



# Internet of Things

## Valencia – Internet of Things Case Study

### Introduction

Founded in 1890, GLOBAL OMNIUM/Aguas de Valencia manages all aspects of the collection, treatment and distribution of water in the Spanish city of Valencia and the surrounding areas (more than 300 cities). They supply water to around three million people in the region. GLOBAL OMNIUM/Aguas de Valencia also provides water management services in other countries. Operating in an area with water scarcity, GLOBAL OMNIUM/Aguas de Valencia has positioned themselves as an innovative water company, utilising modern technology and the latest innovations to improve their operations.

GLOBAL OMNIUM/Aguas de Valencia already uses automated meter readings in more than 60% of their fleet of over one million water meters, and their goal is to keep improving this service to make it more agile, and provide customers with more benefits. Currently, water meters are read once per hour across the region. This uses specific technology from manufacturers that means GLOBAL OMNIUM/Aguas de Valencia has to install and maintain each solution providers communications infrastructure across the region. Their goal is to implement a more efficient water meter reading service using a more standard communications system, that will permit its Innovative Solution growth in a more scalable way.

### NB-IoT Water Meter Deployment

Vodafone and GLOBAL OMNIUM/Aguas de Valencia have been working together to put in place an operating model for the future, based around the use of NB-IoT to connect their water meters. To better understand NB-IoT, they have been conducting a trial with around 220 meters from a range of six different manufacturers to assess the properties, performance and battery life of both water meters and local gateway connectors powered by NB-IoT with a view to use a standard communication solution across the region, whilst retaining the existing requirement to take 24 meter readings per day from each meter.

By using NB-IoT, GLOBAL OMNIUM/Aguas de Valencia is able to take advantage of standardised data gathering and platforms, where the whole end-to-end management of network operations can be conducted centrally by either the water company or Vodafone themselves.



The trial is designed to test the capabilities of NB-IoT in the most demanding conditions, to see if NB-IoT could work in areas where the existing specific solution struggled to obtain meter readings. To this end, a range of meters in hard to access sites were selected to prove the performance of the NB-IoT network. This included areas with limited network coverage such as in underground meter rooms, or recessed meters installed underneath the pavement with metal covers that can block signals. Additionally, water meter models from six different meter providers are installed with the integrated NB-IoT chipset to see if there is a difference in network performance between the different implementations of the chipset and also assist the meter providers with their own designs for effective NB-IoT deployments.

To manage the connectivity, the NB-IoT connected units were managed through the Vodafone Managed IoT Connectivity platform, which allows the meters to be managed remotely, and the connections to these meters controlled. Meter reads could be scheduled and data was collected every day. In addition, every Meter Manufacturer has provided its own AMR (Automatic Meter reading) system for collecting the data from the meters, and showing the information on the application (this is just for the pilot phase, with the ambition to integrate in the centralized AMR system owned by GLOBAL OMNIUM/Aguas de Valencia in the deployment phase)

### **Benefits to GLOBAL OMNIUM/Aguas de Valencia**

NB-IoT has delivered some significant benefits to GLOBAL OMNIUM/Aguas de Valencia compared to their existing communications solution (coming and owned from each meter manufacturer).

**Simplicity** – the ability to use a standardised solution has meant that multiple meter providers have been able to offer connected water meters for deployment. Previously, the water company has had to work hard to ensure that the meter manufacturer proprietary solutions were integrated and supported with its AMR centralised solution. However, with NB-IoT, which is fully standardised globally, procurement is much more straightforward as partners are able to integrate into the NB-IoT communications modules directly without GLOBAL OMNIUM/Aguas de Valencia engagement.

**Speed** – As NB-IoT is based on existing mobile networks, it means that NB-IoT coverage was already in place across the Valencia region. With no coverage planning required, GLOBAL OMNIUM/Aguas de Valencia were able to rollout quickly with confidence.

**Cost Reduction** – A quicker, simpler implementation combined with no longer needing to procure, install and manage a proprietary communications network can mean a significant cost reduction for GLOBAL OMNIUM/Aguas de Valencia expects in this deployment.







### Outcomes & Lessons Learned

The initial deployment of NB-IoT powered water meters has been a success and met its objectives, with all meters installed and working, delivering 24 reads per day.

All meters were connected using NB-IoT. Every meter installed was able to deliver up to 500 messages per day, easily surpassing the current requirement for 24 meter reads needed per day through the NB-IoT network. Less than 0.5% of messages were lost over the trial period, and no interference from other networks was recorded. NB-IoT is designed to support a battery life of more than 10 years, which matches the expected lifespan of the water meter. Therefore, battery performance of the water meters will be also tested during this project to show that the battery consumption rate at every location supports the anticipated 10-15 year battery life for NB-IoT connections. Signal strength was found to be adequate at all installed sites, with deep penetration of NB-IoT proven. 100% of devices that were installed underground, up to a depth of two meters, or in metal cabinets were able to be connected and send messages. Testing proved a 20dB improvement over GSM.

The experience has taught GLOBAL OMNIUM/Aguas de Valencia that NB-IoT is a clear contender to connect large

numbers of smart water meters in the future. The use of a standardised technology will permit to GLOBAL OMNIUM/Aguas de Valencia the real possibility to outsource all of their communications and data needs to partners such as Vodafone in the future.

### Conclusion

The initial phases of the proof of concept, demonstrate how NB-IoT can achieve many of the critical technology parameters for GLOBAL OMNIUM/Aguas de Valencia. In this pilot phase, with real meters from different meter manufacturers involved in the NB-IoT trail with Vodafone, the intention will be to prove all the required features, with all water meters in all locations connected and communicating. By supporting a long lifespan, with consistent secure message delivery, NB-IoT is expected to demonstrate that it is a good choice for connecting remote, hard to access water meters and other devices with similar requirements. NB-IoT coverage in place across the region today also means that in the future GLOBAL OMNIUM/Aguas de Valencia can rollout on a large scale and focus on continually working to improve their innovate offerings available to their customers.



The GSMA Internet of Things programme is an initiative to help operators add value and accelerate the delivery of new connected devices and services in the IoT. This is to be achieved by industry collaboration, appropriate regulation, optimising networks as well as developing key enablers to support the growth of the IoT in the longer term. Our vision is to enable the IoT, a world in which consumers and businesses enjoy rich new services, connected by an intelligent and secure mobile network

For more information visit the website:

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