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Dominion Energy: Building an evergreen asset model

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Driven by the Grid

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An Industry in Flux

## The electric utility and its service landscape are evolving rapidly

- For decades, the model was sound: Generation, transmission, and distribution worked as isolated organizations.

- Shared services including IT, finance, and purchasing function as independent support organizations

- The shift to renewables and a growing load on Dominion's system is posing new challenges that is demanding a shift in the operating model.
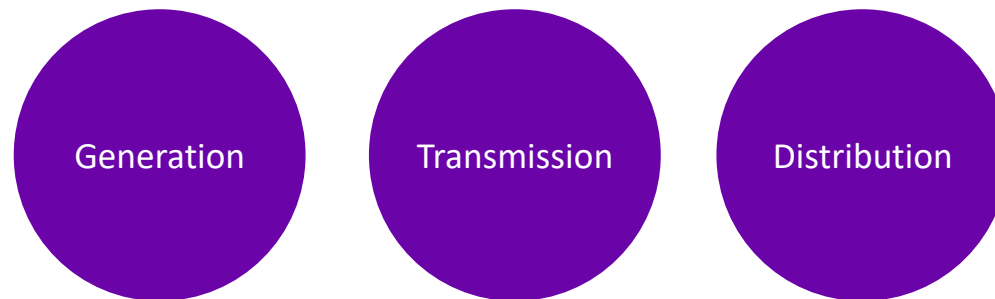
Dominion is Big. Dominion is Regulated

Fast-Paced Innovation is Tricky

- Like most big companies we suffer from a case of corporate segmentation and siloing of our data

- Conventional business units continue to focus on their functional and operational needs

- The challenges of an evolving system will not wait, but the regulations are here to stay

- We need to enable a data environment that allows for nimble development and greater accessibility to information while ensuring we meet the complex regulations of our industry

| Transmission | Distribution | Generation | IT | Finance | Key Accounts |

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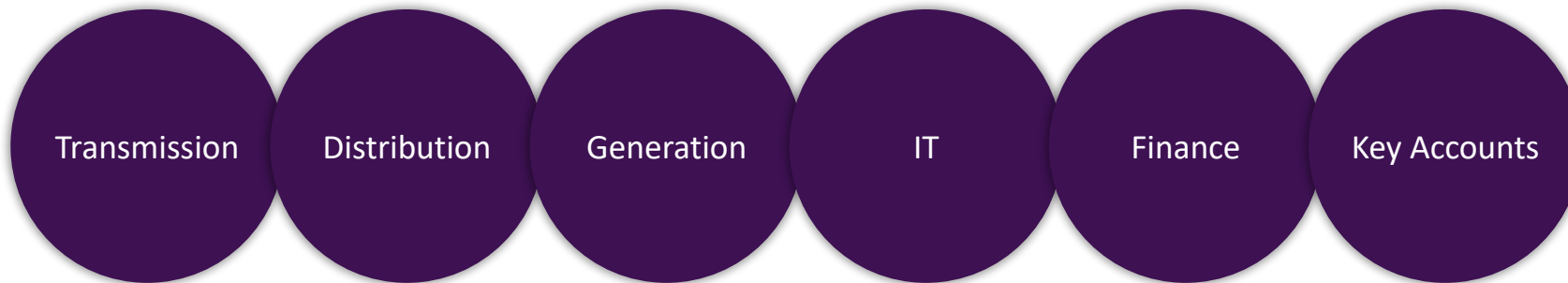
In an industry that avoids risk and change in the name of reliability, we had to take steps to build an environment that challenges decades of habit

Challenge

- Our SCADA historian was increasing in size and complexity
- Thousands of new assets come online or get retired weekly
- Disparate business function means inconsistent data

Solution

- Dominion deployed an ever-green centralized model that combines data from multiple systems of record for an intuitive and easy to use experience.

Results

- An automated AF that reduces data exploration and data cleansing exercises
- Enabled data analysis and data science capabilities by integrating with powerful modeling software (ESRI, Seeq, PredictiveGrid)
- More intelligent data-forward decision-making including CBM

Dominion Energy®

Dominion deployed an environment that enables streamlined design and development of business intelligence products and bespoke applications

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Business challenge

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Business Challenge

Developing new data capabilities was difficult for many reasons. We had to enable Dominion

- **The environment is convoluted:** Required substantial domain knowledge and data skills to find and gather information.

