



Regulatory Challenges Facing Renewable Natural Gas

Thomas N. Russo

Natural gas is coming increasingly under attack by policymakers and elected officials who are embracing “electrification only” as a means of reaching state clean energy and climate-mitigation goals. Achieving these goals may mean reducing the use of natural gas as a residential and industrial fuel. Earlier this year, the California Public Utilities Commission (CPUC) launched a new rulemaking to address the state’s transition away from natural gas.¹ The commission will address issues related to stranded assets and cost recovery, and unfair shifting of costs among different customer classes. Other state public utility commissions in New Jersey and New York may follow shortly, given their

increasing opposition to interstate natural gas pipelines that would serve their residents and businesses.

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Renewable natural gas (RNG) should be a win-win scenario for all parties involved, given the technology’s environmental benefits, which include the conversion of waste-to-energy and the resulting reduction of methane emissions—all of which are critical for mitigating the impacts of climate change. What RNG lacks is nationwide visibility and a coordinated response by the National Association of Regulatory Commissions (NARUC) and its members, the US Environmental Protection Agency (EPA), the Federal Energy Regulatory Commission (FERC), and state pipeline regulators. The high cost of RNG projects interconnecting to gas pipelines is a major obstacle. FERC and state pipeline regulators could reduce such barriers by developing standard interconnection guidelines similar to what FERC has done for small power generators. Finally, RNG projects rely heavily on selling Renewable Identification Number (RIN) credits created by the Renewable Fuel Standard (RFS). Congress should clarify the annual obligation volumes for the RINs and how they will be set

¹ Balaraman, K. (2020). California launches rulemaking to manage transition away from natural gas. *Utility Dive*. Retrieved from <https://www.utilitydive.com/news/cpuc-launches-rulemaking-transition-natural-gas/570653/>.

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year to year in 2023 and beyond to reduce risk to RNG developers.

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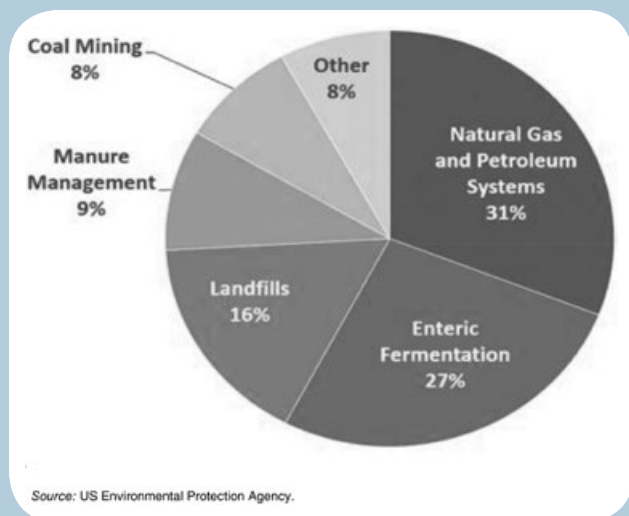
METHANE EMISSION SOURCES

Natural gas is composed largely of methane, which is a greenhouse gas (GHG) that is 84 times more potent than carbon dioxide. For that reason, the states and many environmental groups have focused on reducing methane emissions or eliminating fossil fuels altogether, including Greenpeace's "Keep it in the Ground" Campaign.² The US oil and natural gas supply chains contribute approximately 31 percent of methane emissions (Figure 1).

Unfortunately, most states and groups such as Greenpeace ignore the contribution of methane from global waste, which will

² Greenpeace. (n.d.). *Keep it in the ground (pipelines & drilling)*. Retrieved from <https://www.greenpeace.org/usa/issues/keep-it-in-the-ground/>.

Figure 1. 2017 US Methane Emissions by Source



increase by 70 percent by 2050.³ Driven by rapid urbanization and growing populations in high-income countries, the increased waste will increase to 3.4 billion tonnes over the next 30 years, up from 2.01 billion tonnes in 2016. Landfills and manure management may increase their share of methane emissions as a result.

