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50 shades of GREEN INFRA

RESEARCH INSIGHTS

POWERED BY WASTE

"Trends in pricing and project construction, especially over the past two years, strongly suggest RNG is poised to take off"

Kearney

Waste Revolution: Biogas & Beyond

Innovations in power production could offer a transformative pathway for waste management, turning it from a climate change liability into a pioneering force for a low-emission future. By leveraging the abundant organic waste in daily life, significant volumes of methane and other gaseous energy sources, also known as biogases, can be captured to produce **Renewable Natural Gas (RNG)**. RNG can be generated by capturing and processing biogas from landfills in dedicated treatment plants.

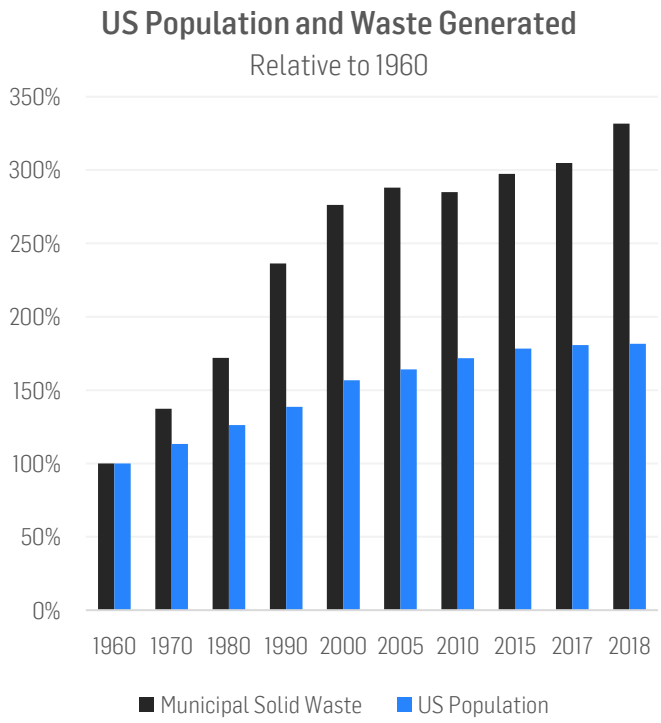
RNG, a pipeline-quality gas, boasts full interchangeability with conventional natural gas. This feature facilitates its integration into existing gas-powered systems, including aviation, maritime, and heavy-duty transport, as well as energy generation for households and heavy industry. Notably, while RNG's combustion produces CO2, the carbon it generates originates from organic matter that has already sequestered atmospheric CO2, rendering biogas production **carbon-neutral with no additional GHG emissions**. Moreover, the substitution of fossil fuels with biogas avoids the production of CO2 emissions, making RNG a comparatively carbon negative source of energy.[1, 2]

Waste's Warming Impact Ahead

Growing levels of waste worldwide, propelled by an expanding population and surging consumption, present a global challenge. Projections from the World Bank indicate a global population nearing 10 billion by 2050, coupled with an anticipated annual municipal solid waste output of 3.40 billion tons. This surge in waste is set to outpace population growth by over 35 percentage points relative to 2016 levels, with far-reaching consequences.[3, 4]

Inadequately managed landfills disproportionately affect vulnerable communities, while oceans suffer from millions of tons of plastic waste. Its economic toll is also substantial, ranging from about 4% of municipal budgets in high-income countries to a significant 20% in low-income nations. [4]

Beyond immediate societal and economic impacts, rising waste generation exacerbates global warming. In 2016, **solid waste management contributed to approximately 5% of global emissions**, equating to 1.6 billion tons of CO2-equivalent. Projections suggest this figure could further soar to 2.6 billion tons by 2050 unless countermeasures are taken. [4]

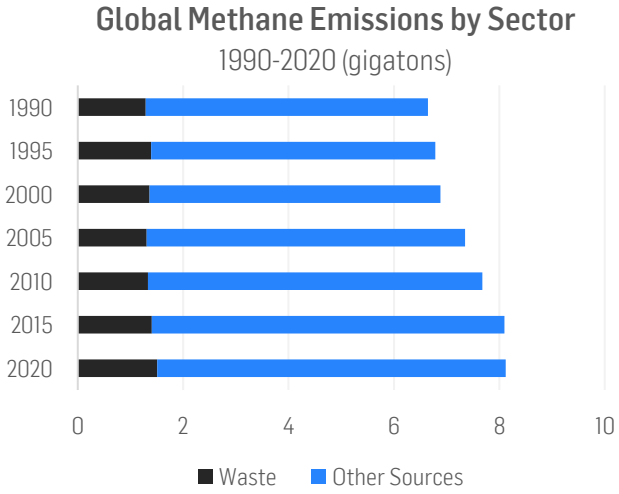


Landfills' Methane Menace

Landfills not only raise alarm due to their emission volume but also its emissions' composition, particularly the prevalence of methane – the second most abundant man-made greenhouse gas in the atmosphere. Stemming from organic waste decomposition, methane stands as the leading greenhouse gas contributor in the solid waste sector, making landfills a major source of human-generated methane emissions. This is particularly urgent given **methane's significantly high short-term global warming potential**. [4, 5]

Therefore, addressing landfill emissions is imperative in broader climate mitigation efforts, both due to their high impact and their comparatively short atmospheric lifetime compared to other sources' greenhouse gases. [5]

Under this context, RNG emerges as a solution able to both curb emissions and transform the increasing levels of global organic waste into a valuable resource.



References

[1] An introduction to biogas and biomethane (iea.org)

[2] What is RNG? (shell.us)

[3] Population estimates and projections (databank.worldbank.org)

[4] What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050 (openknowledge.worldbank.org)

[5] Methane (climate.nasa.gov)

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