



Wireless Energy Meters Improve Efficiency and Save Money: NURI Telecom and Ember Automate Meter Reading



Industry

Public Utility

Summary

Automated meter reading technology gets a boost from a new line of Ember-enabled electric meters from NURI Telecom, providing wireless data transfer and streamlined metering processes.

Challenges

Energy efficiency and cost reduction are industry watchwords as public utilities try to improve the ways in which they measure energy usage and communicate with customers.

Why Choose Ember?

NURI Telecom and other companies that work closely with Ember rely on Ember's innovation and leadership in the ZigBee space. Ember pioneered the first comprehensive development platform for ZigBee-ready applications, including all required hardware, software, and tools. The Ember EM2420 platform has become the golden suite for 802.15.4 interoperability. Through a combination of unparalleled experience and engineering expertise, Ember leads the industry in helping OEMs bring ZigBee-ready products to market.

Next-Generation Meter Reading

Utility companies that want improved efficiency and greater control over meter reading operations now have a practical alternative to manual techniques thanks to automated meter reading (AMR) technology from NURI Telecom. Working closely with Ember, NURI Telecom developed a wireless mesh networking approach using Ember chipsets. This solution can read electric, gas, and water meters remotely—without a meter reader ever stepping foot onto a homeowner's premises. A successful product rollout in Asia and large-scale deployments have generated worldwide interest in the Ember-enabled AMR system and launched pilot projects in a number of different countries.

From their headquarters in Korea, NURI Telecom capitalized on momentum from a government-initiated Digital Home Pilot Service to create a system for reading utility meters wirelessly, as well as supporting future ZigBee-ready home automation devices. Public utility companies using NURI Telecom components can collect and aggregate data from residential customers through a wireless mesh network. The potential benefits are substantial: utility companies can save millions of dollars, address safety and load-balancing concerns more responsively, and improve service to customers.

By establishing wireless, two-way communication between the utility central office and the customers' homes, companies can track and monitor utility use without dispatching meter readers. NURI CEO Song Man Cho describes the solution in these terms, "Our Ember-enabled meters form a complete mesh so that they can all communicate with each other and route data reliably. The ZigBee network works well because latency is not an issue, yet the network can be easily expanded as new buildings are brought into service. We partnered with Ember because it had the most mature ZigBee platform, enabling us to reduce our product development times dramatically."

Meeting the Challenge

Rising worldwide energy prices and increasing consumer expectations pose a significant challenge to public utility companies tasked with improving their overall efficiency while keeping costs under control. Responding effectively to power outages, gas and water leaks, brownout conditions, and seasonal demands can be complicated by the lack of real-time usage and system status data from residences. Even the simple act of manually reading gas, water, and electric meters typically costs utilities millions of dollars a year.

As part of a nationwide initiative in Korea to equip residences with smart home components, NURI Telecom developed a line of residential electric meters under the brand name AIMIR, using Ember ZigBee-ready ICs. The collaborative design effort brought NURI Telecom and Ember engineers together to establish a utility-oriented technology platform that can streamline utility metering. This extensible platform can also become a part of an extended home automation system. With this system, utilities receive up-to-the-minute data from residences and can also send information to subscriber-controlled units (SCUs) in the home. This solution leverages the inherent advantages of mesh networking, providing a flexible, wireless communication network that is self-organizing and self-healing. Easy to set up and deploy, AIMIR gives utility companies real-time data to improve decision making, detect fraudulent utility use, respond to safety issues promptly, and improve the quality of service through better communication with customers.

Responding to the Technical Challenges

As part of the development effort to address NURI Telecom requirements, Ember expanded the capabilities of EmberNet to accommodate larger networks, creating a scalable, reliable network infrastructure that can support 250 nodes reporting to a single base station. To accommodate more intensive net-

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NURI Telecom and Ember Automate Meter Reading



"Wireless networking will drive adoption of advanced automated meter reading that reduces water, gas, and electricity costs by up to 25%, according to a research study by ON World. With utility costs rising by as much as 10% per year, conservation is becoming increasingly important."

