CUSTOMER STORY

PXiSE's PI System Powered Microgrid and the Future of Renewable Energy

INDUSTRY
TRANSMISSION & DISTRIBUTION

CHALLENGE
Need for resilient renewable energy-powered microgrid at SRJC.

SOLUTION
PXiSE control system relies on high-speed sensor data stored in PI System for rapid control of microgrid.

BENEFIT
Expected savings of $330,000 per year.

PARTNER
Santa Rosa Junior College

Even before the 2017 and 2018 fire seasons ravaged California with some of the most devastating fires in the state's history, Santa Rosa Junior College (SRJC) in northern California understood the importance of sustainable energy production. The intensity of the fires, widely thought to be aggravated by climate change, only deepened the school's commitment to its goal of becoming a zero net energy district and achieving carbon neutral operations by 2030. But when Pacific Gas & Electric (PG&E), an investor-owned utility in northern California, began instituting public safety power shutoffs after several of the fires were blamed on old and faulty equipment, the college realized it also needed a resilient and reliable power grid. The school turned to PXiSE Energy Solutions, a company which utilizes PI System™ data to create power grid control systems. Together, PXiSE and SRJC are developing a data-driven high-performance microgrid to help the school achieve its ambitious goals for reducing its green-house gas emissions while maintaining a resilient and reliable power supply to the campus.

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 bi-directional, 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. You really have to have a more comprehensive view as well as faster speed of control," Patrick Lee, CEO of PXiSE Energy Solutions said during his presentation at PI World 2020 online.

To help achieve better and faster control of microgrids, PXiSE relies on high-speed sensors that allow measurements to be taken at a rate of 60 times per second. Data from these sensors is collected in the PI System where it can then be analyzed by AI and machine learning software for improved grid control. Collecting high-speed sensor data in the PI System also helps PXiSE scale its control systems to larger and larger grids. "Building up on top of a data platform such as OSIsoft's PI System is very important for scalability," Lee said. The templates feature of Asset Framework allows PXiSE to easily replicate control systems in different contexts whether it be creating precision control capabilities for hydro-power plants

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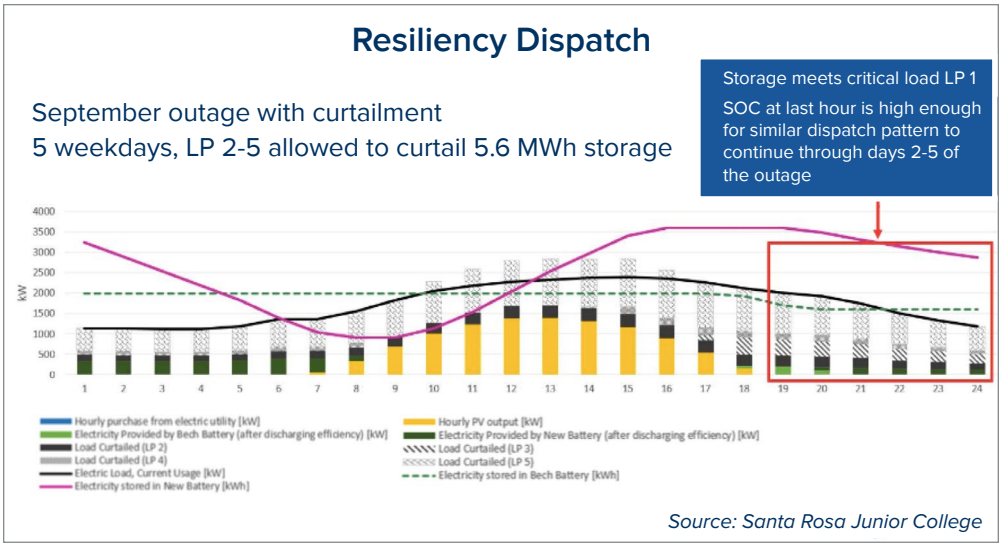
> — Patrick Lee, CEO of PXiSE Energy Solutions



Graph shows fluctuations of power being provided by different energy sources on SRJC's microgrid during a potential PG&E power shutdown.

or providing power to a remote community in Western Australia. "Most microgrid solutions that exist today are customized so that they are not easily transferable from one site to another site. But because we build our solution on a data platform like OSIsoft, it allows us to do the replication using the Asset Framework," Lee explained.

In the case of SRJC, the microgrid project consists of about 2.5 MW of solar energy capacity across several different feeders with a single point of connection to the main grid controlled by PG&E. SRJC's microgrid also includes 4 MWh of lithium ion battery storage. SRJC's microgrid control system relies on a constant supple of reliable, real-time data from the PXiSE Microgrid solution utilizing the PI System. With their 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," David Liebman, the Energy and Sustainability Manager of the Sonoma County junior college district said during the presentation.

Thanks to their 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 to reduce the college's greenhouse gas emissions.

For more information about PXiSE and the PI System, watch the full presentation here.

Lee, Patrick; Liebman, David. "High-Performance Microgrids, DERMS, and the Changing Future of Grid Controls [PXiSE Energy]."