CUSTOMER CASE STUDY

The future of energy: Santa Rosa Junior College powers its new microgrid with AVEVA™ PI System™

Santa Rosa Junior College - www.santarosa.edu
Industry - Power

Goals

- Improve power grid resilience and reliability
- Reduce greenhouse gas emissions

Challenges

- Power grids are becoming increasingly complex, distributed, and unpredictable
- Increasingly frequent natural disasters put tremendous strain on the power grid

Results

- The new, data-driven microgrid helps SRJC significantly lower emissions
- Expected savings of $330,000 per year

Solution

- AVEVA PI System

When some of the most devastating fires in California's history ravaged the state in 2017 and 2018, Santa Rosa Junior College (SRJC) already understood the importance of sustainable energy production. The intensity of the fires, widely thought to be aggravated by climate change, only deepened the Northern California school's commitment to become a zero-net-energy facility and achieve carbon-neutral operations by 2030. But then, after several of the fires were blamed on old and faulty equipment operated by Pacific Gas & Electric (PG&E), the utility company began instituting public-safety power shutoffs. As a result, the college realized it also needed a resilient and reliable power grid. It turned to PXiSE Energy Solutions, which utilizes AVEVA PI System data to create power-grid control systems. Together, PXiSE and SRJC are developing a data-driven, high-performance microgrid. This approach will help the school reduce its greenhouse gas emissions while maintaining a resilient and reliable power supply.

Managing power – coming and going

Power grids are in a state of transition. They are becoming increasingly complex, distributed, and unpredictable as more and more renewable energy sources and energy-storage devices connect to existing grid systems. What was once a one-way power flow from utilities out to homes and businesses is now becoming bidirectional, with energy flowing from distributed renewable sources in homes and businesses back out to the grid.

This increase in distributed energy resources and the two-way flow of electricity makes managing parts of the grid increasingly complicated. One way to deal with this increasing complexity is to conceptualize smaller systems of interconnected power resources, like solar panels, turbines, and energy-storage devices, as a microgrid.

PXiSE specializes in creating control systems for modern complex grids that provide advanced control of the flow of energy between microgrids and primary grids. The company's control systems are built to be quick and responsive in order to accommodate the rapid changes and fluctuations in voltage common among renewable energy sources.

"As we evolve into much more distributed systems, it's really important to understand that every piece of equipment affects the entire grid," said Patrick Lee, CEO of PXiSE. "You really have to have a more comprehensive view as well as faster speed of control."

> "Most of the microgrid solutions that exist today are more customized, so that they are not easily transferable from one site to another site. But because we built it on a data platform like [AVEVA PI System], it allows us to do the replication using the asset framework."
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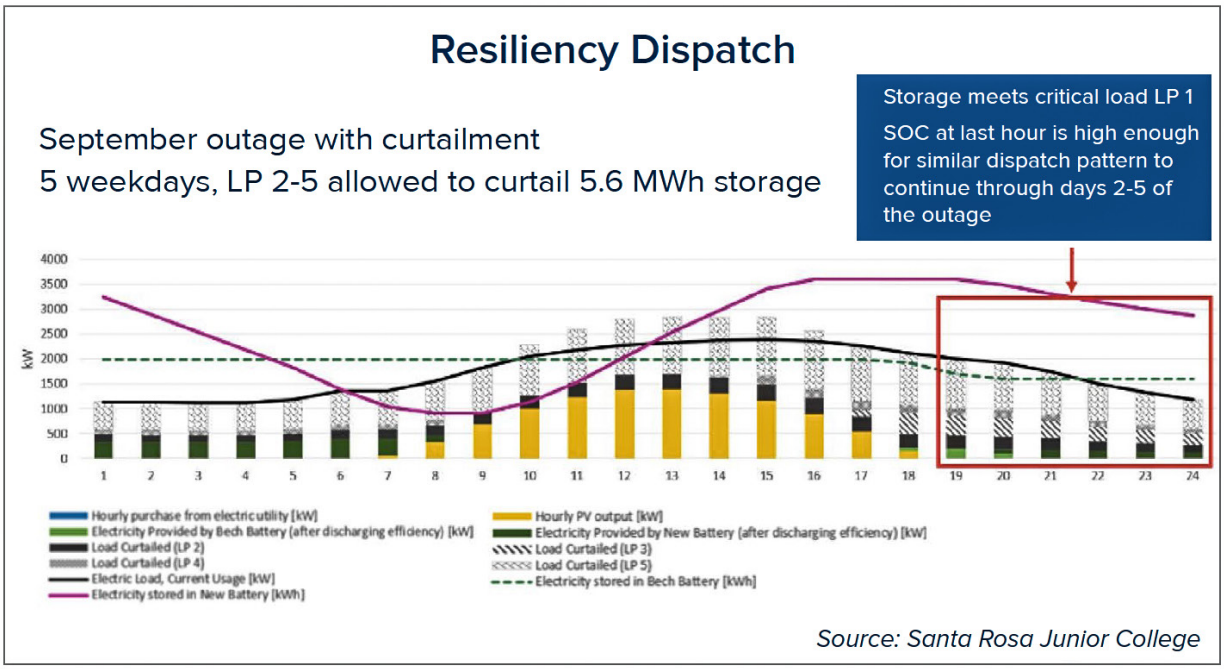
> **Patrick Lee**
> CEO, PXiSE Energy Solutions

Data collection at high speed

To help achieve better and faster control of microgrids, PXiSE relies on high-speed sensors that allow measurements to be taken 60 times per second. Data from these sensors is collected in AVEVA PI System, where it can then be analyzed by AI and machine learning software for improved grid control. Collecting high-speed sensor data in AVEVA PI System also helps PXiSE scale its control systems to larger and larger grids.

"Building up on top of a data platform such as AVEVA PI System is very important for scalability," Lee said. The templates feature in the asset framework of AVEVA PI Server allows PXiSE to easily replicate control systems in different contexts, whether it be creating precision control capabilities for hydropower plants or providing power to a remote community in Western Australia. "Most of the microgrid solutions that exist today are more customized, so that they are not easily transferable from one site to another site," said Lee. "But because we built our solution on a data platform like [AVEVA PI System], it allows us to do the replication using the asset framework."



Fluctuations in power provided by various energy sources on Santa Rosa Junior College's microgrid are displayed during a potential power shutdown

Power to spare – and store

In the case of SRJC, the microgrid project consists of about 2.5 megawatts of solar-energy capacity across several feeders with a single point of connection to the main grid controlled by PG&E. SRJC's microgrid also includes 4 megawatt-hours of storage on lithium-ion batteries. SRJC's microgrid control system relies on a constant supply of reliable, real-time data from the PXiSE microgrid solution utilizing AVEVA PI System.

With its microgrid control system ensuring a continued balance between generation, storage, and use, SRJC expects it will now be able to sustain limited power to the campus in the event of a PG&E power shutdown, which can last up to five days.

"Our microgrid has become a key component for achieving our ambitious campus goals of zero-net-energy source and carbon neutrality," said David Liebman, energy and sustainability manager of the Sonoma County Junior College District, of which SRJC is a part.

Thanks to its microgrid project, SRJC is projecting over $300,000 in annual utility cost savings. Such savings will insulate the school from expected utility-rate increases while helping reduce the college's greenhouse-gas emissions.

For more information about AVEVA PI System please **click here.**