

Kraftwerke Mainz-Wiesbaden AG

CASE STUDY



Enabling KMW AG to operate profitably in the increasingly volatile power market and provide climate-friendly district heating to the community. Owing to the broad use of renewable energy sources as well as the utilisation of power generation for district heating, Germany has become one of Europe's forerunners in the development of its energy system.

The municipal energy producer Kraftwerke Mainz-Wiesbaden AG (KMW) recognises the benefits that greater flexibility in the generation of conventional power offers, as the share of renewables in the system steadily increases. Not only does this flexibility guarantee reliable power supply, but it also enables KMW AG to operate profitably in short-term power markets.

Wärtsilä's fast-acting engine power plant enables KMW AG to operate the plant

in short-term markets with competitive prices, resulting in a new revenue stream for the company. Furthermore, KMW AG is complying with the renewed Combined Heat and Power (CHP) Act, whereby Germany has committed to increasing its share of electricity produced by CHP power plants to 25% by 2025. To meet this target, the act favours flexible and environmentally-friendly CHP power plants.

“Unlike traditional CHP power plants based on coal-fired units or gas turbines, Wärtsilä gas engines can be started and stopped without limitations within just 2 minutes. This is our answer to the increasingly volatile power market that results from greater levels of renewable energy. It makes us the future partner of renewables.”

*Jörg Höhler, CTO
at Kraftwerke
Mainz-Wiesbaden AG*

Growing share of renewables in German and European power system

The “Energiewende”, Germany’s plan for its energy transition, has ambitious targets for expanding the use of renewable energy sources. By 2050, Germany aims to have 80% of its energy produced by renewables. At the same time, the plan outlines actions that support technological developments and strengthen energy security. The continued and strong addition of renewables, as stated in the plan, is particularly interesting. It aims to make Germany’s energy system more sustainable and to drastically lower its greenhouse gas emissions. On the other hand, the intermittency of renewable power will also create a need for more flexible generation of conventional power.

Intermittency is best balanced by flexible power generation, such as Wärtsilä’s Smart Power Generation technology. To date, intermittency shapes the pricing structure within EEX (the European Energy Exchange). In the future, fluctuations in price determinants will favour fast-acting generation.

In response to this change in the market, Kraftwerke Mainz-Wiesbaden AG has built a state-of-the-art engine power plant supplied and maintained by Wärtsilä. With the fast-starting power plant, KMW is able to sell its electricity to the EEX when pricing is favourable.

Combined heat and power – a vital part of the energy system

As noted above, Germany has committed to increasing its share of electricity produced by CHP power plants to 25% by 2025. This implies that the vast majority of new plants in power generation will need to produce district heating as well as power. KMW AG supplies the city of Mainz with power and district heating – the latter reaching approximately 40,000 households. **Stephan Krome**, CFO, notes: “The combination of the company’s current assets and the coming Wärtsilä CHP plant allows us to supply the citizens of Mainz with the most efficient and affordable district heat.”

A full EPC delivery with a lifecycle solution

Wärtsilä’s scope of service covers engineering, procurement and construction

(EPC), as well as a comprehensive 15-year maintenance agreement that guarantees availability and reliability of the plant. Wärtsilä provides a range of maintenance services, including on-site support and online monitoring. The latter is conducted via Wärtsilä’s Asset Diagnostics combined with expert analyses. It monitors the condition of the equipment and identifies instant maintenance needs. The use of Asset Diagnostics ensures safe and reliable operation. This increases the availability of the plant and allows for better predictability of operations. Wärtsilä ensures that KMW AG has the required capacity available when needed, for instance during periods of increased demand in the winter.

Stephan Krome adds: “We sought an EPC delivery and a complete maintenance agreement. With Wärtsilä, we now have a competent and strong partner on our side for the next 15 years.”

KEY DATA

CUSTOMER:

Kraftwerke Mainz-Wiesbaden AG

TYPE: Wärtsilä 34SG based CHP plant

OPERATING MODE: Combined heat and power, operating in the reserve markets

GENSETS: 10 x Wärtsilä 20V34SG

TOTAL OUTPUT: 100 MW for power + up to 96 MW for district heating

FUEL: Natural gas

SCOPE: EPC (engineering, procurement and construction) and a 15-year maintenance agreement with performance guarantees. The maintenance agreement also includes online monitoring and support.

DELIVERED: 2020

THE CHALLENGE	WÄRTSILÄ’S SOLUTION	BENEFITS
The need to generate power profitably in a market with increasing levels of renewables	A 100 MW flexible engine power plant that allows for benefitting from volatile power prices	Reliable district heat and power supply to the city of Mainz and revenues from short-term trading
Financial and timing risks in construction	Full EPC delivery	As EPC supplier Wärtsilä takes full responsibility for both timelines and costs
Power plant availability and reliability throughout the lifecycle	A comprehensive 15-year maintenance agreement	Guaranteed performance, predictability of operations and optimised maintenance

