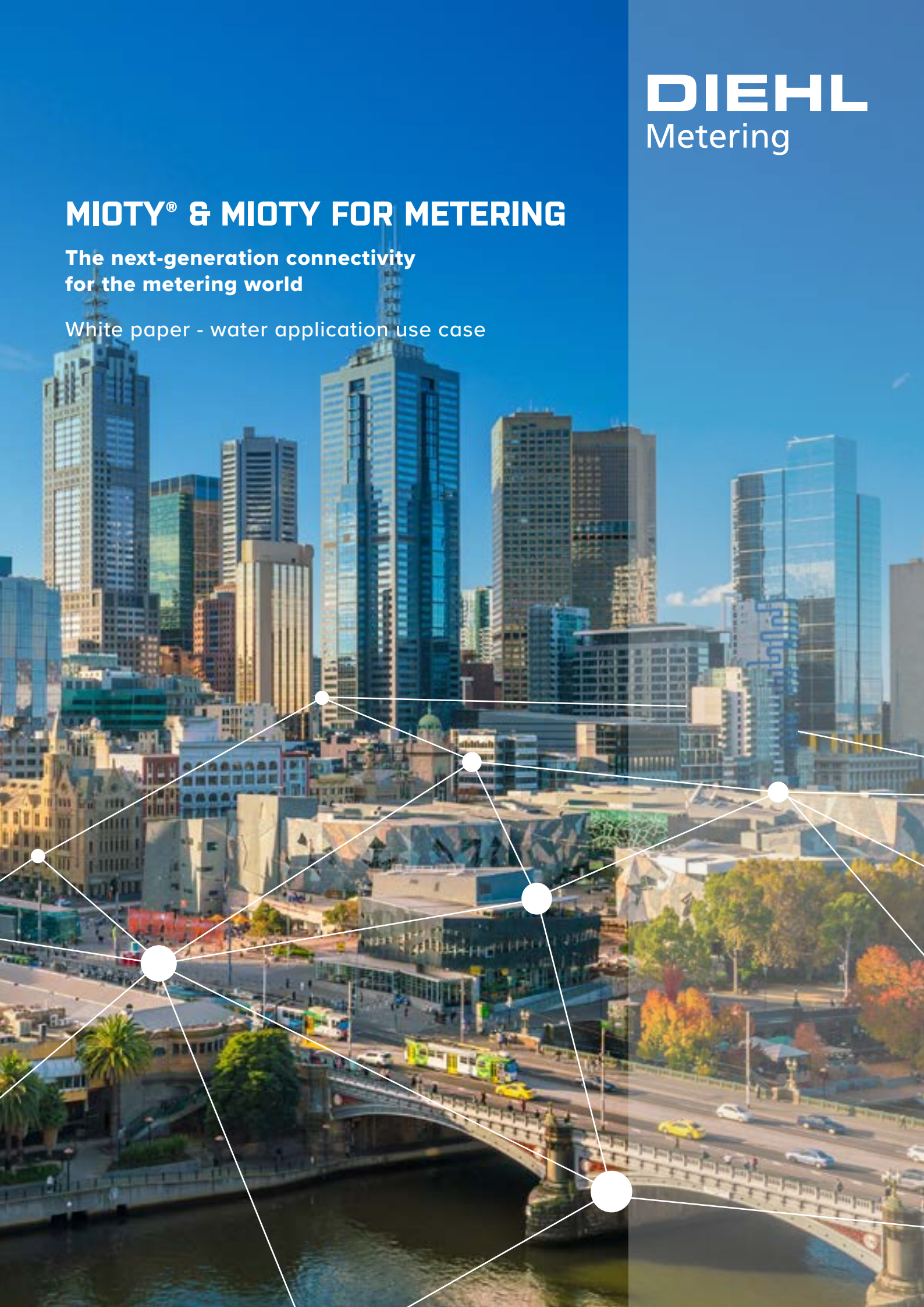
DIEHL
Metering

MIOTY® & MIOTY FOR METERING

The next-generation connectivity for the metering world

White paper - water application use case



WHAT'S INSIDE

Why connectivity is crucial to the water sector?

Today, water utilities are increasingly expected to address challenges that affect not just their own business, but also the wider community, the environment, and the future of our planet.

