Green Power

Maximum benefit from liquid biofuels

Engineering the Future – since 1758.

MAN Diesel & Turbo

MAN Diesel & Turbo

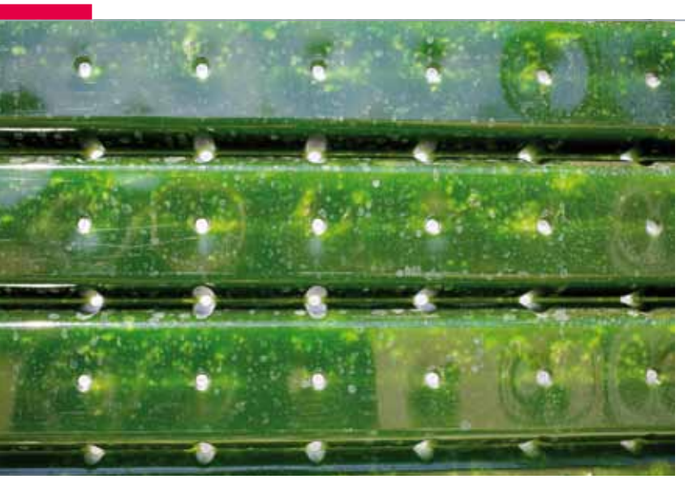
A proven track record in green power

There is no better partner for green power than MAN Diesel & Turbo. We were pioneers in this specialised field over a century ago. Today, green power is a key focus for our business. We have established a track record second to none: our engines operate efficiently and reliably with a variety of biofuels, and we have a long list of satisfied green power customers.

Why are our engines so efficient and reliable? Our focus on quality is legendary. Our engines are almost entirely designed and built at our own facilities, giving us unbeatable hands-on control and visibility. That translates into more uptime and less maintenance.

Whether stand-alone engines, gensets or turnkey power plants, we create one-stop solutions that precisely meet your needs. We offer a true partnership: expert advice and lifelong support. And whenever and wherever you need it, our global network of service hubs delivers expert, rapid on-the-spot assistance.

Why Go Green?



Microalgae

Rapeseed

Cooking Oils

Soy Bean

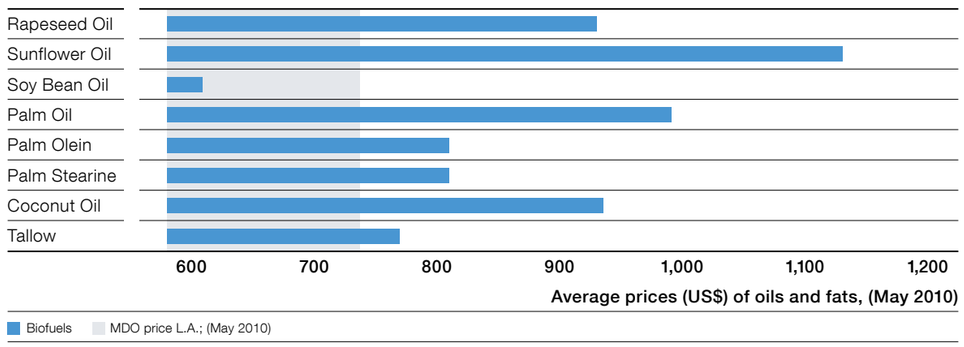
The BIOCLEAN study validated the use of biofuels: they are clearly suitable for large medium speed diesel engines. This study was published by DLR, Öko Institut, the German Federal Ministry for Education and Research (BMBF) and MAN Diesel & Turbo in 2010. Biofuels generate less CO_2 and considerably lower particle emissions than HFO, and emit practically no sulphates. According to the simulation, widespread use of biofuels could slash CO_2 emissions by up to 60 per cent by 2050 - reducing climate change by 30 per cent. But the certification of the sustainability of the used biofuels is essential. If those biofuels were sourced from cleared rainforest, emissions would rise dramatically.

And, as our customers have found, going green covers financial as well as environmental benefits. Instead of needing expensive and unpredictably priced fossil fuel, biofuel engines can be run using waste products, such as cooking oil or animal fat.

Even better, biofuel engines can be run for Combined Heat and Power (CHP). By harnessing the thermal energy that is a by-product of generating electrical energy, these systems achieve exceptional levels of efficiency. In other words, CHP, or cogeneration as it is also known, saves even more money, saves even more energy and is even better for the environment.

For these reasons, projects based on biofuels are often eligible for subsidies and support programmes. MAN Diesel & Turbo can help customers to capitalise on the assistance available.

Available biofuels USD per ton



Why Choose MAN Diesel & Turbo?

Engines and power plants

MAN Diesel & Turbo's longstanding reputation for efficient, reliable and pioneering engines is something we are proud of – so we strive to uphold it.