Much has been written about RNG; however, there has been little interest in the topic from state public utility commissions or NARUC until recently. As the states roll out their clean energy programs, natural gas local distribution companies (LDCs) will be under even more pressure to decarbonize their systems by regulators, even though their contribution is less than 4.1 percent of the emissions reported to the EPA's Greenhouse Gas Reporting Program by companies operating petroleum and natural gas systems (Figure 2).

This column discusses the regulatory issues that need to be addressed to enable LDCs to decarbonize their natural gas systems and focuses on landfill gas and livestock manure as the two most promising feedstocks for RNG production, although other technologies exist, such as power to gas using electrolysis and renewable power as an energy source.

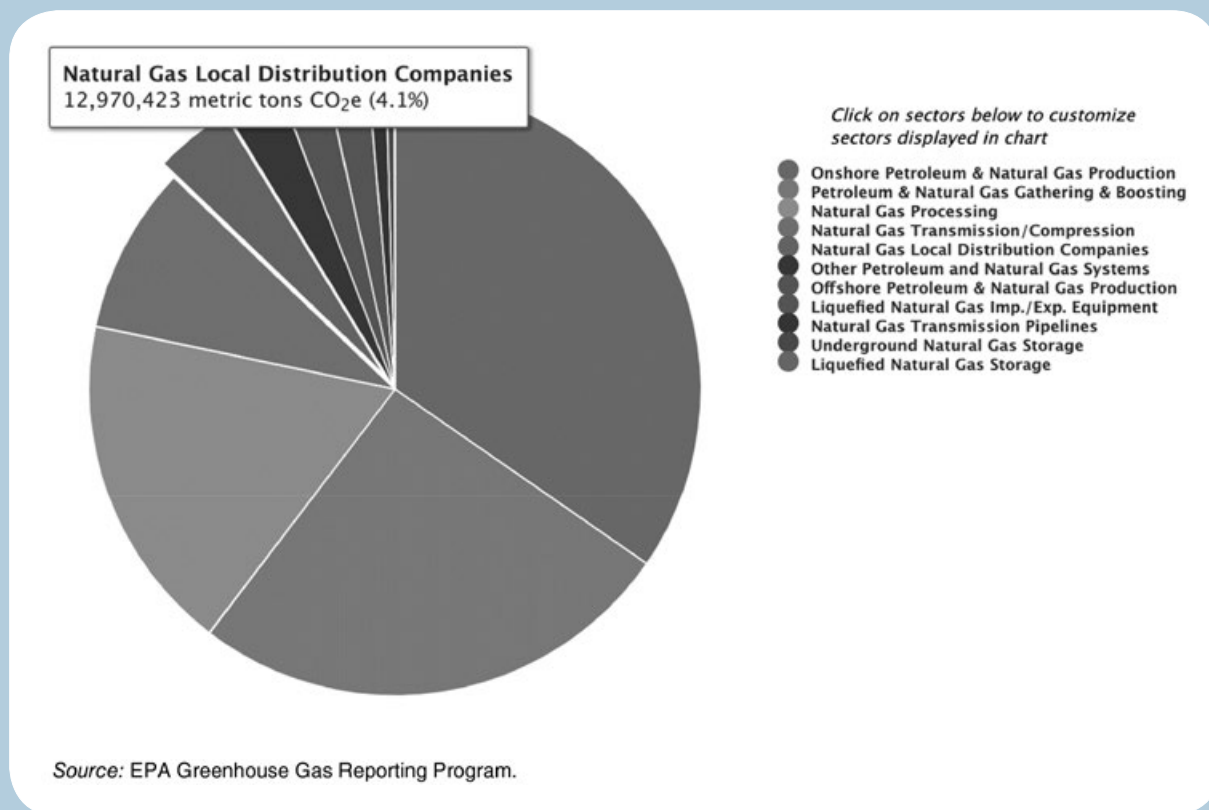
LDCS AND RENEWABLE NATURAL GAS

The recent report prepared by ICF for the American Gas Foundation (AGF)⁴ is an exhaustive study that addresses the ability of RNG to decarbonize the residential natural gas sector under both a low-resource scenario and aggressive resource scenario. Both scenarios assume that RNG would be produced for pipeline injection using nine feedstocks: (1) landfill gas, (2) animal manure, (3) water resource recovery facilities, (4) food waste, (5) agricultural