—TMC On the Web, 26 October 2004
[<http://www.tmcnet.com/usubmit/2004/Oct/1086980.htm>]

Key Results

Successful deployments of Ember-enabled gas, water, and electric meters in Asia have proven the concept and opened up the opportunity for millions of automated meter reading systems worldwide.

Ember Solution

- Integrated circuit: EM2420
- EmberZNet™
- Ember Developer Kit

The Ember logo, featuring the word "ember" in a lowercase, black, sans-serif font, with a red dot above the letter 'b'.

working demands, Ember developed a special-purpose network mode that includes gateway software for handling the increased data flow generated by large sensor networks. Consulting with NURI Telecom engineers throughout the development process, Ember tested and fine-tuned these modifications to ensure that the increased network traffic could be handled reliably with minimal latency. The improvements were then incorporated into Ember's standard development kit.

The scope of this effort required that NURI Telecom achieve a manufacturing test capability of more than 10,000 nodes per month. Using Ember's manufacturing support documentation and development tools, NURI Telecom successfully met this objective.

Going Beyond Meter Reading

The ZigBee standard, as implemented in the Ember chips used in the solution, establishes a capable framework for unifying communication among a variety of home components, including security devices, digital entertainment systems, heating and cooling systems—all using wireless, two-way communication.

The nature of the ZigBee standard creates an environment within which utilities can explore a number of highly innovative applications. For example, using a ZigBee-enabled thermostat in the home coupled to a ZigBee-enabled gateway, residential customers could give utilities permission to adjust temperature settings in exchange for a rate discount. Being able to increase or decrease thermostat settings slightly during summer and winter months could help utilities respond more efficiently to peak demands while helping residents save money.

With thousands of successful deployments by Korea's primary electric and gas utilities and increasing numbers of installations in other Asian nations, NURI Telecom has expanded its focus to other parts of the world. In the United States, with recent multi-state power outages vivid in everyone's memory, public utility companies can clearly benefit from a

system that provides more granular visibility into power use patterns and the potential for establishing cooperative interaction with utility customers.

Tapping into Worldwide Markets

With dwindling gas and oil supplies, nations around the world have become much more energy conscious; the NURI Telecom AIMIR solution offers a way to collect and aggregate data on energy use so that large countries with rising populations, such as India and China, can monitor and deliver energy to users more effectively. In Korea alone, the opportunity to reach more than 30,000,000 energy users is being realized as primary utility companies increasingly deploy the AIMIR solution.

Working from Irvine, California, Elizabeth Park, the Global Marketing Director for NURI Telecom, is planning pilot projects with a number of utility companies in the United States. "We believe strongly in this technology and put a lot of energy into developing the AIMIR solution. NURI Telecom is the first company to introduce a ZigBee-enabled automated meter reading application. Using the Ember Developer Kit and Ember network stack, we were able to realize the full potential of ZigBee technology in a short time."

The ongoing support from Ember has proven invaluable as NURI Telecom continues to refine and improve products to meet U.S. market requirements. "Throughout our product design," Park said, "we received excellent support from Ember, particularly from the engineering staff members, who were deeply involved in the development. NURI Telecom and Ember worked together very closely to overcome many difficulties and to create the advanced AIMIR solution that will accomplish great things for the utility industry."

NURI Telecom offers comprehensive, network-centered solutions for IT management, automated meter reading, sensor network, and home automation applications. For more information, visit www.nuritelecom.com.

Ember Corporation develops wireless semiconductor solutions that help buildings consume less energy, manufacturing plants run with fewer breakdowns, and the country's borders and infrastructure remain safe and secure. A promoter of the ZigBee Alliance, its vision is to help create an "Internet of things" by enabling the eight billion microcontrollers built into products each year to support low-cost, low-power networking applications in any industry. Headquartered in Boston with offices and distributors worldwide, the company was named one of Fortune Magazine's top "Cool Companies" for 2004. For more information, please visit www.ember.com.

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