

# Brightsite

Transforming industry

## BrigH2 plant to present syngas as a viable means of a circular economy

BrigH2 is a startup that is developing a 50-MW plant on the Brightlands Chemelot Campus to produce syngas by gasifying torrefied biological raw materials, based on Technology developed by Torrgas. The company is responding to the growing need for green fuel sources as the chemical industry moves towards sustainability.

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Willem Jan van Asselt, CEO of BrigH2:

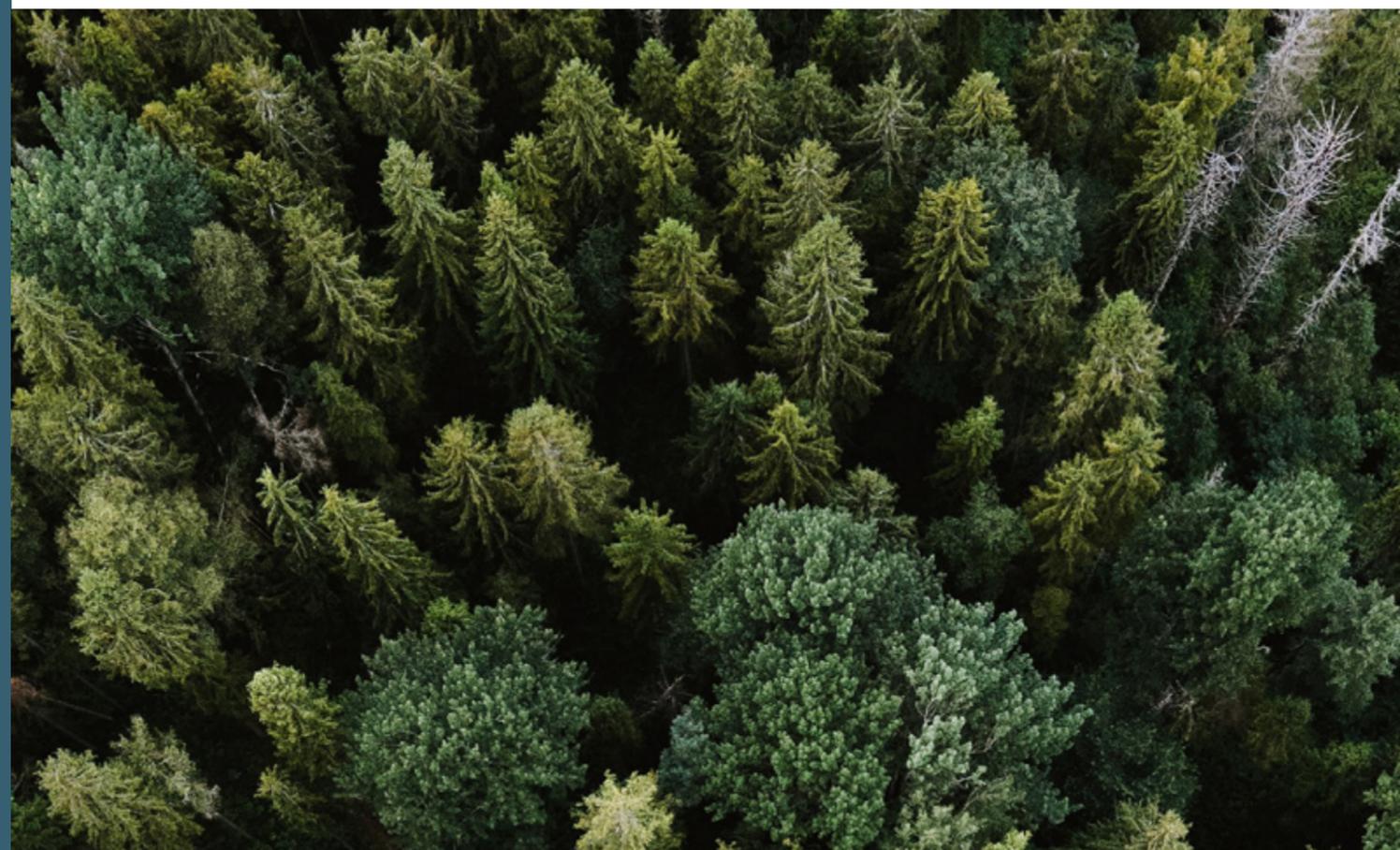
*"It is precisely this combination of innovation and considering what we already have available from the past, that can give us valuable answers to facilitate the transition of the chemical industry".*

Various Chemelot products are currently produced using oil and gas. "These products will continue to exist, but need to be made in a different way. The non-sustainable fossil fuels currently used must be replaced by green fuel sources. Syngas—a mixture of carbon monoxide (CO) and hydrogen (H<sub>2</sub>)—is one of the building blocks that has the potential to make various chemical products sustainable, if it is produced using green methods from biological raw materials. Hydrogen is of great interest to the chemical industry, but the carbon component is also very attractive for industrial applications and as a soil improver", says Willem Jan van Asselt, CEO of BrigH2.

