

CUSTOMER CASE STUDY

Dominion Energy: Building a cloud-enabled, unified asset environment

Dominion Energy - www.dominionenergy.com
Industry - Power

Challenges

- Dominion's SCADA historian was growing in size and complexity
- Thousands of new assets come online or get retired weekly
- Disparate business functions led to inconsistent and difficult-to-access data

Solutions

- Used the asset framework software development kit in AVEVA™ PI System™ to deploy a centralized, cloud-enabled model that combines real-time data from multiple systems of record for an intuitive user experience.
- Used CONNECT to share generation data, allowing its customers to verify the power was sustainably sourced and to claim green power incentives. This secure data-sharing capability created a new revenue stream for Dominion.

Results

- Data shared in real time and integrated into Dominion's activities
- 50% increase in speed-to-market for vital environmental data
- Identified and prevented 42 potential equipment failures in just one year
- Improved reliability and efficiency of power plant operations

More information is almost always better, as long as you have a sophisticated system in place to organize that information, turn it into actionable insights, and share it across your business. That's why power industry leader, Dominion Energy, used AVEVA PI System asset framework software development kit (AF SDK) to bring all its systems of record together and create one cohesive model accessible throughout its enterprise and beyond.

Dominion Energy serves communities across Virginia as well as North and South Carolina, with operations spanning generation, transmission, and distribution. In recent years, Dominion found itself inundated with massive influxes of data. Across the company's operations, thousands of new assets come online or are retired every week, which makes the task of maintaining data models manually untenably difficult and time-consuming. As longtime AVEVA PI System users, the company decided it was time to take full advantage of one of the solution's most powerful tools: asset framework.

Spurring innovation and ensuring compliance

For decades, Dominion had generally understood itself as comprised of three distinct segments: generation, transmission, and distribution. Alongside these three, largely siloed segments, the company had traditionally viewed shared services, like the IT department and the finance and purchasing groups, as independent support organizations, which introduced further division into an already fragmented information environment.

Today, an evolving service landscape is placing new pressures on these divisions. More renewable energies are entering (and complicating) the energy mixture. Year after year, the load on Dominion's system continues to grow, and, as a result, Dominion's SCADA historian had grown increasingly large and complex.

"Frankly, our problems don't care about these divisions," says Jaime De La Ree, Supervisor of Engineering Analytics & Modeling at Dominion. "As the complexity of the problem grows, we can't continue to operate with the assumption that these are separate parts of the business," says De La Ree.

But shifting away from longstanding operating models isn't so simple when you're working in a highly regulated industry. "When you serve power to the Department of Defense and the Pentagon," De La Ree says, "well, things get a little more complex." The challenge Dominion faced was not just the need to innovate quickly, but to innovate quickly while remaining compliant with stringent regulations.

"In an industry that avoids risk and change in the name of reliability, we had to take steps to build an environment that challenges decades of habit."

