Preparing Today for the Grid of Tomorrow

EXECUTIVE SUMMARY

National Grid UK, the transmission system operator for nearly 20 million people in the United Kingdom, is deploying an advanced, upgradable grid measurement system to provide better operational data for the condition of the UK grid. Like many energy providers, National Grid UK is facing the challenges that come with a rapidly changing grid; thus, the company is focused on developing a flexible solution that can be upgraded with new software as the measurement needs of the grid and amount of data available evolve.

Gathering reliable, real-time data from all areas of the grid is critical to identifying problems early and preventing power disruptions. To keep the grid running consistently, operators must be able to gather data from a wide range of measurements and quickly gain insight from that data to monitor the overall health of the grid. Software-designed systems provide customized measurement solutions that can be upgraded in the future as new grid modernization challenges arise.

> *"The high processing power of the CompactRIO allows us to gather and analyze large amounts of data from anywhere on the grid, as well as compile and analyze all the data to see grid-wide trends to optimize our investments to meet the energy needs of the next generation."*
> - Peter Haigh, National Grid UK

THE CHALLENGE

The modern grid comes with new engineering challenges. In the United Kingdom, as renewable energy resources are being used to supplement fossil fuel production, power quality issues are surfacing. Combine this with the rapidly increasing demand for energy and the decommissioning of fossil fuel plants, and grid operators are finding that traditional measurement systems do not offer adequate coverage to handle these new challenges and manage the new risks the industry faces.

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THE SOLUTION

Knowing it could not fix what it could not measure, National Grid UK adopted a platform, based on the CompactRIO system, that can provide more measurements and also adapt with the evolving grid for generations to come. This interconnected network includes 136 systems, with 110 permanently installed in substations throughout England and Wales and 26 portable units that provide on-the-go spot coverage as needed. The software application running on both versions is identical, which minimizes the impact on system integration, training, and support.

RESULTS

National Grid UK selected the NI platform to develop a flexible, powerful, and connected measurement system capable of gathering and analyzing large amounts of data to better detect grid-wide trends. Compared to its existing infrastructure, implementing a smarter, more connected system allows National Grid UK to manage change, optimize energy sources, and plan for the future grid.

With an open, flexible, software-designed instrument, National Grid UK engineers can customize the information available for grid operation and easily make upgrades as needs change. This approach improves grid monitoring and reliability while reducing the amount of equipment needed. Additionally, with the advanced processing power of CompactRIO, National Grid UK can easily maintain its network of connected systems and push intelligence down the grid to turn massive amounts of raw data into bits of useful information, keeping the lights on for millions of businesses and homes throughout the United Kingdom.

ABOUT NATIONAL INSTRUMENTS

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