Importance of Data Analytics at Con Ed

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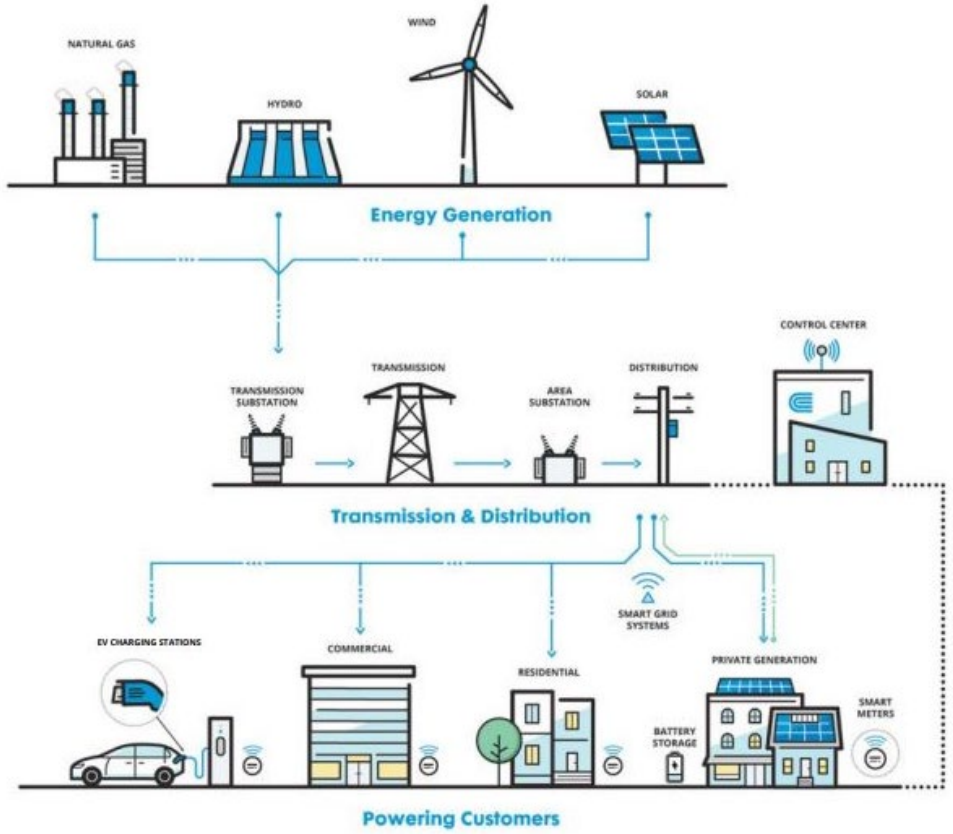
Overview of Con Edison's Electric System

Con Edison's electric service territory includes both New York City and Westchester Country, covering 660 square miles and serving 3.6 million customers. Con Edison's grid is a delivery system that connects energy sources to customers.

Energy produced by generating sources is delivered via the Con Edison transmission system, which includes 430 circuit-miles of overhead transmission lines and the largest underground transmission system in the United States, with 749 circuit-miles of underground cable. The system also includes 39 transmission substations. The high-voltage transmission lines bring power from generating facilities to transmission substations, which supply substations, where the voltage is stepped down to distribution levels, as shown in the diagram below.



Con Edison has two different distribution systems—the non-network *(primarily overhead)* system and the network *(primarily underground)* system.

