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United States

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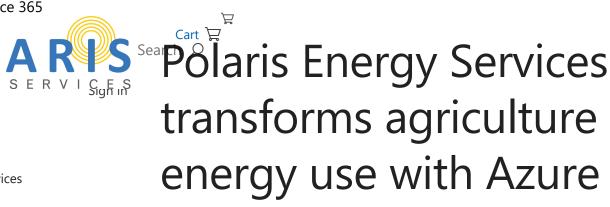
Polaris Energy Services transforms agriculture energy use with Azure

June 20, 2019

Polaris Energy Services is revolutionizing the way in which farmers in the western United States water their crops—saving them money and managing energy use at the same time. By installing automatic controls on irrigation pumps, the company helps customers to schedule and optimize water use, reducing costs to absorb more renewable energy. Polaris uses Microsoft Azure to provide the analytics that help customers forecast energy use for irrigation.

Author and ecologist Aldo Leopold once said, "Conservation is a state of harmony between men and land." Polaris, a California-based energy management company, has taken this quote to heart. Its commitment to environmental responsibility shines through the

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work it has been doing to change the way the agriculture industry thinks about energy and its effects on the environment.

Polaris is responsible for 40 percent of the agricultural load participating in California demand response (DR) programs, which compensate growers for occasional shifts in energy usage—about a couple of small power plants' worth. Irrigation draws on increasingly scarce water resources, and becomes more energy-intensive as aquifer levels decline. "All of this stuff matters in a big way to agriculture," explains David Meyers, President of Polaris. "There's a big goal out there that we're trying to be part of." That goal is helping farmers thrive in the face of changing environmental and economic conditions.

To provide customers with better energy services and to streamline business practices, Polaris has developed services that enable customers to earn energy rewards and incentives, such as designing a DR program optimized for operations; quantifying the amount of incentives and equipment for which clients are eligible, and identifying areas of impact for each client's systems.

Polaris has also built a full pump control system that sends signals to customers' irrigation pumps, enabling manual, remote, and automated operations according to customer-defined schedules or grid signals.

The demand response system and ROI for customers

Prior to technology transformation, farmers irrigated crops the old-fashioned way. Workers drove to the pumps and turned them on manually, and when it was time to turn them off, they drove around again. Farmers had an irrigation schedule, but they couldn't turn all the pumps on and off at the same time. With staffing shortages, operations managers scheduled irrigation around the times that workers were available to handle the pumps.

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Thanks to Polaris and the automation of irrigation pumps, farmers can now turn pumps on and off remotely. This functionality optimizes energy use and gives operators more choices. Now, they can run them during times when more energy is available.

The DR system encourages farmers to run pumps when more energy is available, or "off-peak times." Meyers explains, "Instead of turning on more power plants, you turn off some electrical usage." Polaris clients save money—and get paid—when they turn off pumps during times of peak energy use.

The DR system and associated cost savings aren't the only return on investment (ROI) for the company's agricultural clients. They're also seeing operations optimized due to laborers no longer having to drive around to turn on the pumps. These workers can be used in other places, increasing overall efficiency. Polaris is also helping customers understand and manage their bills through an improved web and mobile app, where they can access information, compare bills against operational data, and schedule irrigation pumps.

Integrating Azure into existing technology

When Polaris began digitally transforming its business practices, the company was motivated by customer pain points and its commitment to environmental protection. The company wanted to include irrigation pump automation to help clients in limited-bandwidth areas, and accommodate the booming energy market in the Western United States.

Polaris was already a Microsoft shop. "We've been using our software [on the Windows platform] for a decade, and it has proven to be efficient, very robust, and safe," says Meyers. Database management was performed on a computer running Microsoft SQL Server. The technology for the automatic irrigation pump controller used .NET Micro Framework; when Polaris needed more functionality, space, and analytics, it made sense to use Microsoft products.

Integrating Azure into the technology portfolio was the next step. "We're not really migrating; we're adding," says Meyers. Adding automatic irrigation pumps has caused an influx of data. In addition, Polaris needed more storage to support the functionality of the website that synthesizes large volumes of IoT data with customer data from CRM and external integrations.

Integration of legacy systems into Azure has been seamless and very beneficial. Polaris can pull data streams together to track energy and water use for its clients. It can provide itemized billing and usage reports, so users know exactly how much energy they're using and when.

The future of data and Polaris

"Now we want to add the analytics," notes Meyers. With the integration of Azure, cloud computing, machine learning, and analysis of all data being pulled into the company's systems, the future of energy services is smarter. Polaris hopes to measure and gain actionable insights into energy optimization, water conservation, crop planning and yield, cost reduction of energy and water, and predictive maintenance of irrigation pumps.

Most irrigation pumps ramp up usage during the spring growing season, and the bulk of the company's data collection begins around that time. Polaris aims to collect insights across the energy industry and use power as efficiently as possible. Armed with this technological vision, Polaris strives to meet and exceed its goals of helping farmers and the planet.

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