



Thermodynamics at scale: How Energy IQ redefined comfort and efficiency in Times Square

Highlights:

- Energy IQ created a building automation system to help the Marriott Marquis maximize energy efficiency
- As the hotel's cogeneration plant generates electricity, the system captures the heat generated and reuses it for other purposes, like heating the air or water, or preheating the boilers
- Energy IQ relies on Phoenix Contact automation technology to ensure the speed, security, and reliability needed in a complex, dynamic environment

“If a building becomes smarter, cleaner, and more resilient without compromising occupant experience, that’s true success for us.”

– Isi Sudit

Customer profile: Energy IQ

In Times Square, the lights never dim, and in this city, comfort isn't a luxury – it's an expectation. The Marriott Marquis hotel is one of New York City's busiest and most iconic hotels (Figure 1). How do you sustainably manage the immense energy demands of a 1.7 million square-foot complex in a city that never sleeps?

Heating nearly 2,000 rooms in winter, cooling them in summer, supplying hot water continuously, and powering Broadway

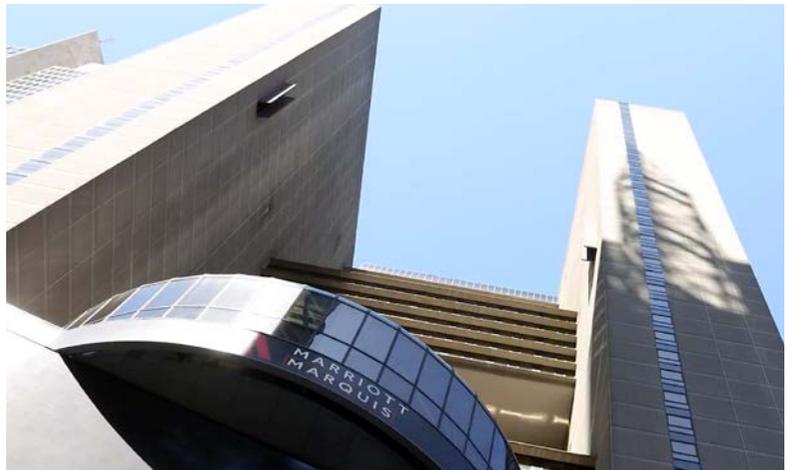


Figure 1: The Marriott Marquis hotel is one of New York City's busiest and most iconic hotels. The 1.7 million-square-foot landmark is home to 1,900 guest rooms, restaurants, meeting spaces, and a Broadway theater.

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theaters and rooftop restaurants: It's not just about more energy. It's about smarter energy.

Energy IQ empowers organizations to make better energy decisions (Figure 2). Isi Sudit, Chief Revenue Officer, said, "Energy IQ was founded by Karl Zimmerman more than 20 years ago. We specialize in automation and control systems, specifically for large, complex customers, where we manage large assets with multiple sites. The industries include hospitality, healthcare, data centers, arenas, colleges, and more."



Figure 2: Energy IQ empowers organizations to make better energy decisions.

Challenge: Maintaining comfort, continuity, and control

An aging infrastructure strained under rising costs, grid instability, and the pressure to maintain uninterrupted guest comfort. In a city where buildings account for nearly 70% of emissions and face strict energy mandates, traditional solutions weren't enough. Marriott Marquis needed a new approach — one grounded in science, precision, and real-time efficiency.

- High energy demand across 1,900 rooms, 100,000+ sq ft of meeting space, and a Broadway theater
- Rising energy costs and grid instability
- Need for sustainable, scalable solutions

"Tens of thousands of people go through the hotel every day. It's not just guests, but people going to a restaurant, theater, or a convention center. The hotel has to manage

everything for these guests, from the water to the energy to the air conditioning to the kitchens," explained Isi. "And it has to be managed within the same control automation system."

Solving this complex challenge takes more than upgraded equipment. It takes a partner who understands energy not just as a utility, but as a foundation for comfort, continuity, and control. That's why Marriott Marquis turned to Energy IQ, whose expertise in cogeneration and thermodynamic systems helped transform rising costs into long-term resilience. Over the past 10 years, Energy IQ has worked with the Marriott Marquis on several projects to enhance guest comfort.

"Keeping the customers comfortable in a building with 60 stories is challenging," Isi said. "With thousands of rooms and common areas, you need to run the air conditioning efficiently in different areas of the building."

Solution: Thermodynamics in action

A building the size of the Marriott Marquis, with thousands of people on-site, requires a safe and reliable megaplant that can generate up to 4.2 megawatts of power. Understanding the thermodynamic strategy behind this solution reveals how businesses can lead the way toward a smarter, more sustainable future.