³ Kaza, S., Yao, L. C., Bhada-Tata, P., & Van Woerden, F. (2018). *What a waste 2.0: A global snapshot of solid waste management to 2050*. Washington, DC: World Bank. Retrieved from <https://openknowledge.worldbank.org/handle/10986/30317>.

⁴ American Gas Foundation. (2019). *Renewable sources of natural gas: Supply and emissions reduction assessment*. Prepared by ICF. Retrieved from <https://www.gasfoundation.org/2019/12/18/renewable-sources-of-natural-gas/>.

Figure 2. Distributed Energy System



residues, (6) forestry and forest product residues, (7) energy crops, (8) the use of renewable electricity, and (9) the non-biogenic fraction of municipal solid waste. ICF assumed that the feedstocks would produce RNG using anaerobic digesters, thermal gasification systems, and power-to-gas (P2G) in combination with a methanation system.

The ICF report estimated that there were approximately 17.5 trillion British Thermal Units (tBtu) of RNG produced for pipeline injection in 2016 and that there will be approximately 50 tBtu of RNG produced for pipeline injection in 2020. The latter number is a small percentage of the 10-year average of residential natural gas consumption nationwide of 4,846 tBtu. Even in 2040, the estimated RNG production is 1,910 tBtu, or just 39 percent of the 10-year average of residential natural gas consumption nationwide. This estimate only assumes normal growth of the technologies with little or no incentives than what currently exists in the RNG

market. While the ICF report did not address regulatory incentives, this author assumed that few states would encourage greater decarbonization of residential natural gas systems, and instead rely on electrification and little or no growth in the use of natural gas in new homes and businesses.

In the high resource potential scenario, ICF estimates that 93 percent of the 10-year average for residential natural gas consumption nationwide could consist of RNG. This amounts to 3,780 tBtu of RNG produced annually for pipeline injection by 2040 (**Figure 3**) and commensurate reduction of the 12,970,423 tons of carbon dioxide equivalent (CO₂e). That estimate increases to 4,510 tBtu per year when including the potential for the nonbiogenic fraction of municipal solid wastes. The ICF report assumes that the underlying technologies will improve drastically, although there is no evidence this would occur unless federal and state incentives were used.

Figure 3a. Estimated Annual RNG Production, High Resource Potential Scenario, tBtu/y