- **Data silos:** meant Excel warriors and/or highly specialized gatekeepers required to get data.

- **Access:** Requests for data could take several weeks.

- **Unprecedented growth:** New assets come online, and old ones get retired at rates that make it extremely difficult to maintain a model manually. We are talking 5k to 10k point updates a week, sometimes more.

- **Complex layering:** Decades of naming conventions, legacy names, and multiple systems.

Solution and Implementation

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Establishing a Unified Asset Environment

We have worked to overcome the obstacle of data access, data naming, and data misalignment

EMS

ADMS

SAP

SQL

Others

AFSDK

Governance
Database

Evergreen Asset Framework

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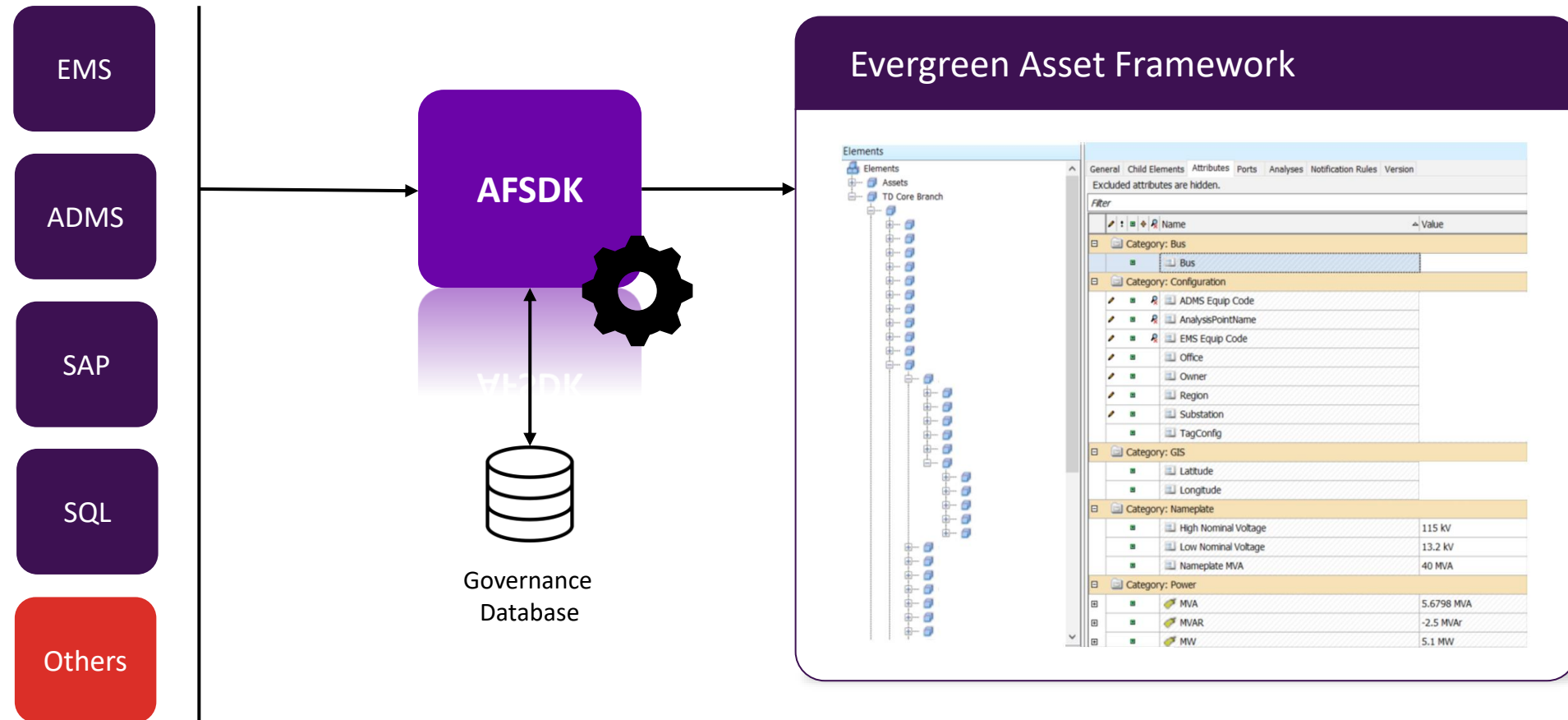
Growth of an Enabling Asset Framework