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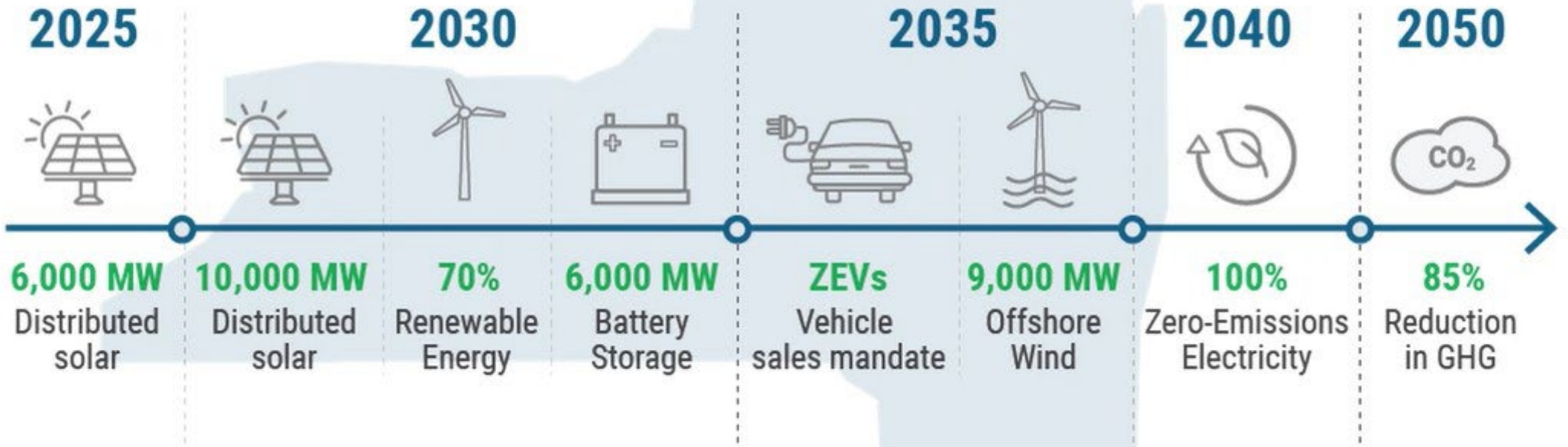
Con Edison Overview

Clean Energy Evolution NYS CLCPA Targets



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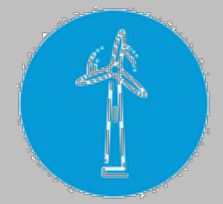
Our Clean Energy Commitment

- Key stakeholders in mind
  - Customers and communities we serve
