CUSTOMER PRESENTATION BRIEF
As presented at the 2017 Users Conference

OSIsoft.

SUMMARY

Arizona Public Service (APS)

Industry

Power Generation, Renewables

Business Value

- Internet of Things
- Fault Location
- Real-time Fault Mapping
- Business Analytics
- Logistics
- Asset Helath
- Forecasting
- AMI

PI System™ Components

- PI Server™
  - Data Archive
  - Asset Framework (AF)
  - Notifications
- PI Vision™
- PI ProcessBook™
- Enterprise Agreement (EA)

OSIsoft Partners

esri

APS Harnesses Data to Capture the Sun

As the largest utility in Arizona, Arizona Public Service (APS) is also one of the leading solar utilities in the country with over 170 MW of solar capacity and 40MW slated to come online in the near future. APS' talk addressed both the value of the PI System and their Enterprise Agreement (EA). Katie Hoepfl discussed how Arizona Public Service uses the PI System to manage asset health with only six field technicians. Kurt Pager discussed how their innovative residential solar program is enabled by a collaboration with the Electric Power Research Institute (EPRI) and the University of Arizona.

Scaling Staff to Maintain Geo-Dispersed Solar Power Plants

Hoepfl began by noting that APS has one of the most diverse solar portfolios in the country. It operates nine utility-scale solar power plants and 59 commercial-scale arrays located on schools, hospitals and other government buildings as well as over 1,500 APS-owned rooftop residential systems through its Solar Partner program. Unlike a conventional generation plant with operators on site 24/7, solar sites are dispersed geographically and largely unmanned. "We need to able to monitor the plants - from headquarters and from wherever our techs are - to know if we need to respond to a downed inverter, a broken tracker, anything like that," she said.

A utility-scale solar power plant can cover 300 to 400 acres and include over 90,000 solar panels, 20+ inverters, hundreds of tracker motors as well as standard electrical equipment like transformers that require oil pressure monitoring and regular maintenance. APS has adopted PI Vision[1] so that the techs working from their trucks can pull PI Vision up to do anything from viewing an offline inverter, monitoring power output or irradiance to drilling down into a power block to troubleshoot problems. The mobile solution is also in sync with text and email notifications. "They're constantly in the know of what's going on at all of the power plants," she said.

Because APS can troubleshoot problems in their unmanned plants from headquarters or remote vehicles, they can dispatch technicians more effectively, reducing downtime and costs while increasing power production.

Moving Toward an Enterprise Infrastructure

A longtime PI System user for traditional transmission and generation assets, APS decided to enter into an EA with OSIsoft to extend the power of the PI System to its solar initiatives. According to APS, they found that their EA effectively simplified technology management by aligning software licensing more closely to a business objective. With EAs, companies can explore how the PI System can support new applications without putting a focus on licensing - it scales as they grow.

For its solar initiative, APS uses Asset Framework, Notifications, PI Vision, and PI ProcessBook to allow it to monitor the status of its solar assets. On a single screen,

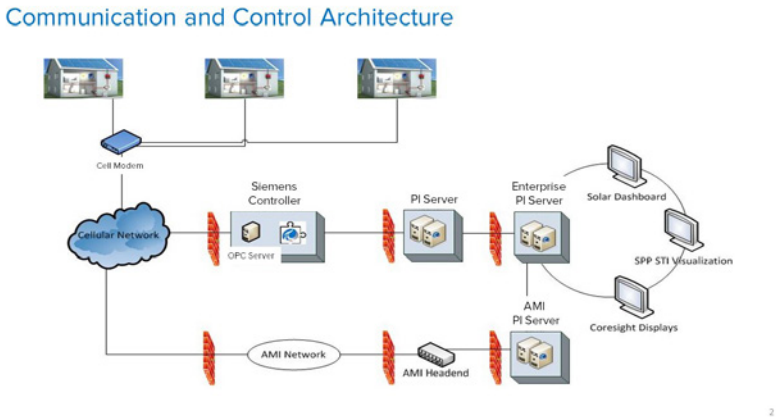
APS can view the performance of all nine of its utility-scale solar power plants. By zooming in on an individual plant, a technician can obtain real-time information on factors that can impact power output such as solar irradiance, wind, and temperature along with a dynamic comparison between actual and expected power outputs.

The PI System has also been a strategic tool in their innovative residential program.

A Collaborative Approach to Harvesting Residential Sun

The Solar Partner program—where APS pays homeowners $30 a month to lease their rooftops for residential photovoltaic systems--is the first of its kind and viewed as a potential model for other utilities. "The reason we're doing this...If we put these systems on people's houses, we own the data," Pager said.

Owning the data means that APS can use it to determine how the residential solar system could impact the grid - now and in the future.



APS has engaged with experts at the Electric Power Research Institute (EPRI) and the University of Arizona to make the most of their solar data. In a research project, EPRI installed power quality monitors on APS feeders. EPRI and APS are working together to examine how voltage spikes and other performance issues created by the unique nature of residential solar systems can impact short-and long-term performance of local substations, a critical issue for capital and maintenance costs. The EPRI research will enable APS to add more residential solar to their service territory as well as prepare a foundation for EV charging or new grid balancing applications. To get the data it needs, APS collects data once every second from meters at homes and once every minute from neighborhood feeder lines.

Finally, Pager said, "Solar is a challenge to utility companies because it's unpredictable." With the University of Arizona, APS has begun to experiment with using historical data to predict solar power generation up to seven days in advance. By being able to predict the solar load, APS will be able to ramp up and run its natural gas generators in a more efficient manner as well as reduce fuel consumption.

Overall, APS says that they PI System helps them track massive amounts of data to make better decisions and that their EA helps them do that better.

"If we know solar won't be available, we can plan days ahead which plants will be running and figure out how much gas we have to purchase. That is what the future data capability has bought for us."

– Kurt Pager
PI System Administrator
for APS

[1] PI Coresight was renamed to PI Vision in 2017

Pager, Kurt and Kathryn Hoepfl. *Utility Scale/Residential Solar Programs - APS* OSIsoft.com. 4 April 2016. Web. 14 June 2016. <http://www.osisoft.com/Presentations/Commercial/Residential-Solar-Programs/>.