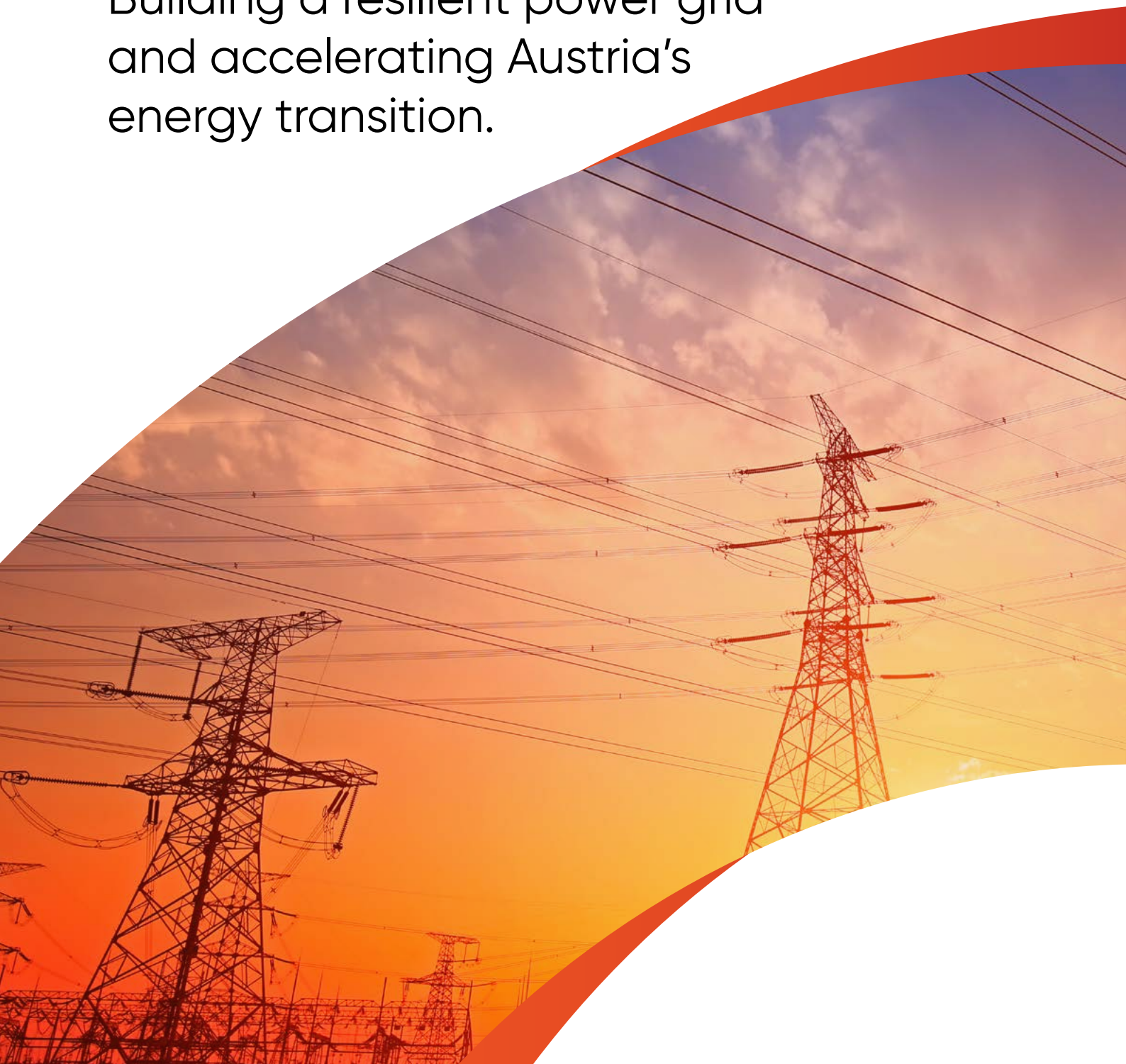iskraemeco
BY ELSEWEDY ELECTRIC

CUSTOMER SUCCESS STORY

Wiener Netze – Digitalization of the power grid and smart metering.
Building a resilient power grid and accelerating Austria's energy transition.