  - Partners in government and regulators
- Five Pillars
  1. **Build the Grid of the Future**
  2. Empower our Customers to meet Climate Goals
  3. Reimagine the Gas System
  4. Lead by Reducing our Company's Carbon Footprint
  5. Partner with our Stakeholders

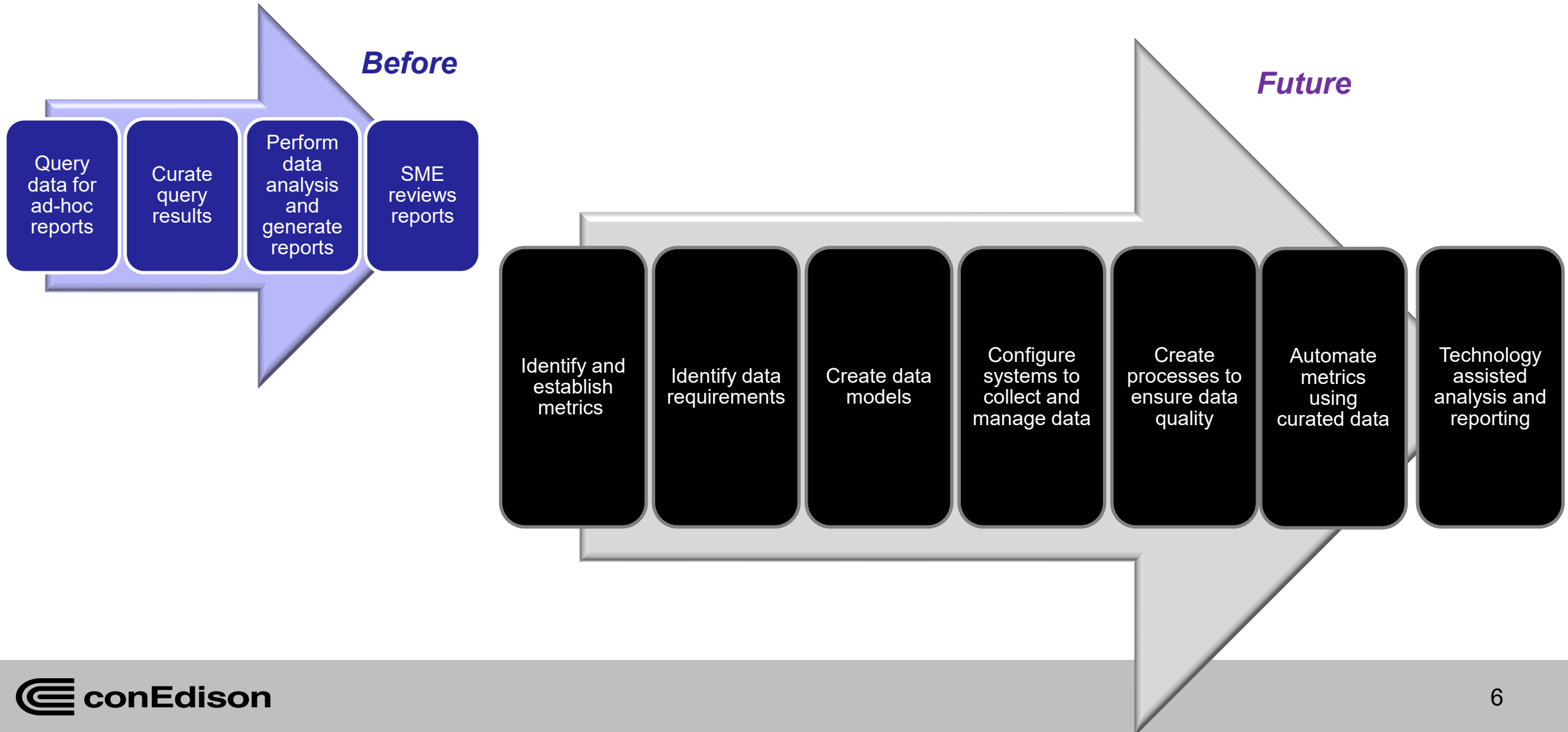
Pillar One: Build the Grid of the Future

