



FAULT CIRCUIT INDICATORS AND WIRELESS M2M COMMUNICATIONS CASE STUDY

Hawaiian Electric

Using Fault Circuit Indicators and Wireless M2M Communications at Hawaiian Electric

Oahu, Hawaii – Hawaiian Electric Company (HECO) has been providing electric power for more than 100 years, helping the islands evolve and grow into modern, and efficient communities. HECO and its subsidiaries, Maui Electric Company, and Hawaii Electric Light Company, currently serve 95 percent of the state's 1.2 million residents on the islands of Oahu, Maui, Hawaii Island, Lanai and Molokai.

FreeWave Usage and Applications

The reliable command and control functionality extended to the distribution layer and beyond (via distribution automation) is a key enabler for smart grid operations. One emerging automation application in the distribution layer is Fault Circuit Indicators (FCIs), which are deployed along power lines to detect fault current. If the current defaults on a line with a FCI, it will detect the distance that the current has failed from pole to pole, letting operators pinpoint the location of the fault along the power line.

In an effort to improve customer satisfaction to mitigate or respond to power outages quicker, HECO was a perfect use case for FCI implementations. As the island populations grew substantially over the last century, HECO's load requirements continually increased, along with the need for a reliable data network to serve various automation purposes.

However, due to the rough terrain, unpredictable weather and remote locations of the equipment, it needed flexible, yet reliable M2M communications technology that was dependable in the field, could transmit data over long distances and was not exceedingly costly to deploy.

In stepped FreeWave Technologies and its partner Power Delivery Products, Inc., who provided the Smart Navigator FCI sensors. Together, they installed an M2M network using FreeWave's FGR2-PE radios for longrange wireless data communications. HECO operators wanted to test the system in one of the harshest environments on Oahu to see how it performed. While the challenge proved to come with its fair share of difficulty, FreeWave was the first wireless M2M communications provider able to establish a reliable communications link in the environment.

The FGR2-PE is part of the portfolio of Ethernet solutions offered to address the needs of distribution automation. It provides simple Ethernet connectivity, industrial grade security, superior RF link performance, and integrated network manageability. The FGR2-PE also offers a second, switched Ethernet port as well as two serial ports to meet the demands of customers' automation requirements.

The FGR2-PE can be embedded within the FCI system and transmit data up to 60 miles Line of Sight (LOS), ensuring fast identification of a fault. Embedding M2M communications within the FCI prompts a fast reaction from the utility operators at HECO to help prevent a major blackout from occurring. It also helps narrow down problems when they occur along the line, which maximizes up-time, prevents power delivery issues and saves the utility money.

and FCIs have been deployed across the entire island of Oahu. In doing so, HECO is now able to effectively mitigate power outages or issues along the power line by detecting fault data and transmitting it in real-time with FreeWave's wireless M2M communications solutions. This allows HECO to better serve its customers for generations to come.

Outcome

The goal of FCI project for HECO was to reduce outage time by isolating faults and increasing response time for its customers. Deployment kicked off in late 2012

HIGHLIGHTS

- > FreeWave was the first wireless M2M communications provider able to establish a reliable data communications link in the harsh terrain on Oahu.
- > The difficult terrains / challenging installation of FCIs on Oahu have posed no threat to the functionality of its network comprised of FreeWave's FGR2-PE solutions.
- > By installing FCIs throughout the island of Oahu, HECO can now mitigate power outages or issues along the power line and address issues faster and more efficiently.
- > HECO employees have cited excellent customer service and on-site support as key reasons for choosing FreeWave.



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