Asset Framework Today

- Templates: 24
- Analysis: 135K
- Elements: 28K
  - Substations and DPs: 615
  - Transformers: 1093
  - Circuits and Breakers: 6014
  - Capbanks: 1115
  - Lines: 1408
  - Reclosers: 9032
  - Batteries: 445

5 Million+
Points on PI Data Archive

54 VMS
Across Prod, QA & Dev

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Model Validation
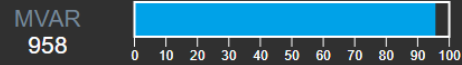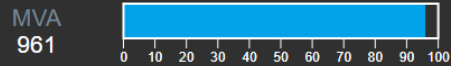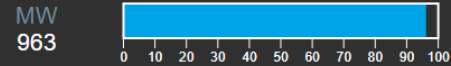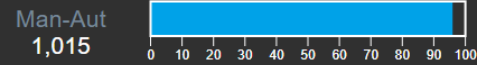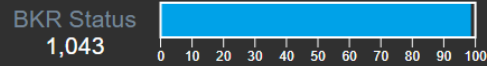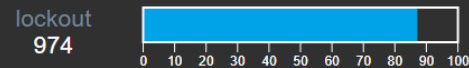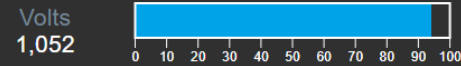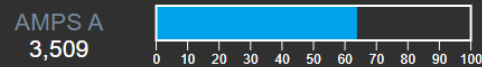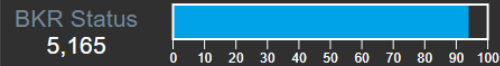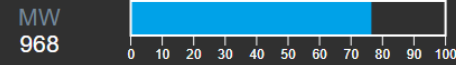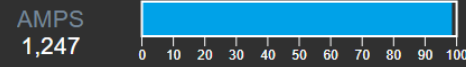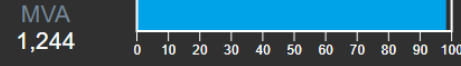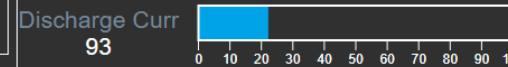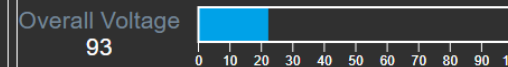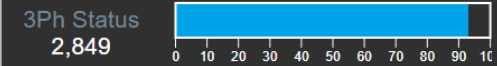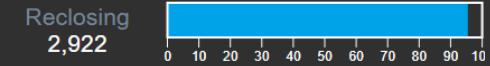
Providing Proactive Vigilance

Creating a culture of awareness for admins and the business was critical for the growth and adoption of the AF

- The application runs daily as a service
- An email goes out to admins with all updates

Information Shared Includes

- NEW assets includer
- RETIRED assets
- Point mapping success/errors

Sample Email Report

[PROD] AFsync Run Report

B   Bruno.Bachiega@dominionenergy.com
To ✅ Bruno Bachiega

Manual—Auto mapped: 1/1
LINES
Number: ####
[NEW] LINEID1 under SUBSTATION1 Substation
[NEW] LINEID2 under SUBSTATION2 Substation
Line AMPS mapped: 2/2
Line MVA mapped: 2/2
RECLOSERS
Number: ####
Reclosing tags mapped: 0/0
Hot Line tags mapped: 0/0
BATTERIES
Number: ####
[NEW] BATTERYID1 under SUBSTATION1 substations
TX BREATHER ALARMS
Number: ####
[NEW] Alarm for ALARMID1 under TRANSFORMERALARMS1
Execution completed in 01:22:25.5193267

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Success Stories at Dominion

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Supporting the Maintenance of Load Tap Changers (LTC)

Through the newly deployed asset framework, the Engineering Analytics & Modeling team helped model and visualize hundreds of transformer LTCs

- Integrated with maintenance system to forecast future maintenance dates.

- Capture events and notify engineers on multiple alarms and events use cases.

