



Alco Bio Fuel

Looking for further greening and diversification

Photo courtesy of Alco Bio Fuel.

Alco Bio Fuel is taking a new step in greening its operations by building a second unit for the recycling of CO₂ generated by the production of bio-ethanol. “Other developments will follow. Sustainability is our core business and we are constantly looking at further diversifying our products portfolio, in line with the many possibilities offered by our biorefinery”, says Plant Manager Pablo Vercruysse.



ALCO BIO FUEL AND GREEN CO₂ (WITH THE STORAGE UNIT IN THE LOWER RIGHT CORNER) ARE AN INTEGRAL PART OF THE RODENHUIZE BIOCLUSTER AND INTERACT WITH THE EURO-SILO GRAIN TERMINAL AND OILTANKING'S TANK STORAGE TERMINAL.

Alco Bio Fuel (ABF) is still a young company. It started producing bio-ethanol at its plant near the Rodenhuis dock in Ghent, the Belgian part of North Sea Port, in July 2008. "Back then, biofuels were an upcoming industry and we were exploring new territory on the interface between the chemical and agricultural sector", recalls Mr Vercruysse. He was part of the team of engineers overseeing the construction of the new factory. He stayed on, moving up to the position of plant manager, a function he will now leave to become Director

Technology Quality & Environment for the production facilities of Alcogroup, ABF's main shareholder.

Just twelve years after the start, Alco Bio Fuel has already covered quite some ground. Its initial production capacity of about 150,000m³ of renewable ethanol has gone up to 260,000m³, equivalent to roughly 260 million of this biofuel that can be blended with gasoline. "We now exceed the design capacity of our plant. This is mainly the result of a continuous optimisation by eliminating bottlenecks in the many stages



Photo courtesy of Jean-Louis Vandevoorde.

DURING THE HARVEST PERIOD ALCO BIO FUEL ALSO FEEDS NON-DRIED CORN INTO ITS PRODUCTION PROCESS.

in our production process. We haven't seen the end of this effort yet, even if all the low hanging fruit has been picked and every new progress is harder to achieve. But for us engineers, limitations are there to be overcome."

Strategic port location

Along the way, the multigrain installation which Alco Bio Fuel constructed at a cost of EUR 100 million fully switched from wheat and combinations of grains to corn as raw material for its bio-ethanol. The plant yearly consumes about 600,000t of corn, which is mainly imported from Black Sea countries, like Ukraine, or France. About one tenth of that volume comes from Belgian suppliers, a share which ABF would like to increase. Since the corn is brought in by seagoing ships or inland navigation vessels, being located in a port is a major advantage in terms of logistics. "This is even more so in Ghent, since we are part of the biocluster at Rodenhuis where several companies can interact using only conveyor belts and pipelines to exchange their flows. Incoming, our corn can be delivered and stored next door at grain stevedoring company Euro-Silo, which can also handle the outgoing 170,000t of protein-rich feedstock known as DDGS that we produce along with our ethanol and corn oil. The bio-ethanol can be directly transferred to tank terminal operator Oiltanking for storage and distribution. This proximity of major service providers helps us to reduce our ecological footprint."

Sustainability drive

Becoming greener always ranks very high on Alco Bio Fuel's agenda, clarifies the plant manager. "Sustainability is at the very core of our business and takes on many forms. Our DDGS, for instance, replaces genetically modified soya that is imported from the USA or South America. During the harvest period we also use non-dried corn, hereby avoiding CO₂ emissions linked to drying. Through a co-generation unit we cover our own needs in steam, and we produce excess electricity that is injected into the grid and can supply about 8,000 households. We were the very first biorefinery to receive the ISCC (International Sustainability and Carbon Certification) Proof of Sustainability certificate, as we comply with the very high standards that this scheme puts forward for the transition to a circular economy and bioeconomy. And we make top-grade bio-ethanol that now achieves CO₂ emissions reductions of over 90% (up from 50% in 2008) when compared to the CO₂ emissions of gasoline."



Photo courtesy of Jean-Louis Vandevoorde.



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AS DIRECTOR TECHNOLOGY QUALITY & ENVIRONMENT FOR ALCOGROUP'S PRODUCTION PLANTS, MR VERCRUYSSSE WILL HELP TO DEFINE THE ROAD TO THE FUTURE FOR ALCO BIO FUEL.

