

# TRANSFORMING CHEMICAL WASTE INTO VALUABLE RESOURCES

## THE WASTE OPPORTUNITY

The treatment of waste currently accounts for ~3% of the world's CO<sub>2</sub> emissions, and most waste is inefficiently disposed of through energy intensive incineration which does not capture valuable and usable by-products.<sup>1</sup> In fact, the carbon intensity of European incinerators equates to around twice the concentration of CO<sub>2</sub> emissions derived from the average EU electricity grid.<sup>2</sup>

TreaTech is able to turn this waste crisis into an opportunity by providing industrial and municipal companies with an innovative, modular, and onsite waste treatment solution that converts waste products from a climate change liability into valuable resources that can support a circular business model.

We recently worked with Arkema, a leader in Specialty Materials building on its unique set of expertise in materials science to address the ever-growing demand for innovative and sustainable materials, driven by the challenges of new energies, new technologies, the depletion of resources, mobility, and increasing urbanization.

## TREATECH'S SOLUTION

Implementing zero waste strategies can reduce overall GHG emissions from waste by an average of 84%<sup>3</sup> TreaTech's waste treatment solution uses catalytic HydroThermal Gasification (HTG) technology and is able to transform 99.9% of this manufacturer's chemical waste into methane-rich gas and CO<sub>2</sub> without leaving the production site.

We validated the capabilities of our technology for Arkema using our prototype to treat one of their chemical wastes. Our technology was able to recover 90% of the chemical energy from the original waste as reusable gas, which was composed of 60% CH<sub>4</sub>, 35% CO<sub>2</sub> and 5% H<sub>2</sub>. Since we treated a purely organic waste, water was co-injected with the feedstock to act as the medium in which the gasification reactions took place. Following the waste treatment process, all the water co-injected was recovered free of contaminants (total organic carbon below 1 mg/l).

We then designed an industrial unit able to treat a few thousand tons of our partner's chemical waste annually. The chemical waste is pumped through the system at a high pressure of 250 bar and heated up to 400°C to reach supercritical water conditions. Under these operating conditions, the organic fraction of the waste is converted into a clean methane- rich gas that can be injected into the grid, stored or used to produce electricity on site.

<sup>1</sup> [https://www.no-burn.org/wp-content/uploads/2022/11/zero-waste-to-zero-emissions\\_full-report.pdf](https://www.no-burn.org/wp-content/uploads/2022/11/zero-waste-to-zero-emissions_full-report.pdf)