- Incorporated drill-down capabilities to help engineers diagnose and take action

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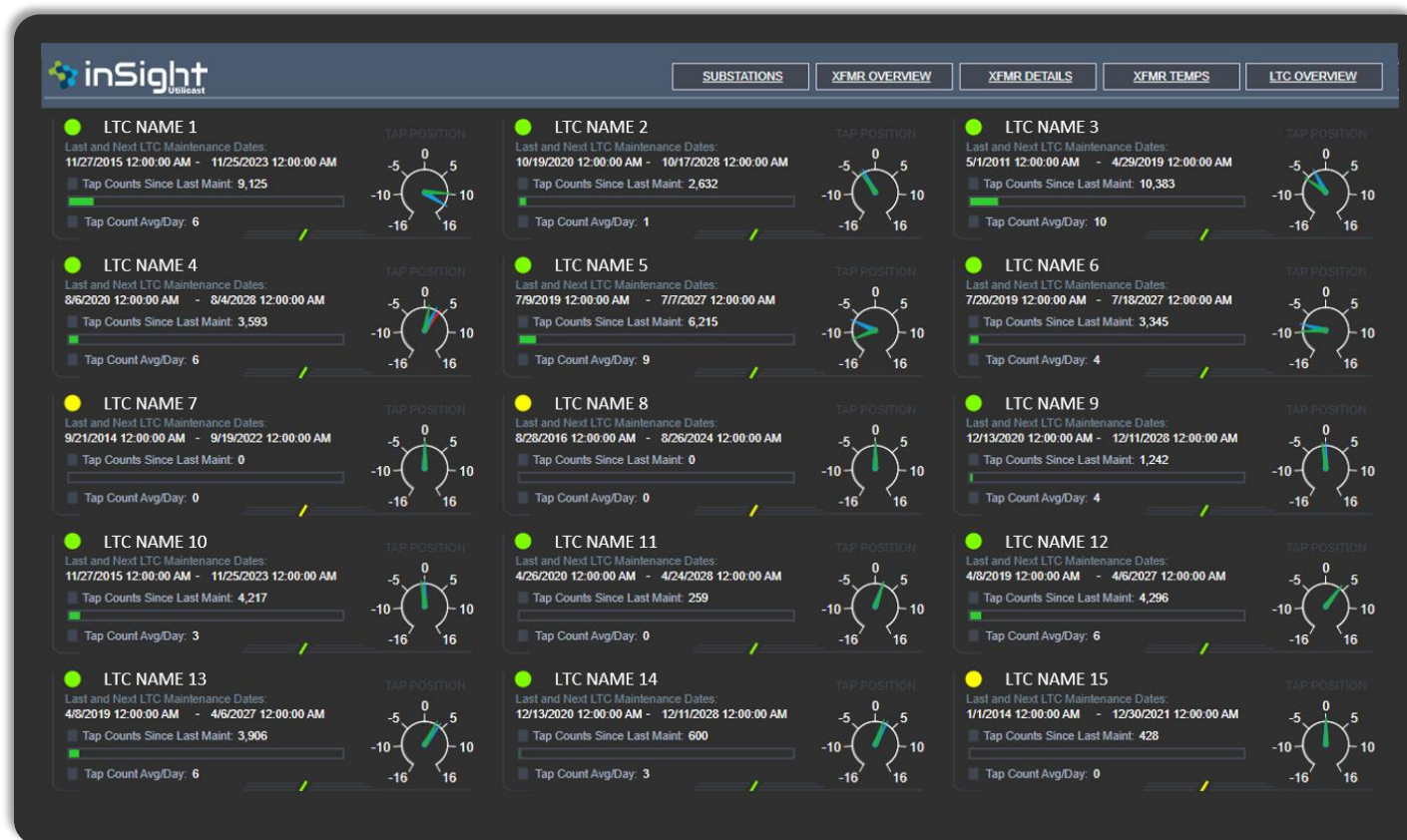
