CASE STUDY

NOVVA Data Centers protects data and the environment with zero downtime and water-free cooling

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David Carpenter, controls manager, Holbrook Service, (left) inspects control panel with Siemens Desigo PXC controller (right)

Gaining better control of a newly acquired data center

NOVVA houses servers for major Internet companies among other hyperscale businesses, making every second of downtime a major and potentially expensive disruption. "The critical nature of our business – you almost can't put a financial number to it. Literally, seconds are millions of dollars," explained Steven Boyce, Vice President, Mission Critical, NOVVA Data Centers. "A mistake with any downtime on our part could actually put one of our clients out of business." Since NOVVA acquired the Colorado Springs facility, it had experienced weekly downtime with the cooling system. That had to change.

A "controls change out that could not fail"

That is why Boyce and Jeff Gray, Senior Controls Engineer for NOVVA's Colorado Springs data center, turned to partners Siemens Smart Infrastructure and Holbrook Service for the best solution that would keep their cooling system running 24/7. The answer was to replace the existing controllers with Siemens Desigo PXC controllers. "This was a controls change out that could not fail," explained David Carpenter, Controls Manager, Holbrook Service. "We had to have cooling running nonstop for their building."

About NOVVA Data Centers

NOVVA is a privately held company with state-of-the-art wholesale and multi-tenant colocation data centers in Utah, Colorado, and Nevada. It provides data infrastructure and turnkey data center solutions that are hyperscalable and easily customizable to meet specific needs.

NOVVA's Colorado Springs Data Center

The city's first large scale, multi-tenant colocation data center. Big on business and connectivity, with plenty of eco-friendly ambient air, this 37-acre campus has room to grow.

- Available Land: 37 acres
- Total Building Size: 122,000 sq. ft. with room to expand
- Power Availability: 40MW capacity

The team behind the change in Colorado Springs:

- **Steven Boyce,** VP, Mission Critical, NOVVA Data Centers
- **Jeff Gray,** Senior Controls Engineer, NOVVA Data Centers
- **David Carpenter,** Controls Manager, Holbrook Service
- **Product and Support:** Siemens Smart Infrastructure

Meeting “super aggressive” sustainability goals

The process began when Boyce and Gray’s controls team began implementing a plan for the Colorado Springs data center to meet NOVVA’s “super aggressive” sustainability stance, according to Boyce. “NOVVA made a decision at the company's very beginning not to use water as part of our cooling process. When you take into account how many millions of gallons of water that a data center consumes every day, it just doesn’t make sense,” he said. “Our controls team immediately put a plan in place to begin to migrate to air cooling in Colorado Springs and away from the existing water cooling as well as change out all the controllers,” Boyce added.

But they couldn’t start soon enough. “Right after the acquisition of the Colorado Springs data center, we had a mission-critical equipment failure and reached out to Holbrook Service for help when a previous company could not restore it. Because of Holbrook’s response to our needs, we immediately decided we were going to remove what was there and begin to replace it all,” Boyce added.

Applying new technologies at data centers

With a philosophy that data is the future, NOVVA strives to make sure their data centers are not stuck in the past. The company aims to push the data center industry into the future with thoughtful, innovative technology implementations. The team at NOVVA’s recently acquired data center in Colorado Springs works hard to create and utilize new technologies like waterless cooling, renewable energy resources, drone surveillance, and augmented reality training so customers can be future focused on their own businesses, not on their server housing. NOVVA's Mission Critical VP Steven Boyce enjoys the challenge because, along the way, NOVVA’s “CEO allows us to chase the latest data center innovations.”

Reviewing HVAC equipment data at Colorado Springs data center

Looking for innovative partners

The Colorado Springs team chose to work with Siemens and Holbrook because, according to Boyce, they “look for partners who also have innovation goals and solution-oriented people who bring problem solving skills to work every day.”

At the beginning, Holbrook helped reprogram the existing control system. “As we moved along, part of the system that we inherited continued to fail,” Boyce said. “There wasn’t the redundancy we required to ensure no downtime. But the biggest problem we were running into as we were working through our controls processes replacement is that the older controllers kept failing. We were having a hard time finding and replacing those," he added.