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Jaime De La Ree

Supervisor of Engineering Analytics & Modeling, Dominion Energy

Establishing a unified asset environment

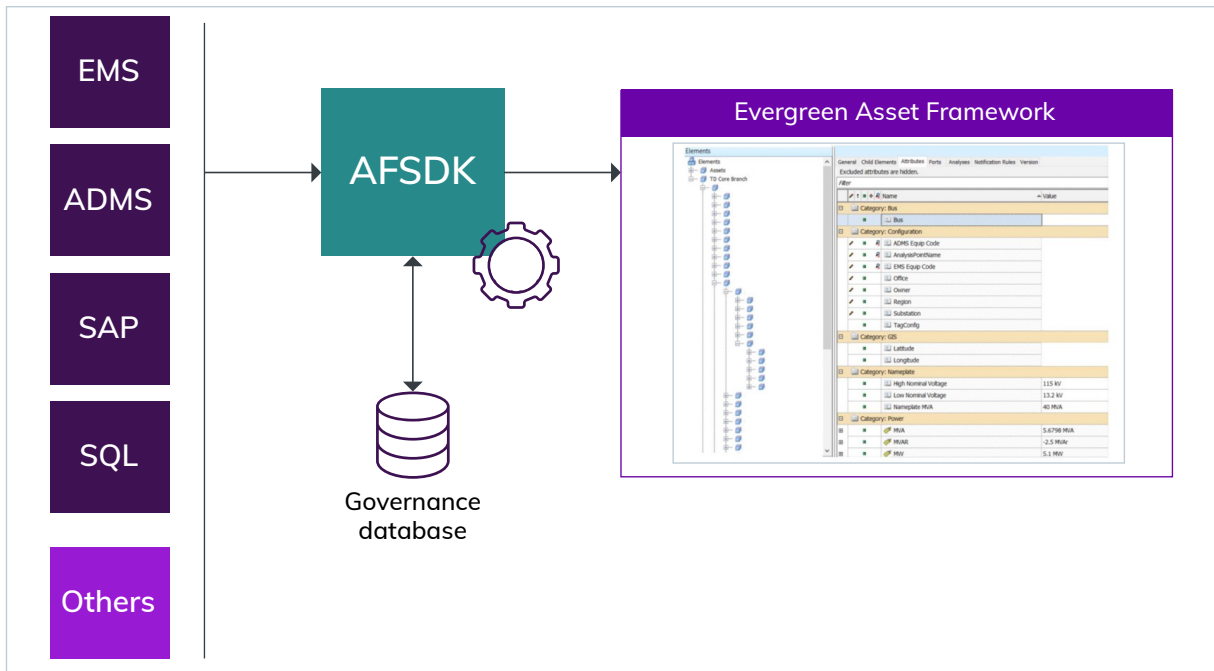
To overcome the obstacles of data access, data naming, and data misalignment, Dominion Energy used AVEVA PI System's AF SDK to develop an application to serve as the foundation of a unified asset environment. The application connects with Dominion's SCADA system, energy management system, advanced distribution management system, its SAP system of record, and other data sources, including ESRI, the geographic information system Dominion uses for geospatial capabilities. This unified asset environment provides enterprise visibility of contextualized data for faster decisions, particularly regarding CAPEX expenditure.

Integral to Dominion Energy's solution is asset framework, an AVEVA PI System tool that allows users to model either physical or logical objects in whichever way they wish to view those assets and their associated data. "Asset framework is an investment in our ability to innovate," says De La Ree. "And it's been one that's paid dividends."

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Dominion Energy's application connects to numerous systems of record and other data sources (left) and outputs an always-up-to-date asset framework model (right).

Dominion Energy's application ingests information from all those aforementioned data sources, applies Dominion's governance information and intelligence, and ultimately produces a centralized, evergreen asset framework model—created and maintained automatically. That means that the Engineering Analytics & Modeling team at Dominion Energy doesn't have to manually maintain its models.

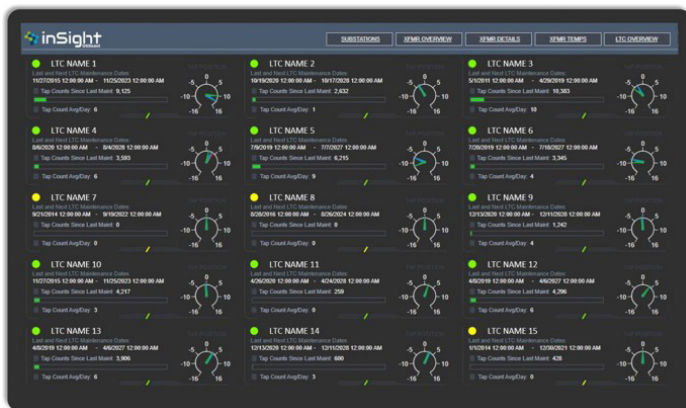
Cloud-enabled proactive vigilance

Dominion Energy's evergreen solution uses AVEVA PI Server's asset framework to model about 28,000 elements—substations, transformers, circuits and breakers, lines, batteries, and so on. And between all these many elements, AVEVA PI Server is running upwards of 135,000 analyses, which perform calculations, capture events, and issue notifications by email. The result is proactive, effortless vigilance. On a typical day, the team wakes up to an automated email with a summary of the past night's events—which assets were added, which were retired, and how tags were mapped. "Hopefully, all you have to do is enjoy your cup of coffee," says Bruno Bachiega, Power and Utilities Consultant at Utilicast, Dominion Energy's partner on this project.