1. **Electric Grid Buildout to Support Load Growth**
   - Clean Energy Hubs to facilitate 6000 MWs of offshore wind
   - New substations
   - Local transmission (Reliable Clean City) projects
2. **Electric Grid Climate Adaptation and Resiliency**
   - Undergrounding
   - Underground and Overhead Reliability Projects
   - Distribution Automation, Circuit Upgrades/ Exits/ Relocations
   - Submersible Equipment
   - Substation Hardening
3. **Distributed Energy Resources**
   - New grid capabilities
   - New technologies for distribution automation, and new tools and analytics for data access (e.g., IEDR)
   - Programmatic focus to manage peak demand reduction
4. **Utility-Owned Renewables**
   - Advocacy to allow utilities to develop, own, and operate renewable generation
5. **Con Edison Transmission (CET)**
6. **Energy Storage**
   - Large-Scale and Distributed-Battery Systems Deployment

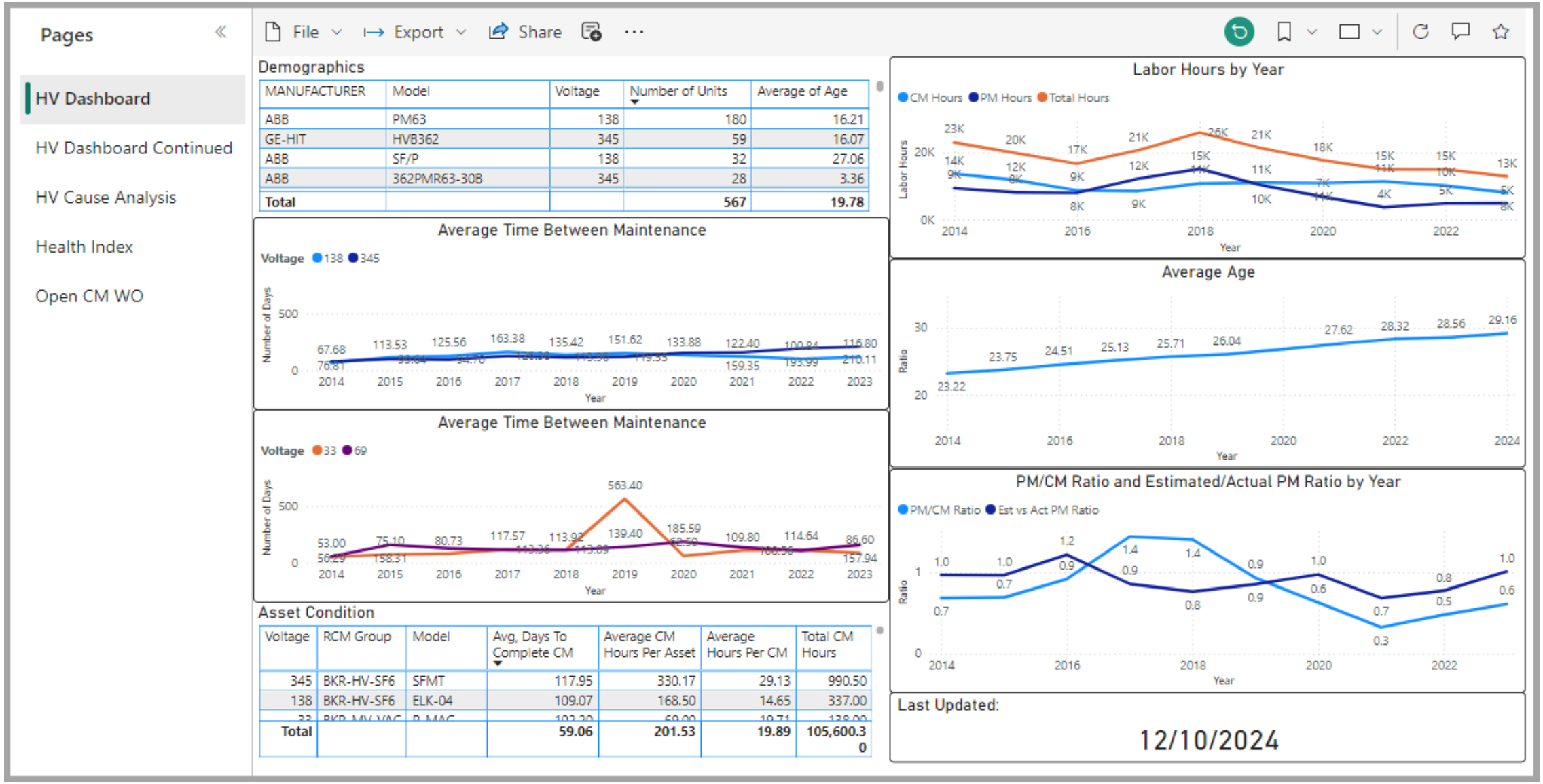


Build the Grid of the Future

Data Analysis Improvements to facilitate Grid of the Future



Leveraging Data: Asset Health Dashboards



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Leveraging Data: Asset Health Dashboards

PM And CM Hours by Year And Model

Year	2019		2020		2021		2022		2023		Total	
Model	urs	CM Hours	PM Hours	CM Hours	PM Hours	CM Hours	PM Hours	CM Hours	PM Hours	CM Hours	PM Hours	CM Hours
PM63	761.50	2,350.00	2,151.00	1,325.50	476.00	2,276.50	489.00	1,921.50	1,073.00	1,623.00	6,950.50	9,496.50
HVB362	177.00	1,567.00	1,845.00	1,985.50	1,121.50	2,001.50	1,349.50	1,772.50	1,163.00	1,755.00	8,656.00	9,081.50
SF/P	327.00	478.50	94.00	608.50	200.00	1,115.00	443.50	1,333.50	528.00	1,646.50	1,592.50	5,182.00
PMC	162.00	800.50	499.00	1,507.00	108.00	290.00	0.00	1,467.50	264.00	159.50	1,033.00	4,224.50
PK4C	872.00	840.50	0.00	768.50	328.00	1,125.50	0.00	647.00	127.00	418.50	1,327.00	3,800.00
Total	**286.00**	**11,063.30**	**6,836.50**	**10,931.50**	**3,670.00**	**11,374.00**	**4,837.00**	**10,134.50**	**4,880.50**	**8,041.00**	**30,510.00**	