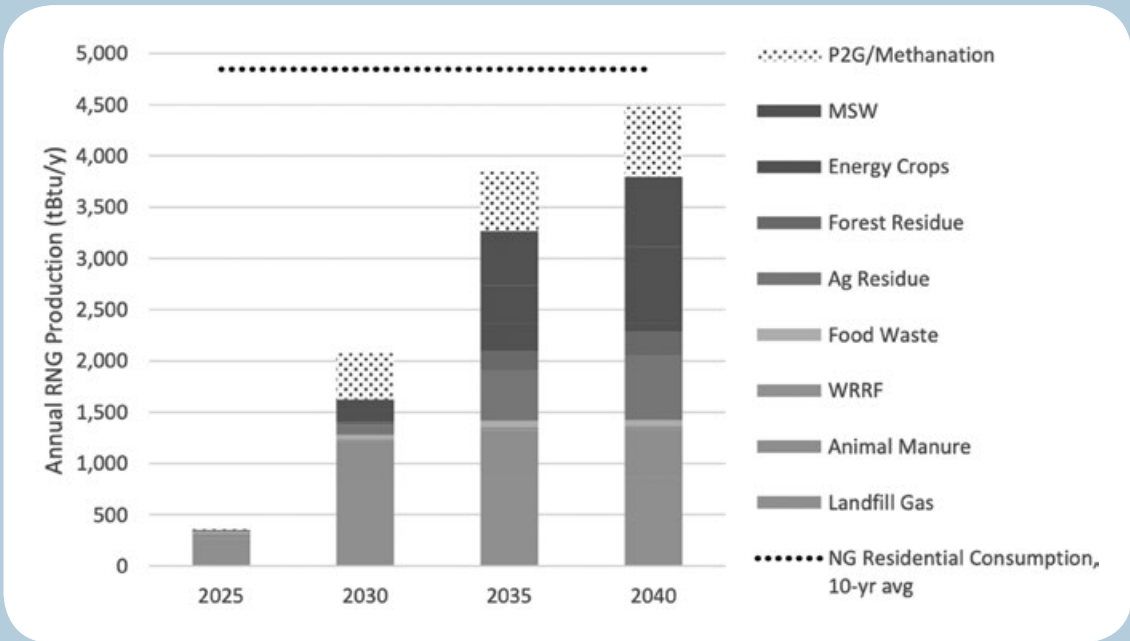
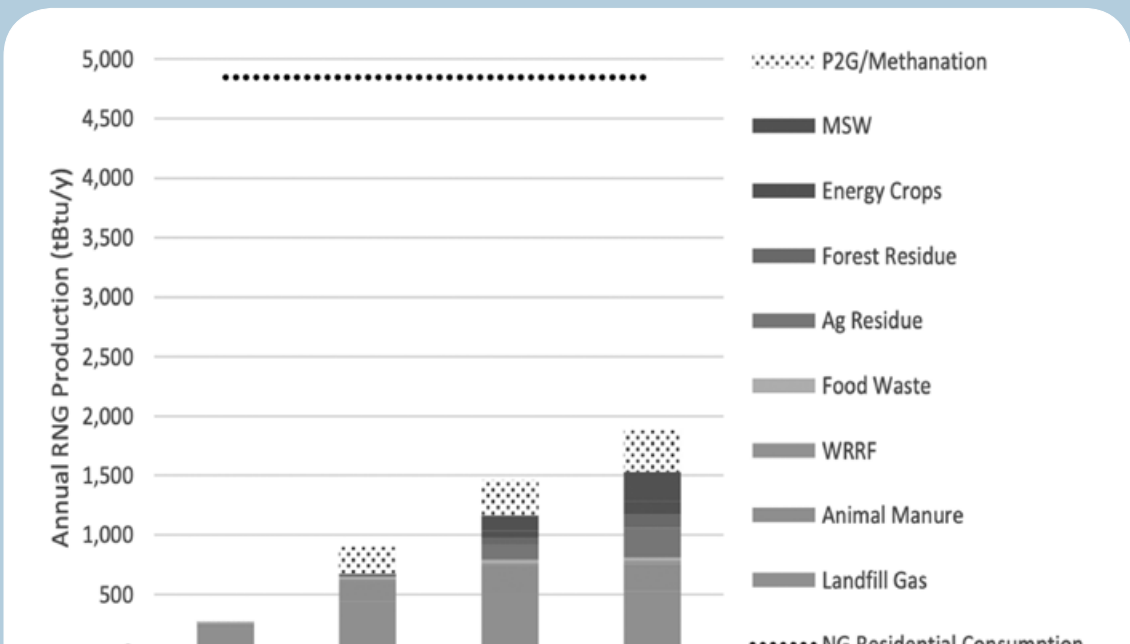


Figure 3b. Estimated Annual RNG Production, High Resource Potential Scenario, tBtu/y



Source: American Gas Foundation. (2019). *Renewable sources of natural gas: Supply and emissions reduction assessment*. Prepared by ICF. Retrieved from <https://www.gasfoundation.org/2019/12/18/renewable-sources-of-natural-gas/>.