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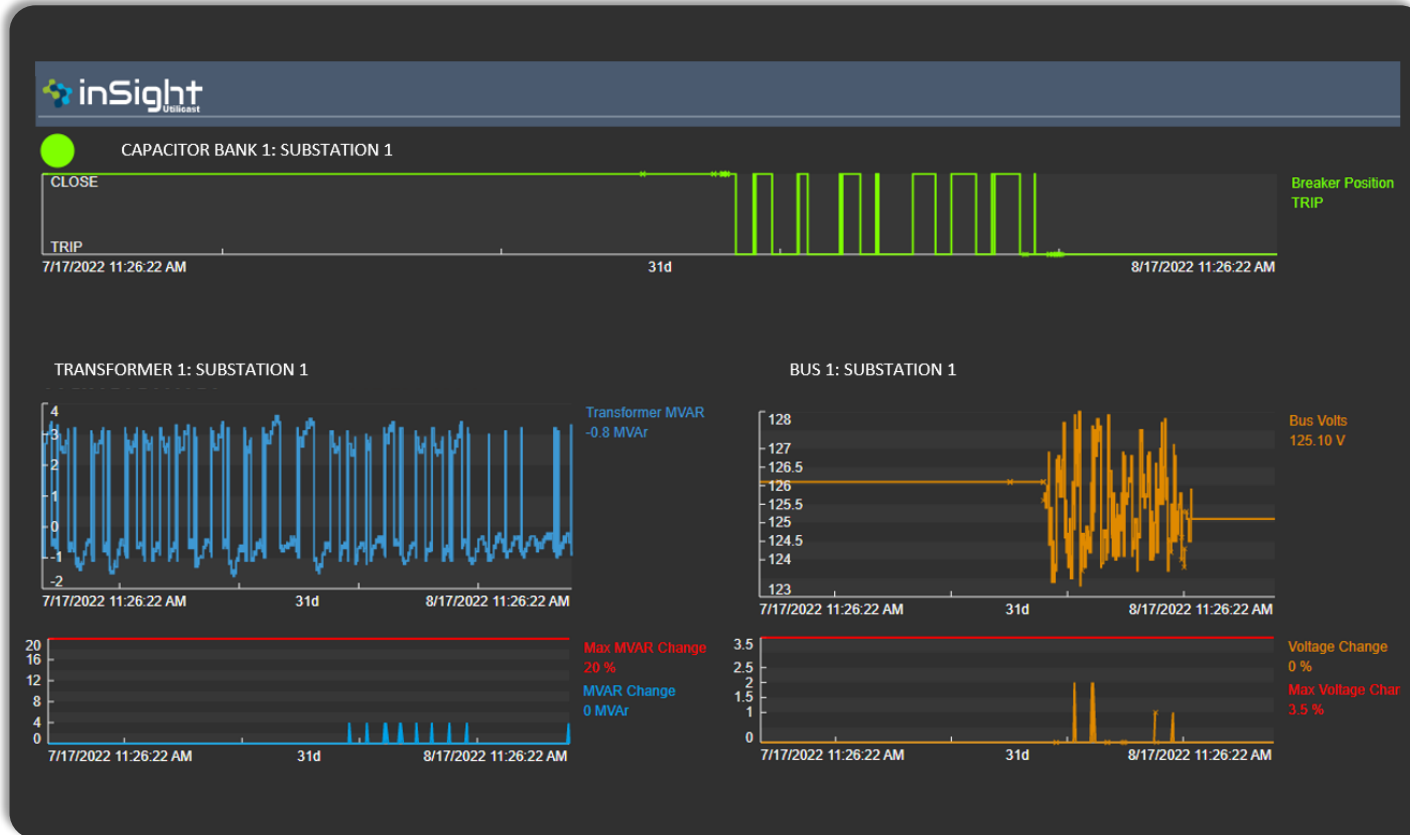
The deployed AF Hierarchy enables disparate resources to co-exist.

