

# Energy management in manufacturing

Manufacturing industry company uses proof of concept for energy management from the AWS cloud



**“The cloud-based, end-to-end energy management system has given the customer a solid foundation for sustainability.”**

Ingo Müller, T-Systems

The Green Deal is the EU initiative to do its part to stop global warming. Its targets: reduce CO<sub>2</sub> emissions by 65 percent (compared to 1990 levels) and achieve net greenhouse gas neutrality by 2045. In later years, there are even plans to remove CO<sub>2</sub> from the atmosphere. It will take many players to achieve these earth-friendly targets. In tangible terms, the German government – implementing the directives from Brussels – has obligated German companies and industries to meet specific reduction targets. The energy and manufacturing sectors, in particular, face the highest demands, because they are also the largest contributors to the national CO<sub>2</sub> footprint. The energy sector needs to reduce its CO<sub>2</sub> emissions by nearly 60 percent by 2030, compared to 2019, while the manufacturing sector faces a reduction target of 35 percent (from around 180 million tons of CO<sub>2</sub> equivalent to 118 million).

For companies in the manufacturing sector, however, the Green Deal doesn't only mean emitting less carbon dioxide; it also means optimizing production processes in the long term. Intelligent, digitalized production with Industry 4.0 elements point the way there. One European company in the manufacturing sector has chosen a pioneering strategy that involves digitalization of its production. In addition to cutting costs, improving quality, and innovating, the strategy also foresees creating the foundations for improving energy efficiency in production.

## At a glance

- Satisfy the targets of the EU Green Deal
- Proof of concept for an end-to-end energy management system
- Analysis of energy consumption
- Identification of optimization potential
- End-to-end solution: IT/OT gateway collects data at production sites
- Decentralized data standardization using edge servers
- Normalization and preparation for AI-based data analysis in the AWS cloud as the central data platform
- Foundation for energy management in accordance with ISO 50001 and corresponding certification
- Cost reduction
- Shrinking carbon footprint

# Reference in detail

## The challenge

Shrinking the customer's carbon footprint not only contributes toward meeting the global climate targets. The company is convinced that sustainability will also become relevant to its image in the medium term – and a criterion in decisions to buy its products. In addition, more energy-efficient production will also reduce long-term costs. Implementing an end-to-end energy management system in accordance with DIN ISO 50001 is a major milestone for the customer. The company also intends to be certified as compliant with this standard. In turn, certification is a prerequisite for receiving federal subsidies for its conversion to more efficient energy use.

Every sustainability strategy faces a crucial question in the beginning: How much energy do we actually use? Given the number of international, highly different production sites, the answer is not a simple one. Together with T-Systems, the customer developed a PoC (proof of concept) for an energy management system that renders energy data transparent. Based on this information, the company plans to obtain ISO 50001 certification, to continually optimize its energy efficiency, energy use, and energy consumption.

## The solution

To determine the influencing environmental factors like energy consumption and emissions from overall production, the customer integrates data from its production sites and consolidates them centrally. The problem: Each of these sites has a different climate, covers different production elements, and has unique machinery. Each of these components has a significant impact on energy consumption.

T-Systems developed an end-to-end solution for the customer as part of a proof of concept for measuring energy consumption. The data is collected from the local systems through an IT/OT gateway. The concept includes standardization of the data formats and data structures using local edge servers. The preprocessed data is delivered to a back-end application that was developed by T-Systems and runs on the AWS (Amazon Web Services) cloud, where it is processed further for analysis and presentation. A regression analysis “normalizes” the data, for instance, taking the local conditions into account and making the data comparable across the different locations. To do so, the application uses a variety of AWS services, such as Kinesis, S3, Glue, and Athena, which in turn use the platform's own machine learning functions.

The application presents the analyzed data to production managers and sustainability managers in a number of dashboards. This makes it easy to identify absolute consumption figures, as well as anomalies such as peak energy loads.

## Customer benefits

The transparent presentation of consumption information gives the customer a solid foundation for development and the ongoing management of its energy consumption. Analyses enable them to identify optimization potential. The services have been optimally integrated with the customer's application landscape – an example of how the cloud enables rapid innovation.

For the company, this solution marks the start of enhanced energy consumption optimization in production and opens the door for ISO 50001 certification. Their sustainability strategy has been given a solid foundation and the CO<sub>2</sub> reduction targets can be resolutely pursued – and documented.

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