Biofuel expertise

MAN Diesel & Turbo is famous for its diesel engines. As you might know, the inventor of the diesel engine, Rudolf Diesel, actually worked for MAN, over a century ago. Already back then, his engine ran on peanut oil. And we have maintained our talent for innovation, especially when it comes to green power. More recently, MAN Diesel & Turbo has played a pivotal role in heralding a new era in biofuel power generation. And, with our commitment to developing green technology, we continue to be at the forefront of new developments.

Enduring quality

To ensure our products continue to meet our stringent standards, our engines are still produced by our skilled employees at our own facilities. We therefore have total visibility into each and every step of the manufacturing process – and we understand each and every step. The result is exceptional products that offer the dependability and efficiency essential for a robust return on any green power investment.

Our Commitment to Green Technology

As one of the world's leading manufacturers of large-bore diesel engines, we take our corporate responsibility to the environment seriously. Every year, MAN Diesel & Turbo invests millions of euros in the research and development of green technology. That keeps us at the cutting-edge of the green power business.

More output, less fuel

With the aim of reducing fuel consumption and cutting emissions, we are continually working to make our engines even more efficient. That means producing more output from less fuel. So it also makes them more cost-effective, which naturally benefits our customers.

Making use of waste

Our pioneering work on waste products is another example of our commitment to green technology producing dividends for our customers. Waste products offer a sustainable source of biofuel that does not come at the expense of food production. However, waste substances are not easy to work with. For example by creating especially durable components for our engines. The result is a cheap and plentiful source of fuel for our customers, as well as an environmentally-friendly one.

Engines that Deliver

Efficiency, reliability and durability

Flexibility

Various MAN Diesel & Turbo engines can be delivered in biofuel execution and will run on a wide array of biofuels: animal fat, palm oil, frying fat, and much more.

Independence

Because MAN Diesel & Turbo green power engines will run so efficiently on so many kinds of fuel (including conventional fossil-fuel diesel), our customers can keep their plants running under almost any circumstances. If one kind of fuel becomes difficult to obtain, or prices move beyond reach, you can simply switch to another source of fuel. If necessary, the engines can quickly and easily be retrofitted.

Efficiency

Changing fuels does not put productivity at risk. Even on difficult fuels, our engines can achieve extremely high efficiencies. MAN Diesel & Turbo biofuel engines are so efficient that they may even generate surplus power, which can be sold to electricity utilities.

For maximum efficiency, our biofuel engines can be used for CHP, providing heat as well as power. Examples include district heating for homes and office blocks, or warm water for swimming pools or leisure centres.

Low emissions

When fitted with our advanced Selective Catalytic Reduction (SCR) technology, our biofuel engines produce remarkably low emissions. This enables power plants to comply with strict national guidelines or fulfil criteria for subsidies.

Reliability and durability

Our engines are also famously reliable. They require very little maintenance, which minimises unproductive downtime. And they are built to last, even under the toughest of circumstances. As a consequence, our customers are free to concentrate on their core business.

Biofuel engines

Engine type	Speed r/min	Engine power (MW)
48/60	500 – 514	
32/40	720 – 750	
V28/32S	720 – 750	
L27/38	720 – 750	
L21/31	900 – 1,000	

Turnkey Power Plants

Built to your specifications

MAN Diesel & Turbo does not merely build engines. We can provide turnkey solutions for power plants in excess of 50 megawatts.

From start to finish

Our expertise covers the whole process of planning, constructing and operating a green power plant. We have the technology, but we also know the suppliers, the local legal and regulatory framework, and the subsidies and incentives available. We can advise on the economic feasibility as well as the technical challenges presented by a potential new project.

Constructed by experts

A special project team, comprising a mix of global and local experts, is formed to develop an integrated, tailor-made solution for each project. As a result, each project receives the benefits of both in-depth experience of power plant design and construction and relevant local understanding.

Smooth operation

Once we have built the plant, we can even operate it, so our customer can focus on their core business. We take care of everything, including staffing the plant, day-to-day operation and maintenance, troubleshooting, performance reporting and general logistics.

Lifelong support

With the benefits of MAN Diesel & Turbo's quality service, our customers can also run the plant themselves, without any difficulty.

Experience that Counts

Tried and tested technology

A green power plant is a significant investment. With MAN Diesel & Turbo, this investment is in safe hands.

An unbeatable track record

We have ten years' hands-on experience with modern day green power generation stations that have proven to be economically viable, operationally robust, and environmentally friendly. In other words, our plants are in solid long-term operation.

With all kinds of plants

Each of these plants has been successfully built to meet specific requirements. This includes plants working smoothly with types of biofuels that have a reputation for being difficult, such as animal fat. We can provide solutions for particular fuels, or other special needs.

Including combined heat and power

Our solid track record in project execution includes extremely efficient combined heat and power plants. Our expertise means we do not need to call on any external specialists for assistance or form costly joint ventures. That minimises costs and potential complications.