Across the world, water is becoming scarcer as the global population increases and climate change makes extreme weather more common. Around 1.1 billion people lack access to water and 2.7 billion experience water scarcity at least one month a year. By 2025, two-thirds of the world's population may be facing water shortages*. This means the role of utilities is crucial in ensuring water is delivered as efficiently as possible to populations all over the world.

Alongside water scarcity, one of the major obstacles to achieving this is water losses. This is often defined as Non-Revenue Water (NRW), which is any water that is produced by a utility but not billed to the consumer. The causes of this water loss are many and varied, including leaks, aging networks, poor metering accuracy, manual reading, billing errors and fraud. The impact on both utilities and the wider world ranges from financial and economic to humanitarian and ecological.

The key to tackling the water crisis? Network monitoring through digitalization. By ensuring a constant flow of accurate data about their network, utilities can monitor and analyze its performance. This enables them to identify the underlying causes of water losses and NRW so they can control the situation and react efficiently.

To achieve this, utilities need a high-performance connectivity standard. Such a standard must be capable of relaying data reliably, precisely and rapidly over long distances. While most existing protocols require a compromise in terms of range, scalability or energy efficiency, the recently-developed mioty® protocol would appear to offer considerable potential by combining all the characteristics required for tackling existing and upcoming water challenges.

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** Source: Water scarcity threat - WWF (https://www.worldwildlife.org/threats/water-scarcity#:~:text=Billions%20of%20People%20Lack%20Water,may%20be%20facing%20water%20shortages)*

The global water crisis challenge

The UN's Sustainable Development Goal number 6 is to ensure the availability and sustainable management of water and sanitation for all – and the deadline is set as 2030.

In 2020, 74% of the global population used safely-managed drinking water services, 60% in rural areas and 86% in urban areas. Two billion people lacked safely-managed services, including 1.2 billion people with basic services, 282 million with limited services, 367 million using unimproved sources, and 122 million drinking surface water.[1]

While certain countries have stepped up their plans to support water connection buildouts (e.g. India, Indonesia), some of the most populous emerging markets are struggling to increase investment in line with urban growth. A GWI analysis suggests that only 23 developing countries have a fair chance of meeting the goal to provide universal access to safe drinking water.[2]

According to the International Water Association (IWA), NRW represents 346 million m^3/day and costs the world $39 billion per year. Across the planet, roughly one third of water is produced but not billed – the equivalent of half the average flow of the Ganges River.

While NRW rates are over 50% in some developing countries, the problem affects all regions of the world. In Europe, countries such as France (20%) and the UK (21%) have significant room for improvement, while Italy registers rates of up to 61% in the south of the country.

To tackle this phenomenon, governments and enforcement agencies are tightening regulations, setting targets that require increasing intervention. Utilities are under pressure to reduce network losses and capture storm water in order to avoid tapping new water resources. Digital solutions, which can pinpoint problems before they become too expensive and disruptive to fix, are now in high demand.

Asset optimization is also a key priority on the industrial side. In the face of tightening regulations, utilities are looking for solutions that can minimize their risk of leaks and overconsumption by delivering real-time quality water data and reducing operational costs.

SUSTAINABLE DEVELOPMENT GOALS

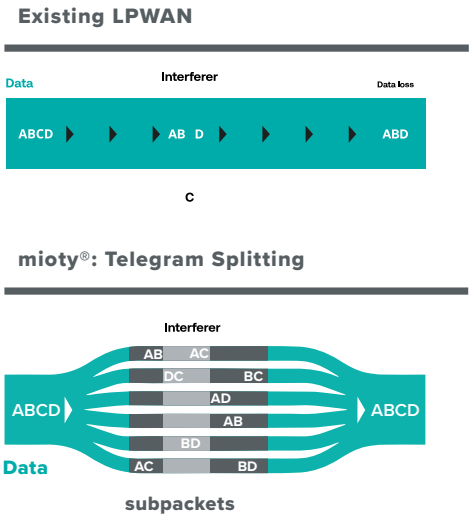
Source: [1] *World Health Organization and UNICEF Joint Monitoring Programme. (2021). Progress on Drinking Water and Sanitation, 2021 Update and MDG Assessment)*

[2] *GWI water data*

mioty®: a promising new standard for Massive IoT

mioty® is a radio communication protocol created in 2020 by the Fraunhofer Institute and Diehl Metering. This unique wireless technology has been designed with the specific intention of becoming a worldwide standard for massive IoT (Internet of Things).

