

Kraftwerke Mainz-Wiesbaden AG

CASE STUDY



Smart Power Generation in Germany – 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 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."

Dr. Lars Eigenmann,
CEO at Kraftwerke
Mainz-Wiesbaden AG

KEY DATA

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-Weisbaden AG is building a state-of-the-art Smart Power Generation plant supplied by Wärtsilä. With its new fast-starting power plant, KMW AG will be 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. Dr. Lars Eigenmann, CEO at KMW AG, 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 turnkey delivery and maintenance agreement

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 condition based maintenance concept (CBM), combined with expert analyses. It monitors the condition of the equipment and identifies instant maintenance needs. The use of CBM 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.

Dr. Eigenmann 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.”

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_e + up to 96 MW_{th}

FUEL

Natural gas

SCOPE

EPC and a 15-year maintenance agreement with performance guarantees. The maintenance agreement also includes online monitoring and support.

DELIVERY

Heating period 2018

CHALLENGE	WÄRTSILÄ'S SOLUTION	BENEFIT
Profitable power generation in a market with increasing levels of renewables	A 100 MW ultra-flexible Smart Power Generation 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	One EPC supplier with full responsibility for both timelines and costs
Professional maintenance of the power plant over a long period of time	15-year maintenance agreement that guarantees availability and starting reliability.	Guaranteed availability of power plant due to condition based monitoring



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