

How to optimize connectivity for smart metering systems

CONNECTIVITY

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Whether you know it or not, smart meters are at work all around us. For example, these connected devices allow for data to be sent from our homes, cities and industrial facilities directly to essential service providers, such as water or energy companies. Not only is **data sent faster and more efficiently**, but smart metering systems are also less prone to errors and eliminate the need for a technician to read meters on-site.

So, whether in our homes, on an oil rig in the middle of the desert – or any number of other locations – smart meters allow us to remotely measure the consumption of commodities and create real benefits for industries, companies and end users. But to ensure that they send the right data at the right moment, their **specific connectivity needs must be met**: smart meters require long standing, secure and reliable connectivity.

Cellular connectivity: a more flexible option for the smart meter industry

When it comes to connecting smart meters, it is important to remember that these devices are fabricated all over the world—often oceans away from where they may be shipped and used. Connecting smart metering systems via cellular networks offers **all the advantages of remote management**, starting with the secure and transparent distribution of SIM credentials. Reprogrammable SIM technology (removable or soldered), better known as **eSIM technology**, ensures smooth and secure connection to local operators in the country where they will be used.

Connecting via cellular networks also means that connectivity parameters can be updated over-the-air, and **service quality** can be constantly monitored to ensure the data is properly sent and received.

Robust IoT SIM technology for long-lasting smart metering systems

One of the key challenges of smart meters is that they can be installed in hard to reach or extremely remote places – such as in the middle of the desert or outside a home in a rural neighborhood – and can generally go untouched for months and even years at a time. To maintain access to cellular networks at all times, smart meters should embed a robust **IoT SIM or eSIM designed to resist harsh conditions**.

Equipping smart metering systems with adapted SIM technology not only means using **ruggedized hardware** to cope with extreme temperature, vibrations and other environmental constraints, it is also about the implementation of **robust SIM software**. For example, the **IoT SIM** must be able to deliver notifications if a certain application is consuming too much memory, which could interfere with meter readings and functioning, thereby reducing the SIM's lifespan. The cellular networks connectivity provider can use this information to make **real-time parameter**

modifications and guarantee that their Service Level Agreement (SLA) is maintained over time.

Future-proof connectivity for long-lasting smart meters

Using the right SIM technology can also **extend device battery life**. In general, smart metering systems require very little energy, as they intermittently send small amounts of data. **IoT SIMs can offer a low power mode** to manage communication more efficiently with the device. For example, the “poll interval negotiation” setting extends the interval between when the device interrogates the SIM, ensuring that the smart meter consumes as little energy as possible and thus helps extend battery life up to 10-15 years.

Device authentication and data integrity for reliable smart metering systems

In order for a smart meter to be truly reliable, it must also be secure. For example, utility companies need to know that their meters are not only collecting data efficiently but also sending accurate data back to the company's monitoring platform in the Cloud—meaning secure, private customer data that is neither manipulated nor compromised. To ensure **mutual authentication** between the smart meter and the Cloud, the IoT SIM applet, known as IoT SAFE, provides a cryptographic mechanism to **secure IoT data communications**, prevent potential security breaches and ensure data integrity can be trusted across the ecosystem.

5G and the future of smart metering systems

The implementation of **5G networks** is set to improve many aspects of smart metering connectivity. For example, **more efficient data transmission** requires less energy to communicate with the network. 5G cellular networks will also offer **better coverage, security and network reliability**—further accelerating the rollout of smart meters.