FEDERAL RNG PROGRAMS

The EPA’s Landfill Methane Outreach Program (LMOP) and the joint EPA–US Department of Agriculture AgSTAR program promote RNG and are excellent resources for LDCs who are new to RNG.

Established in 1994, the LMOP has more than 1,100 partners among landfill owners and operators, states, municipalities, energy users and providers, and the landfill gas industry and communities. The LMOP offers an extensive database on operating landfill gas to RNG projects and those in the planning stages. The staff at the LMOP can often connect LDCs with biomethane and RNG experts in biomethane processing, RNG procurement and sale, and how to leverage the use of the EPA’s RINs, which are a part of the RFS program. Many developers of RNG projects rely on the RIN program to make their projects financially feasible.

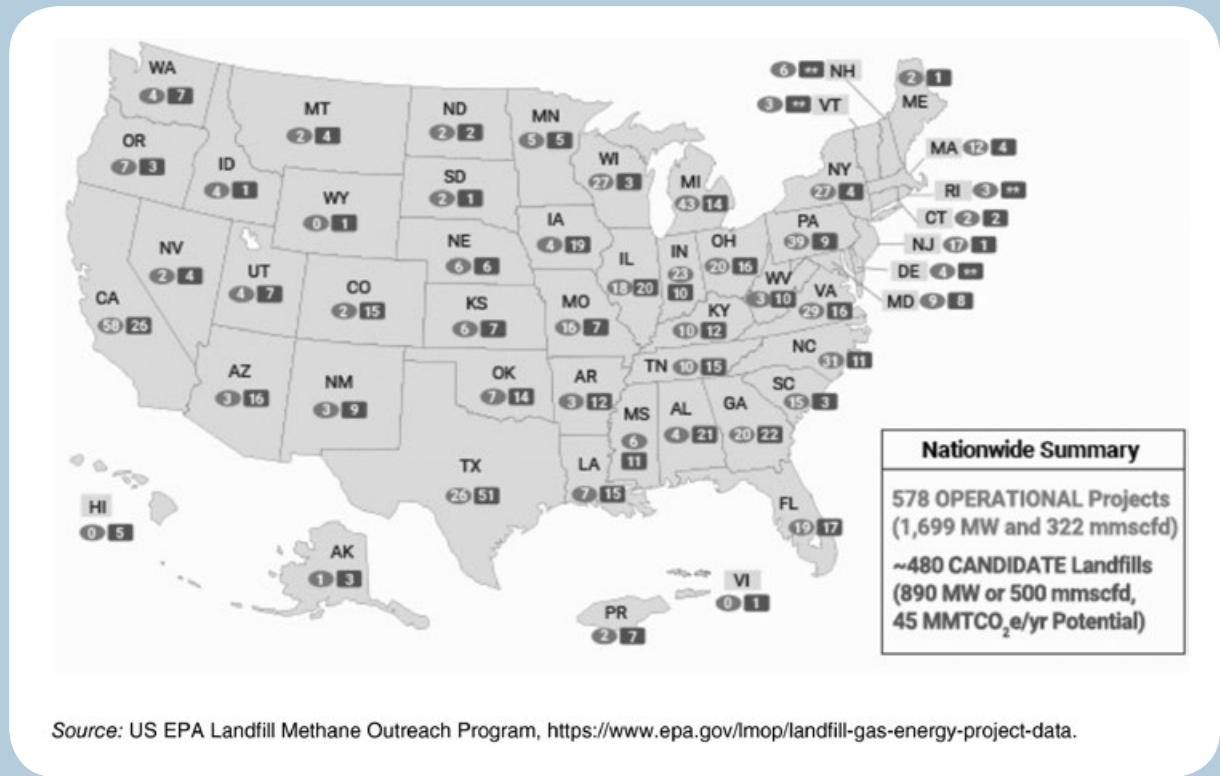
Currently, there are 578 operating landfill gas to RNG projects that produce 322 million