As a software-defined radio technology, mioty® offers an alternative to overcome the limitations of existing Low-Power Wide-Area Network (LPWAN) solutions.It is hardward-independent (support for meters and sensors from different brands), scalable and secure, making it more accessible and interoperable. As such, it is an attractive futureproof option for Smart Cities, including smart metering and Industry 4.0.



How does it work?

What makes mioty® unique is its combination of reliable data transfer with ultra-low power, broad scalability and a capability to support very long-range networks, plus extreme robustness to interference.

Thanks to patented telegram splitting technology, data is divided into multiple sub-packages and transmitted at different times and frequencies. This innovative system ensures unrivalled interference immunity. Furthermore, data can be transferred over 11 kilometers and collected from moving devices at up to 120 km/h.

mioty® operates in a license-free spectrum and is compliant with the ETSI standard (European Telecommunications Standards Institute).

mioty® technology is governed by the mioty alliance, a community of people, businesses and institutes founded by the 2 entities that created the protocol alongside 5 additional companies: Texas Instrument, Ifm, Ragsol, Stackforce and Wika. The mission of the alliance is to promote mioty® technology as a worldwide IoT connectivity standard.

Any company can join the alliance and contribute its intellectual property to further enrich the technology across the IoT value chain.

Standardized mioty® technology (ETSI TS 103 357 V1.1.1)

- Messages are divided into short sub packets at PHY-level **(telegram splitting)**
- Radio bursts are distributed at different times and frequencies **(frequency hopping)**
- **Forward error correctio**n affords up to 50% loss
- Telegram splitting achieves **<1% packet error rates** (compared to >10% for other LPWAN technologies)
- Long transmission-free periods allow **battery** recovery

For more information on the mioty alliance, visit
https://mioty-alliance.com/

mioty®: the potential to transform smart cities

Thanks to its long range, compatibility with moving objects and extreme robustness to interference, mioty® can bring benefits to many areas of business and life.

Smart cities

- Smart waste management
- Smart parking

Buildings

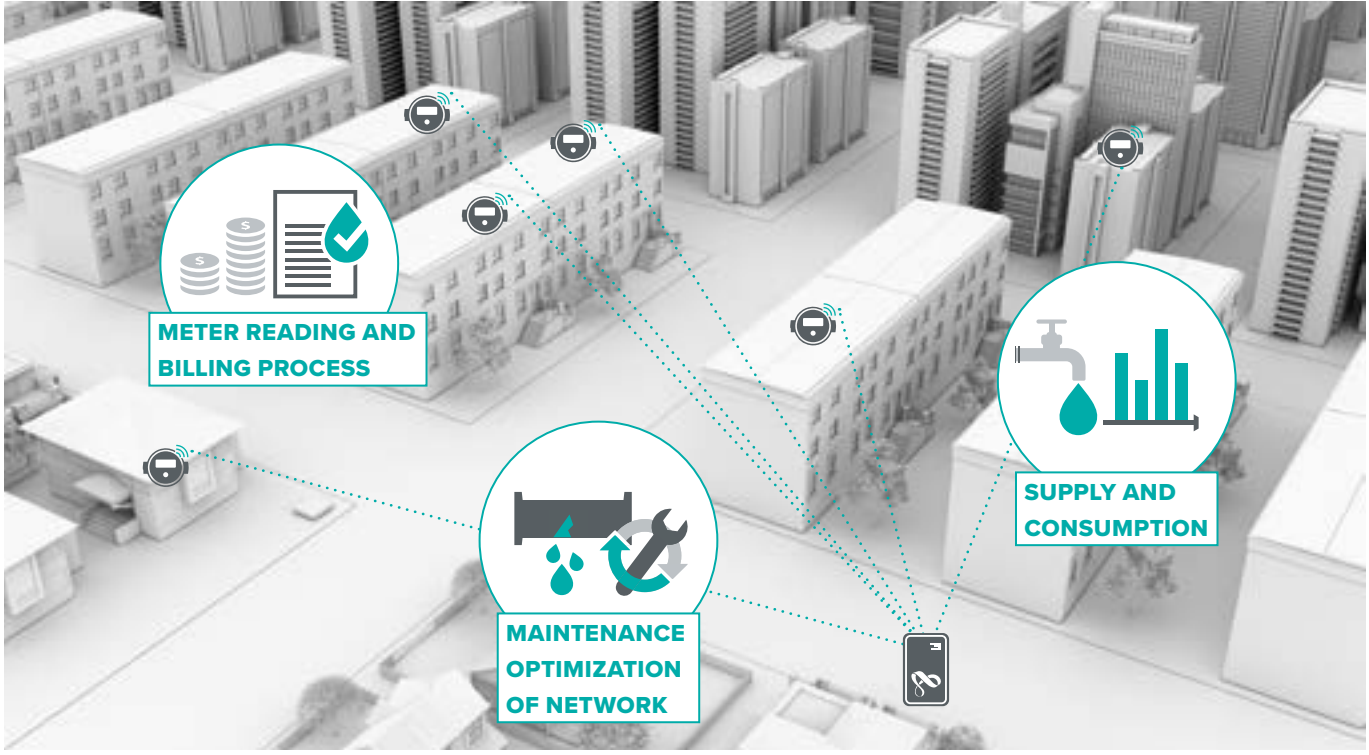
- Intelligent HVAC control
- Air quality monitoring
- Access control
- Fire detection