Oldest Breakers

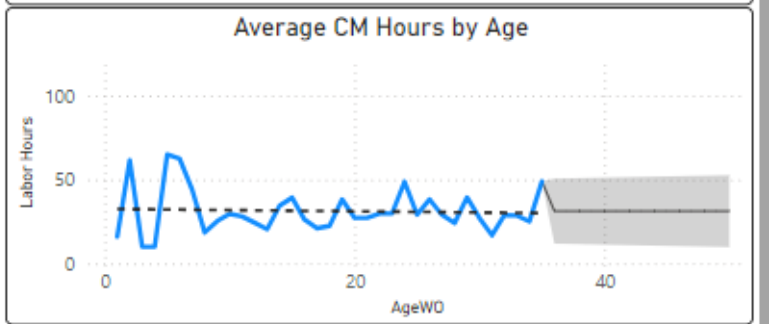
MANUFACTURER	Model	Voltage	ASSETNUM	LOCATION	INSTALLDATE	Age
ITE	KS	33	BKR-0003206	S-FH-76-BKR-11S	1/1/1961	63.00
ITE	KM	33	BKR-0003220	S-FH-76-BKR-3S	1/1/1962	62.00
SI	SP-38	33	BKR-0003203	S-FH-76-BKR-1S	1/1/1962	62.00
ITE	KM	33	BKR-0003223	S-FH-76-BKR-4S	1/1/1965	59.00
ITE	KM	33	BKR-0003256	S-FH-76-BKR-9S	1/1/1965	59.00
DE	PK4C	345	BKR-0000878	WN-BUC-696-BKR-7	7/1/1973	51.00
ITE	KB	33	BKR-0003140	S-FK-68-BKR-5S	1/1/1973	51.00
ITE	KB	33	BKR-0003143	S-FK-68-BKR-6S	1/1/1973	51.00
ITE	KB	33	BKR-0003155	S-FK-68-BKR-8S	1/1/1973	51.00
ITE	KB	33	BKR-0003164	S-FK-68-BKR-9S	1/1/1973	51.00
ITE	KSB	33	BKR-0003110	S-FK-68-BKR-10S	1/1/1973	51.00
Total						**52.59**

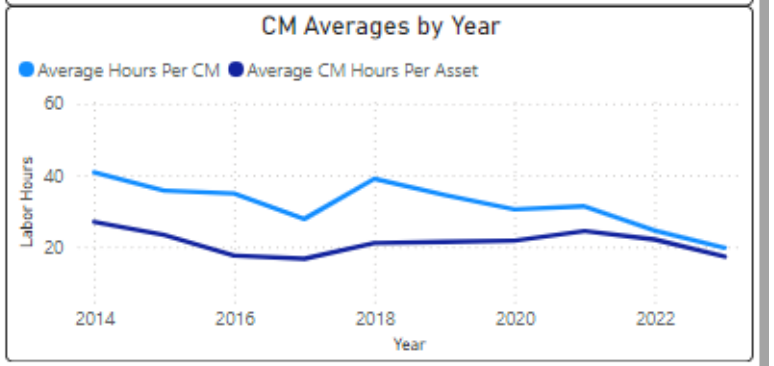
Maintenance Group Stats

Voltage	Maintenance Group	Average CM Hours Per Asset	Average Hours Per CM	Total CM Hours	Time Between Maintenance
33	BKR-ITE-KM	82.17	5.60	246.50	48.56
345	BKR-ABB-362PMR63-30B	57.95	21.93	1,622.50	52.57
33	BKR-ABB-R-MAG	69.00	19.71	138.00	55.40
345	BKR-DE-PK4C	677.33	30.79	2,032.00	66.64
33	BKR-ITE-KS	65.83	15.19	197.50	70.64
Total		**202.71**	**19.88**	**105,002.30**	**141.14**

Last Updated:

12/10/2024





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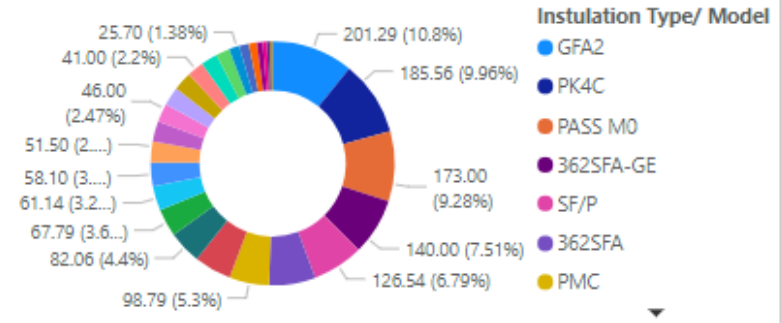
Leveraging Data: Asset Common Causes

