

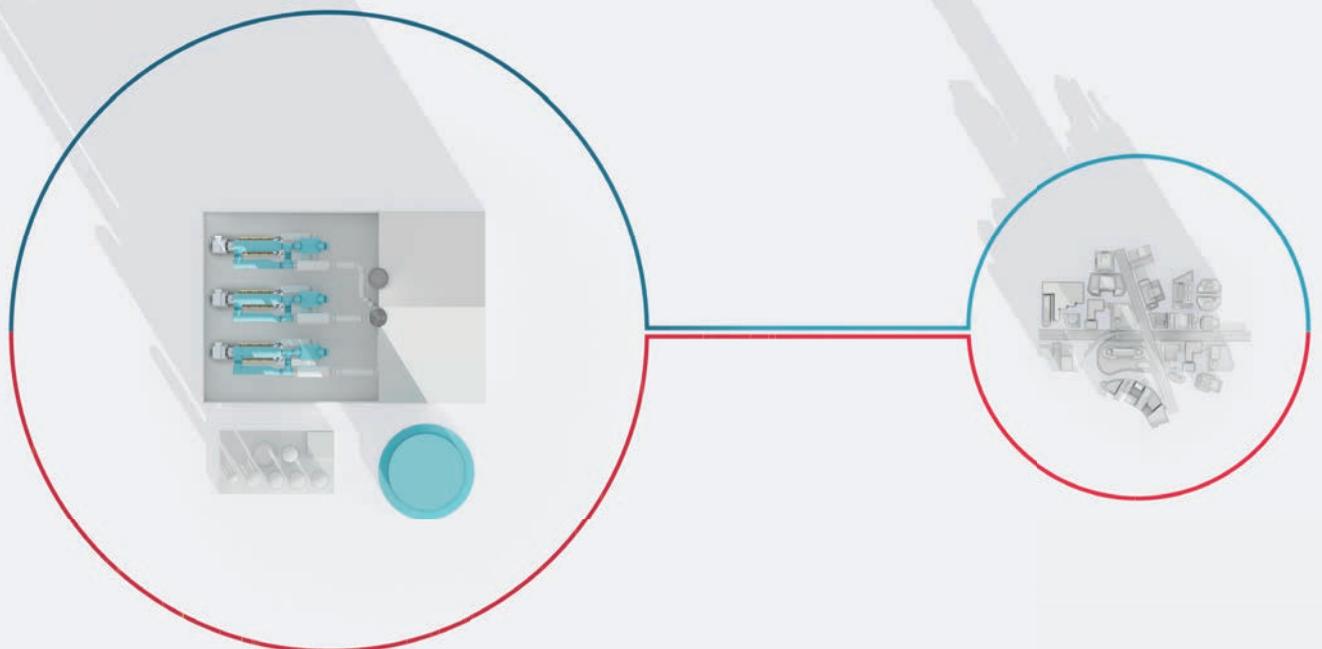
# MAN CHP

## Engine combined heat & power plants

Combined heat & power plants meet the world's growing demand for sustainable energy by simultaneously generating electricity, heat, and cold from a single fuel source. The technology is well-established, highly efficient, cost-effective and environmentally friendly. MAN engine-based CHP solutions are ideal for businesses that focus on electrical power generation and hot water production.

### Benefits at a glance

- Optimized fuel efficiency of up to 95 %
- Excellent fast-start and low-load capability
- Modular concept for high operating efficiency and easy expansion
- Trigeneration capability (electricity, heat, and cold)
- Multi-fuel capability





# Turning waste heat into value

## Cost-effective cogeneration

Cities, utilities, and industries require flexible energy supplies that ensure the constant availability of electricity and heat or cold. And while the demand for energy grows, as does the demand for environmental responsibility and cost-effectiveness.

CHP, also known as cogeneration, is the simultaneous production of power and thermal energy from a single fuel source, offering a practical solution to the challenging conditions of the energy market. Cogeneration is a highly efficient form of energy conversion and it can achieve primary energy savings of approximately 40 % compared to the separate purchase of electricity from the national electricity grid and operating a gas boiler for on-site heating.

CHP plants can also reduce the overall CO<sub>2</sub> emissions and help achieve climate protection targets in many regions worldwide. They are typically located close to the end user and therefore help reduce transportation and distribution losses, improving the overall performance of the electricity transmission and distribution network.

## General competence

MAN CHP solutions convert the waste heat generated in gas or diesel engines into useful energy. The waste heat extracted from the exhaust gas, engine jacket water, engine lube oil and charge air cooling circuits can be used to heat water. This form of thermal energy can then be used in applications such as district heating and industrial processes.

The high power density of the engine modules means that MAN CHP power plants are compact, with a short erection time, and can easily be extended when more power is needed. Maintenance is easy and cost-effective thanks to customized service concepts.

MAN CHP plants are designed to meet the overall demand of the end consumer and can easily adapt to changing electrical and thermal requirements throughout the year.