After creating this evergreen asset framework model, the next step was making it accessible across the organization and beyond via the cloud. That's why Dominion Energy deployed CONNECT to securely share select data with trusted partners, as well as renewable energy customers, shareholders, and local, state, and federal entities.

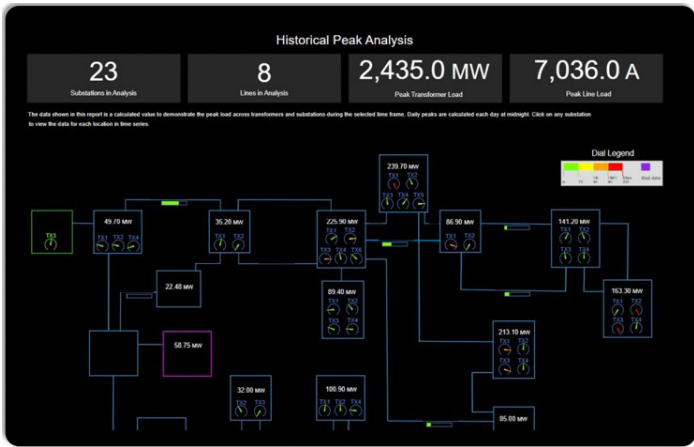
These cloud-based data-sharing capabilities not only serve as an additional selling point for Dominion customers, they also allow Dominion to scale its digital solutions easily without the need to build additional datacenters, and increase the speed-to-market of vital environmental data by 50%.

Dominion Energy has used its new system to implement a number of use cases with remarkable success. One of the first such use cases centered on the load tap changers (LTCs). In the past, due to a shortage of time and manpower, these assets were often overlooked except in the case of major anomalies. Smaller issues went by unnoticed. Now the team can monitor hundreds of LTCs in real time with just one PI tag. The asset framework model allows users at Dominion to forecast optimal maintenance dates, capture events, notify engineers of anomalies, and help them diagnose issues and take corrective action early.



Dominion Energy uses this AVEVA™ PI Vision™ display natively integrated with data from AVEVA PI Server's asset framework to monitor its load tap changers in real time and forecast when maintenance should be performed.

But the LTCs were just the first of many use cases. Dominion Energy has also put its asset framework model to work monitoring the VOLT-VAR control, identifying anomalies and notifying engineers as necessary. To keep pace with a growing load on the system (which is expected to grow 5% annually), the model is helping engineers monitor and analyze daily peaks for specific regions, substations, and transformers.



This AVEVA PI Vision display helps engineers monitor and manage daily peaks and analyze historical daily peaks.

References

For more information about Dominion's presentation here:
<https://resources.osisoft.com/presentations/dominion-energy--building-an-evergreen-asset-model>

A deployment of asset framework based entirely on templates has also allowed the Engineering Analytics & Modeling team to integrate the model seamlessly with ESRI. This integration empowers the team to deploy new geospatial capabilities for its customers, including asset monitoring and loading heat maps.

Conclusion

Today, Dominion Energy has already implemented two dozen of these business use cases, but that figure is soon to rise. By better leveraging AVEVA PI Server's asset framework, Dominion's team was able to decrease implementation time from months to days for new use cases.

The early results of Dominion's new application have generated so much interest across the company that the Engineering Analytics Team is beefing up its numbers to keep pace with requests for new use cases. Right now, the team counts four members. Next year, Dominion Energy plans to expand the team to 16. With an expanded team and an expanded user training program, Dominion Energy plans to continue to monitor and optimize assets across the enterprise.

Watch the full presentation