Customer information

Company name
Wiener Netze

Country
Austria

Trade
The largest combined grid operator in Austria

Application
Digitalization of the power grid and smart metering

Austrian metering landscape and regulatory requirements

Austria's electricity meter reading system has undergone significant changes. Traditionally, Distribution System Operators (DSOs) conducted hourly readings for large commercial and industrial customers, while smaller consumers received yearly readings. Costs associated with meter operations were covered by a regulated monthly charge.

To align with the EU directives and improve grid efficiency, the Austrian government mandated a large-scale smart meter rollout. Initial targets set in 2011 aimed for 80% customer coverage by 2020. However, slow progress necessitated revisions. The revised legislation, implemented in January 2022, established more achievable milestones: 40% penetration by the end of 2022 and 95% by December 2024. By the end of 2022, Austria had achieved a smart meter penetration rate of approximately 63%.

The regulatory framework established by the Energy Regulatory Authority (E-Control) defines specific functionalities for smart meters

- Secure bi-directional communication with encryption.
- Detailed data capture, including 15-minute consumption intervals and internal storage for 60 days.
- Multi-utility compatibility with ports for connecting external meters (gas, water) and customer devices.
- Remote management capabilities for disconnection, reconnection, and load limitation.
- Support for remote software updates and clock synchronization.

Responding to privacy concerns, E-Control implemented an opt-out mechanism for smart meter installations. Additionally, collecting high-frequency (15-minute) data requires explicit customer consent.

Austrian law also mandates utilities to provide customers with comprehensive access to meter data. Consequently, Wiener Netze needed to ensure accessibility and convenience for customers to view data, change parameters, and set alarms through a web portal and an adaptive mobile interface via web browsers.

Challenges and project landscape

Wiener Netze embarked on a smart meter rollout journey in 2009, starting with pilot projects and technology evaluations. Its approach to smart metering was influenced by several key challenges:

Data accessibility and regulations

Wiener Netze prioritizes customer access to meter data. Customers can conveniently view data, adjust parameters, and set alarms through a user-friendly web portal and mobile interface.

However, regulatory restrictions limit how Wiener Netze could leverage collected smart meter data for analytics and grid planning. This hindered their ability to gain deeper insights into grid health and variations across different grid types and optimize grid operations by comprehensively understanding grid dynamics and ensuring long-term reliability.

A quote from Johannes Geist, former program manager smart metering at Wiener Netze, emphasizes this challenge:

»Unfortunately, in Austria it is quite heavily regulated what data we are allowed to use for analytics or grid planning, and I think that is why we are not currently using the full potential of this data. But we need to understand the data, the measurements, what is being measured and what we can do with the data. We need to understand the state of the grid, and there are many differences between different types of grids. A better understanding of the state of the power grid is, I think, the next big step.«

Active consumers and evolving customer demands

Wiener Netze observes a significant shift towards "active consumers", who actively control their energy consumption, engaging in practices like load balancing and adopting e-mobility solutions. This trend underscores the evolving role of customers in energy management and necessitates enhanced utility-customer interaction and support.

»We see a lot of customers moving towards »active consumers«, who actively control their energy consumption, maybe do some load balancing, e.g. an e-mobility station and so on... It's going to be interesting because these customers are interacting with us much more.«

Johannes Geist, former program manager smart metering at Wiener Netze.

Management of network losses

Wiener Netze recognizes the importance of minimizing both commercial and non-commercial network losses. These losses encompass technical issues like energy dissipation in transmission lines and non-technical issues like theft or meter tampering. While current losses might be manageable, Wiener Netze understands their potential impact on long-term grid health and financial sustainability.

Smart meter technology offers Wiener Netze a proactive approach to addressing network management. Real-time monitoring allows for the swift identification of unusual consumption patterns that could indicate potential theft or tampering. Additionally, advanced data analytics can help detect anomalies in energy usage data. By incorporating smart meter data into their operations, Wiener Netze can further strengthen grid integrity and efficiency, ensuring a more reliable and sustainable energy future for their customers.

