About Us

Hago is comprised of a team with decades of experience in science, innovation and technology, farming, and business.

We are guided foremost by a commitment to mitigating climate change, with focus on developing new technologies and processes that can help make hydrogen energy more cost-effective and accessible. By doing so, Hago could help to accelerate the transition to a more sustainable and carbon-neutral energy system.

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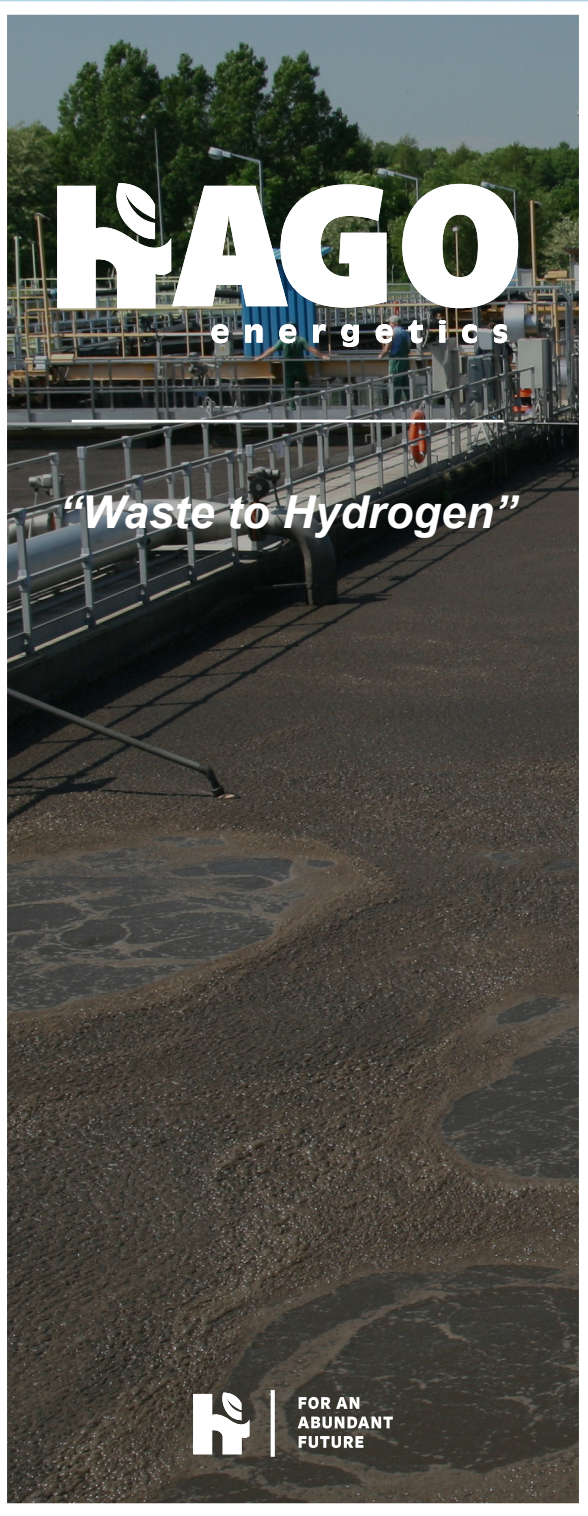


The Problem

Methane emissions by municipal wastewater treatment plants (WWTPs) can be a significant environmental problem.

WWTPs treat wastewater from homes, businesses, and industries, and the treatment process can produce significant amounts of methane, a potent greenhouse with a global warming potential that is 80 times greater than CO 2 over a 20-year period.

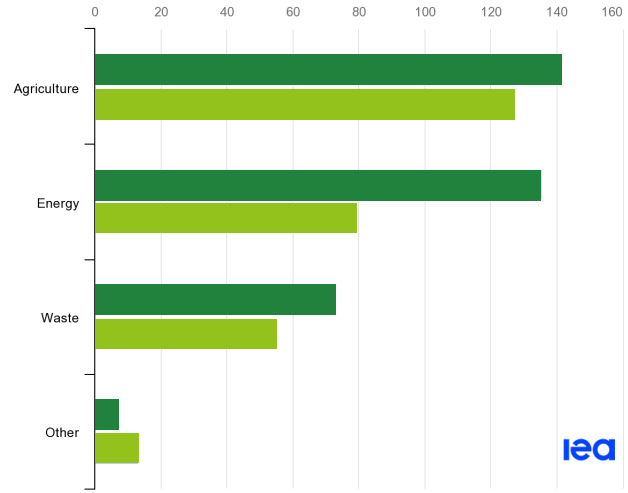
Globally, methane from wastewater caused emissions equivalent to 512 million tons of CO 2, accounting for approximately 7% of total global methane emissions.