Number of DataSplice Events by Component

Model	AC/DC Power	Aux/Relay Contacts	Cable / Wiring (General)	Cable / Wiring - Control Wiring	Control Cabinet	Heaters	Hydraulic System (General)	Insulation - SF6	Mechanism (General)	Pressure Switch	Total
PM63	3	5	11	7	5		15	138	4	4	**192**
SF/P	2	3	1	4		3	24	62	7	2	**108**
HVB362	7	9	7	3	4	15		39	3	5	**92**
Total	**17**	**39**	**28**	**21**	**16**	**46**	**54**	**371**	**21**	**20**	**633**

CM Hours Per Breaker by Model and Location



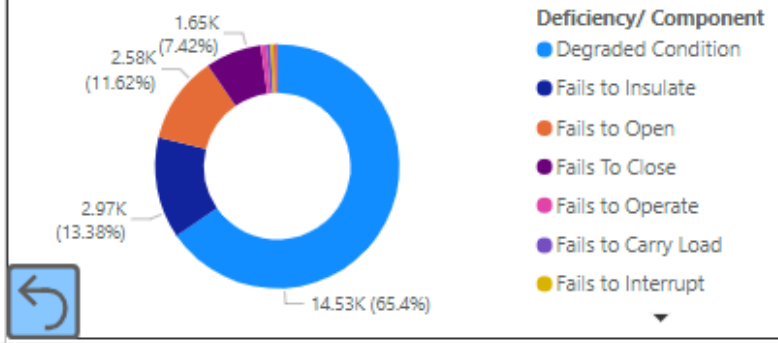
Last Updated:

12/10/2024

DataSplice Events For Top Ten Models by Component Category

Model	Bushing	Elec / Controls	Insulation	Mechanical	Physical / Structural	Total
362SFA			5	1		**6**
362SFA-GE			4			**4**
FX-22D		16	27	5	2	**50**
GFA2		5	7	3	3	**18**
HVB145		7	9	2		**18**
HVB362	1	55	39	23	5	**123**
PASS M0		3				**3**
PK4C		13	1	12	2	**28**
PMC		8	21	2		**31**
SF/P	2	21	64	42	1	**130**
Total	**3**	**128**	**177**	**90**	**13**	**411**

Total CM Hours by DataSplice Deficiency and Component



Most Common Problem Codes

Model	Damaged	Leak	Out of Range/Calibration	Settings	Worn/Deteriorated	Total
PM63	18	116	34	15	16	**199**
SF/P	8	76	13	5	10	**112**
HVB362	24	16	21	9	16	**86**
FX-22D	3	21	5	3	7	**39**
FA2	4	12	11	2	7	**36**
PMC	2	15	7		1	**25**
GB MODEL C	6	7	4	3	4	**24**
PK4C	4	4	4		9	**21**
Total	**96**	**311**	**120**	**46**	**92**	**665**