standard cubic feet per day (mmscfd) and 1,699 megawatts (MW) of power. The landfill itself acts as the digester tank, because as the landfill accepts more waste material, it becomes devoid of oxygen over time, leading to favorable conditions for certain microorganisms to break down waste materials. An additional 480 landfills are available to LDCs across the United States and territories to produce 500 mmscfd of RNG and potentially remove the equivalent of 45 million tons of CO₂ equivalent from the atmosphere per year (Figure 4).

LDCs need not invest in the infrastructure at the landfill and processing plant. Instead, they can simply purchase the RNG under contract.

AgSTAR promotes the use of biogas recovery systems to reduce methane emissions from livestock waste. The AgSTAR program is a good

Figure 4. Operational and Candidate Landfill by State (First Number in a State Is the Operational Projects and Second Are Candidate Landfill Sites)



place to start if an LDC is located in areas that have large sources of livestock manure.

A major concern of many companies exploring RNG projects is whether or not they can obtain a dependable supply of biomethane and/or RNG.

There are a variety of ways to take advantage of RNG projects to decarbonize an LDC's residential gas supply. LDCs need not invest in the infrastructure at the landfill and processing plant. Instead, they can simply purchase the RNG under contract. A major concern of many companies exploring RNG projects is whether or not they can obtain a dependable supply of biomethane and/or RNG. This is generally not an issue if the project goal is to inject the RNG into a pipeline to decarbonize its gas. Many LDCs with large service areas prefer to find landfills or manure sources of biomethane close to their customers for public relations reasons. However, the most important consideration is the ability of the landfill to supply adequate quantities of useable biogas to the LDC for a period of 15 years. So, if a large landfill can supply an LDC's needs, the RNG can then be injected into the interstate and intrastate pipeline system and still achieve the goal of decarbonizing the LDC's gas supply.

Congress should clarify and extend future RIN creation well beyond 2023 to reduce risks to RNG projects and promote the underlying technologies.

Most RNG projects are driven by policy and monetized because they create RINs in the EPA's federal renewable fuels program or state programs such as California's Low Carbon Fuel Standard (LCFS). RNG project developers can create RINs by working with the EPA and sell the RINs to refineries and importers of refined fuels into the United States. Without the revenue from selling RINs, most RNG projects would not be financially viable. Therefore, Congress

should clarify and extend future RIN creation well beyond 2023 to reduce risks to RNG projects and promote the underlying technologies.⁵

WHERE ARE THE REGULATORS?

The RNG industry is not well represented by LDCs, but dominated by companies and municipalities that promote RNG use in the residential and commercial sector. However, only 13 RNG applications have been filed with PUCs, and six have been approved (**Figure 5**).

The RNG industry is not well represented by LDCs but dominated by companies and municipalities that promote RNG use in the residential and commercial sector.

During the 2019 NARUC Summer Policy Summit, on July 23, 2019, the Committee on Gas hosted an RNG Workshop with support from the US Department of Energy/NARUC Natural Gas Infrastructure Modernization Partnership. The workshop was attended by state commissioners, RNG project developers, and gas utilities. The objectives of the workshop were to: (1) provide information about RNG to build a general understanding; (2) present a broad range of policy perspectives, from gas utilities to environmental advocates to state regulators, on RNG; and (3) illuminate policy and regulatory options for states interested in advancing RNG. The following major points were made at the workshop⁶ sessions.