Today, engineers can promptly find and visualize an array of assets including:

- Capbanks
- Transformers
- Buses

We now serve an increasingly complex set of use cases with greater expediency that allow experts to meet business requirements previously maintained manually (or left entirely unserved)

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Keeping up with Growing Load

Dominion's system is slated to grow as much as 5% year over year. Executives and engineers want to keep up.

- Roll ups at multiple levels of the hierarchy.
- Pre-calculation of computer intensive analysis for quicker view and reporting.
- PI Vision allows for easy playback and backtrack.
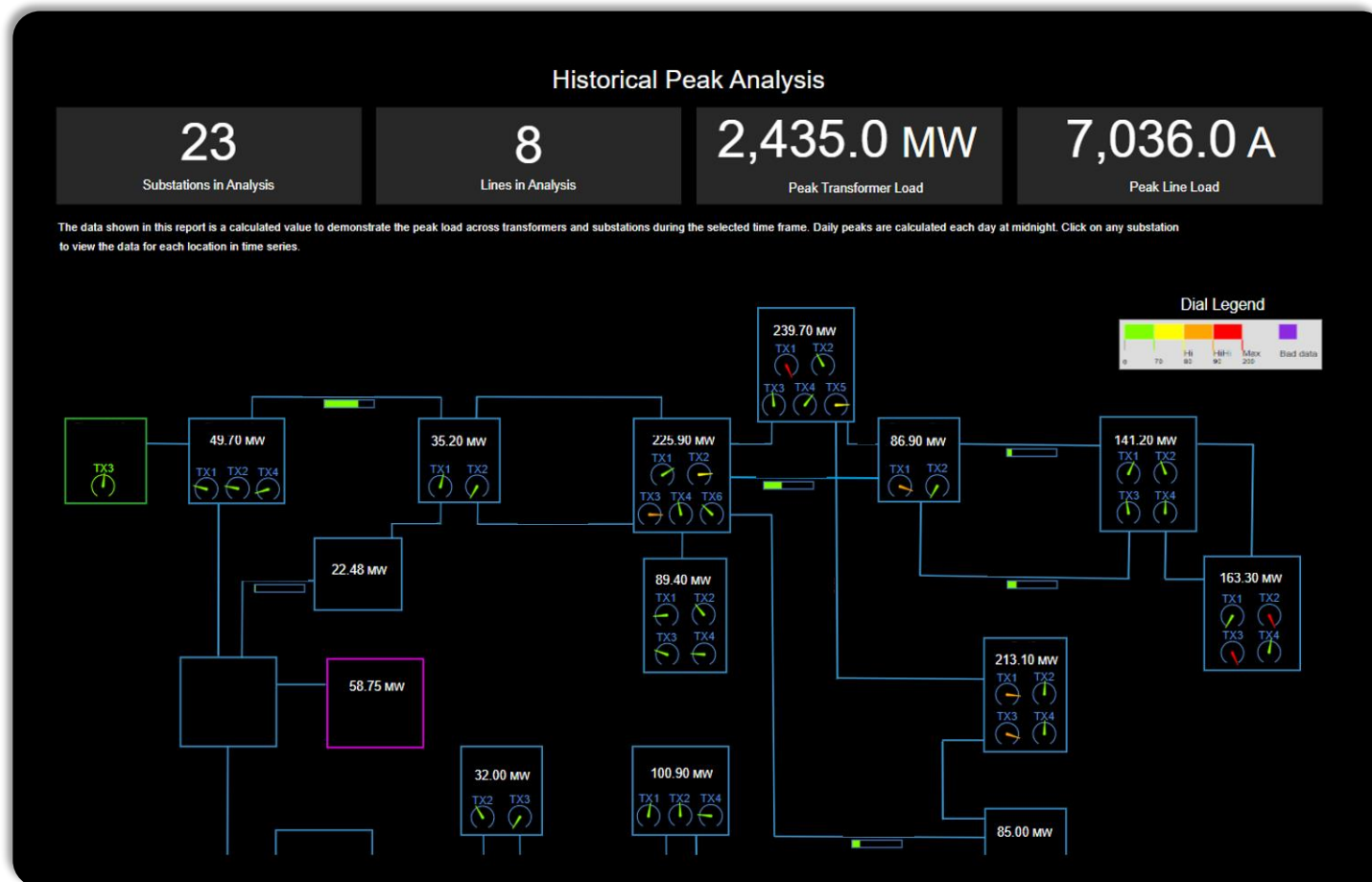
Enabling a Geo-Spatial Capability