## Obtaining hydrogen by gasification of biological raw materials

"At present, electrolysis is often used as a method of producing sustainable hydrogen. This is not feasible for Chemelot given the enormous amount of (wind and solar) energy that is required to produce enough green hydrogen for all of the on-site chemical processes. That is why we are looking at the feasibility of producing hydrogen through the gasification of biological raw materials. Hereby we focus on torrefied wood as a biological raw material. This is wood that has been heated without oxygen at a relatively low temperature (about 300°C) creating a brittle material that is compressed into 'green' coal. The resulting torrefied wood is economical to transport thanks to its high energy density. Furthermore, the introduction of this specific, more homogeneous biofuel results in fewer problems in production" says Van Asselt.

By using gasification, based on Technology developed by Torrgas, the raw material is converted, via a chemical process at high temperature, into mainly CO and H<sub>2</sub>. The technology is flexible and can handle both pure raw materials and a mix of various kinds of waste or biological raw materials. Read more about it in the article ['Learning from the past: the sustainable future of syngas'](#).



## Picking up on Chemelot balance with demo factory

We are building a plant that is large enough to supply a limited amount of the hydrogen Chemelot needs and that will scale up well. Syngas is the basic product that the plant will produce. The demomodel will focus mainly on the green hydrogen component of the syngas produced. In addition to syngas, the process will also produce Bio-Char (pure carbon), which can be used as a soil improver. It is therefore an optimal way to make the chemical industry greener. There are various ways and means of using syngas, for example, as ethanol. But syngas can also be turned into green natural gas (green methane), from which acetylene/ethylene can be formed using plasma technology. We want to focus initially on addressing the current balance of energy and raw materials at Chemelot. That is to say that we are looking at who uses CO<sub>2</sub>, steam and hydrogen and how these can connect to existing processes. In a later step, we will look at the final building blocks that we can deliver to companies at Chemelot", explains Van Asselt.

**Willem Jan van Asselt, CEO of BrigH2:**

**"We want to link the plant to the processes and companies at Chemelot, and make it available flexibly to projects from other startups and companies".**

## Flexible deployment

Van Asselt emphasises that technology does not necessarily have to be new or innovative when it comes to sustainability. "We have known about producing syngas through gasification for a long time, like many other processes and methods, but in the past it was not economically viable. Current developments mean that it could now be feasible economically and that is what we are going to look for. It is precisely this combination of innovation and considering what we already have available from the past that can give us valuable answers to facilitate the transition of the chemical industry. Given the urgency of the situation, now is the time to quickly apply what we have available", says Van Asselt.

The aim is to have the plant operational as soon as possible, probably at the end of 2024 or early 2025. "We are currently busy designing the plant, the engineering plans are increasingly taking shape. The process has been decided and we know what we want and can do. The next step is to actually build the plant. We are grateful to Brightlands Chemelot Campus, Brightsite and the 'Groene Chemie Nieuwe Economie (GCNE)

platform for the support and help we are receiving to continue as a startup. As I said, we want to link the plant to the processes and companies at Chemelot. That is why we will also make the plant available flexibly to projects from other startups and companies. Syngas is after all a generic building block for several subsequent processes. If other startups have projects that allow them to use syngas, we will provide space for that. We are also interested in how syngas from certain raw materials can then be used. We hope our plant will demonstrate that the products we need can also easily be made in a more sustainable way", Van Asselt concludes.

