



Energy intelligence Guaranteed asset performance

WÄRTSILÄ SERVICES BUSINESS WHITE PAPER

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Energy intelligence is about optimising lifecycle costs and ensuring efficiency, which can be done by using all assets in the most efficient and sensible way.

However, this is not always enough. Being able to guarantee the reliability as well as efficiency of the power plant – and to ensure that the plant reaches the agreed performance targets – is becoming increasingly important. Digital technologies, data intelligence and human expertise play an important role in making all this possible.

There are many ways to improve the energy efficiency of a power plant – from an upgrade of a single component to a complete lifecycle solution that includes asset performance guarantees and jointly agreed KPIs for measuring success. In today's power generation, the use of renewables as a method of increasing energy efficiency is also increasing.

This Business White Paper illustrates the role and importance of performance guarantees when considering the ways of improving a power plant's energy efficiency during its whole lifecycle.

CONTENTS

New trends re-shaping the energy industry	3
How to improve energy efficiency with Guaranteed asset performance	4
Wärtsilä's energy efficiency offering	7

New trends re-shaping the energy industry

NEW TRENDS are re-shaping the energy industry. The importance of energy efficiency continues to increase. An investment in energy efficiency creates significant commercial, operational and environmental benefits. It decreases fuel costs, increases the efficiency of operations, lengthens the lifecycle of the plant and reduces emissions. It is also a way of future-proofing operations and increasing brand value.



Renewable energy is gaining popularity because it is often financially the most attractive option. This changes industry dynamics and creates demand for flexible power generation that enables more renewable energy generation.



Load balancing power plants are needed to ensure that energy output meets demand. Renewable energy is gaining popularity because it is often the cheapest form of energy. However, it is still subject to weather conditions, resulting in fluctuations in energy production. Energy storage systems and fast-response, load balancing plants are needed for frequency control and for ensuring that the total energy output meets the demand.



More stringent environmental regulations and an increasing focus on people's health call for emission reduction and stimulate renewable growth. Climate change and the increase of more extreme weather conditions are putting pressure on reducing CO₂ emissions globally.



Digitalisation: predicting power demand and maintenance needs. As digitalisation advances, collecting and analysing data is becoming the norm. With this information, power demand and plant's maintenance needs can be forecasted more accurately, and their operations adjusted accordingly. Services enabled by digitalisation also make it possible to guarantee the reliability and efficiency of assets.



The role of consumers in energy production is growing. Consumers are already showing interest in producing their own electricity and selling the surplus, becoming "prosumers". This trend will only strengthen as new small-scale solar and wind technology becomes more easily available and affordable. Also communities are influencing their energy mix via policies and by putting pressure on the status quo.



Adoption of electric cars could create demand peaks when a large number of cars are charged simultaneously. This can be avoided via programs that allow vehicle owners to opt into delayed charging and other grid services that enable participation of electric cars in the grid operation.

How to improve energy efficiency with Guaranteed asset performance

THERE ARE many ways to improve the energy efficiency of a power plant – from the upgrade of a single component to a complete lifecycle solution with asset performance guarantees and jointly agreed KPIs for measuring performance.

When evaluating the need for asset performance guarantees there are many things to consider. Finding answers to the following questions can help in the decision-making process:



Sometimes, answering these questions is straightforward. More often it is not. A thorough discussion is always needed to find the most suitable solution for each case.



Energy efficiency improvement is not a one-off operation but **a continuous process**

Guaranteed asset performance

Wärtsilä Guaranteed asset performance is a solution in which Wärtsilä guarantees the operational reliability of a power plant. Performance targets are set together with the customer, and Wärtsilä ensures that they are reached by providing advanced performance analytics services combined with advisory and planned maintenance services that keep the equipment in good condition and prevent disruptions.

Wärtsilä Energy efficiency management service

When it comes to improving energy efficiency while guaranteeing asset performance, Wärtsilä Energy efficiency management service comes into play. With this service, the power plant operator can monitor fuel efficiency, benefit from remote operational support offered by Wärtsilä's Expertise centre and enjoy the benefits of performance guarantees.

The first step is the establishment of remote heat rate monitoring. Based on the monitoring data, experts provide advice and recommendations to the customers' operators. This ensures that the heat rate is always kept at an optimal level. Wärtsilä also guarantees that the heat rate will remain within this optimal, mutually agreed window.

One of the key outcomes of a solution such as Wärtsilä Guaranteed asset performance is continuity. Wärtsilä constantly monitors the level of energy consumption and provides advisory services to the power plant operators in order to optimise energy efficiency. A continuous performance improvement plan is updated regularly as new potential products and solutions become available in the market.

Wärtsilä Guaranteed asset performance can be applied to complement technological upgrade projects or new installations, supporting the investment for a longer time and extending the guarantee period of the original project.

KEY BENEFITS of Guaranteed asset performance

- Guaranteed operational reliability
- Maximized uptime through Wärtsilä Maintenance management
- High efficiency and productivity throughout lifecycle partnership
- Long-term cost predictability and shared goals

Case: Kraftwerke Mainz-Wiesbaden – guaranteeing the availability and reliability of a power plant in the increasingly volatile power market



GERMANY has become one of Europe's forerunners in the development of its energy system. With the share of renewables in the energy system steadily increasing, the municipal energy producer Kraftwerke Mainz-Wiesbaden AG (KMW) recognised the benefits that greater flexibility in the generation of conventional power could offer.

KMW commissioned Wärtsilä to carry out an extensive engineering, procurement and construction (EPC) project to build a state-of-the-art Smart Power Generation plant. With its new fast-starting power plant, KMW will be able to sell its electricity to the European Energy Exchange (EEX) when pricing is favourable. Furthermore, KMW 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.

In order to guarantee the availability and reliability of the plant, KMW and Wärtsilä signed a comprehensive 15-year maintenance agreement. Under the agreement, Wärtsilä provides a broad 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. Wärtsilä monitors the condition of the power plant's 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's energy efficiency offering

When running a power plant, optimising lifecycle costs and ensuring efficiency is crucial. But in today's energy generation market, you must go a step further. As the importance of renewable power generation is growing, the need for flexible, fast-response power plants and energy storage systems is increasing as well – and so is the need for guaranteeing the performance of these power plants and energy storage systems. The availability and performance guarantees offered by Wärtsilä ensure asset performance and availability of the required capacity. Always.

Wärtsilä has a broad range of solutions for improving the energy efficiency and guaranteeing the performance of a power plant:

- Guaranteed asset performance - a lifecycle solution with performance guarantees
- Power plant lifecycle upgrade
- Power plant gas conversions
- Power plant combined cycle upgrade
- Engine and turbocharger upgrades

For more information, please visit <https://www.wartsila.com/services/services/lifecycle-solutions-for-energy>

Wärtsilä's smart energy vision

- The energy landscape is in transition towards more flexible and sustainable energy systems. **We envision a 100% renewable energy future.**
- Wärtsilä is leading the transition as the **Energy System Integrator** – we understand, design, build and serve optimal power systems for future generations.
- Engines and storage will provide the needed **flexibility** to integrate renewables and secure **reliability**.

Wärtsilä Services in brief

Wärtsilä Services provides high-quality lifecycle services that enhance customers' business. Its broad range of services supports both shipping and power generation companies, whenever and wherever needed. Solutions range from spare parts and basic support to ensuring the maximised lifetime, increased efficiency and guaranteed performance of the customer's equipment or installation – in a safe, reliable, and environmentally sustainable way.

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