

ENERGY SPECIAL

# CIO Review

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The Benefits of a  
'Modular' Future  
for Data



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# IoT Benefits Scalability of Advanced Energy Solutions

By Joe Blanchard, VP of Services, Plug Power

From micro grids to rooftop solar plants to hydrogen powered forklift trucks, every alternative energy solution, to some extent, is a distributed energy technology. In order to be successful, every alternative energy solution must scale and use the power of Internet of Things (IoT) technology to grow and expand profitably.

However, IoT technology generates a lot of data, and may be—in many cases—the first big data application that customers are embracing. This can have a large impact on a customer’s IT organization and as a CIO, you are in a good position to provide important input on how to deliver the value of this big data without overwhelming the IT professionals that provide support.

around them. For example, every time a forklift truck powered by a Plug Power hydrogen fuel cell stops to be refueled, a complete download of operational data is passed from the unit to the cloud and is aggregated into its control center in Latham, NY.

In many cases, systems are already collecting all of the required operational data. There just needs to be a cost-effective way for it to be transmitted to a central data repository for analysis and display. New networking technologies are emerging to provide this connectivity. Most IoT networks are wireless, but that does not always have to be the case. In some solar applications, power line communications—the ability to send network data across an existing power



Often times, long battery life is a requirement for IoT sensors and networks, but for energy systems, power is readily available which opens up the options for higher throughput network connections and sensors. Low-power Wide Area Networking (LPWAN) technologies are popular for IoT because they can preserve battery life. This technology is excellent for devices that are low-cost, remotely located and need to transmit limited amounts of data for many years.

Once the network is in place to send data, it must be processed and analyzed by an application that combines big data analytics with day-to-day management updates including developing reports and

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## Elements of an Energy IoT System

The core of the IoT solutions are sensors embedded in your energy systems that connect back into the cloud or other IT systems to report data on the units themselves and the operating conditions

line—is an ideal solution because it leverages existing cables, reducing the upfront cost of implementation. Tradeoffs could include the available bandwidth or size of data that can be communicated at any time.

triggering alarms to warn of system health or performance limit issues.

One advantage of these systems is real-time response to issues in the field, which results in improved customer service. The right analytics can provide data on possible failures before they happen, allowing a field technician to be dispatched with the right part at the right time, minimizing downtime and interruption of a customer's operations.

## Why IoT? For Scalability

The real payoff from the investment in building a monitoring application based on embedded networking technology is to improve the scalability of your energy systems, both in terms of reducing costs and improving reliability.

The biggest cost impact is using analytics to identify performance or maintenance issues and to fix them quickly. A medium term benefit is to collect enough data for predictive analysis, which lets service teams anticipate issues and respond before the customer even knows a problem exists. One energy management company, whose products are targeted at restaurants, has found that its IoT technology can predict issues with other electrical equipment within the restaurant, such as HVAC systems. This can open up new business opportunities as systems share data and work more closely together.

Faster service response does contribute to better system reliability, but the information can also be used to help develop better follow up products. Often times insights are gained that, when combined with the creativity of an engineering team, can lead to breakthrough product features and functionality. In addition, information can help monitor and improve new products early in their lifecycle, improving customer satisfaction and reducing development costs along the way.

## Case Study: GenCare SiteView

To get a sense of how the IoT journey has played out for an energy company, let us

look at Plug Power and the evolution of its SiteView system, which relies on IoT technology to provide feedback on its hydrogen fuel cells. Plug Power is the largest hydrogen fuel cell company in the industry, with more than 11,000 installed units in the field.

In the last several years, the company has expanded beyond fuel cells to deliver a turnkey hydrogen system and expanded customer support services to give its customers a complete solution



for their need. GenCare is the company's customer service solution that enables its support team to provide improved uptime to the distribution centers, which use Plug Power's GenDrive fuel cells and GenFuel fueling infrastructure to power their material handling equipment. As a component of GenCare, SiteView's intelligent data services provide timely information 24/7 that allows the company to access, in real-time, the operational status of each fleet in the field through remote access and reporting tools.

Everything is tracked, from the upcoming maintenance schedule, to daily hydrogen fuel dispensed. SiteView allows Plug Power to be proactive on maintenance needs while guaranteeing 97 percent uptime at each location, and the level of information the company shares with its customers is transformational.

The SiteView system starts with the communication systems embedded in each GenDrive fuel cell that can communicate

with a GenFuel hydrogen dispenser each time the equipment driver connects to refuel the forklift or other material handling equipment.

The information collected is delivered to the cloud-based SiteView data compilation software, is dissected and analyzed and then served back to customer service technicians in reports they can use. The data allows these technicians to know when to optimally time maintenance activities, ensuring the equipment is in

service for as long as possible. If the data indicates an emerging issue, technicians can schedule maintenance so that unplanned work stoppages do not occur.

This information is important to Plug Power, but also to its customers. SiteView's digestible reporting tools share critical information enabling customers to make educated decisions regarding their fleets and employees as they strive for increased operational productivity.

While IoT improves reliable scalability and improved product functionality, energy CIOs should also be involved to ensure that these systems enhance the functionality of IT teams. Each IoT sensor is a potential endpoint that IT teams must manage, support, and integrate into existing networking or data center operations. The energy company CIO should be consulted in the IoT design process to ensure that this added data is properly used to support existing systems. **CR**