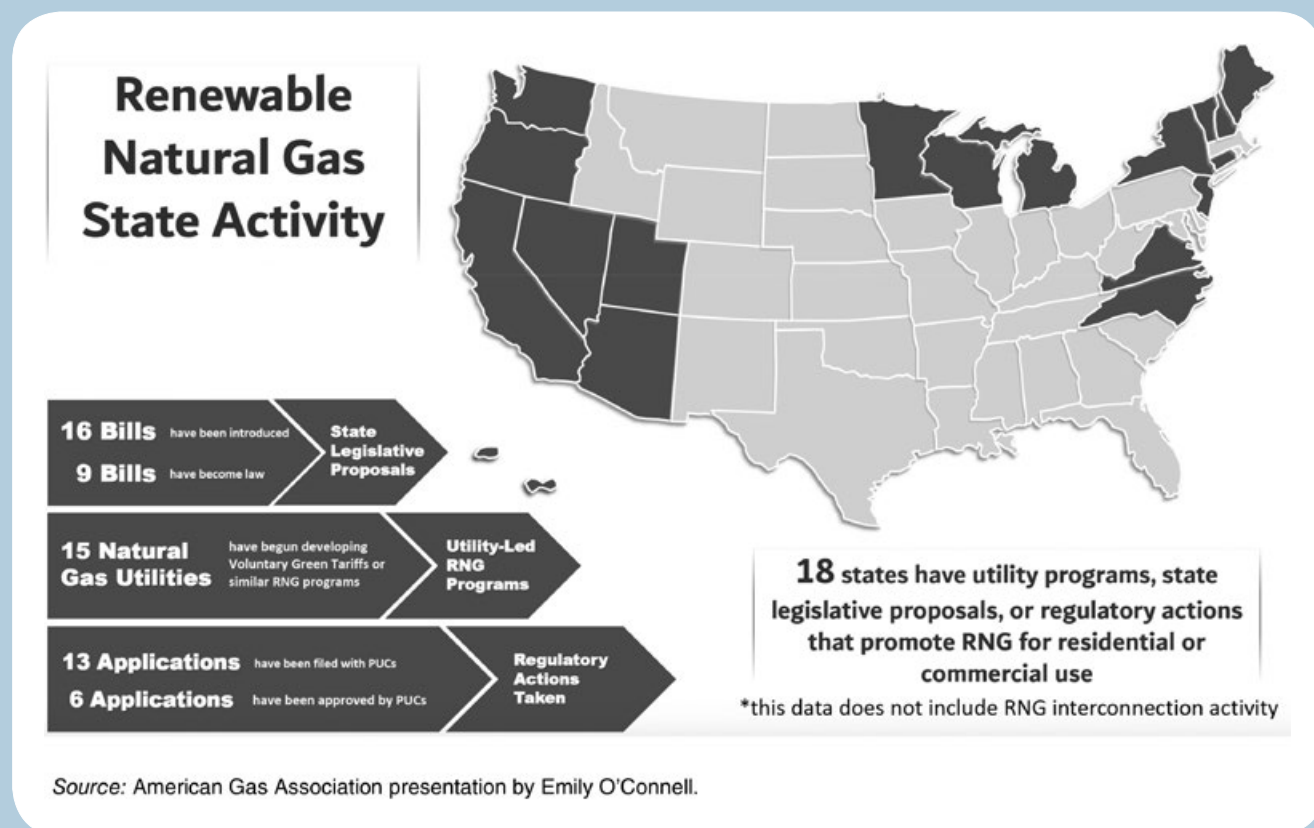
Session 1: Understanding Real-World Deployment of RNG Through Case Studies

- The shale revolution and cheap natural gas have driven many existing RNG projects out of business.

⁵ Pleima, B. (2019, March/April). Biogas to RNG projects: What, why and how. *BioCycle*, 60(3), 38.

⁶ National Association of Regulatory Utility Commissioners. (n.d.). *Renewable Natural Gas Workshop summary—NARUC-DOE Natural Gas Infrastructure Modernization Partnership and NARUC Committee on Gas*. Retrieved from http://www.russoonenergy.com/sites/default/files/RNG_workshop_summary.pdf.