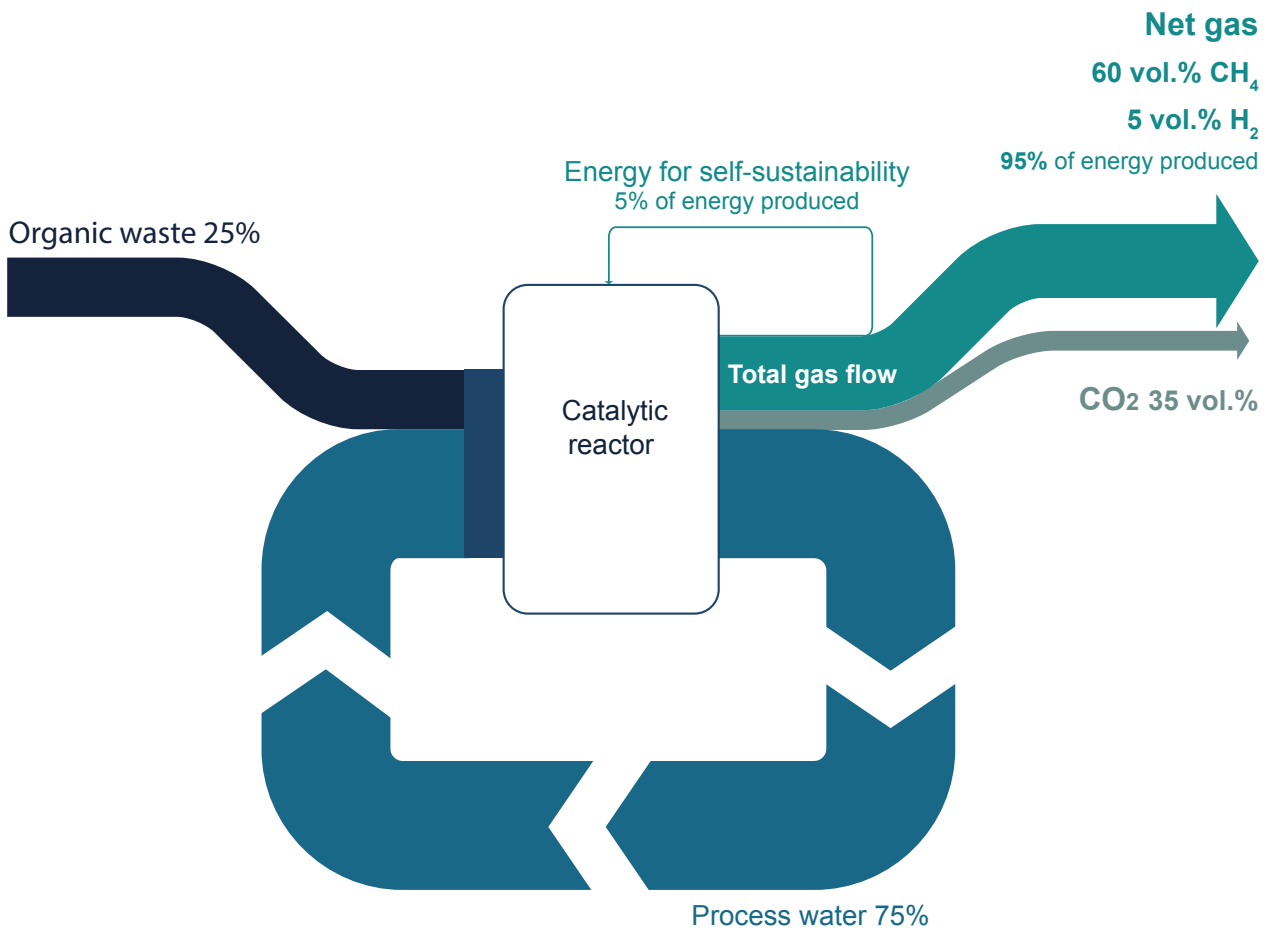
<sup>2</sup> <https://zerowasteurope.eu/2020/03/understanding-the-carbon-impacts-of-waste-to-energy/>

<sup>3</sup> [https://www.no-burn.org/wp-content/uploads/2022/11/zero-waste-to-zero-emissions\\_full-report.pdf](https://www.no-burn.org/wp-content/uploads/2022/11/zero-waste-to-zero-emissions_full-report.pdf)

By using our product, Arkema would be able to produce several dozen GWh of energy annually in the form of methane. The unit only requires 5% GWh of the energy produced so they would be able to valorise the rest. Moreover, we would be able to extract several thousand tons of CO<sub>2</sub>, which can be further separated using market-available technologies. Finally, the water co-injected into the system can be fully recycled due to its high quality at the output point.

## EXPANDING OUR PARTNERSHIP

We are currently exploring how we can treat Arkema's other types of chemical waste streams. The implementation of our system at the partner's site will allow them to create a positive impact by investing in circular economy, energy independence and climate change mitigation solutions.



Mass and energy balance simulation for a plant treating several tons per hour of organic residue with water co-injection using TreaTech's technology. These figures are based on our TreaTech's validation results. Vol.%: volume percentage.



## ABOUT TREATTECH


TreaTech was founded in 2015 by Life Sciences and Chemical Engineers at the Swiss Federal Institute of Technology in Lausanne, with the goal of harnessing the power of the circular economy to convert waste into valuable by-products.

To do this, TreaTech has developed patented technology that uses catalytic hydrothermal gasification (HTG) to convert a broad range of waste streams that are usually incinerated into integral resources in a sustainable and cost-efficient manner. These include capturing fresh water for industrial and consumer use, minerals used for fertiliser such as phosphorous, nitrogen and potassium, as well as a constant supply of methane-rich renewable gas that can be injected into the grid network, stored or used to produce electricity at our customers' sites.

TreaTech's technology provides a solution to both short-term and long-term problems. In the short-term it can provide a secure feedstock of renewable gas that can enhance supplies for businesses and consumers, improving regional resilience to a sudden spike in wholesale gas prices. Long-term, TreaTech provides a clean technology solution that can reduce the climate impact of current waste treatment solutions.

Today, the TreaTech team consists of 10 experienced and highly motivated team members with more than 50 years of expertise in entrepreneurship, technology validation, process engineering and catalyst research. We are passionate about sustainability and believe the necessary climate change mitigation measures can only be achieved if we deviate from our current course with disruptive innovation and immediate action. TreaTech's technology is one of the many solutions required to help shape a sustainable future.

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