Solution

Wiener Netze began exploring smart metering technology in 2009 with a period of pilot projects and technology evaluations lasting until 2015, after which preparations for a large-scale rollout began. During the piloting phase, the DSO utilised equipment from different vendors. In August 2017, Wiener Netze announced that it had selected a consortium comprising Siemens, Landis+Gyr and Iskraemeco for the mass-deployment phase of the rollout. Installations began at a smaller scale in November 2018. The large-scale phase of the rollout began in 2021 and by the end of the year, the number of deployed meters had reached 436,000.

By the end of 2022, Wiener Netze has installed 800,000 smart meters, translating into a penetration rate of 50 percent.

Consortium Partnership

Wiener Netze's decision to partner with Iskraemeco within a consortium of reputable suppliers provided a solid foundation for the project. Iskraemeco's expertise and commitment to quality aligned with Wiener Netze's objective of prioritizing quality over price. Rigorous testing procedures ensured that only meters meeting stringent quality standards were accepted, reflecting the Iskraemeco's dedication to delivering reliable and high-quality solutions.
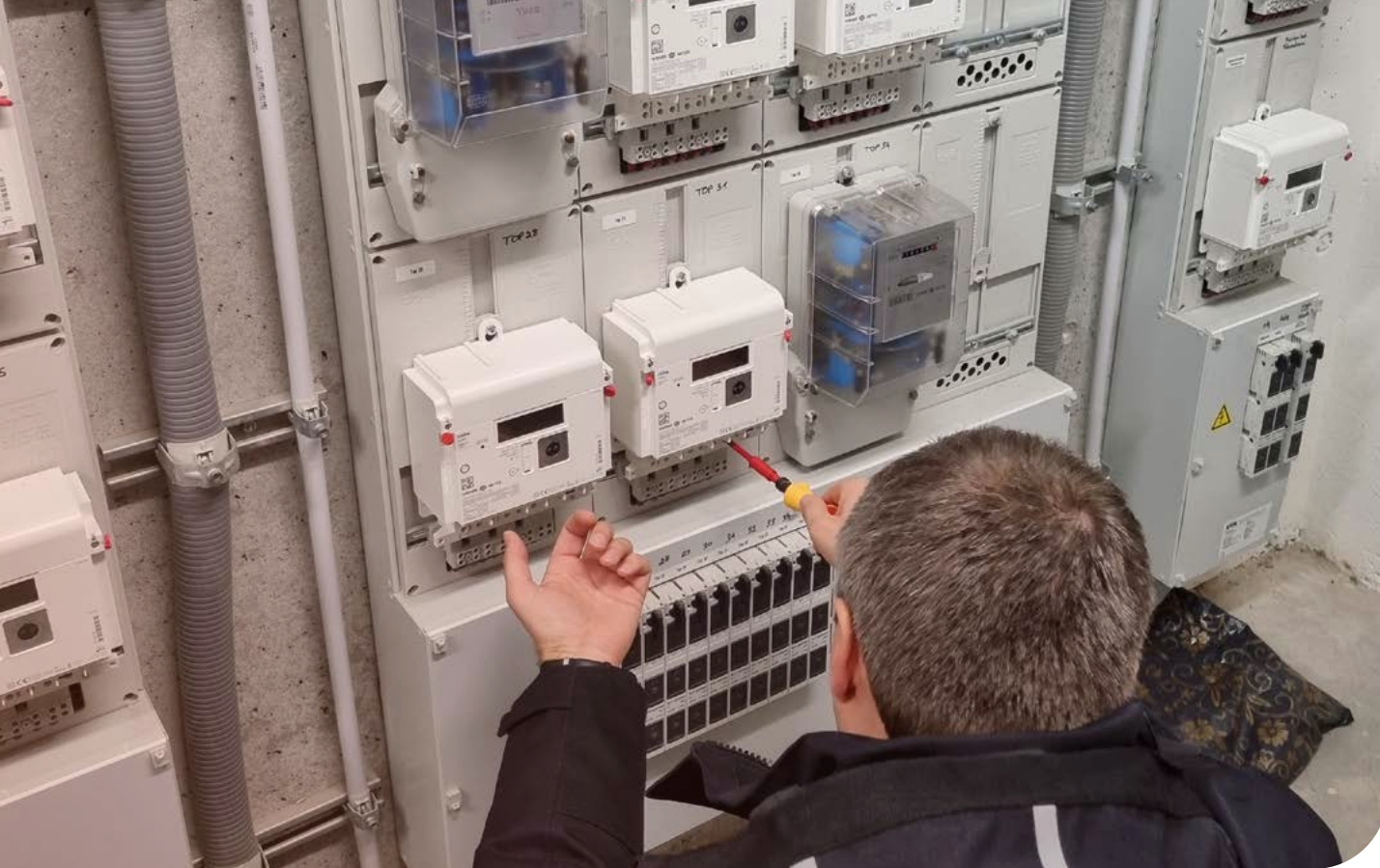