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> NOVVA Data Centers

Desigo PXC controller: easy from beginning to end

For a solution, Holbrook presented the Siemens Desigo PXC controller. “One of the things that really impressed our facility team was the fact that they could put PXC controllers in place with the existing system and then migrate into our new air-cooled chillers and control that equipment without having to change or upgrade any of the controllers. The PXC had all the capabilities we need today and tomorrow on day one,” Boyce explained.

The Desigo PXC controller is a future-proof technology that delivers optimal control of all facility operations. It is scalable and ready to control immediately. Desigo Automation is intuitively designed for easy commissioning and leverages sophisticated applications and libraries. Different protocols can be integrated without additional hardware or software, in a consistent and harmonized workflow that saves costs and efforts.

Pre-programmed and tested for smooth commissioning

For Holbrook, working with PXC controllers was easy from beginning to end. “Siemens PXC controllers were a great fit for this plant because they came in different sizes and we had the option of changing point counts,” Holbrook’s Carpenter explained. “We were able to have them pre-programmed and tested in my office before we ever started to change a panel out. And that meant we had peace of mind that when it was installed and it was wired, it was going to work,” he added.

Siemens Desigo PXC controller

One of four chillers controlled by Siemens Desigo PXC controllers

Greater redundancy at all levels

Redundancy is vital in all parts of a data center – from chillers, to cooling towers, to air handling units (AHU), to pumps, to variable frequency drives (VFD). Nowhere is uptime more important than in the chiller plant, which keeps the data center from overheating and shutting down. Before Siemens Desigo PXC controllers were running the Colorado Springs chiller plant, Gray was kept up at night by fears of equipment failures, power outages, or not being notified of any situations that may arise. And the fears were well founded, since downtime was a weekly thing at the data center prior to the work by Holbrook and Siemens.

The controllers in the data center control four chillers and two chiller plants, four cooling towers, and the associated pumps and fans that go along with it. "It's important to be able to stage and rotate the chillers at a moment's notice," Carpenter detailed. The 800-ton chillers are cooling a lot of equipment throughout the data center.

"We now have Siemens PXC controllers that are running our four chillers," Gray said. "Holbrook helped us design the system so that it is more of a flat architecture, which helps with redundancy. If a chiller goes down, we are able to have another chiller operate as a 'lag chiller' so that we don't lose our cooling for the space," Gray described. "If there is something that happens with the controller itself, say power is lost, we can have a transformer trip power to that controller. And since the architecture is flat, the three other controllers are still able to operate and keep the building at temperature the way we need it to be."

Immediate results: from weekly downtime before, to zero downtime today

Since the Desigo PXC controllers were implemented, things have changed dramatically for the better, according to Boyce.

- **There is zero downtime.** Downtime was a weekly problem in the past. It has gone from weekly downtime to zero downtime with PXC controllers.
- **Weekly service calls were eliminated,** thanks to zero downtime reliabilty. Facility engineers have more time to dedicate to strategic projects without responding to equipment failures.
- **Easily moved from one system to another.** When the old water-cooled chillers are replaced with new air-cooled chillers, the PXC controllers can be easily reprogrammed to control the new equipment. No new controllers will be needed.
- **Integrated additional systems,** which eliminated the use of water cooling and allowed dry coolers for ambient air cooling.

"The PXC controllers have been great," according to Gray. "We have not experienced any downtime on those controllers. They've been in my central plant on that location for a year and a half now. And in that time, they haven't missed a beat. We've experienced great results with that product."

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>
> Jeff Gray
> Senior Controls Engineer
> NOVVA Data Centers

Saving 2 million kWh of energy per year

Based on some of the changes NOVVA was able to implement in Colorado Springs, "we're saving ourselves over two million kilowatt hours of energy per year," Boyce said. This equates to the amount of energy needed to:

- Power 197 homes for a year
- Drive 4 million miles in average gasoline-powered passenger vehicles

$176k per year saved

Working together, the NOVVA, Holbrook, and Siemens Smart Infrastructure team found other opportunities to save. "They were able to eliminate a lot of other costs that were going on because of inefficiencies in the system," Boyce said. "That allowed us to save $176,000 a year."

