A kick-start for biodiesel

In Rotterdam, Neste Oil has started building its first large-scale European biodiesel plant. Production will start in 2011, making the Finnish company the largest biodiesel producer in the world. But how sustainable is 'rain forest oil', as Greenpeace has dubbed the new product?

by Tseard Zoethout

It was a grey, cloudy day at the end of May when the ship with guests of Neste Oil sailed from the World Port Center in Rotterdam to the location of the newly to be built Neste Oil plant on the industrial area of the Maasvlakte. Security checks were sharp that day, both at the Center and at the party tent on the Maasvlakte. Not without reason: earlier that month 32 Greenpeace activists had locked themselves down at Neste Oil's bio refinery plant in Porvoo, Finland, with flags protesting against the deforestation of rainforests in Southeast Asia. Greenpeace claims the rainforests are destroyed to make room for palm oil plantations. Some of that palm oil is used by Neste Oil to make biodiesel. Neste Oil certainly has ambitious plans in this field. With its so-called NExBTL

Location of NExBTL-plant, Rotterdam. Photo: Neste Oil Corporation

diesel, Neste Oil – majority-owned by the state of Finland – wants to become the leading producer of renewable diesel fuel in the world. After building two smaller refinery plants in Finland, each producing 170,000 tonnes a year, in 2008 Neste Oil started the construction of its first large renewable diesel refinery plant in Tuas, Singapore, which will have a capacity of 800,000 tons and will be operational in 2010. Their newest refinery plant on the Maasvlakte, which will start producing in 2011, will have the same capacity – enough for some 4,000 average family cars to drive 35,000 kilometres each. As one of the biggest ports in the world, Rotterdam offers excellent logistical benefits with easy access to large volumes of feedstock as well as to customers. When completed, the €670 million refinery plant will generate direct employment for over a hundred people.

Lowering emissions

But there's more at stake than mere employment and production of an innovative premium diesel, as authorities during the press event at the World Port Center underlined. Neste Oil claims that compared with oil from fossil fuels, the NExBTL diesel fuel generates 40-80% fewer greenhouse gas emissions (GHG) throughout the product lifecycle, as well as significantly lower tail pipe emissions of NOx, particulates and aromatics compared with fossil fuels, as recent tests with 300 city buses in Helsinki have shown. 'Laying down the first brick is a special moment for the city of Rotterdam', mayor Ahmed Aboutaleb said. 'Our ambition is to reduce CO_2 emissions with 50% in 2050, much more than current EU targets. That can be done with energy savings in households as well as by generating electricity with wind turbines and solar panels. Or with biofuels. With Neste Oil's new product economic and environmental objectives go neatly hand in hand. The building of Europe's largest renewable diesel plant in our port further strengthens our position as the leading biofuels hub in Europe. With Neste Oil's new investment we are in the forefront of supplying Europe with the most advanced technology in renewable diesel.'

> *'With good farming practices, palm oil plantations can have positive impacts'*

Frans Timmermans, the Dutch Minister of European affairs, took an even broader perspective. 'For the city, this country and Europe there are daunting challenges', he said. 'In the last few years balances have gone out of control, in the financial sector as well as in the natural world. We need to find new markets that are knowledge-based and more regionalised in its economic activities. When Asia is smart enough to stimulate this development, so can we. Switching to sustainable fuels is just one step to take. To make a cleaner world for us and our children we have to lower CO_2 emissions. We have to continue to come up with ideas for more investment in innovative developments such as Neste Oil's NExBTL advanced technology. If there are certain reservations towards the use of palm oil for transportation, we need to make sure where it comes from, avoid environmental problems and switch, when possible, to more sustainable alternatives.'

Next biodiesel

So what makes NExBTL so innovative? For

the most part it has to do with its technology. Jarmo Honkamaa, deputy ceo of Neste Oil and vice-president of its Renewable Fuels Business Area, does not want to say too much about this for reasons of confidentiality. 'NExBTL technology is a little bit like a normal refining process for fossil fuels. Under high pressure and temperatures, we turn fatty acids into hydrocarbon molecules by using hydrogen to remove the water. The end product is light, highly homogeneous and very close to GTL (gas-to-liquid) fossil fuels, making it the best and cleanest renewable diesel in the world.'

But there's another advantage why NExBTL will be the future of renewable fuels, according to Neste Oil. The technology tolerates all kinds of fatty acids, even in the same tank, without compromising the quality of the diesel. 'The technology gives us the possibility to mix crude palm oil with rapeseed oil and animal fats in different proportions', Honkamaa continues. 'For instance, while we are using 75 percent palm oil and 25 percent animal fat nowadays in Porvoo, our Finland plant, in the Rotterdam plant we are going to take 30 to 40 percent animal fat with less than 60 percent palm oil, added with rapeseed oil. The exact percentage of these kinds of feedstock will depend on market prices and availability.'

