



Mobile IoT

LPWA:

# THE FUTURE OF SMART METERING

June 2016

Mobile IoT = **TRUSTED IoT**



# TABLE OF CONTENTS

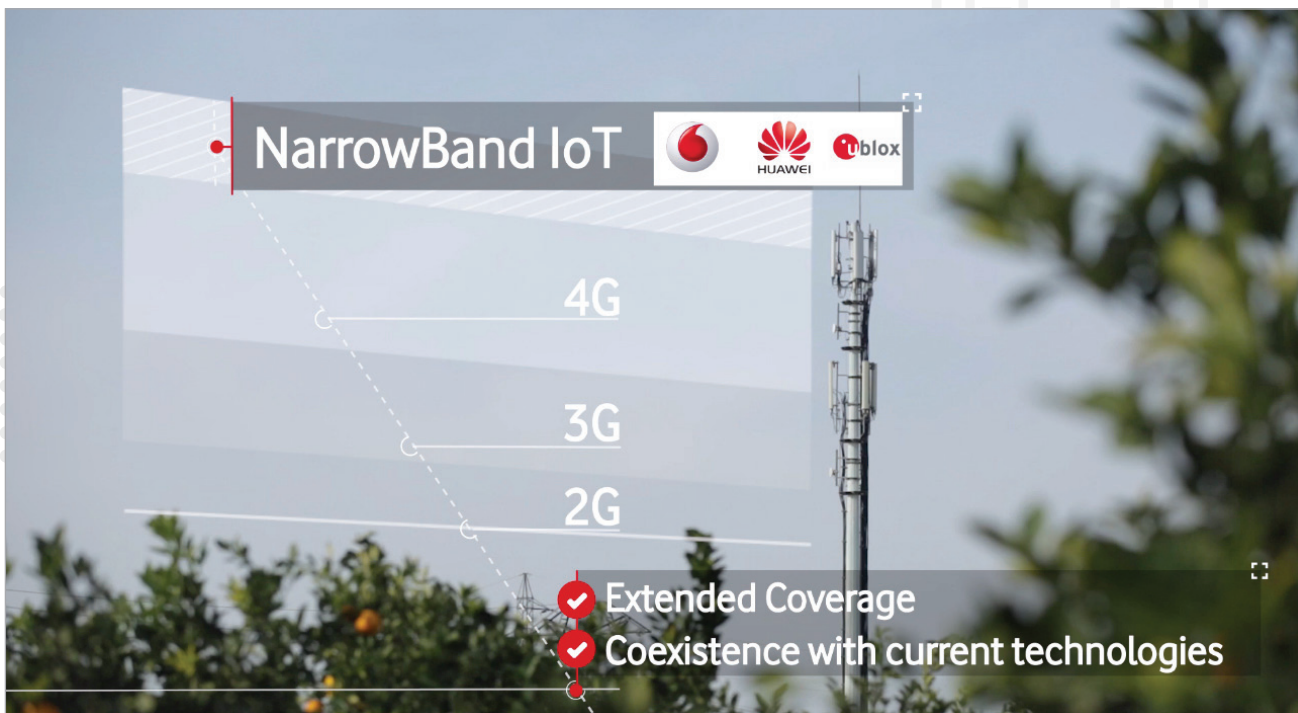
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1	SUMMARY
2	CONNECTING MANY MORE METERS
3	STREAMLINING SMART METERING
4	THE INTERNET OF THINGS ENTERS A NEW PHASE
5	ABOUT THE CONNECTED LIVING PROGRAMME

# SUMMARY

Utilities around the world are installing smart meters that can monitor customers' usage of energy or water in near real-time, cutting costs and helping to balance supply and demand. But it can be expensive and difficult to connect meters that are deep inside buildings, in basements or under manhole covers. Mobile operator Vodafone and water group Aguas de Valencia are exploring how new low power wide area (LPWA) technologies could address this challenge.

The results of a trial in the Spanish town of Moncada suggest that LPWA networks could bring connectivity to utility meters beyond the reach of existing wireless solutions, enabling energy and water grids to become smarter and more efficient.



# CONNECTING MANY MORE METERS

WITH GROWING PRESSURE ON THE WORLD'S LIMITED ENERGY AND WATER RESOURCES, UTILITIES ARE SEEKING WAYS TO REDUCE COSTS, HARNESS RENEWABLE SOURCES AND BETTER MATCH SUPPLY AND DEMAND. SMART METERS, WHICH TRANSMIT USAGE DATA BACK TO THE UTILITY, CAN INCREASE EFFICIENCY AND PROVIDE CUSTOMERS WITH INCENTIVES TO CUT USAGE AT TIMES OF PEAK DEMAND. WHILE MOBILE OR FIXED TELECOMS NETWORKS CAN BE USED TO CONNECT THESE SMART METERS, THE EXISTING INFRASTRUCTURE IS NOT OPTIMISED TO SERVE LARGE NUMBERS OF DEVICES TRANSMITTING SMALL AMOUNTS OF INFORMATION FROM A MYRIAD OF LOCATIONS BOTH ABOVE AND BELOW GROUND.

