



Moving up the value chain with Finnish biodiesel

Ab Feora, Nykarleby, Sweden

Case story



xxxxxxxxxx, says Ab Feora's CEO Peter Björkskog.

An innovative, high-efficiency Alfa Laval Ageratec biodiesel plant opened up profitable market opportunities for Ab Feora, a Finnish rendering plant.

Investment in improvement

Ab Feora operates a rendering/destruction plant designed for recycling slaughterhouse waste. An important part of the company's revenue stream originally came from rendering animal fat by-products into raw oil for export.

The company is a subsidiary of the Nyko-Frys Group (www.nykofrys.fi), one of the oldest animal feed companies in Finland. The Nyko-Frys Group has invested heavily in advanced technology to restructure its services to meet modern needs, to boost efficiency and to comply with the very latest environmental requirements.

As part of this Group strategy, and in order to help the company move further up the value chain, Feora decided to invest in a plant to convert rendered fat into EN14214-compliant biodiesel with a high commercial value. This biodiesel could be used to fuel road vehicles and machinery, and as heating oil.

Few suppliers capable

Prior to taking the actual purchasing decision in 2008, the Feora company undertook thorough investigations of the possible technologies, surveying the market and trying to find possible suppliers.

Very few suppliers were capable of supplying a small/medium-sized biodiesel processing set-up that could use degraded high free fatty acid (FFA) feedstock as raw material. Most suppliers of the kinds of technology required could only provide plants with extremely large capacity. Such approaches and such technologies were simply not feasible for a project of this size.

The technology available from Alfa Laval Ageratec was deemed much more suitable, and a contract was duly signed in June 2009. The new plant was commissioned and brought on line in the course of Q1 2010.

Consistent quality regardless of input

Alfa Laval Ageratec provided Feora with a PE8000 batch processing line with a capacity of 2,400 tons/year. This particular set-up features front-end acid esterification for

converting FFAs into biodiesel with minimal yield loss, and a two-step alkali transesterification set-up in which the remaining triglycerides are turned into biodiesel. The batch-type acid esterification reactor at the beginning of the process ensures processing efficiency regardless of poor-quality fat in the input, and despite fluctuating levels of FFAs.

The finished – but still crude – biodiesel is then refined using the patented ACA neutralization fluid along with Alfa Laval disc stack centrifuge technology for high-speed mechanical separation.

Water-free wash saves costs

The majority of the wash plants installed in conventional biodiesel plants use either extremely large quantities of water or ion exchange systems to treat the effluent.

By contrast, the combination of the patented water-free wash system and mechanical purification used in the Alfa Laval Ageratec biodiesel plant guarantees a production set-up that is free of all aqueous effluents – these are removed along with the glycerine component. For Feora, this means doing away with any need for costly recovery or distillation systems for replenished water, and there is no need to dispose of effluent via sewers and wastewater treatment facilities. Compared to conventional biodiesel wash systems, this results in big savings.

Similarly, there is no need for expensive purchasing, regenerating or disposing of the dry bed resin needed in traditional ion exchange systems.

Designed for energy efficiency

The PE8000 biodiesel plant installed for Feora also brings benefits from other key Alfa Laval technologies. For example, advanced heat exchangers are used for energy-efficient heating, cooling and condensing duties.

Any excess energy is captured and recycled, and any differences in thermal loadings are exploited to provide energy inputs. For example, a powerful heat pump system extracts thermal energy from the chilled water in the condenser cooling circuits, and this energy is then put to good use elsewhere in the process.

Commercial advantages

For Ab Feora, the prime commercial benefit stems from the considerable added value generated by producing and selling fuel as a fully processed end-product – instead of merely delivering raw oil with only limited sales value.

Another tangible benefit derives from the fact that the PE8000 biodiesel production process expels about 13% glycerol, which is now used to feed Feora's biogas plant. Here it serves as an excellent catalyst for the digesting process, boosting pH levels, improving digesting efficiency and increasing methane outputs.

The community benefits, too

The energy-efficiency of the new Feora biodiesel plant makes a big contribution to reducing the carbon footprint of the company's slaughterhouse waste rendering activities. And it helps the Finnish government achieve its goals for renewable fuel.

It also provides important benefits for the local community. Feora is now able to recycle 100% of the locally sourced animal fat – regardless of quality or specifications – into biodiesel, and this can be used as fuel for the local plant for generating the steam and hot water needed by the rendering plant and other facilities. This in turn does away with the need to truck in fuel supplies from further afield, with the pollution and traffic burdens this entails.

The community also benefits from there being only very limited smoke emissions, and the lack of sulphur ensures a better working environment for Feora staff.

Complying with the right standards

Two major standards are used for the quality assurance of biodiesel – EN 14214 in Europe and ASTM D6751 in the USA. Most countries use one of these standards or a combination of both – often with some local adaptations.

The parameters used in such quality assurance standards can be roughly divided into two groups – those that are process related and those related to the raw materials used. Any company producing biodiesel has to be keenly aware of the differences, and of the practical implications.

Expert advice makes a key commercial difference

For a plant like Feora, which uses animal fat as raw material, the key parameters lie in the sulphur content and the fatty acid methyl ester (FAME) content. Biodiesel made from animal fats is distinctive for containing long C17-methyl esters, and this can give problems in securing recognized compliance with EN 14214.

However, in this case Alfa Laval Ageratec experts were able to advise Feora staff on how best to ensure the EN 14214 quality recognition that is essential for commercial success.

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How to contact Alfa Laval

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