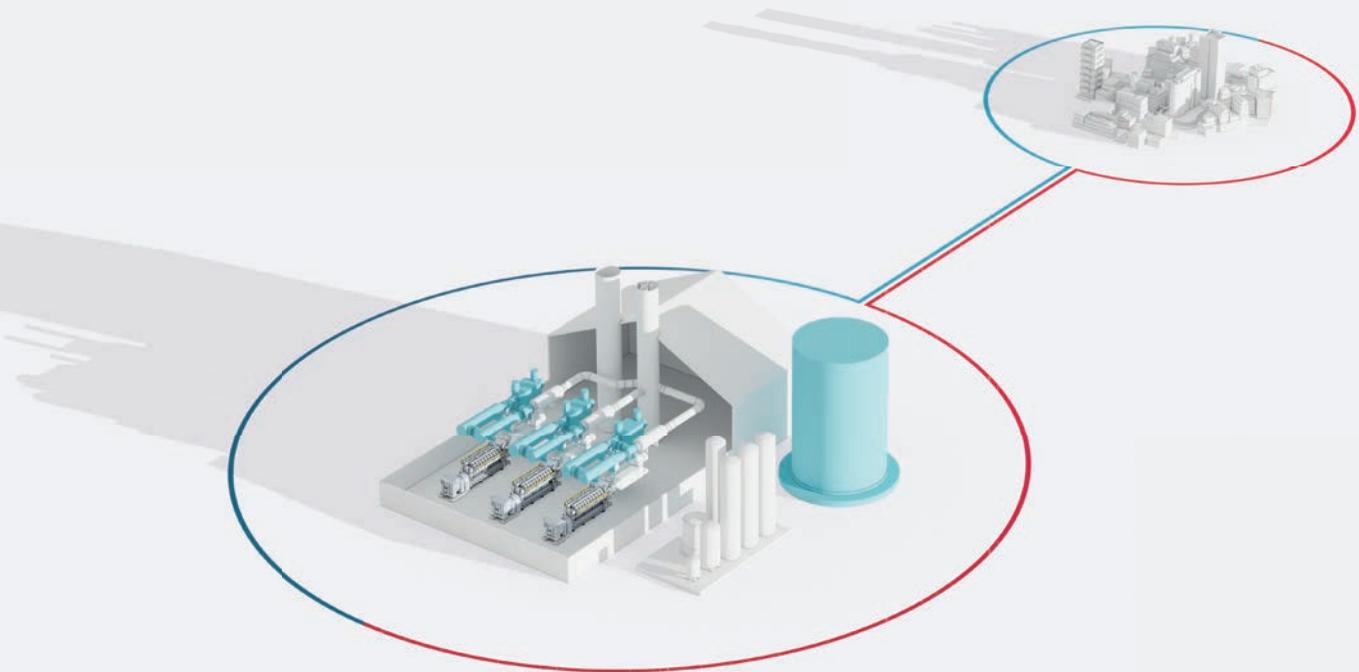
Every combined heat & power plant is unique. We help customers to find the optimal solutions for their specific challenges. One of our key skills is the integration and optimization of various systems to provide a complete solution.

## System solutions

MAN CHP power plants are an economical solution for electricity, district heating, and process heating or cooling. MAN engines can convert practically all of the input energy, achieving fuel efficiency levels of up to 95 %. Continuous partial-load operation and low-load operation down to 15 % load are possible.

Our solutions are suitable for different fuel sources thanks to a wide range of gas, liquid fuel and dual fuel engines. This includes biofuels and carbon-neutral gases such as synthetic natural gases and/or mixtures of hydrogen.

Compared to conventional electrical generators and on-site boilers, MAN CHP plants lower emissions considerably. MAN engines are clean and comply with international environmental requirements. Using gas reduces emissions drastically when compared to other fossil fuels.



## Key applications

Our engine-based combined heat & power solutions are ideal for businesses focused on electrical power generation and hot water production, i.e. where the power-to-heat ratio is higher than 0.8.

For companies focused on thermal energy at high temperatures (power-to-heat ratio lower than 0.8), we provide highly efficient gas-turbine-based CHP solutions.

### District heating

As cities expand, the new residential areas, shopping opportunities, leisure facilities and industrial zones demand their share of energy. Whereas conventional power plants normally waste exhaust heat from power generation, district heating uses it by feeding it into a network of insulated water pipes.

### Cooling

The waste heat from the engine can also be turned into cold. By including an exhaust gas or hot-water-driven absorption chiller, MAN CHP plants can produce chilled water to run central air conditioning systems in hospitals, data centers, hotels and office blocks.

### Process heat and cold

Approximately two-thirds of the energy consumed by industries is used for generating process heat and cold. At the same time, up to half of the energy consumed for power production ends up as waste heat. MAN CHP plants can use this heat for your industrial processes and lower your energy costs and emissions.

### Peaking plants

Engine-based combined heat & power plants are the best solution for a flexible change in operation between power generation and heat production. In warm periods where there is no heat demand, the fast-starting gensets can be used as a peaking plant, ensuring emergency availability and adding security to your grid. With fast ramp-up times and a multi-fuel capability, MAN CHP plants can easily compensate for fluctuations caused by renewable energy sources or seasonal changes in power demand.

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