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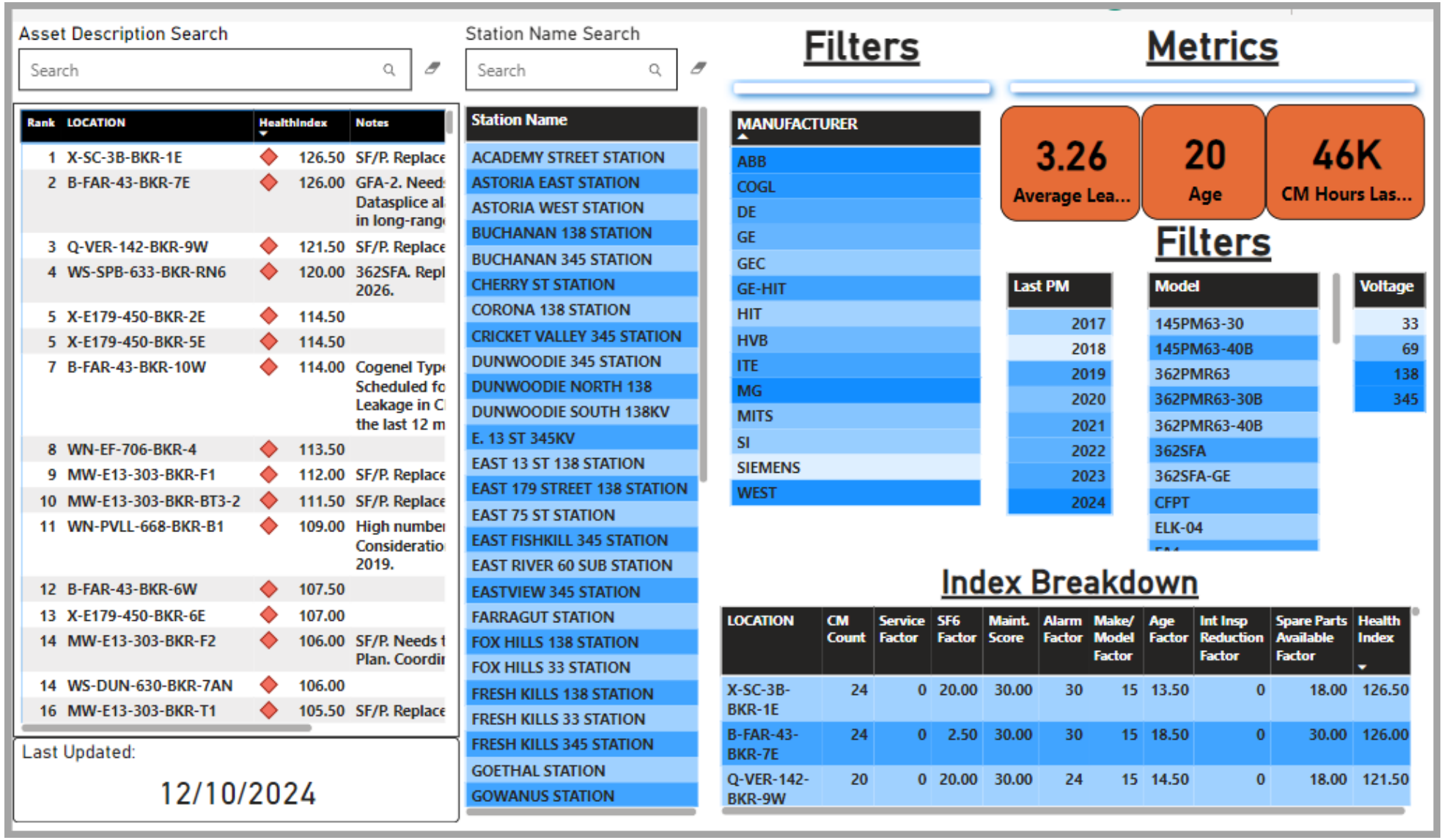
Leveraging Data: Asset Health Indexes



