OSIsoft.

SEMPRA ENERGY

Presented at PI World 2018

THE PI SYSTEM™: A RENEWABLE ENERGY SOLUTION FOR NOW AND THE FUTURE

Sempra Energy is one of the largest energy providers in the country. With over 3000MW of solar, wind, and energy storage, Sempra Renewables (a subsidiary of Sempra Energy) delivers renewable energy to over 32 million customers around the world. A few years ago, Sempra Renewables bought the rights to development of Great Valley Solar, which is a 200MW solar facility just outside of Fresno, CA. Spanning nearly 1200 football fields of solar modules, the vast complex will provide enough energy to power nearly 90,000 homes. Site construction was done in phases, resulting in four plants tied together with one single substation. Each of the plants as well as the Ocho substation had its own SCADA system used to control and manage each plant.

Managing five different SCADA systems was already expensive, but an upgrade to an already cumbersome solution would prove to be even more costly. David Jeon, the Fleet Technical Manager at Sempra Renewables, needed another solution.

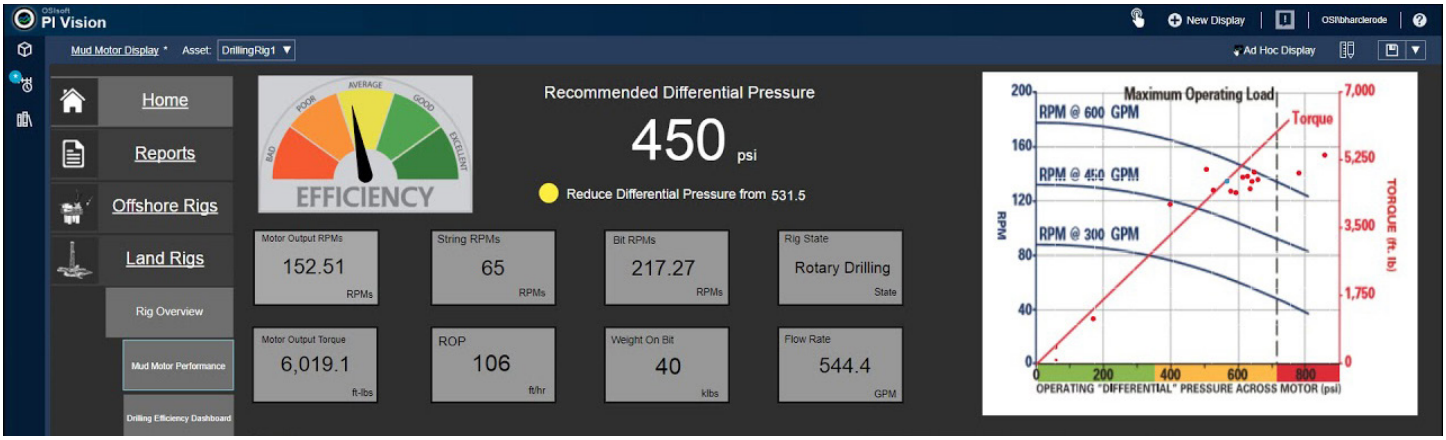
A COMPLEX NETWORK OF FIVE SEPARATE SCADA SYSTEMS

Managing five separate SCADA systems is a time-consuming process. Any new assets needed to be individually connected to and configured in the SCADA system, resulting in a network of PLCs and DCSs that tied over 70,000 manually configured data points together. With five licenses to maintain, the site was looking at high operations & maintenance (O&M) costs as well as a high price for a contractor to manage the SCADA systems. All in all, it was a very expensive undertaking.

The SCADA systems weren't just costly; they were also difficult to operate. The site needed to ensure that all five human-machine interfaces (HMIs) were running to give plant operators visibility. If an issue did occur, operators had to cycle through separate screens to isolate the problem. The site also needed a separate data historian to archive incoming data. However, consolidating the five SCADA systems wasn't an option because there were too many data points. Given the size, the PLCs would simply collect data versus controlling the power coming from the solar farm.

HIGHLIGHTS:

- Rapidly combined five separate SCADA systems into one system, reducing annual licensing and O&M costs
- Saved hundreds of thousands of dollars in future upgrades
- Gave operators a single view of data, enabling increased visibility and better reporting



Real-time Review: *PI Vision gives engineers rapid insights into each of the four plants at the complex, acting as the single HMI for all the sites.*

THE TIES THAT BIND

But there was an even bigger problem on the horizon: the SCADA systems were tied to the operating system, Microsoft Windows 7, which would reach end of life in 2020, forcing Great Valley to upgrade its SCADA systems to be compatible with a newer Windows version. "My site is less than a year old," said Jeon, during the 2018 PI World conference in San Francisco. "I have to go back to my management and say sorry, the OS is…end of life, give me another million dollars to re-do the SCADA, or upgrade the SCADA."

To combat all these challenges, Great Valley Solar turned to the combination of the PI System and PXiSE to deploy a system that would offer endless flexibility and scalability, both now and in the future.

PI SYSTEM + PXISE = A SEAMLESS, SCALABLE SOLUTION

PXiSE is an advanced grid control solution that comes with an embedded PI System. The team needed only one license to deploy it as a single SCADA program to manage each of the five sites. Leveraging the 400+ interfaces within the PI System, they were able to easily connect assets across the complex to the system. Using the Asset Framework (AF), a part of the PI Server, they built out asset hierarchies and templates that were self-replicating, which significantly shortened deployment time. For example, they only needed to configure one inverter, and the system would automatically use that template to configure the rest. With the old SCADA systems, they needed to manually configure each one.

"Once we had control over the network we put a parallel PXiSE SCADA system on top of it," Jeon noted. "It took two weeks to deploy… where they'd been working on it (the original SCADA system) for…almost four months."

Not only was the system easier to deploy, the PI System easily managed the 70,000 data points, all without additional procurement. Now, operators can visualize data using a single PI Vision display that gives them rapid insights into each of the five sites. "It's by exception reporting," said Jeon. "The screen was built, there's alarm screens tied to it, but the graphics will tell them where the problems are…instead of them actually cycling through every one of the screens."

For Sempra Renewables, the combination of the PI System and PXiSE gave its Great Valley Solar complex better functionality at a significantly better price—and without the need to upgrade based on a Windows program. "In my case, my license fee was topping just below $100,000 a year," said Jeon. "Now it's just a fraction of that."

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

PARTNER:
PXISE ENERGY SOLUTIONS

PI System Components Used:

PI Server™
- Data Archive
- Asset Framework
- Event Frames
- Notifications
- Asset Analytics

PI Vision™

> *"Now I have one license for the site to manage, which lowers my O&M cost and it is very loosely tied to the operating system. If you go for a PI upgrade, it's not going to cost you a million dollars for an upgrade."*
>
> - David Jeon, Technical Services Manager at Sempra Renewables

Jeon, David. "Redefining Renewables SCADA"
<https://www.osisoft.com/Presentations/New-Approach-to-SCADA-at-Solar-Farms/>

CBSMEN-080318