



HAFFNER ENERGY BRINGS THE COST OF RENEWABLE DIESEL AND SAF CLOSER TO THAT OF FOSSIL FUELS WITH SB-HEFA

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Haffner Energy is redefining the economics of renewable fuels with the launch of SB-HEFA (Solid Biomass to HEFA), an innovative technology that converts solid biomass directly into liquid feedstock through its proprietary thermolysis process. Eliminating the syngas step, shortening the production chain, and leveraging feedstocks costing less than one-fifth of conventional oils, SB-HEFA is expected to cut production costs by approximately 50%, bringing renewable diesel and SAF closer to cost parity with fossil fuels.

At the core of Haffner Energy's thermolysis technology is the generation of a bio-oil that is typically converted into non-condensable gases for downstream production of syngas, hydrogen, methane, or methanol. SB-HEFA takes a different approach by eliminating the reforming step and directly valorising the bio-oil. After rapid cooling and stabilisation, the oil is filtered and upgraded through hydrodeoxygenation using proven HEFA processing technologies.

Philippe Haffner, Chairman and Chief Executive Officer of Haffner Energy stated: "The strength of SB-HEFA lies in combining our existing core technology with a simple, already industrialised

conversion chain. By radically transforming the economics of renewable diesel and SAF, SB-HEFA creates the conditions for their large-scale deployment. This represents a paradigm shift for both markets."

Several leading stakeholders across the aviation value chain have already initiated discussions with Haffner Energy regarding the deployment of its SB-HEFA technology. Beyond sustainable aviation fuel, the same technology also supports renewable diesel production, which serves as a cornerstone of the Multi-Energy Hubs being developed in Canada in partnership with Mundi Énergies.

Transforming the economics of SAF and Renewable Diesel

SB-HEFA introduces a fundamentally different economic model for renewable fuel production. By utilizing low-cost residual biomass instead of expensive waste oils, the process dramatically lowers the largest cost component in HEFA fuel manufacturing.

The technology also simplifies production by directly converting solid biomass into liquid feedstock, bypassing the gas phase required by competing pathways. This shorter and more efficient process chain not only improves energy performance but could also reduce facility capital costs to roughly one-third of those associated with Fischer-Tropsch or methanol-based biomass-to-fuels technologies.

Combining significantly lower feedstock costs with reduced capital expenditure and improved efficiency, Haffner Energy is targeting a 50% reduction in the levelized cost of producing both SAF and renewable diesel, potentially reshaping the competitive landscape for sustainable fuels.

Renewable Diesel: The First Commercial Application for SB-HEFA

Haffner Energy is prioritizing the industrial deployment of SB-HEFA in the renewable diesel sector, a market that significantly exceeds aviation fuel demand in scale. Diesel represents one of the world's largest fuel markets, offering substantial opportunities for the rapid adoption of lower-carbon alternatives.

Renewable diesel and Sustainable Aviation Fuel (SAF) are produced through closely related conversion pathways. However, renewable diesel faces fewer technical certification requirements and regulatory barriers than SAF, enabling a faster route to commercialization and market penetration.

Unlike conventional biodiesel (FAME), renewable diesel is a hydrocarbon fuel that closely mirrors the chemical properties of fossil diesel, allowing it to serve as a true drop-in replacement without requiring modifications to engines or infrastructure.

By leveraging low-cost biomass feedstocks and a streamlined production process, SB-HEFA aims to narrow the cost gap between renewable and conventional diesel, unlocking significant opportunities across sectors such as heavy-duty transportation, agriculture, construction, rail, maritime operations, and power generation.

Haffner Energy expects to commission its first fully integrated industrial demonstrator by 2027-2028. In the meantime, production of the non-hydrotreated bio-oil intermediate is already operational at the company's Marolles facility, providing a foundation for the technology's industrial scale-up.

SAF: 2030 is already here

Global SAF production still accounts for only 0.6%³ of kerosene consumption, while its cost is currently two to three times higher⁴. HEFA is by far the leading commercial SAF pathway today, but its development is constrained by the availability and cost of oils and fats. SB-HEFA aims to change this equation by providing access to solid biomass feedstocks that are far more abundant and several times less expensive.

Marcella Franchi, Business Development Director at Haffner Energy commented: “The main challenge facing SAF today is economics. The key is to overcome the barrier of its high cost while broadening access to sustainable feedstocks that are available at scale. SB-HEFA is specifically designed to address both challenges: to bring the cost of SAF significantly closer to that of fossil kerosene, thereby making the blending targets set by governments and international institutions achievable.”

Haffner Energy intends to initiate the ASTM qualification process for the SB-HEFA pathway to SAF production, drawing in particular on the precedent set by HC-HEFA, the first pathway to benefit from the ASTM D4054 accelerated evaluation process (“Fast Track”) prior to its incorporation into ASTM D7566.

The objective is to enable the commercial deployment of SB-HEFA in aviation from 2030. This timeframe coincides with the increase in the minimum SAF blending mandate in Europe to 6%⁵.

Selling equipment and licences simultaneously

SB-HEFA forms part of Haffner Energy’s technology licensing business model, developed alongside its equipment supply activities, notably illustrated by the CORE100 programme. While CORE100 draws on the Company’s industrial capacity and generates revenue through equipment sales, SB-HEFA will primarily generate licensing revenue without placing significant demands on this capacity. In this context, Haffner Energy is targeting several million euros in upfront fees from the granting of technology licences, supplemented by royalties as well as revenue from services and the supply of strategic components.

In terms of EBITDA contribution, each €1 million in upfront payments or royalties from a licence is equivalent to approximately €3 million in revenue generated through equipment sales. Over the longer term, Haffner Energy also intends to take equity stakes in selected projects, with a view to generating recurring revenue from their operations.

The development of SB-HEFA will be supported by SAF Zero, a dedicated entity focused on developing the SAF business through technology licensing, as well as by Mundi Haffner Technologies, Inc. in Canada. Haffner Energy is also in advanced discussions with an investment bank with a view to appointing it to identify industrial and financial partners that would invest in SAF Zero and finance its development.

The development of SAF Zero is intended to be financed by its partners, without drawing on Haffner Energy’s own financial resources or resulting in any dilution of its shareholders in connection with such financing.

From solid to liquid without going through gas

Producing renewable hydrocarbons from solid biomass is not in itself new. Existing pathways, however, including Fischer-Tropsch, require a complex and highly costly conversion chain

involving the production of elementary molecules in gaseous form, which must then be recombined into longer molecules in liquid form.

SB-HEFA oil differs fundamentally from conventional pyrolysis oils, including those produced through fast pyrolysis. The combination of torrefied biomass and the extremely short residence times used in Haffner Energy's thermolysis process is designed to produce an intermediate that is far better suited to hydrotreatment, notably due to its lower oxygen content and acidity, as well as its very low residual solid particle content.

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