

# Building Automation

Customer case study



## World-class training facility achieves Net Zero Energy

### Summary

- Builders in California – and around the world – are looking for creative ways to implement Net Zero Energy
- The end customer, a living laboratory and training facility, is the largest Net Zero Energy commercial retrofit in the U.S.
- EnergyIQ created a comprehensive SCADA system to support the entire project, including lighting, involving HVAC, a microgrid, energy management, solar power, and more
- Phoenix Contact industrial-grade PCs and controllers, which run on the Niagara platform, maximize the system's reliability

“When we use Phoenix Contact's power supplies and surge protection, the products come with a five-year warranty. That's a powerful statement that Phoenix Contact stands behind the quality of its products.”

**Karl Zimmerman, president and CEO of EnergyIQ**

### Customer profile

EnergyIQ was commissioned by an electrical training school in California.

This school educates workers and contractors at a state-of-the-art training center, preparing more than a thousand apprentices per year for challenging and rewarding careers in the electrical industry.

EnergyIQ was required to provide a comprehensive, state-of-the-art SCADA system to support the project. EnergyIQ's solution maximized the value of information, grew trust and confidence in decision-making, and lowered the cost of enterprise information.

### Challenge: Net Zero Energy

California has set a policy that all new residential buildings must meet “Net Zero Energy” standards by 2020. By 2030, new commercial buildings must also comply. This means that the building must produce as much energy as it consumes during the course of a year. To meet this standard, builders and contractors are looking for ways to improve overall energy efficiency, combined with solar and other renewable energy systems for on-site power generation. (Source: <http://www.californiaznehomes.com/faq>)

As a leading training site for electricians in California, the school needed to be at the forefront of the Net Zero Energy initiative. This facility is a living laboratory to test, demonstrate, train, and bring to market emerging energy technologies.



**Phoenix Contact industrial automation and control give EnergyIQ the ability support the end customer's overall energy management strategy.**

As builders, facility owners and managers, manufacturers, and municipalities from California and other locations look for a better understanding of the new energy economy, the training center continually evolves with new technologies.

### **Solution: Comprehensive SCADA system runs on industrial-grade controllers**

EnergyIQ created a comprehensive Net Zero Energy project, comprising applications involving solar power, battery control, energy demand response, HVAC, lighting integration, and dashboard/glass walls. The system monitors close to 600 power meters, several hundred lighting circuits, a high-efficiency central cooling and heating plant, all HVAC and exhaust systems, an electrochromatic glass system, 500 kilowatts of solar power panels, 4 DC/AC power inverters, three grid-style battery systems, and eight vehicle charging stations.

At the heart of the system was a Tridium Niagara-based AX 3.8 Supervisor running on a Phoenix Contact industrial server. Data collection and integration were performed using two Phoenix Contact ILC 2050 BI controllers. One ILC controls the inverters and power meters, and the other performs demand-limiting control for the HVAC systems.

The ILC 2050 BI controller can automate different subsections in building infrastructure, data centers, and distributed properties. The controller offers a variety of interfaces and supports various protocols. Through standardization of various data types, the integrated IoT framework enables IoT-based automation of processes and management services, which go beyond a building management system.

Because Niagara is an open platform, the software drove many of the design decisions, but EnergyIQ was looking for hardware that would prove more durable than commercial off-the-shelf (COTS) options. Karl Zimmerman, president and CEO of EnergyIQ, said that Phoenix Contact's industrial-grade reliability and interoperability with Modbus TCP and BACnet were key factors in the decision process.

"We've used the Niagara platform for years, so we were always going to use that platform," said Zimmerman. "Sometimes, we see controllers that have been made in somebody's garage, but



**ILC 2050 BI controller can automate different subsections in building infrastructure, data centers, and distributed properties.**

when I saw the Phoenix Contact factory [in Pennsylvania], the quality made a big impression. The people — especially the sales engineer — have been a big help."

Zimmerman added, "When we use Phoenix Contact's power supplies and surge protection, the products come with a five-year warranty. That's a powerful statement that Phoenix Contact stands behind the quality of its products. We've seen that quality in the Phoenix Contact products we use."

### **Results: A world-class showcase for Net Zero Energy retrofits**

According to its website, the end customer projects that the new building will reduce total electrical usage by over half and will generate 1.25 times more energy per year than what is consumed. It can operate off the grid for multiple days. It will reduce over 500 metric tons of carbon dioxide per year. It will also cut down on lighting, heating, and cooling consumption.

The facility stores its excess energy, so that it can continue to operate if there is a grid disturbance or high demand. If the building loses its main power, the PV system acts as a UPS for the entire building. As other builders look for ways to meet Net Zero Energy standards, they will look to this training center as the standard for best practices in energy efficiency and reliability.