Our long list of references is proof positive that we can deliver on our promises. You will find just a few of our many success stories on the following pages.

Reference

Fritzens

Fritzens, Austria, 6L21/31

Fritzens: Operating on waste and CHP

Working closely with local authorities in Fritzens, in the Austrian Tyrol region, MAN Diesel & Turbo has delivered an innovative project that meets multiple needs. The 1,130 kW power plant powered by our 6L21/31 medium speed engine has been operating successfully since 2004, combining waste disposal and highly-efficient combined heat and power generation.

The diesel generator, located at the local garbage disposal and sewage works, is powered by an unusual fuel: used cooking oil. Residents and restaurants in the area collect their used cooking oil in resealable plastic containers. Around 1,800 tonnes of old oil and fat are collected each year, enough to supply around 3,500 households with electricity.

What's more, the waste heat generated by burning the oil is also put to use, heating the building and drying sewage sludge. The latter is then granulated and burned, powering a nearby cement works – neatly compounding the fossil fuel savings.

Further references

Customer	Country	Engine type	Power output	Biofuel
Fritzens	Austria	1x 6L21/31	1,128 kW	used cooking oil
Emacon	Austria	1x 7L28/32H	1,470 kW	used cooking oil
SPE Harelbeke	Belgium	8x 14V52/55	85,000 kW	vegetable oil
Electrawinds Mouscron	Belgium	1x 18V48/60	17,500 kW	tallow
Electrawinds Oostende	Belgium	2x 18V32/40	17,000 kW	tallow
Electrawinds Biomassa	Belgium	1x 18V48/60	17,500 kW	tallow
BRAKE	Germany	1x 7L35MC-S	4,500 kW	CPO TAN 15
Termoindustriale 7	Italy	1x 9L27/38	2,970 kW	stearin
Termoindustriale 7	Italy	1x 9L27/38	2,560 kW	stearin
Termoindustriale 6	Italy	1x 8L27/38	2,970 kW	stearin
Termoindustriale 8	Italy	1x 8L27/38	2,345 kW	stearin
Termoindustriale 5	Italy	1x 8L27/38	2,640 kW	stearin
Termoindustriale 5	Italy	1x 8L27/38	2,640 kW	stearin
Termoindustriale 4.1	Italy	1x 8L27/38	2,640 kW	stearin
Termoindustriale 4.2	Italy	1x 8L27/38	2,640 kW	stearin
Termoindustriale 2.1	Italy	1x 9L27/38	2,726 kW	stearin
Termoindustriale 2.2	Italy	1x 9L27/38	2,726 kW	stearin
Termoindustriale 3	Italy	1x 9L27/38	2,726 kW	stearin
Termoindustriale 1	Italy	1x 8L27/38	2,432 kW	stearin
Termoindustriale 1	Italy	1x 8L27/38	2,432 kW	stearin
DIUSA	Italy	1x 7L28/32H	1,470 kW	tallow, TAN to 40
DIUSA	Italy	2x 18V28/32S	3,800 kW	tallow, TAN to 40
OXON-MEZZANA Bigli Plant	Italy	1x 18V32/40	8,300 kW	stearin
Palomonte	Italy	1x 18V32/40	8,300 kW	stearin
TOPEC 1	Netherlands	1x 18V28/32S	3,768 kW	CPO TAN 15
TOPEC 1	Netherlands	1x 18V28/32S	3,768 kW	CPO TAN 15
VANUATU	Vanuatu	2x 9L32/40	7,300 kW	diesel/coconut oil

World Class Service

Expert advice and assistance

PrimeServ – peace of mind for life

With more than 150 PrimeServ service stations and service partners worldwide and our growing network of PrimeServ Academies, MAN Diesel & Turbo is committed to maintaining the most efficient, accessible after-sales organisation in the business.

PrimeServ's aim is to provide:

- Prompt, OEM-standard service for the complete life cycle of an installation
- Tuition and qualification of service personnel at our PrimeServ Academies to maximise the plant's availability and viability
- Rapid, global availability of genuine, quality-assured MAN Diesel & Turbo spare parts via local outlets or our 24 hour hotline.

PowerManagement by MAN Diesel & Turbo

Complementing the PrimeServ after-sales offering is the MAN PowerManagement concept.

MAN PowerManagement packages provide integrated support solutions for all aspects of running a power or co-generation plant. Individually negotiated agreements can cover assistance with – or delegation of – the management of all mechanical, electrical and thermal equipment. This gives the power plant operator comprehensive access to the technology, experience, best practices and professional resources of MAN Diesel & Turbo.

In short: PowerManagement by MAN Diesel & Turbo allows you to benefit from our specialist expertise in running a power plant while you concentrate on your core business.

D2366313EN-N8 Printed in Germany GMC-AUG-08122

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

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