



Cornell University Optimizes Energy Efficiency With iFIX From GE Digital

Results

- ▶ **40% faster** off-hours troubleshooting with Industrial Internet technology
- ▶ Increased **energy savings** and lower operational costs
- ▶ **Improved uptime** through proactive maintenance of equipment
- ▶ **Faster responsiveness** to issues and better decision making
- ▶ Better facilities management through **increased process visibility**

“iFIX enables cost management by providing data to management to make informed decisions. We can also manage demand volatility easier and faster than before.”

**TIM PEER PE, ENERGY PLANT MANAGER
CORNELL UNIVERSITY**

Better visibility and informed decisions

One of the leading learning institutions in the world, Cornell University, located in Ithaca, New York, is practically a city in itself. With over 34,000 students and staff at peak attendance during the academic year, the school maintains 260 major buildings on 745 contiguous acres. Both a private university and the land-grant institution of New York State, the 145-year old university prides itself on being an educationally diverse member of the Ivy League.

The campus consumes up to 35 megawatt (MW) capability to power the buildings that make up the school. In an effort to conserve electricity and reduce greenhouse gas (GHG) emissions, Cornell sought a visualization and control system to monitor its operations and drive down operational costs.

The university leveraged iFIX from GE Digital and Historian from GE Digital, part of the HMI/SCADA suite to monitor and control major aspects of the campus facility operations, including:

- ▶ Lake source cooling
- ▶ Water filtration
- ▶ Steam and power generation

In addition, Cornell implemented GE Digital's Mobile to deliver real-time operational intelligence from across these facilities' systems, enhancing the use of iFIX for campus-wide monitoring and control.

A powerful off-the-shelf application, iFIX provides facilities management with key information on mobile devices, such as an iPad for better and faster decisions that help speed troubleshooting, reduce downtime, and increase energy savings.





“GE Digital’s commitment to delivering an open and layered product, continually adding new and useful features at the HMI/SCADA layer and expanding their higher level toolsets, keeps them at the top of our list.”

**BILL RICHARDS, SENIOR IT ENGINEER
CORNELL UNIVERSITY**



Enabling reliable, safe control of the lake source cooling system

The Lake Source Cooling (LSC) project is an upgrade of the central campus chilled water system with a more environmentally-sound design that conserves energy and utilizes a renewable resource: the deep cold waters of nearby Cayuga Lake. It provides the university with a more cost effective method of cooling that minimizes complex chilling equipment and reduces its associated energy use by 80%, providing significant cost and environmental benefits.

Chosen for its ability to interface with a wide variety of devices, iFIX HMI/SCADA monitors the process from the central plant, alongside independent video cameras for visual inspection. Data collected via Historian enables the university to measure effectiveness, and the data is shared with other applications directly and is exported for statistical analysis.

iFIX helps control and monitor the pumps, electrical components and pressure sensing on the innovative and groundbreaking cooling project. The software solution, in conjunction with accurate sensors, drives preventative maintenance actions to avoid reduced flow situations from lake debris and zebra mussel buildup.

It generates alarms and warnings on the connected equipment and identifies where maintenance is required to remove buildup of debris in the pipes—supporting stable and safe control of the entire system.

Improving visibility into water filtration, steam, and power generation

Cornell operates a relatively small campus-based water filtration plant, supplying potable water for use in labs and campus buildings. The control system previously controlled valves and chemicals manually and operated for more than 80 years.

The need for more accurate control, reporting, and data retention drove Cornell to upgrade the system with modern controls and software with HMI/SCADA.

The HMI/SCADA solution consists of two pairs of redundant iFIX systems to control and monitor the pumps and chemical distribution. It interfaces with a variety of sensors and a PLC-based control system to provide full visibility to the water system and easy integration with other GE and third-party systems. Operators use the system's trending capability and general visualization to ensure water quality and centralize process set point inputs.

In addition, Cornell operates its own on-campus central utility energy plant. The primary objective is to create steam for heating the more than 270 campus buildings with a secondary objective of generating electricity to run the chilling units and building power. Natural gas turbines and natural gas boilers help generate steam.

The HMI/SCADA solution provides statistical analysis offline of steam production, electrical power generation and chilled water demand, providing visibility and critical decision support.

The system consists of a wide variety of components, PLCs and vendorspecific equipment supported by HMI/SCADA in the form of a redundant pair of iFIX servers with 10,000 tags and approximately 15 clients.

In addition, the solution includes Historian with 10,000 tags, which shares data for building energy reduction initiatives. For example, Cornell makes some information available to the public over the web in real time through a web-based portal. This information is accessed from the Historian APIs in real time for analysis by the public, students, and campus professors.

“iFIX allows us to monitor and control our systems in a manner which maximizes reliability and efficiency.”

**TIM PEER PE, ENERGY PLANT MANAGER
CORNELL UNIVERSITY**



“iFIX supports the school’s green initiatives and its goal of becoming carbon neutral by implementing data and control elements that provide nonsubjective operational data.”

**LANNY JOYCE PE
DIRECTOR ENERGY MANAGEMENT
CORNELL UNIVERSITY**





“With real-time operational intelligence from GE Digital, I can see the KPIs I want – anytime. When an operator calls at night, I reach for the iPad with iFIX and Mobile. I can see what the operator is up against and what the campus needs and immediately help with troubleshooting and decision making.”

**CHRIS SMALT, PLANT MANAGER
CORNELL UNIVERSITY**



Real-time operational intelligence anytime, anywhere

With thousands of equipment assets running 24/7, Cornell’s facilities management has information at its fingertips through the use of Mobile, which leverages the power of the Industrial Internet. For off-hours troubleshooting of its complex systems and equipment, the team can access information through standard iPad devices using this software application. Decisions regarding equipment assets such as choosing the right equipment based on changing weather conditions can significantly impact efficiency and energy usage.

Additionally, when an asset fails, a workaround must be implemented immediately. With iFIX and Mobile, the facilities team has key performance indicators (KPIs) available, anywhere, anytime—which improves decision making and speeds system troubleshooting, helping to get systems back online as efficiently as possible.

Using Mobile, the university can monitor operations and drill into KPIs such as electrical distribution, equipment status, how much power the university is sending or receiving from the grid, power through breakers, and more. Based on this information, managers assist operators to solve problems faster and make the smartest choices for energy efficiency and environmental stewardship.

Staying on the leading edge of the future

The HMI/SCADA solution from GE Digital has enabled Cornell to achieve key benefits, including 40% faster off-hours troubleshooting, increased energy savings, improved reliability and higher equipment uptime. Moving forward, the university plans to expand its use with advanced alarming and analytics to avoid issues before they occur—further increasing asset uptime for optimized performance.



About GE

GE (NYSE: GE) is the world's Digital Industrial Company, transforming industry with software-defined machines and solutions that are connected, responsive, and predictive. GE is organized around a global exchange of knowledge, the "GE Store," through which each business shares and accesses the same technology, markets, structure, and intellect. Each invention further fuels innovation and application across our industrial sectors. With people, services, technology, and scale, GE delivers better outcomes for customers by speaking the language of industry.

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