But a new class of mobile technology is set to make it much easier and more cost-effective to deploy and manage smart meters in inaccessible locations and places with poor coverage. This low power, wide area (LPWA) technology is specifically designed to bring connectivity to millions of devices spread over large geographic areas, while minimising power consumption and the need to replace batteries.

Mobile operator Vodafone is testing a LPWA network in the town of Moncada in Valencia in Spain. It is using LPWA connectivity to connect

meters run by the water utility Aguas de Valencia. Many of the meters involved in the trial are in locations that lack conventional cellular coverage, such as basements or beneath manhole covers.

Many of these locations are also difficult to access, hindering manual meter readings and battery changes.



# STREAMLINING SMART METERING

Based in Valencia, but also present in other parts of Spain, Africa and Latin America, Aguas de Valencia is one of the most advanced utilities in the world in terms of harnessing smart metering. It manages 1.1 million meters, of which more than 600,000 are “automated meter reading devices,” which can transmit usage data up to 24 times a day.

CEO Dionisio García Comín sees opportunities to further expand Aguas de Valencia’s use of smart meters and boost their contribution to the business. “We use automated meter reading and our goal is to continually improve the service, so it is more agile and provides customers with more benefits,” he says.

In particular, Aguas de Valencia is looking for a standardised solution that can be deployed quickly and efficiently. “Until now, meter reading technology has been proprietary and has required the installation of our own infrastructure,” says Víctor González, metering and smart reading manager, Aguas de Valencia.

To that end, Aguas de Valencia has entered into a trial with Vodafone of a pre-standard version of Narrowband Internet of Things (NB-IoT) technology, a LPWA solution that can be deployed on existing cellular base stations. For the trial, which began in November 2015, Vodafone has, with the help of equipment supplier Huawei, upgraded six base stations to support NB-IoT using 900MHz spectrum. The operator is employing the new technology to connect 42 meters, which have been equipped with NB-IoT modules supplied by u-blox of Switzerland.

“The most important aspect for the trial was to identify meter locations that are harder for a signal to reach, such as meter rooms in

basements, where it is difficult to get coverage, meter boxes below ground, recess niches with metal covers that block the signal,” says Víctor González. “We found meters with all these issues in the village of Moncada, so we decided to run the trial there. So far the results have been very promising, as the signal has been able to reach its destination without any issues in all the locations tested.”

The results have been very positive,” agrees Lory Thorpe, NB-IoT Programme Lead at Vodafone. “There hasn’t been a location where we didn’t have coverage.”

Although the trial hasn’t yet tested the battery life of the connected meters, NB-IoT is designed

“***There hasn’t been a location where we didn’t have coverage.***”

to keep power consumption to a minimum. The actual battery life will depend on how often the meters transmit data, but could reach a decade.