Water & energy

- Automated billing
- Alignment of supply & demand
- Leak detection
- Network maintenance & optimization

Mobility

- Connected car applications
- Toll management
- Fleet tracking
- Theft detection



mioty for Metering

The unique characteristics of mioty® makes it an attractive protocol for a wide range of smart IoT applications. Within the metering sector, it offers enormous potential for optimizing water distribution networks – and notably for addressing the critical challenge of NRW.
However, since the metering industry requires different use cases, additional features have been developed. Today, Diehl Metering offers utilities mioty for Metering, a subset of the overall mioty® standard that allows utilities to integrate the technology into their existing metering solutions with minimal migration effort. With mioty for Metering, utilities can easily integrate the technology into their existing metering solutions with minimal migration issues. The long-term ambition is to make mioty for Metering the new IoT radio standard for the metering world.
To make it more accessible, Diehl Metering is working to integrate mioty for Metering into the Open Metering Standard (OMS), a communication standard that enables interoperability by allowing a wide range of different meters and devices to operate together in the same system.

For utilities, the potential benefits of mioty for Metering are significant. The technology has been developed specially for the metering industry, and is particularly well-adapted for water management.

The technology enables a high Service Level Agreement (SLA) by delivering data as much, as frequently and as reliably as the utility needs. Furthermore, its ultra-low power consumption ensures high battery efficiency, while its long range reduces the need for extra network equipment. This makes it a cost-effective long-term investment, allowing utilities to reduce capital and operating costs and benefit from a low total cost of ownership (TCO).

What makes mioty for Metering adapted for water utilities?

The characteristics of mioty for Metering have been specifically designed to meet the needs of water utilities. These include:

Enhanced data

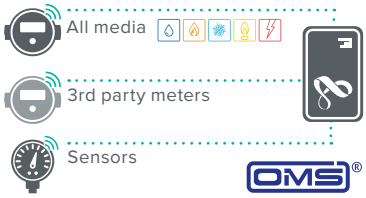
- Data quantity: mioty for Metering transmits not only billing-relevant data like volume, but also a wide range of data for network monitoring, like flows, temperatures, pressure, alarms, etc.
- Data timeliness: information is transported not just once a day, but hourly.
- Energy efficiency: data is transported extremely energy-efficiently to ensure a battery lifetime of up to 15 years
- Data quality: thanks to the mioty® patent, even in the case of telegram collisions, information reaches the gateway.

Improved range

- The radio communication range is around 30% better than similar LPWAN technologies, meaning few receivers are needed, and installation and maintenance costs are lower. This results in a lower total cost of ownership.