ARCGIS to Track a Physical System
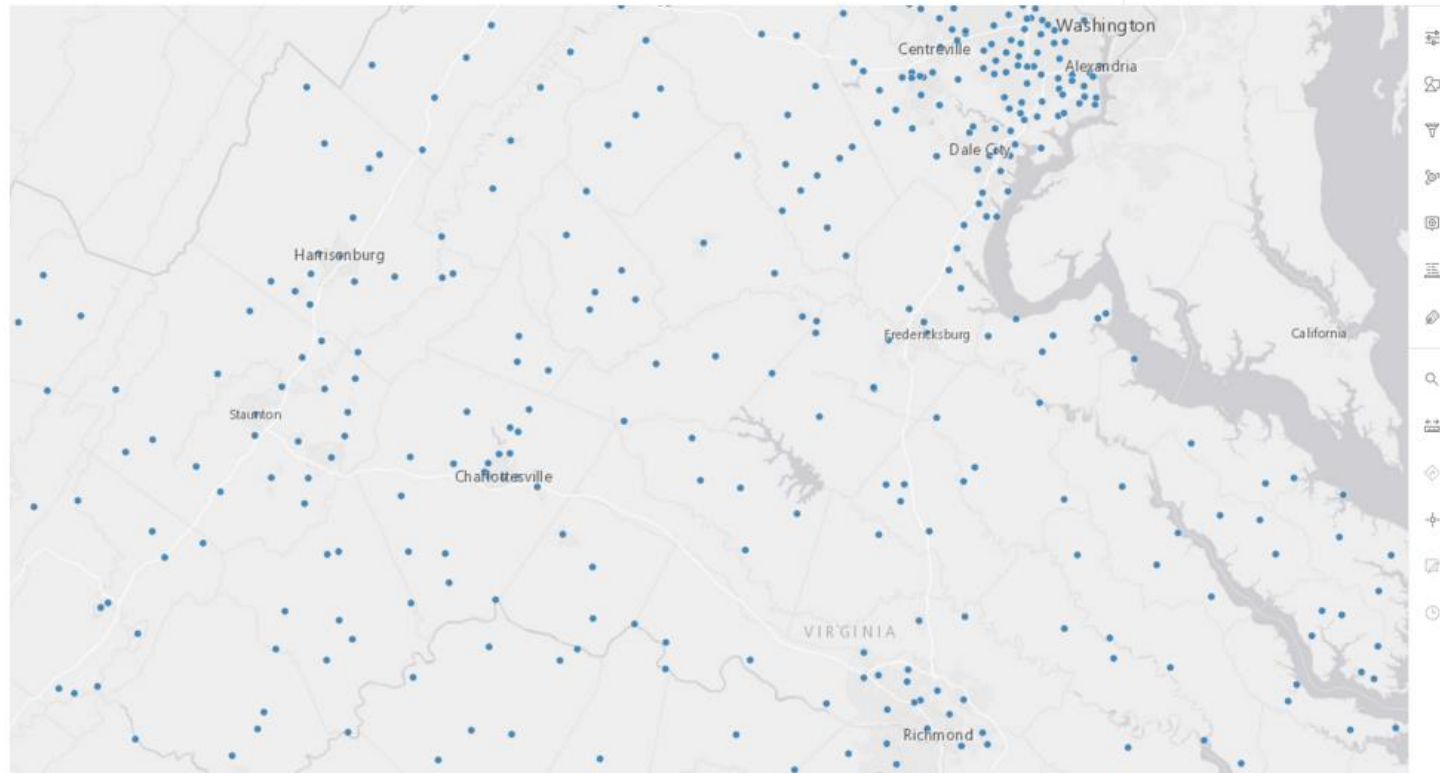
The deployment of an AF based entirely on templates provided a seamless means for an ESRI integration.

From asset monitoring to loading heat maps, AF is helping EA&M deploy new geospatial capabilities for its customers

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Next Steps

- Automation of PI point creation from both EMS and ADMS

- Full ESRI integration (migrate to BA Integrator)

- Implementation of more business use cases (over two dozen tracked)

- Roll out and training for a growing user-base

- Full-time Engineering Analytics Team set to grow from four to 16 by 2024

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I wanted to pass along a success story from the LTC Pages that your team built. It identified excessive operations on [LTC], and upon review, the team alongside Distribution Planning determined a settings change was required to resolve the issue. Without these pages/alerts, we would not have caught the problem.

- Kevin Goldsmith, Manager, Substation Operations

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Questions?

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State your name and company.

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Navigate to this session in the mobile app to complete the survey.

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