Energy IQ brought more than expertise. They brought perspective, precision, and purpose, leveraging the fundamental laws of thermodynamics to capture, reuse, and optimize energy.

"In a cogeneration plant, you're taking burning fuel and then creating either heat, electricity, or motion. In Marriott Marquis's case, it is electricity," said Isi. "We're creating an electric load so they can run the air conditioners and all the other equipment in the building. As you run that, part of the process creates heat. If you capture that heat, rather than let it dissipate, you can reuse it for other things, making the building much more efficient and sustainable" (Figure 3).



Figure 3: The cogeneration plant burns fuel to create electricity.

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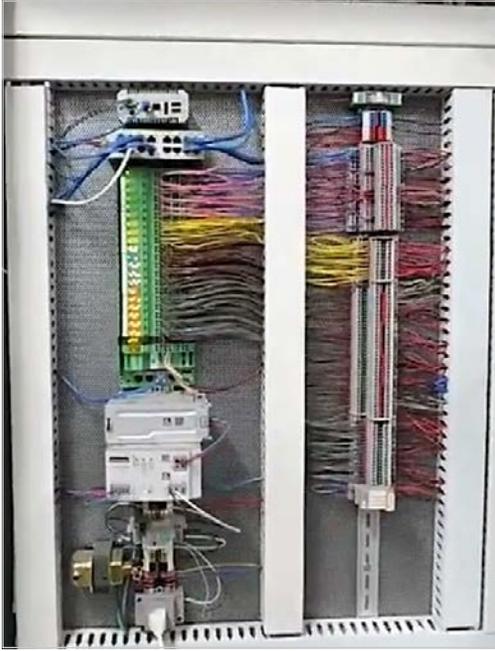


Figure 4: Phoenix Contact's industrial-grade control and I/O hardware form the backbone of the building automation system.

The process is based on the laws of thermodynamics: “The first law is that power cannot be created or destroyed, but it can be transformed. So by burning fuel, you’re actually transforming that into electricity, heat, or motion,” said Isi.

“The second law is that through the process, you have losses,” he continued. “Those losses are usually

heat. Instead of losing that heat and then wasting it, we capture it and reuse it for other purposes like heating the air or water, or preheating the boilers. We even do things in the kitchen with that heat. So it all comes together as a closed-loop sustainable system.”

Automation and analytics go hand-in-hand

Phoenix Contact's industrial-grade control and I/O hardware form the backbone of the building automation system (Figure 4). The technology's speed, security, and reliability gave Energy IQ the precision and scalability needed in complex, dynamic environments.

The Phoenix Contact ILC 2050 BI is the brain behind the control system. This programmable logic controller (PLC) runs on the Niagara framework, an open building automation protocol. Other Phoenix Contact components, like relays, power supplies, and terminal blocks, enhance the system's reliability. Cellular modems give Energy IQ and its customers remote access to the systems.

The system is fed by the data from the sensors' controls. The customer can use this data for predictive

maintenance or compliance. “One of the areas we work in is called demand response, which is the capability of shaving the peak demand on these plants when they actually need the power.”

Analytics are critical to Energy IQ and its clients, so every system they create has an analytics component to it. “Our analytics dashboard offers real-time analysis, fault detection, and predictive maintenance cues,” Isi explained. “Instead of having to look at the plant continuously and changing the settings, the automation looks at the entire data set, and it can manage the plant based on the energy usage of the building. Operators can visualize performance and make data-driven decisions, or let the system manage things automatically.”

Isi explained the long-lasting relationship between Energy IQ and Phoenix Contact: “Number one, Phoenix Contact is a great company to work with. Number two, Energy IQ uses open protocol solutions, which means we can connect equipment from a variety of manufacturers. Phoenix Contact uses this open protocol idea, too. And the most important part of our relationship is that Phoenix Contact equipment never fails. When we install something, we know it's going to last forever. And that's music to our ears.”

Results: Beyond the bills

“People often look at energy in terms of saving energy and saving money on energy bills,” said Isi. “But that's just a small part of the energy efficiency program. Energy efficiency can be related to sustainability and the lifecycle of the equipment you have.”

Efficiency can lower energy bills today, but it's also about long-term impact – cutting waste, reducing carbon emissions, and ensuring reliable energy when demand peaks.

Isi concluded, “Just as important, it means creating intuitive, interoperable systems that empower operators. If a building becomes smarter, cleaner, and more resilient without compromising occupant experience, that's true success for us.”