These savings came from an unusual error in the previous control system's wiring and programming sequences that was discovered when Carpenter was installing the Desigo PXC controllers. It turned out that the electric reheat was wired to be on constantly. "So we were always dumping heat and having to over-cool the air so we could bring it down. Carpenter remedied it immediately so that we are no longer wasting an astronomical amount of money on energy. This had been going on for I don't know how many years," Gray said. The issue had not been discovered earlier because of the large amount of electricity that the data center uses.

Today, if equipment issues arise, the NOVVA team is notified immediately through emails and texts. "We are able to respond in a timely manner before the space temperatures are too far out of tolerance or even out of tolerance depending on the time of day or night," Gray said.

The Desigo PXC controller's interface with the front end has very nice interaction, too, according to Gray. Trend logs and data analytics also give the team the necessary system status information

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on a timely basis so they do not need to routinely check the equipment in person as was necessary in the past. This saves time and helps improve productivity, Gray said.

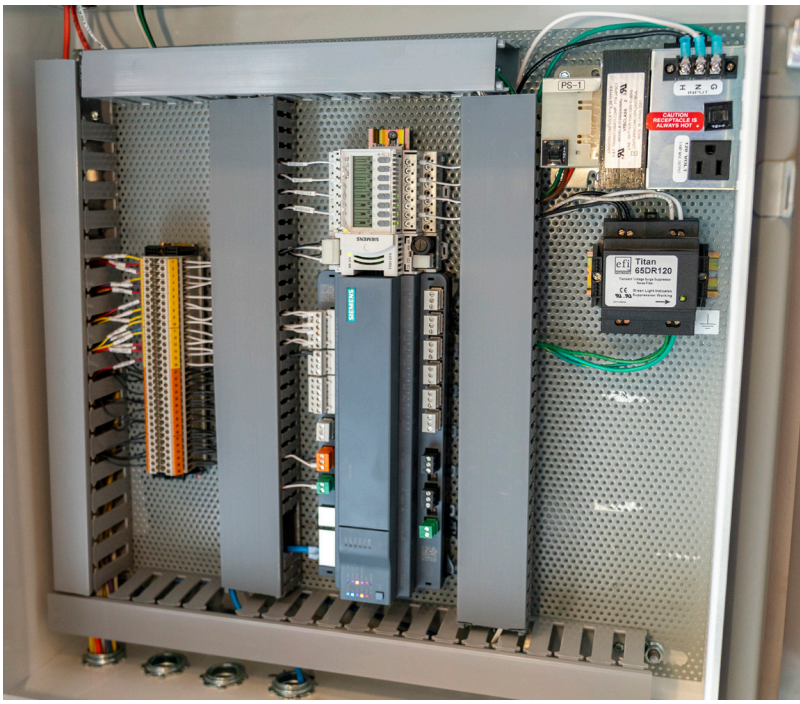
Carpenter added, “Just like with anything new, at the beginning, they looked at the system frequently. Now they trust the system and they don’t have to look at it except for getting data out of it.”

Success today and tomorrow

Carpenter attributes the successful use of the Desigo PXC controllers to its innovation and flexibility. “The Siemens PXC controllers allow us to have the flexibility to imagine what we could do and stretch the limits of what previously was thought possible. We’ve really enjoyed innovating with their products, whether it’s something new or something that’s being applied in a way we haven’t used before,” Carpenter explained. He also highlighted the success of the partnerships involved: “The reason that Siemens is a good fit for Holbrook Service and my customers like NOVVA is that they really are a partner, supporting us with a range of products and providing technical expertise and solutions that we need.”

Echoing Carpenter, Gray said, “PXC programming is very intuitive. It’s very easy to put the function blocks and logic blocks in place. You can write pretty much anything that you can think of, as far as the operations side of it goes, to be able to control your equipment how you want.”

In the end, Boyce said, “The biggest payoff is that I don’t have to worry about anything. My team is getting the rest that they need. They feel good and confident about the equipment that they're working with. Everything just works. Which is huge, right?”



Siemens Desigo PXC controllers keep the cooling system running 24/7 at NOVVA Data Centers’ Colorado Springs facility

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Siemens Industry, Inc.
Smart Infrastructure
1000 Deerfield Parkway
Buffalo Grove, IL 60089
Tel: (847) 215-1000

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