Several factors influenced Wiener Netze's decision to choose Iskraemeco as a partner:

- **Quality focus:** During the tender process, Wiener Netze prioritized quality over price, emphasizing the importance of production and delivery quality in selecting a smart meter provider. Iskraemeco's commitment to quality assurance and testing ensures the reliability and performance of its solutions.

- **Adaptability to regulatory environment:** Iskraemeco's solutions demonstrated flexibility to meet the specific regulatory requirements of the Austrian market, including customer preferences regarding smart meter functionalities and data privacy concerns. This adaptability ensures compliance and customer satisfaction.

- **Geographic proximity and centralized operations:** Iskraemeco's location in Kranj, Slovenia, offers a strategic advantage due to its proximity. This co-location of meter development, manufacturing, and all technical and commercial functions facilitates streamlined communication and efficient collaboration throughout the entire project lifecycle.

»The contract for our digitization project was awarded to a consortium of partners. Overall, we had quite a lengthy tender process and a concept with three meter suppliers, which gave us a good, strong partner in Europe. In the end, it was the best offer overall that won. We paid a lot of attention to quality – the price factor was not our main focus when choosing a smart meter provider. Production and delivery quality is something we check regularly – when Iskraemeco supplies meters, they are tested first. Only if the meters pass the tests, we accept the delivery and the quality has been really high.«

Johannes Geist, former program manager smart metering at Wiener Netze.

Communication protocol

Communication between metering equipment and external systems follows the client/server paradigm, with metering equipment acting as the server. Messages exchanged between client and server application processes adhere to the COSEM/DLMS protocol, ensuring reliable and efficient data exchange.

Security suite

Iskraemeco meters prioritize data security, ensuring robust protection against unauthorized access and tampering. Customers can access the latest user manual to gain insights into the meter's object model, which enables them to leverage the full capabilities of the metering solution while maintaining data integrity and confidentiality.

Data sampling frequency

Daily energy consumption data is transmitted to Wiener Netze. The quarterly hour data stays on the meter for 60 days. Wiener Netze's customers can opt-in for 15-minute intervals or opt-out of using the smart meter features, which also opt-out of data collection at the meter itself. That is a very specific part of the requirements imposed to fit the regional market.

There is also a possibility to activate or deactivate many of the meter's display functions, which is particularly important in terms of data protection. The Wiener Netze's customers who have the device located in a place that is accesible to other customers cannot see past readings, and have to voluntarily enable the display so they can review them.

Solution architecture

Wiener Netze measures quarterly hour and daily energy consumption utilising Iskraemeco's smart single and three phase meters that utilize G3-PLC and P2P communication technologies.

Iskraemeco meters embody a sophisticated solution architecture that combines adherence to industry standards, robust communication protocols, and advanced security features. By leveraging COSEM/DLMS standards and TCP/IP communication profiles, Iskraemeco meters help utilities to achieve seamless integration, enhanced data management, and reliable metering operations in diverse utility environments.