Energy efficiency

- mioty®'s extremely low power consumption helps to extend battery lifetimes while transmitting more data more regularly. This reduces the need to replace devices in the field due to battery exhaustion. **The benefits? Less maintenance work and a reduced total cost of ownership.**



Interoperability with OMS

- OMS compatibility will allow utilities benefit from interoperability, with the potential to integrate multiple different devices and sensors into their network.

Scalability

- By allowing up to 50,000 transmitting devices to be connected, mioty® enables massive IoT – and empowers utilities to reduce costs by equipping their network with just a few receivers.

How mioty® is transforming NRW

With mioty for Metering, water utilities can enhance the way they monitor their network, allowing them to improve leak detection and transform their approach to NRW management.

The unique capacity of to transport higher amounts of network data more regularly and more efficiently means utilities can get a complete and continual overview of their network in near-real time. By associating with an adapted Meter Data Management Software, they are able to monitor, identify and react faster to anomalies such as faulty meters, leaks and other sources of water loss.

The combination of high-performance connectivity and intelligent software offers utilities the insights and data-driven analytics they need to make the right decisions faster. As a result, they can:

- Reduce damage to their water network assets and infrastructure
- Reduce the risk of water contamination
- Ensure safe and reliable water distribution
- Provide more stabilized water pressure throughout the system
- Increase financial gains from increased water sales and reduced water production
- Reduce operation costs and charges to customers
- Contribute to the sustainability of the water sector

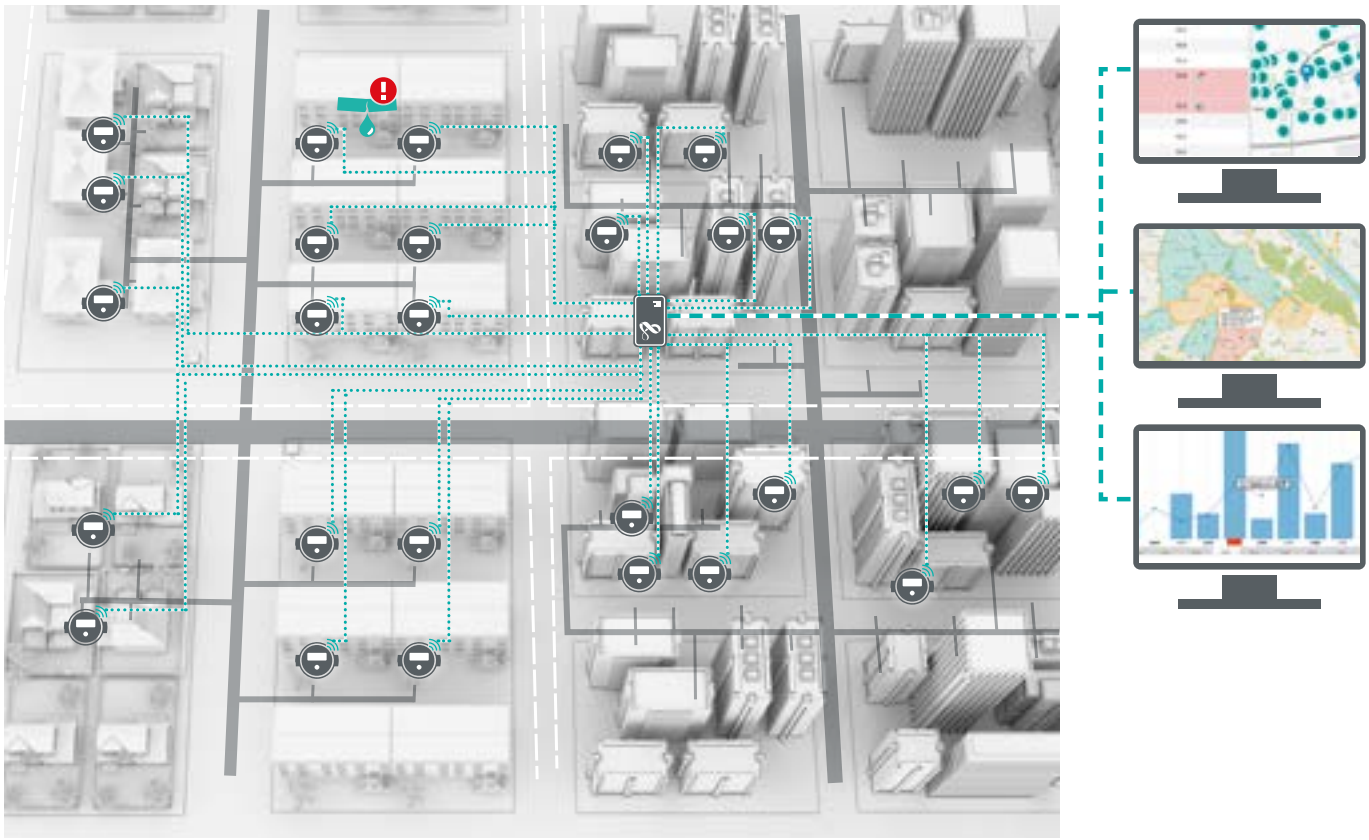
In addition, utilities can improve grid reliability through automation and better align supply and demand.

