A Green New Deal for Natural Gas

By Joanna D. Underwood
Thursday, April 25, 2019

The US Senate voted against the Green New Deal, but its interlinked climate, job and social justice goals are still percolating. Among the issues supporters and opponents alike have flagged is what role the natural gas industry should play in advancing them.

Natural gas has long been considered a “bridge fuel” to renewables. During the Green New Deal debate, former Department of Energy leaders from both parties argued that natural gas is part of the clean energy future, because it burns cleaner than coal or oil, reduces coal use and smoothes out variability of solar and wind generation.

But the Green New Deal proposed to phase out natural gas-fired electricity generation entirely by 2030. Natural gas opponents point out it is essentially methane (a greenhouse gas 86 times more potent than carbon dioxide over 20 years), extracted in harmful ways, and transported in pipelines that can leak. Besides, they argue, natural gas is no longer needed as a bridge fuel. Renewables prices are already low enough to transition from coal directly to solar, wind, etc., so why risk more methane emissions by continuing to expand the natural gas industry?
But the reality is, the industry’s operations are already vast. There are now 3 million miles of gas pipelines in the US. Over 28,000 MW of new gas-fired generation capacity have been built here in the last two years, with another 6,100 coming this year. That infrastructure will be with us for 40 years or more.

While natural gas operations are already locked in, its emissions need not be. Renewable natural gas, also known as biomethane, could significantly reduce the climate impacts of the natural gas industry we have now.

**Ultra Low-Carbon Fuel in Natural Gas Infrastructure**

Biomethane is chemically virtually identical to fossil natural gas, and it burns even cleaner, but it is not a fossil fuel. It is a renewable fuel, superior in many ways to fossil gas. Producing it involves no fracking or drilling; it involves capturing methane biogases emitted by decomposing organic wastes, which would otherwise be released into the atmosphere and warm the climate.

Organic wastes are ubiquitous -- found in landfills, on dairies and farm fields, at wastewater plants, etc. To make biomethane, biogases from these wastes are captured and refined into a “pipeline grade” product that can be transported in the same pipelines and used the same way as fossil natural gas – for power generation, home heating and cooking, or fueling vehicles.

But unlike fossil natural gas, biomethane is ultra low-carbon. In fact, according to the California Air Resources Board, it is the lowest carbon fuel available. CARB found that when made from food waste or farm waste in anaerobic digesters, biomethane is actually net carbon-negative over its lifecycle. That’s because making the fuel captures more greenhouse gases than vehicles emit when burning it -- a big net gain for the climate.

**Decarbonizing Heavy Transport**

Transportation emits more greenhouse gases than any other sector of the US economy. Heavy duty vehicles use a quarter of all road fuel, and getting them off diesel is particularly important. But electrifying them is not yet a practical solution.

There are only a few hundred electric buses and far fewer heavy trucks in operation in the US, and they have been plagued by service problems. And although their tailpipe emissions may be zero, their overall lifecycle emissions are only as good as the fuel generating the electricity to charge the batteries.

Biomethane on the other hand can cut lifecycle vehicle emissions up to 300% compared to diesel. It’s a practical way to decarbonize heavy transport here and now.
Estimating the Impacts

The more biomethane flows through natural gas pipelines, and the more it gets used in existing gas-fired power plants or natural gas-powered buses and trucks, the more the overall climate footprint of the natural gas industry shrinks. Just how much depends on how much biomethane is produced, how soon anaerobic digesters are built, and how fast truck and bus fleets, utilities and companies adopt the fuel.

The US organic waste stream is huge and growing (including 87 million tons a year of food and yard wastes alone). It’s a big enough resource to justify building 10,000 new digester facilities, which would create 30,000-50,000 full time jobs plus 200,00 to 400,000 construction jobs.

Using existing processing technologies, we could generate enough biomethane fuel from our organic wastes to displace 10% of current US fossil natural gas use, or 25% of current on-road diesel use.

If higher-tech ways of making the fuel from additional sources become commercial, like thermal gasification or power-to-gas, those percentages could more than double. And since biomethane is often net carbon-negative, it would reduce emissions from the natural gas industry even more than the percentage of fossil fuel it displaces.

Companies Leading the Way

Biomethane’s potential to mitigate the natural gas industry’s negative climate impacts is too great to ignore. Gas companies are starting to recognize it, and some forward-thinking ones are investing in it.

For example, SoCalGas, the largest US natural gas utility, plans to purchase biomethane from California dairy and other digester companies, and provide it to business and residential customers via its pipeline network. It aims to replace 20% of the fossil gas it sells today with biomethane by 2030.

California-based Clean Energy Fuels is leading the drive to scale up biomethane in the transport sector, which emits more greenhouse gases than any sector of the US economy. The company’s roots go back to T. Boone Pickens’ championing natural gas as a transportation fuel in the 1990s. Today it operates over 530 natural gas refueling stations across the country, enabling more bus and truck fleets to switch from diesel to natural gas.

The company also offers financing for new natural gas heavy duty trucks equipped with ultra-low emission engines which can run on biomethane, so they cost the same as equivalent diesel trucks. Those engines slash lifecycle greenhouse gas emissions compared to diesel, including virtually eliminating nitrogen oxide pollution. NOx is a public health hazard as well as a
climate super-pollutant accounting for 6% of GHG emissions. Its health damaging effects are worse in poorer communities that have higher heavy vehicle traffic and more bus and truck depots.

Clean Energy Fuels was the first company to offer biomethane to commercial fleet customers in 2013 under the brand name “Redeem.” By 2018, most of the fuel the company delivered (53%) was Redeem. By 2025, it plans to zero out fossil gas altogether and sell only biomethane.

That’s a remarkable goal. Running exclusively on biomethane by 2025 would allow Clean Energy fleet customers to meet California’s net-zero carbon goal 20 years before the envisioned deadline at minimal incremental cost.

Biomethane is growing rapidly worldwide, with global capacity roughly tripling over the last decade. The Danish company Nature Energy, is working to phase out fossil gas and sell biomethane exclusively, just as Clean Energy Fuels is doing in the US.

Nature Energy owns nine co-digestion projects in Denmark, and recently merged with Xergi, which has built more than 70 large-scale digester plants worldwide. Biomethane was 10% of the natural gas grid in Denmark in 2018 (spiking to 18% in July). But with Nature Energy adding more capacity, it could reach 100% by 2035.

*Policy Makers Take Note*

These are just a few examples of a growing list of companies that recognize biomethane’s potential to revolutionize the natural gas industry. Meanwhile most US climate policy makers haven’t yet recognized it, despite compelling reasons why they should. They rightly view methane as a climate pollutant to eliminate.

What they aren’t yet seeing is that biomethane cuts methane pollution and offers a valuable carbon-free energy resource to leverage. It could help accomplish climate policy goals, from reversing negative climate impacts to generating green jobs to benefiting disadvantaged communities. That ought to attract policy makers’ attention. But for now, it’s industry leaders who are showing the way.

*Joanna D. Underwood is the founder and a director of the NGO Energy Vision, which researches, and promotes technologies and strategies for a sustainable energy and transportation future.*