Transparency

Since the EU has implemented its directive to raise the biofuel portion in transportation fuels to 5.75% in 2010, the environmental movement has started raising questions about the sustainability of palm oil. Palm oil plantations in Malaysia and, above all, in Indonesia, are replacing tropical rainforests, especially since the EU directive was implemented. In a recent report, written by CE Delft and AidEnvironment for Greenpeace, it is claimed that greenhouse gas emissions in Indonesia increased from roughly 12-25 Megatons before 2005 to over 30 Megatons now. That increase far exceeds the gains of lower emissions from biofuels in transportation. In addition, the authors point out that widespread deforestation of rainforests will push species like the orangutan and the Sumatran tiger within five years to the brink of extinction.

Maija Suomela, palm oil campaigner for Greenpeace in Finland, doesn't believe that Neste Oil is able to produce its crude palm oil in a sustainable way. She disputes the claim by Neste Oil that NExBTL leads to 40-80% lower greenhouse gas emissions. 'Taking palm oil production and the draining of peat lands into account', she says, 'research centre IFEU came up with completely different numbers. Palm oil production is the leading cause of deforestation. Although the biggest share goes to the food and cosmetics industry,

Baby oil palm trees. Photo: Ismo Henttonen/Neste Oil

Cleaner and better

The economic cris has not left the European market for biodiesel unaffected. In recent months, Dutch manufacturers were hardly able to sell their products due to export subsidies for their American competitors. To make matters worse, the price of oil and renewable diesel is rather volatile these days. According to Matti Lievonen, ceo of Neste Oil, his company has little to fear, however, from the competition of first generation renewable biodiesel products. 'Unlike for those products, there are no restrictions on the blending proportions of NExBTL. NExBTL can be even used as a 100% biofuel in cars. Moreover, it is cleaner and better in its performance. Petrol stations and vehicle owners do not have to make any investments to alter their engines or refilling equipment. For these reasons we believe NExBTL can be sold in Europe and Canada for ten to twenty percent above the price of normal diesel.'

the use of palm oil as a transportation fuel leads to more pressure to establish plantations in rain forest and peat land areas.' According to Greenpeace, Neste Oil shows a lack of transparency. 'The company claims to source all of its palm oil from established plantations in Malaysia', Suomela says. 'When asked by Greenpeace, though, Neste Oil refused to provide any evidence of traceability in its entire supply chain from the plantation to the refinery. It is also failing to provide any indication of where it intends to source future palm oil supply. Anyway, regardless of where Neste Oil might get this huge amount of palm oil – 1.5 million metric tons annually by 2012 – their activities will fuel new demand and push other players deeper into the rainforests. We urge them to think of other solutions.'

Simo Honkanen, Senior Vice President, Sustainability and HSSE of Neste Oil, takes another view. 'Biofuel will never be the biggest user of palm oil, only roughly one to two percent will go into energy. It is also a misunderstanding that all lands in Indonesia and Malaysia are tropical forest. Estimations show that about 30 million hectares in Indonesia is only wasteland or old, deforested land with a low degree of biodiversity. We are definitely not going into the rainforests. All our oil comes from ten to fifteen years' old plantations in Malaysia from which we know the farming practices, mills and history. Though it is not always possible to open doors to the lands of our suppliers, we have our own sustainability principles and insist the suppliers have RSPO control systems in place or in progress and external auditing. And because we take full responsibility for the whole value chain, we will never obtain crude palm oil from third parties.'

Honkanen shares the concern of Greenpeace for the protection of the rainforests. But he disagrees with the assumption of Greenpeace and UNEP (United Nations Environmental Programme) that palm oil plantations are the main driver of deforestation. 'With good farming practices in place, palm oil plantations can have positive impacts. On average the yields are 3.5 tonnes oil per hectare. With good farming practices this can be increased to 6 tons or even 10. We invite Greenpeace to participate in the constructive, results oriented dialogue we are pursuing with a number of NGOs to achieve Europe's biofuel targets in a truly sustainable manner.'

> *'We can mix crude palm oil with rapeseed oil and animal fats in different proportions'*

Transition

Greenpeace has urged the Finnish parliament to use the state's share in Neste Oil to stop using palm oil and adopt a moratorium on all palm oil for transportation purposes. 'The most significant way to reduce transport emissions is to make cars more efficient and to develop a low-carbon transport system', Suomela says. Instead of taking palm oil from developing countries such as Indonesia, Finland would do better to give one billion euros a year to developing countries by 2020, says Greenpeace. 'With that money they can better cope with the effects of climate change and reduce their greenhouse gas emissions by protecting their forests and developing clean energy.'

Neste Oil does see palm oil as a temporary feedstock. In the long run, it wants to minimise the use of food-based fatty acids in its biofuel production. 'There are three criteria for Neste Oil when using fatty acids', says Honkanen. 'Sustainability, availability and feasibility. It has got to have an impact on substantially lower greenhouse gas emissions and needs to be available in the right quantities on the market for a reasonable price. The challenge for us is to apply feedstock that uses the least amount of land. Good soil needs to be reserved for producing food. Therefore we are working with 23 research institutes around the world to develop new feedstocks, for instance through the gasification of wood residues into synthetic gas or into biobased wax or by producing fatty acids from algae. But it will take seven to ten years before we can apply this kind of feedstock on an industrial scale to make new types of renewable diesel. Until that time we will continue to use a mixture of animal fats and sustainably produced vegetable oils like rapeseed oil and palm oil for producing the best, cleanest renewable diesel in the world.' ■