When released into theatmosphere, methane can contribute to climate change, which can have a range of negative impacts on the environment, including rising sea levels, more frequent and severe weather events, and loss of biodiversity.

The development of new processes to produce hydrogen without excessive formation of CO 2 is necessary to overcome the high carbon footprint drawback of steam reforming.

Global methane emissions by sector reported to the UNFCCC and estimates from the IEA, 2021

Last updated 14 Feb 2023



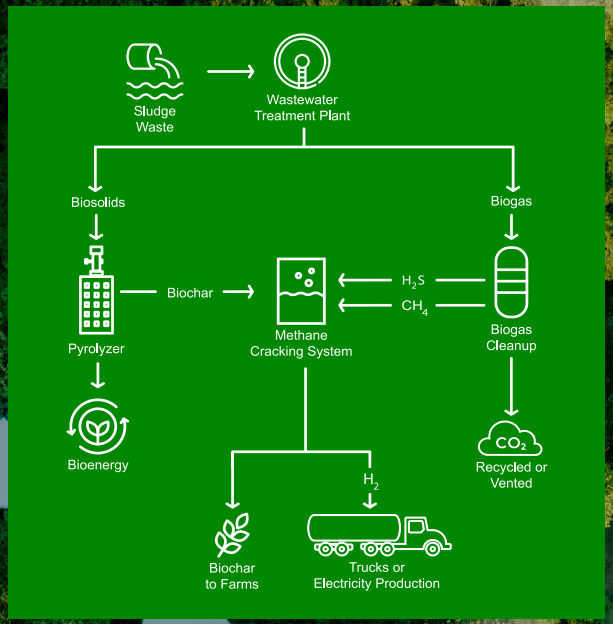
Most hydrogen produced today in the United States is made via Steam methane reforming. It is a mature production process in which high-temperature steam (700°C–1,000°C) is used to produce hydrogen from a methane source, such as natural gas. Despite its long-time commercial optimization, the endothermic SMR process is expensive due to its high capital costs and energy consumption, and it produces significant amounts of CO 2 .

Typically, the production of every kilogram of hydrogen by the SMR/ WSR process is accompanied by the emission of 12 kg of carbon dioxide.

HAGO Solution

An alternative method to generate hydrogen involves using methane pyrolysis. Pyrolysis is most commonly used in the treatment of organic materials and refers to the decomposition of organic materials in the absence or limited amounts of oxygen.

Methane pyrolysis (MP) is a technologically simpler, one-step process, compared to the two-step SMR/WSR steam reforming.



Hydrogen has a wide range of potential end users across several sectors:

1. Transportation: Used as a fuel for transportation, particularly in heavy duty fuel cell vehicles.

2. Industry: Many industrial processes require large amounts of hydrogen as a feedstock or for use in manufacturing processes

3. Power generation: Used in fuel cells to generate electricity, either for stationary applications such as backup power systems or for portable applications.

4. Residential and commercial heating: Used in fuel cells to generate electricity and heat for buildings.

5. Energy storage: A means of energy storage for intermittent renewable energy sources such as wind and solar power.

Business Model + Revenue Streams

Economic benefits: The market for hydrogen as a clean energy source is growing, and there is increasing demand for hydrogen fuel in transportation, power generation, and other applications.

Converting methane into hydrogen can create new revenue streams for municipalities, while reducing their greenhouse gas emissions and increasing their energy efficiency.

We can install a pilot unit at a Wastewater Treatment Plant that will convert on site all or part of the methane/biogas produced during the digestor phase to carbon negative hydrogen using our proprietary technology.

One of the uses of this hydrogen is to burn it in electricity-producing turbines. The generated electricity could power the plant's operations or be sold to the grid. Another use is for transport vehicles, such as heavy-duty trucks. Our technology also involves the use of biochar derived on site from pyrolyzed residual biosolids (aka sludge, grit & screenings) as cheap and efficient catalysts for the waste biogas pyrolysis conversion.

We will be happy to discuss the specifics of how your municipality can benefit from installing our technology at your facility.

There are three main advantages when using this approach compared to direct methane flaring:

- Although the amount of generated heat is less compared to methane oxidation, it is still more than enough to be used for steam/power generation that covers the plant needs;

- The entire process is 100% carbon negative, i.e. all the carbon contained in the methane is converted to solid products that are reused as catalysts or sold to customers;

- Effective use of the waste biosolids by transforming them to methane conversion catalysts and/or long-term fertilizer for agricultural use (biochar), instead of shipping them to a landfill.

In Summary : Hago Energetics Benefit Corporation helps wastewater treatment plants become more sustainable by converting methane to high-value products, such as hydrogen and carbon.

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