Addressing NRW for a sustainable future

By reducing water loss, Diehl Metering's solution not only helps utilities to lower their operating expenses and increase total cost of ownership; it also enables them to contribute to the sustainability of the water sector.

With water becoming an ever more precious resource, there is a pressing need to reduce waste and save water as much as possible. Through its solution, Diehl Metering shows how mioty for Metering could be a game-changer in helping utilities to shape a more responsible and sustainable future.

A solution to fully exploit mioty for Metering



To address the specific challenges of NRW, Diehl Metering has developed IZAR@SMART WATER - Water Loss Management (WLM) software. This enables utilities to get the most from mioty for Metering, exploring its full potential through a solution that is specially-designed for the smart management of NRW.
The traditional solution for addressing NRW is to implement a fixed network to monitor water loss in the distribution network. Now, Diehl Metering is going further by providing a more complete offer that, unlike most others on the market, covers the entire value chain (from meters to software and human expertise) in order to help utilities reduce NRW.

The solution provides utilities with a holistic view of their distribution network by using the HYDRUS 2.0 Domestic smart water meter to collect a wealth of data, including information about leakages and reverse flows. This data is then transmitted using IZAR IoT GATEWAY Compact with mioty for Metering to ensure unrivalled precision and interference immunity.

Through the IZAR@SMART WATER Water Loss Management (WLM) application, utilities benefit from a daily “X-ray” of their infrastructure. The app’s user-friendly interface shows the performance of strategically-formed zones called DMAs (district meter areas), delivering a daily evaluation of infrastructure performance. Thanks to color coding, utilities can immediately identify anomalies and make informed decisions to rapidly resolve the issue.

With its IZAR@SMART WATER – WLM software, Diehl Metering provides a tailored solution that makes it simpler for utilities to address the challenges of NRW. And by exploiting the rich connectivity capabilities of mioty for Metering, the company is leading the way for the future of water metering.

Next steps with Diehl Metering

Diehl Metering is already working closely with its customers to help them get the most from mioty®. The opportunities are wide-ranging and far-reaching. As we have seen, water utilities can benefit from the technology's unique characteristics to tackle urgent challenges such as NRW. In the same way, energy utilities could capitalize on mioty for Metering in potentially game-changing ways.

Through its IoT Network Planning Service, Diehl Metering supports utilities, cities and industrial companies to explore the full potential of the Internet of Things. The choice of connectivity technology – including mioty® – is one of the foundations of the service.

Guided by IoT experts, customers define the possibilities of their network depending on their desired IoT use cases (smart metering, smart lighting, smart CO_2 monitoring, etc.), and then select the most suitable communication technologies to ensure their long-term success.

Following the IoT Network Planning Service, customers can also sign up for Diehl Metering's IoT Network Implementation Service, which provides expert on-the-ground support to get the IoT network up and running.

Through these services, utilities, cities and industrial companies can custom-build IoT networks to seize new opportunities today and tomorrow. With its unique set of characteristics, mioty for Metering has a pivotal role to play in such IoT networks. It is already being adopted and deployed on a large scale, and is set to become one of the leading connectivity solutions for the metering world.

Learn more
about mioty for Metering

Contact us
with questions on implementing mioty for Metering

CSW 10/2022