel has filed a proposal (Dec. 2023) with the PUC for a USD [REDACTED] [REDACTED]-year Natural Gas Innovation Plan, which includes the development of RNG resources within its distribution area.

RNG Specifications

As in Canada, RNG quality standards are not federally regulated. In majority of cases, each RNG project negotiates the acceptance standards with gas utility on a project-by-project basis.

Overall, the lack of standardization is considered as one of the concerns for RNG industry developments and several standards have been proposed over the past years.

Critical parameters of RNG quality in US specifications are summarized in the table below. Please note that the table contains the specifications of utilities that have standards adopted for RNG, as well as general specifications of TransCanada and other US pipelines for reference.

RNG Slippage

Methane slippage, the quantity of methane lost in the CO₂ stream during the upgrading process, is one of the important characteristics to take into account.

There are no federal or state/provincial rules as for the maximum allowed level of RNG slippage in the USA.

The majority of related activities focus on the reporting of GHG emissions (for example, [USEPA GHG Reporting](#)). As for state reporting, California, for example, requires a facility to report to CA Air Resources Board if it exceeds [REDACTED] metric tons of carbon dioxide equivalent [REDACTED] of methane ([REDACTED] methane is approximately equal to [REDACTED]) (for more details, please visit [Regulation for the Mandatory Reporting of Greenhouse Gas Emissions](#)).

The methane emissions in natural gas sector by [OIES](#) in 2017 show USA reported [REDACTED]% of methane emissions. Thus, it will be safe to assume that the same standards will be applicable to RNG activities of the utilities.

An interview with a California utility confirmed that no guidelines or standards are used for RNG slippage, but the utilities will always try to minimize such emissions as much as possible.

A Danish study conducted by [REDACTED] found methane slippage to be quite high at biogas facilities, with many rogue emissions going unreported. It is worth noting that nearly all rogue emissions could be eliminated through the implementation of best practices.

In 2022, the EPA proposed a new regulation which would reduce permissible methane emissions from sources not previously covered. The new standards would cut emissions by [REDACTED]% below 2005 levels.

Selected References

1. Congress.gov. "Text - H.R.5376 - 117th Congress (2021-2022): Inflation Reduction Act of 2022." August 16, 2022. <https://www.congress.gov/bill/117th-congress/house-bill/5376/text>.
2. EcoEngineers. (June 29, 2023). "Insights from the New Federal Renewable Fuel Standard Set Rule." EcoEngineers. <https://www.ecoengineers.us/insights/insights-from-the-new-federal-renewable-fuel-standard-set-rule/>
3. Energy Information Administration. (2022). "What are Renewable Portfolio Standards?" EIA. <https://www.eia.gov/energyexplained/renewable-sources/portfolio-standards.php>
4. Ha, Miae, Gutenberger, Gretchen, Ou, Longwen, Cai, Hao, and Hawkins, Troy R. 2022. "Opportunities for Recovering Resources from Municipal Wastewater". United States. <https://doi.org/10.2172/1876441>. <https://www.osti.gov/servlets/purl/1876441>.
5. International Energy Agency. (2023). "Renewables 2023." IEA. https://iea.blob.core.windows.net/assets/3f7f2c25-5b6f-4f3c-a1c0-71085bac5383/Renewables_2023.pdf
6. US Department of Energy. (2022). "Renewable Fuel Standard." US Department of Energy: Alternative Fuels Data Center. <https://afdc.energy.gov/laws/RFS.html>
7. US Environmental Protection Agency. (2022). "Landfill Methane Outreach Program (LMOP)." US EPA. <https://www.epa.gov/lmop>
8. US Environmental Protection Agency. (2023). "Wasted Food Scale." US EPA. <https://www.epa.gov/sustainable-management-food/wasted-food-scale>

Appendix



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