

# MESH RADIO-BASED AMI SOLVES REAL WORLD PROBLEMS IN THE MOST HARSH AND CHALLENGING ENVIRONMENT: CHINA

By Henry Li and Wang Rong

*Mesh radio delivers highly responsive bi-directional AMI networks, higher levels of data throughput, and lower deployment and operational costs. Real world deployments in China provide the proof.*

In recent years, wireless mesh networks have been an option available to utilities that wish to take advantage of new AMI technologies and the benefits they deliver as part of building the next generation AMI solutions. As utilities start to look beyond basic remote meter reading to provisioning time-critical tariff pricing, remote provisioning of services and demand response systems, key new requirements emerge. The requirements for adaptability, scalability, reliability responsiveness and lower life cycle costs put well-designed mesh radio networks high on the agenda for many utilities. However, when considering real world deployments of mesh radio networks, utilities must be aware of the issues and challenges they may face, that may detract them from realising the full benefits available.

## CHALLENGES IN A REAL WORLD

Some of major factors that need to be considered are:

- Reliability of communications. A modified ad hoc or controlled mesh network tailor-made for AMI offers the best solution. However, it is still important to achieve a balance between reliable routing, including self-healing, responsiveness, maximum number of nodes per network, power consumption and critical node cost. A dynamic and adaptive radio frequency scheme, configured for the country's regulations, should be used to solve RF interference from current and future mesh networks.
- Life cycle of service. When switching from legacy metering devices to two-way communication metering systems, utilities want to protect their investments and be able to add new functionalities in the future. It is also a necessary requirement to be able to remotely upgrade the firmware of devices in the field from the back-end system. Some of utilities operate electricity and gas networks at the same time. Wireless mesh networks

should be capable of providing a path to integrate gas and water meters, as well as future in-home devices, into current electric metering networks.

- ROI of ownership. The overall return on investment (ROI) is a key decision parameter for all utilities. They need well defined functionality and data bandwidth in an optimised cost structure. For instance, in a mixed area of residential users and high power users, the mesh radio networks' data throughput should support high data volume metering of multi-function three-phase meters, and the responsive alert messaging when a tamper is detected. The hidden cost of installation is another important consideration. There should be no on-site setting and pre-installation configuration for RF nodes or meters of mesh radio networks, and this is vital to lower costs. Plug-and-play features are necessary for the installation of new meters as well as for the replacement and maintenance of meters. Furthermore, communication devices or modules may be requested to interface with existing meters that are not 'ageing', or with other suppliers' meters to encourage competition. The intelligent data port of the communication device is a must in these circumstances.

## DEPLOYMENTS SUMMARY

Several AMI solutions based on wireless mesh architectures are available today. Because of the complexities in a challenging environment, utilities demand reliable and cost optimised true mesh radio networks and technologies. RobuNet self-forming mesh network, part of Shenzhen Haoningda's total AMI solution, was built by Robulink Technology to solve the real world problems and challenges that all utilities will face in deploying the next generation AMI systems. The RobuNet mesh networks have been deployed in many provinces within China, including Jiangsu, Guangdong, Shandong and Guangxi. Excellent performance has been achieved in the areas of distribution power loss analysis, overall and single-try meter reading, response time of real-time reading, performance level for special events such as remote disconnect and reconnect, simplification of installation and maintenance, and more. By design, RobuNet mesh networks can also support other value added functions such as non-IC card remote prepayment, tamper detection and signaling, etc., which will be implemented in upcoming deployments.

With learning from the past, RobuNet has been designed to enable the future to be implemented now! **MI**



**ABOUT THE AUTHORS:** Henry Li is a founder and president of Robulink Technology Ltd. He has 22 years experiences in leadership roles within the industries of communications, semiconductors, control engineering and laser system engineering, and has held senior management and technical positions in National Semiconductor Inc, Avnet Inc, Physics Institute of Chinese Academy of Science. He holds an ME in Internetworking from the Dalhousie University of Canada.

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**ABOUT THE COMPANY:** Robulink Technology Ltd, in partnership with HND Metering, was formed to focus on the development of advanced wireless networks and innovative solutions for next generation AMI applications. Robulink employs top engineering and management talent from China and overseas countries, and combined with the in-house expertise and experience of HND Metering, offers multi-national utilities one of the most advanced AMI solutions available, incorporating the Robulink intelligent wireless mesh network technology.

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