

How Renewable Natural Gas is Helping the Life Sciences Sector Tackle Greenhouse Gas Emissions

This article is Part 3 in a series on how renewable natural gas (RNG) can help unlock environmental and economic benefits across the US economy.

Guidehouse, The Coalition for Renewable Natural Gas

The Life Sciences Sector's Emission Reduction Challenges

Healthcare generates approximately 4.4% of global greenhouse gas (GHG) emissions,ⁱ 20-33% of which is associated with the development and manufacture of new pharmaceuticals and treatments.ⁱⁱ The sector is facing increasing scrutiny regarding its emissions reduction targets, their alignment with the Paris Agreement,ⁱⁱⁱ and the specifics of how it intends to do its part in mitigating the impacts of climate change.^{iv}

Emissions associated with the purchase of goods and services (Scope 3, Category 1) represent the largest GHG emissions liability for the pharmaceutical sector. The upstream manufacturing and distribution of pharmaceutical ingredients is energy-intensive, especially where cold chain shipping and storage is required.^v Pharmaceutical companies are also working to reduce their direct emissions (Scope 1) from fuel use, as well as the emissions associated with the electricity they consume (Scope 2).^{vi}

The majority of large US and European pharmaceutical companies have set either carbon-neutrality or net-zero targets for 2030.^{vii} Companies in the sector are decarbonizing their electricity use at a rate in line with reaching net zero by 2030; however, decarbonizing fuel use (e.g., natural gas) is proving trickier, with the sector currently on track to reach full emissions abatement by 2050 at the earliest.^{viii} As described further in the AstraZeneca case study below, RNG is an effective tool to achieve both the rapid and deep decarbonization of fuel-related GHG emissions.

How RNG Can Support Life Sciences Decarbonization

RNG is a substitute for fossil fuels in hard-to-electrify pharmaceutical manufacturing applications, and also provides sustainable alternatives to feedstocks used in the sector's ingredient supply chains.

RNG can be used as a drop-in replacement for natural gas in existing boilers and cogeneration systems employed by the pharmaceutical sector, with no need for new or upgraded equipment.

Cogeneration, or combined-heat-and-power (CHP) systems, are widely used in the pharmaceutical sector, as they can generate electricity and provide the steam and heating functions needed by different steps of the manufacturing process. These cogeneration systems are difficult to replace given their tight integration with many parts of the manufacturing process, limiting the range of viable decarbonization options to RNG and other low-carbon fuels.

Replacing fossil-based chemical feedstocks (such as conventional natural gas) with green hydrogen, RNG, and other sustainable fuels will drive deep decarbonization of the sector.^{ix} Leaders in the sector are collaborating to address the technical, regulatory and commercial hurdles to increase the renewable content of pharmaceutical ingredients (estimated at only 2%

today).^x For example, recent scientific advances have improved the conversion of methane, either bio-derived or fossil-based, into methanol, an important precursor to many active pharmaceutical ingredients.^{xi} Bio-derived CO₂, a by-product of upgrading biogas to biomethane, may also be an attractive feedstock for the chemicals, including methanol, used by the sector in the future.^{xii}

AstraZeneca Case Study

Pharmaceutical giant AstraZeneca has aggressive emission reduction targets, which include abating 98% of Scope 1 (direct emissions from fuels used on site and in vehicles) and Scope 2 (emissions associated with electricity use) by 2026, against a 2015 baseline. As of 2022, the company had achieved 60% of its emissions abatement targets.^{xiii}

In June 2023, AstraZeneca announced that it would procure renewable natural gas (RNG) for its Delaware campus from Vanguard Renewables. The partnership between these two companies will involve AstraZeneca gaining access to high quality RNG from three of Vanguard Renewables' on-farm anaerobic digester facilities across the US for at least 15 years. By 2026, the annual supply of RNG to AstraZeneca will equal 650,000 MMBTU, which if used to produce electricity could power 17,800 US homes per year.^{xiv}

AstraZeneca sees RNG as a key part of its global decarbonization strategy. In September 2023 the company announced an additional \$124 million investment to secure a 15-year supply of RNG for facilities in the UK's Macclesfield, Cambridge, Luton and Speke areas from Future Biogas.^{xv} Notably, the carbon dioxide produced alongside the RNG will be captured and shipped to Norway for long-term geological storage from 2024.^{xvi}

RNG captured from landfills will also be used by AstraZeneca in Puerto Rico for cogeneration at its plant east of San Juan, decarbonizing both fuel and electricity consumption at the facility.^{xvii}

Last Words

RNG is a practical solution to decarbonizing the pharmaceutical sector and its supply chain. Interchangeable with natural gas, RNG offers a straightforward and rapid pathway to achieving deep decarbonization of manufacturers' Scope 1 emissions. Longer-term, RNG and other bio-derived molecules could help decarbonize the production of pharmaceutical ingredients vital to the health and well-being of present and future generations.

ⁱ [6 ways the pharmaceutical industry can reduce its climate impact | World Economic Forum \(weforum.org\)](https://www.weforum.org/articles/6-ways-the-pharmaceutical-industry-can-reduce-its-climate-impact/)

ⁱⁱ <https://themedicinemaker.com/manufacture/its-time-to-calculate-the-carbon-footprint-of-pharmaceutical-products> and [Seven pharma CEOs announce new joint action to accelerate net zero healthcare \(astrazeneca.com\)](https://astrazeneca.com/news/press-releases/2023/07/2023-07-20-seven-pharma-ceos-announce-new-joint-action-to-accelerate-net-zero-healthcare)

ⁱⁱⁱ <https://www.mygreenlab.org/carbon-impact-report-resources.html> and <https://unfccc.int/process-and-meetings/the-paris-agreement>

^{iv} <https://www.pharmaceutical-technology.com/sponsored/the-impact-of-climate-change-on-the-pharma-supply-chain/>

-
- v [Creating a sustainable heating strategy for pharma manufacturing through decarbonization - CRB \(crbgroup.com\)](#)
and [Cutting the carbon footprint of pharma's supply chain \(pharmaceutical-technology.com\)](#)
- vi [Seven pharma CEOs announce new joint action to accelerate net zero healthcare \(astrazeneca.com\)](#)
- vii <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/path-to-net-zero-eu-pharma-accelerates-pledges-while-us-plays-catch-up-67928165>
- viii [Is pharma on track to reduce its carbon emissions? - IQVIA](#)
- ix [Methane-to-chemicals: a pathway to decarbonization | National Science Review | Oxford Academic \(oup.com\)](#)
- x <https://www.cas.org/resources/cas-insights/sustainability/green-chemistry-pharma-industry>
- xi <https://neutrons.ornl.gov/content/found-%E2%80%98holy-grail-catalysis%E2%80%99%E2%80%94turning-methane-methanol-under-ambient-conditions-using-light>
- xii <https://www.ieabioenergy.com/wp-content/uploads/2020/02/Bio-based-chemicals-a-2020-update-final-200213.pdf>
- xiii [Ambition-Zero-Carbon.pdf \(astrazeneca.com\)](#)
- xiv [AstraZeneca announces innovative partnership with Vanguard Renewables to decarbonize its United States sites \(astrazeneca-us.com\)](#)
- xv [AstraZeneca advances UK clean heat and energy efficiencies with £100m commitment | Business Wire](#)
- xvi <https://www.edie.net/astrazeneca-to-support-uk-biomethane-and-ccs-project-in-drive-to-decarbonise-heat/>
- xvii [iPR Pharmaceuticals: First pharmaceutical company in Puerto Rico to use Renewable Liquefied Natural Gas to power its cogenerator \(astrazeneca-us.com\)](#)