The COSEM/DLMS standard utilizes the Open Systems Interconnection (OSI) model to facilitate information exchange between meters and data collection systems. The adoption of the COSEM/DLMS standard aligns with international protocols, enhancing interoperability and compatibility across utility networks. The DLMS standard ensures comprehensive coverage and compatibility across diverse metering applications. COSEM (Companion Specification for Energy Metering) presents an interface model for communicating energy metering equipment, which is characterized by its object-oriented approach. By standardizing data representation and access, COSEM facilitates manufacturer-independent and secure data retrieval and interpretation.

Result

1.

Advancing energy efficiency with accurate data insights

Iskraemeco's smart meter solutions have played an important role in improving energy efficiency by providing accurate and granular data insights. By digitizing the power grid and enabling near real-time monitoring of energy consumption, smart metering facilitated informed decision-making and behavior changes among customers.

»The biggest or first step is that you need data to know what is going on in the grid and what has changed. You can have the best goals, but if you cannot measure them, you cannot track changes in energy efficiency. That, in my opinion, is the first step to more sustainable customer behaviour. What I have personally found is that a lot of standby appliances have high energy consumption, but when you are not at home, you are still using a lot of energy that's wasted because you are not using the devices that consume it.«

Johannes Geist,
former program manager smart metering at Wiener Netze

2.

Improving visibility of energy consumption

Iskraemeco's smart meters provide the utility's customers with visibility into their energy consumption, enabling them to track and understand their usage patterns effectively.

»People really need to understand that electricity does not come out of an outlet, it's produced somewhere, it usually has a certain carbon footprint. Right now, energy production is not visible to customers. That is something that needs to change and become more visible, more understandable. Smart meters and a graphical interface where you can see how much energy you have produced or consumed on a given day is a first step in making that more visible.«

Johannes Geist,
former program manager smart metering at Wiener Netze

3.

Facilitating customer-centric smart metering practices

By offering flexible options for data collection, display functions, and opt-in/opt-out features, Iskraemeco smart metering solutions empower customers to tailor their metering experience according to their preferences while ensuring compliance with data protection regulations.

Wiener Netze emphasizes the importance of customer feedback in refining services and solutions. Proactive engagement with customers, addressing inquiries, and incorporating feedback into iterative improvements are prioritized to ensure the delivery of high-quality services aligned with customer needs and preferences.

»Good feedback leads to a better product or service. That is the biggest challenge – we need to change and optimize our solutions more often.«

Johannes Geist,
former program manager smart metering at Wiener Netze

4.

Maximizing potential for grid optimization

While regulatory constraints limit the full utilization of meter data for analytics and grid planning in Austria, Wiener Netze recognizes the importance of harnessing data insights to adapt to evolving grid challenges and ensure the stability and efficiency of the power grid. Implementing the Iskraemeco solutions maximizes the potential of available data. By fostering a better understanding of grid dynamics and customer behaviors, Iskraemeco solutions support improvements in grid optimization and management.

»Unfortunately, in Austria it is quite heavily regulated what data we are allowed to use for analytics or grid planning. But we need to understand the data, the measurements, what is being measured and what we can do with the data. We need to understand the state of the grid, and there are many differences between different types of grids. A better understanding of the state of the power grid is, I think, the next big step.«

Johannes Geist,
former program manager smart metering at Wiener Netze

Implementation / installation

Wiener Netze initially targeted the completion of smart meter installations by the end of 2022, as mandated by the national regulator.

However, due to unforeseen circumstances, including the COVID-19 pandemic and other factors, the deadline was extended to the end of 2024. With this extended timeline, Wiener Netze remains confident in achieving the revised goal of 95% implementation of smart meters in households by the end of 2024.

Customer statement

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»We paid a lot of attention to quality – the price factor was not our main focus when choosing a smart meter provider. Production and delivery quality is something we check regularly – when Iskraemeco supplies meters, they are tested first in the inspection lab of Wiener Netze. Only if the meters pass the extended inspection tests, we accept the particular delivery, which proves that throughout the project quality has been on a really high level.

We also need to understand the data, the measurements, what is being measured and what we can do with the data. We need to understand the state of the grid, and there are many differences between different types of grids. A better understanding of the state of the power grid is, I think, the next big step.«

Johannes Geist,
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