Figure 5. Legislative and Regulatory Actions That Promote RNG for Residential or Commercial Use



- The American Gas Association (AGA) is looking for opportunities to work with LDCs to direct RNG into the residential and commercial heating load currently supplied by fossil natural gas.
- The RNG market today resembles the electricity market in the early 2000s. RNG needs an aggressive R&D agenda, an RNG credit market, market transparency, standardization, and innovative financing for RNG off-takers.
- RNG allows LDCs to not only continue to put infrastructure into productive use, but also to produce sustainable heat and hydrogen in the future.
- California's LCFS is a major driver of financial incentives for RNG projects, offering \$100 per ton for carbon reductions.
- Landfill projects are the cheapest option for LDCs, followed by dairy manure projects.
- Having to meet varying pipeline quality requirements inhibits RNG development.

Session 2: Connecting the Dots Between Supply and Demand: Integrating RNG Into a Safe, Reliable, and Efficient Pipeline Network

- States need to evaluate whether they have sufficient laws to deal with RNG interconnection and safety.
- The Gas Technology Institute has assisted the Northeast Gas Association in developing its interconnection guidance for RNG.
- Interconnection costs range between \$1 and \$3 million so small projects can't afford it.
- Obstacles with several small RNG projects with the New York Public Service Commission include high cost with respect to fossil gas, small size, and lack of regulatory cost recovery and quality issues, since RNG has a lower Btu content that could affect appliances.
- California's Rule 21 can be instructive, and so can standardization and streamlining the interconnection process.

- RNG does not make sense using a pure cost-benefit analysis; however, it exhibits other qualities, like decarbonization.

Session 3: Bringing the Renewable Heat: How Renewable Natural Gas Market Dynamics Are ‘Burning Up’ Preconceived Notions of Traditional Regulatory Structures and Planning

- New Jersey needs more feedstock for RNG, especially sources that can maintain a heating value of 1,000 Btu/cubic foot.
- New Jersey’s Energy Master Plan will outline new avenues for RNG.
- Oregon will be using RNG as a key ingredient in deep decarbonization of the state’s energy systems.
- The state of Washington has similar legislative and regulatory support for RNG and mandates that utilities offer a voluntary RNG tariff.
- National Grid now offers a voluntary green gas tariff to customers to procure RNG.
- Developers want 10-year contracts, so National Grid is building capacity to evaluate contracts.
- SoCal Gas has voluntarily agreed to 5 percent RNG by 2022 and 30 percent by 2030. California passed a law in 2018 directing its PUC to consider developing a utility RNG procurement program.

CONCLUSIONS AND RECOMMENDATIONS

Aside from the need for policy and regulatory support for RNG, there is a critical need to better inform the public and policymakers about RNG and its ability to convert waste source into energy sources that would comply with state clean energy and climate-mitigation goals. Such an educational program should be at the scale comparable to wind, solar, or energy storage programs and actively publicize successful RNG projects such as Dominion’s Align RNG \$250 million joint venture with Smithfield Foods. The program involves 100 farms in Virginia, North Carolina, and Utah. Once completed, the four projects will provide enough renewable natural gas to power 13,000 homes while reducing 2.5

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million metric tons of GHG from entering the atmosphere.

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Interconnections are expensive and a major obstacle for RNG projects. Therefore, states must develop standardized interconnection guidelines so that RNG developers don’t have to meet the different requirements of intrastate natural gas pipelines. The AGA and its members should request FERC to develop interconnection rules and guidance for RNG developers interconnecting with interstate natural gas pipelines.

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Finally, the AGA, AGF, and the NARUC-DOE Natural Gas Infrastructure Modernization Partnership and NARUC Committee on Gas should include and cooperate with the EPA’s Landfill Methane Outreach, AgSTAR, and RIN programs to benefit LDCs wishing to decarbonize natural gas by producing RNG. 