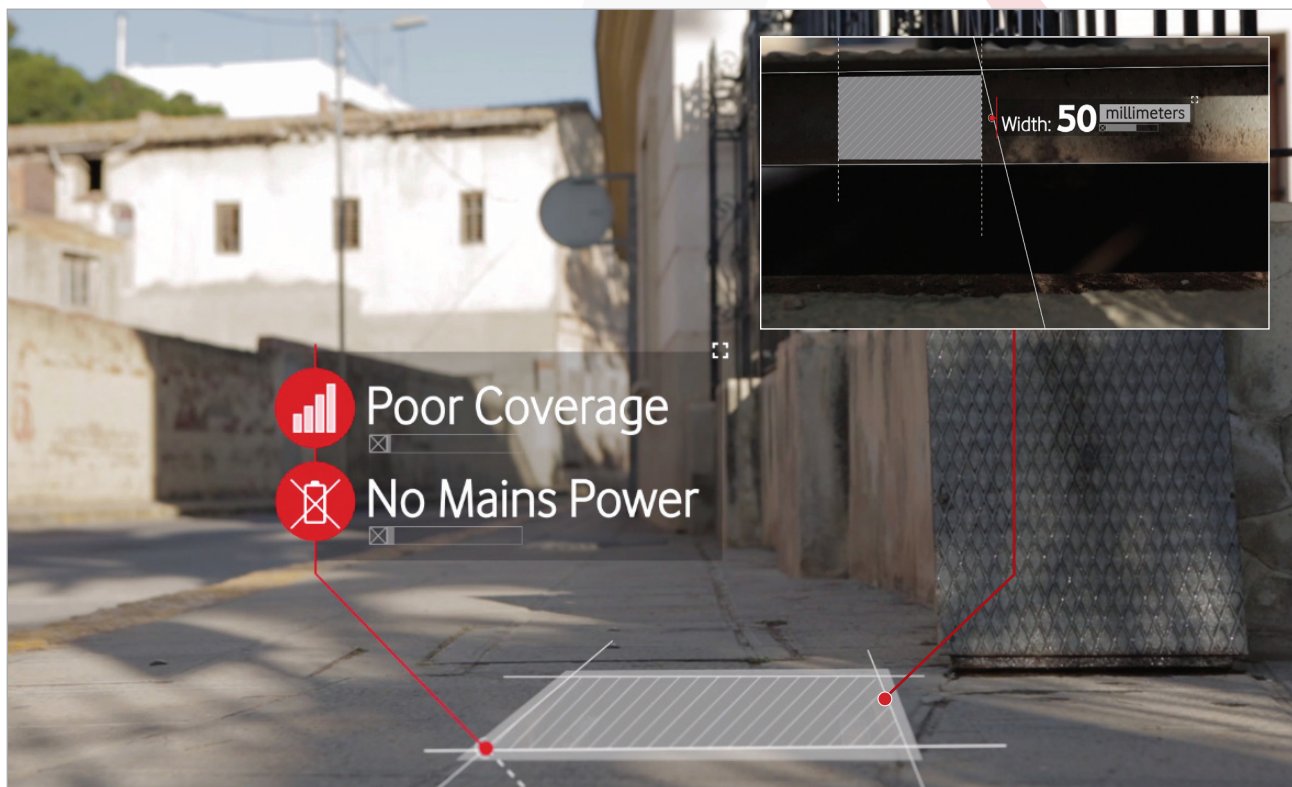
# STREAMLINING SMART METERING

“The useful life of a meter is about 10 years, which is aligned with the battery life of the technology we will be able to provide,” says Víctor González.

In practice, that will mean LPWA-connected smart meters will need minimal maintenance – a major benefit for utilities seeking to keep costs in check. “It is potentially deploy and forget,” notes Lory Thorpe of Vodafone. “Battery life is quite key – you want the battery to last for the life of the device. You don’t want to be going down manhole covers to replace a device.”

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# THE INTERNET OF THINGS ENTERS A NEW PHASE

Already a major player in the global machine-to-machine (M2M) market, Vodafone believes the advent of NB-IoT will enable a major expansion of the Internet of Things. This LPWA technology has widespread support from both equipment vendors and mobile operators because it is able to support large numbers of devices cost effectively, while consuming relatively little power. Moreover, it can be deployed on existing base stations using existing licensed spectrum.

Luke Ibbetson, Chairman of the NB-IoT Forum and Vodafone Group Director of Research & Development, says that NB-IoT is well aligned with mobile operators' commercial strategy. It supports security, a predictable quality of service (through licensed spectrum) and network interoperability through global standards, thereby enabling roaming agreements and the reuse of existing M2M platforms. Luke Ibbetson regards the use of licensed spectrum as particularly important. "The level of guarantees and quality, that customers are asking us to sign up to, can't be delivered unless we have got control over the spectrum asset," he says.

Aguas de Valencia is also enthusiastic about NB-IoT and the potential to employ a single consistent smart metering solution across its international operations. "If NB-IoT becomes a standard, we will be able to outsource communications to a telecoms carrier that guarantees data quality and security," says Víctor González of Aguas de Valencia. "Meter manufacturers will be able to integrate the solution into their

devices. NB-IoT will allow us to perform large scale rollouts very easily and enable us to implement it for water supplies both nationally and internationally."

Standards body 3GPP is on course to finalise the NB-IoT specification by the middle of 2016. Vodafone anticipates that its NB-IoT solutions will be commercially available from 2017 in multiple markets.

"We've got very ambitious launch plans," says Luke Ibbetson, adding that Vodafone is now focused on raising awareness among app developers about the potential of NB-IoT. "It's about building the entire ecosystem to really put a fire under this now that we have the technology."

# ABOUT THE CONNECTED LIVING PROGRAMME

The GSMA's Connected Living programme focuses on enabling a world where consumers and businesses can benefit from rich new services across many different devices – securely connected to the Internet via ubiquitous mobile networks.

The Connected Living programme's Mobile IoT Initiative and NB-IoT Forum are designed to accelerate the commercial availability of Low Power Wide Area (LPWA) solutions in licensed spectrum. Backed by 30 of the world's leading mobile operators, OEMs, chipset, module and infrastructure companies, this Initiative will facilitate demonstrations, proofs of concept and trials of a selection of complementary LPWA

licensed spectrum technologies. It will also provide analysis and feedback to assist 3GPP in standardising the technologies.

For more information, visit the programme's website at [www.gsma.com/connectedliving](http://www.gsma.com/connectedliving).