MAN Diesel & Turbo Runs on Biofuels

Powerful engine turns waste into electricity

Executive summary

Commissioned in early 2007, the power plant operated by Electrawinds Biomassa Mouscron SA in Mouscron, Belgium, marks a milestone. Using biofuel made from waste oils, the cogeneration facility feeds a significant quantity of electricity into Belgium's national grid, with remarkably high efficiency. This pioneering plant is powered by a mighty MAN Diesel & Turbo large medium-speed engine.

Challenge

In 2005, Electrawinds, a renewable energy provider, was looking to significantly boost its output. In addition, it wanted to take advantage of an incentive offered by the Belgian government: a carbon dioxide trading scheme that rewards the use of CO_2-neutral fuel with special certificates. What Electrawinds had in mind was unprecedented: a commercial-scale cogeneration power plant fuelled by a blend of waste oils.

Solution

Electrawinds turned to an experienced partner with proven technology. MAN Diesel & Turbo has been running engines on biofuels since 1994, and its biofuel-driven power plant has been operating successfully since 2001.

For the plant at Mouscron, MAN supplied the highest-powered four-stroke engine in its range, an 18-cylinder, 18V48/60 behemoth. This giant engine runs efficiently on a blend of pre-refined vegetable oils and animal fats.

Several times a week, these substances are delivered to the plant, where they are stored in purpose-built tanks. Also located on the premises is a processing works owned and operated by Electrawinds. Here, the waste oils are heated and put through a three-stage fine filtration system. This relatively simple treatment is enough to make them suitable for use in MAN's heavy-duty engine.

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The engine, with an output of 17.7 MW, powers a generator that supplies electricity to the local grid. In addition, the engine's exhaust gases and coolant generate an additional 14 MW of thermal energy. This is partly used in the plant, for example to heat the fuel during processing. But it is also put to good use warming a nearby pool and leisure centre.
As a further environmentally friendly measure, the Mouscron plant is fitted with selective catalytic reduction (SCR) to control emissions of nitrogen oxides (NO_x). All bio-fuel and cogeneration plants built by MAN Diesel & Turbo and its partners include this sophisticated green technology. These systems incorporate a downstream oxidation catalyst which eliminates ammonia slip.

Benefits

Although waste oils are cheap and plentiful, making them an attractive source of energy, biofuels were formerly seen as difficult to use on a large, commercial scale. Mouscron is proof that MAN Diesel & Turbo's robust large medium-speed engines make this possible. Supplying an impressive 44,000 households, the facility reduces Belgium's CO_2 emissions by thousands of tonnes a year.

That earns revenue for Electrawinds under the Belgian government's carbon trading scheme. And because additional thermal energy is supplied to the pool and leisure centre, the Mouscron facility qualifies as a high-efficiency plant. As a result, Electrawinds receives additional financial incentives.

And that's not just some technicality. Reaching an impressive overall level of 85%, the Mouscron plant really is highly efficient.

Project data

Customer:	Electrawinds Biomassa Mouscron SA
Location:	Mouscron
GenSet:	18V48/60B
Outputs:	17,7 MW electrical 14,0 MW thermal
Overall efficiency:	85%
Fuel:	Organic waste oils and fats
Fuel conditioning:	Heating, 3-stage fine filtration
Recovered heat utilization:	Fuel conditioning- Space heating Heat for local swimming pool
Order:	03-2006
Taking-over:	03-2007
Country:	Belgium

MAN Diesel & Turbo
86224 Augsburg, Germany
Phone +49 821 322-3897
Fax +49 821 322-1460
powerplant@mandieselturbo.com
www.mandieselturbo.com