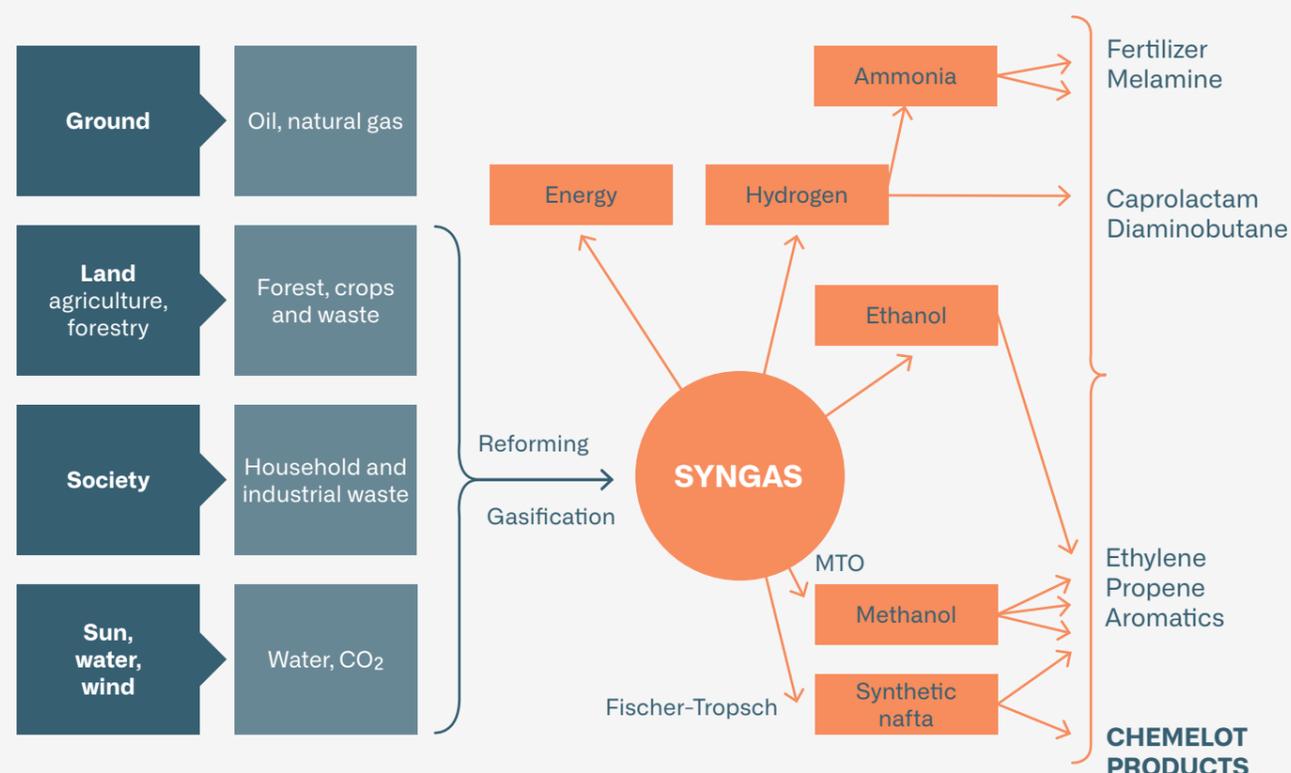
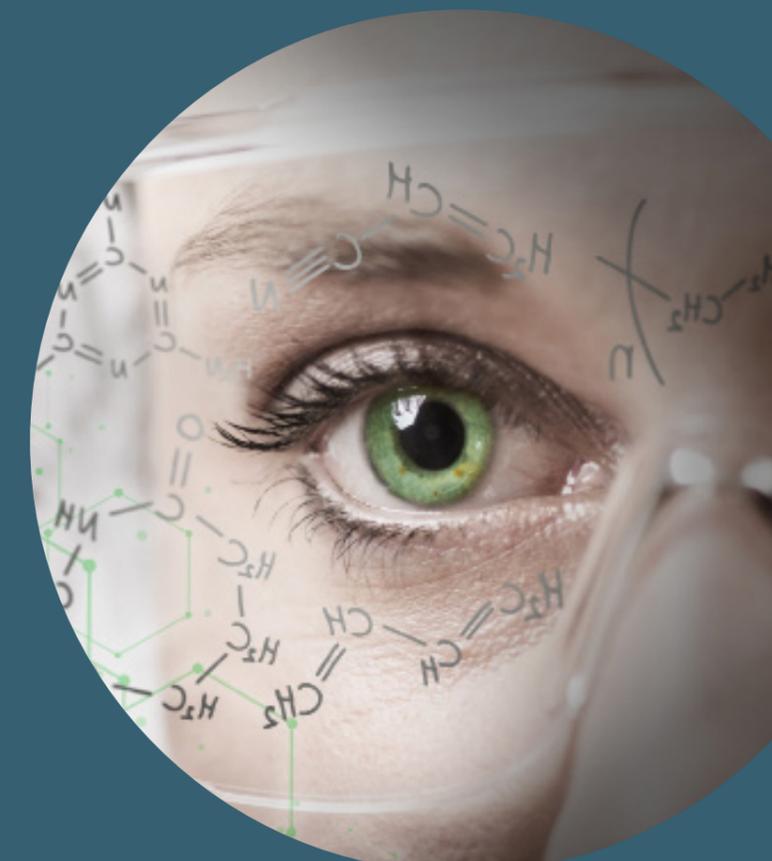


Figure 4. Syngas made from various sources of carbon can provide for the greening of many of Chemelot's products in the further future.

## Interested in participating?

If you would like to know more about how Brightsite supports the transition of the chemical industry or if you would like to contribute to it, please contact us at [info@brightsitecenter.com](mailto:info@brightsitecenter.com)



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