A new milestone in making ABF ever more sustainable was reached in 2016, when the joint venture Green CO₂ started purifying and liquifying up to 100,000t of carbon dioxide generated during the production process for re-use in the food and beverage industry (for creating the refreshing bubbles in soft drinks, e.g.), water recycling, cold chain logistics, and greenhouse horticulture or as a chemical raw material. At the time, Alco Bio Fuel stated that to obtain the same reduction in CO₂ emissions would require a surface area of 2m² million of solar panels. CO₂



A MESSER TRUCK LOADING CO₂. THE STORAGE UNIT WILL BE EXPANDED WITH A FIFTH TANK.



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hence became another item in ABF's product range. For this project, Alco Bio Fuel joined forces on a 50/50 basis with Green CO₂, in which two specialists in industrial gasses, Messer Benelux, and IJsfabriek Strombeek collaborate. Together they invested EUR 15 million in the new facility, which comprises four 30m high and 3.5m wide storage tanks. Each tank holds 300,000l of liquid CO₂ that can be kept at a temperature of minus 20°C and a pressure of 20 bar.

New CO₂ recovery unit

The same partners recently decided to expand Green CO₂ with a second carbon dioxide recovery unit. It will require an additional investment of EUR 10 million. The new installation will be up and running in the spring of 2022 and will bring the annual capture and re-use of green CO₂ – and thus the reduction in emissions – to 160,000t, a plus of 60%. “This is equivalent to taking 117,000 cars off the road in Belgium”, the company stated when announcing the new project.

The new recovery unit will be similar to the first one, further enhancing the plant's reliability. A fifth storage tank will be added

to the existing ones, the aim being to accelerate the rotation of the stored volumes. “Due to the low temperature and high pressure required, CO₂ storage is not cheap.”

Teaming up with players with a strong expertise in their own field is not new to ABF. The company itself is an alliance of three Belgian companies: Alcogroup (51%), a worldwide ethanol trading, distribution, and storage group, and one of the biggest producers and distributors of ethanol for fuel in Europe, Groep Vanden Avenne/Vandema (29%), a European specialist in agricultural raw materials, and Arvesta/Wal.Agri (20%), a major player in agriculture and horticulture products and services in Belgium. This brings together expertise in ethanol technology and upstream and downstream markets. “It is no use having the most efficient plant if you do not have the commercial knowhow to make it work in a profitable way or if you do not know where to get your raw materials at the best price or how to sell your different end products”, comments Mr Vercruysse.

New roads to the future

The new CO₂ recovery unit is just another station on a longer journey, he underlines. “Our goal is to be climate-neutral and CO₂ negative by 2030. This also means that we will have to deal with the fossil CO₂ that we are still producing in our power generation. This is not an easy challenge to tackle, and the technology for doing so is still relatively expensive. We are looking into this matter. It is one of the reasons why we joined the North-CCU-Hub within North Sea Port. What we do and aim for fits perfectly well within their ambitions, as it does within the port's global strategic objectives.”

“We also want to further develop our biorefinery and expand our product portfolio. Glucose for bio-plastics, purer protein feed for fish farms, higher grade ethanol for industry, pharmacy and cosmetics are options that we are investigating. We even produced disinfection alcohol during the first weeks of the COVID-19 crisis, which shows the quality of our ethanol. Once more, we learned a few things about the ample possibilities that our refinery offers”, explains Mr Vercruysse. In his new position as Director Technology Quality & Environment, it will be his task to look into the potential of new products for Alco Bio Fuel in Ghent and for Alco Energy Rotterdam, which Alcogroup, Vanden Avenne and Vandema took over in 2016 and which is the largest facility of its kind in Europe.

“The question is which products will we be making in five years? This might imply that we will be moving away from bio-ethanol, which is now our biggest money-maker. Ethanol still is the most efficient and competitive product for decarbonising the transport sector in the short term. But it is a market that mainly depends on regulation. More generally, the future will bring a mix of fuels and electric cars will become ever more present. This will not happen overnight and we will remain one of the few bio-ethanol plants in Europe, but we must prepare for what comes next.”

Alco Bio Fuel is ready to invest to make that happen. “By 2025 we might be spending around EUR 50 million on our own transformation. We are a profitable company and have the financial means to innovate. The important thing is to make the right choice – also an economically viable one – between the many technologies that can be developed but have not yet reached full maturity. One thing is sure though. We want to remain a front-runner on the way to a circular and biobased future. That's why we now call ourselves Sustainable Pioneers”, concludes Mr Vercruysse.