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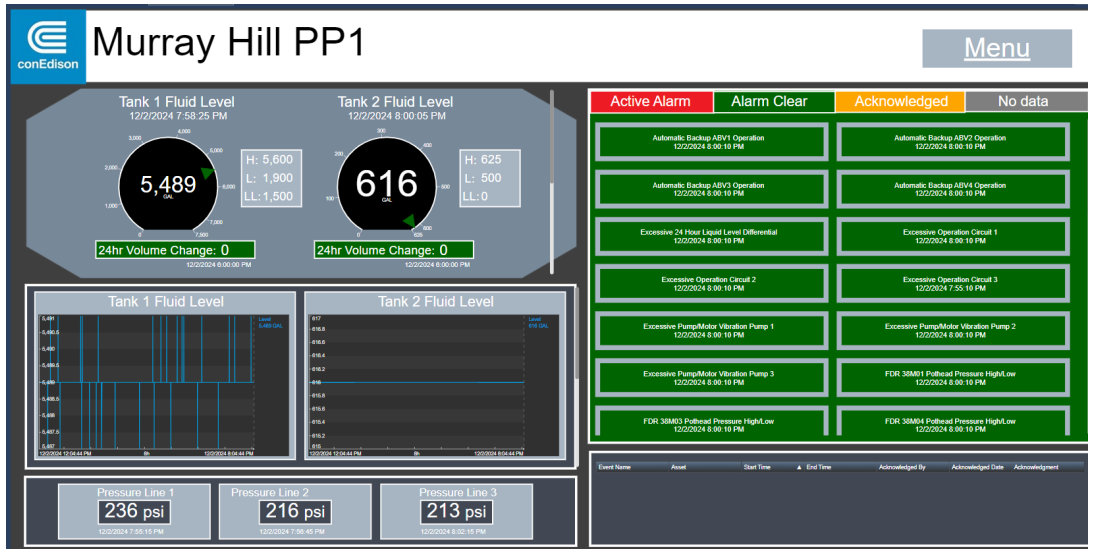
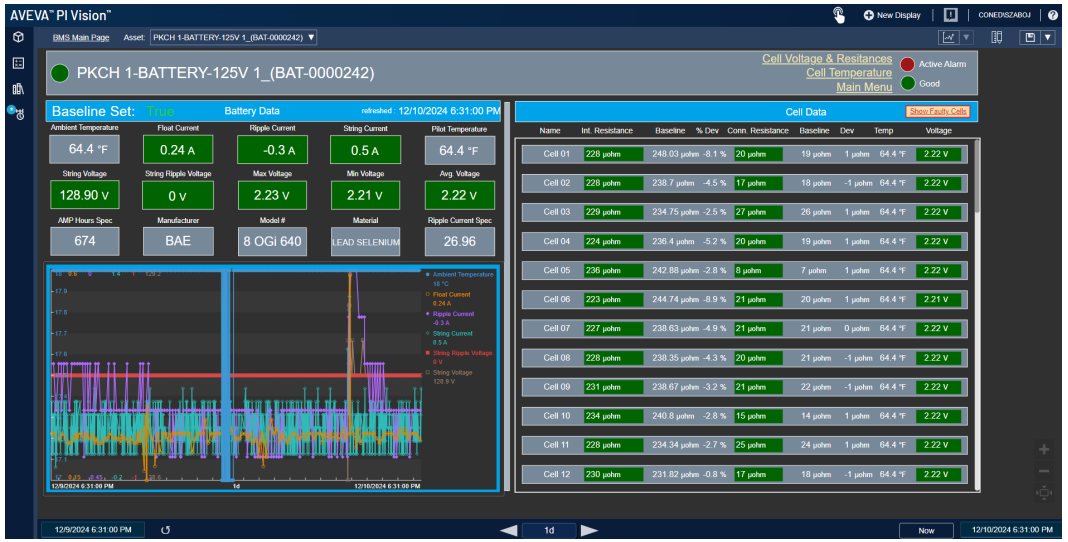
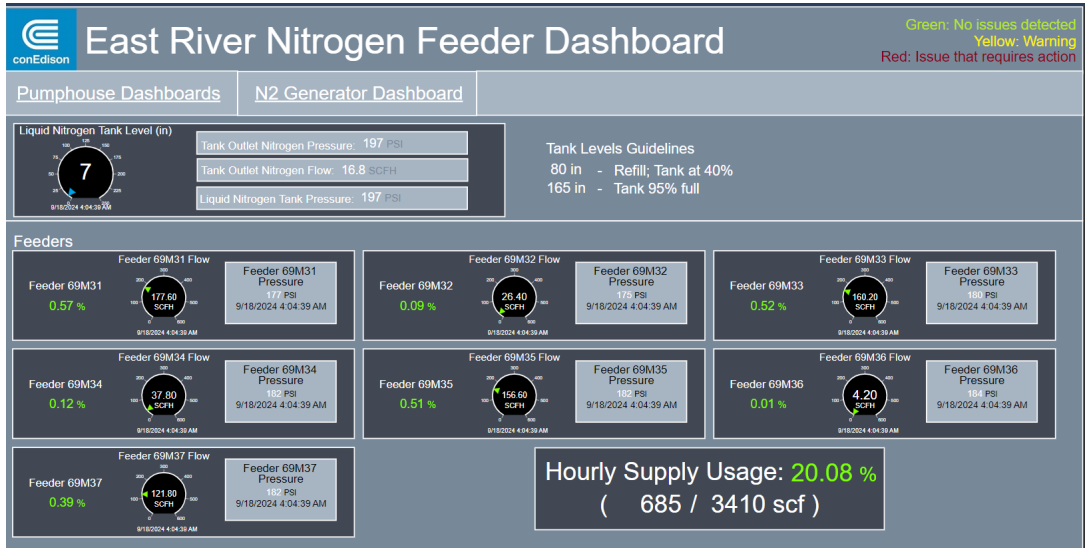
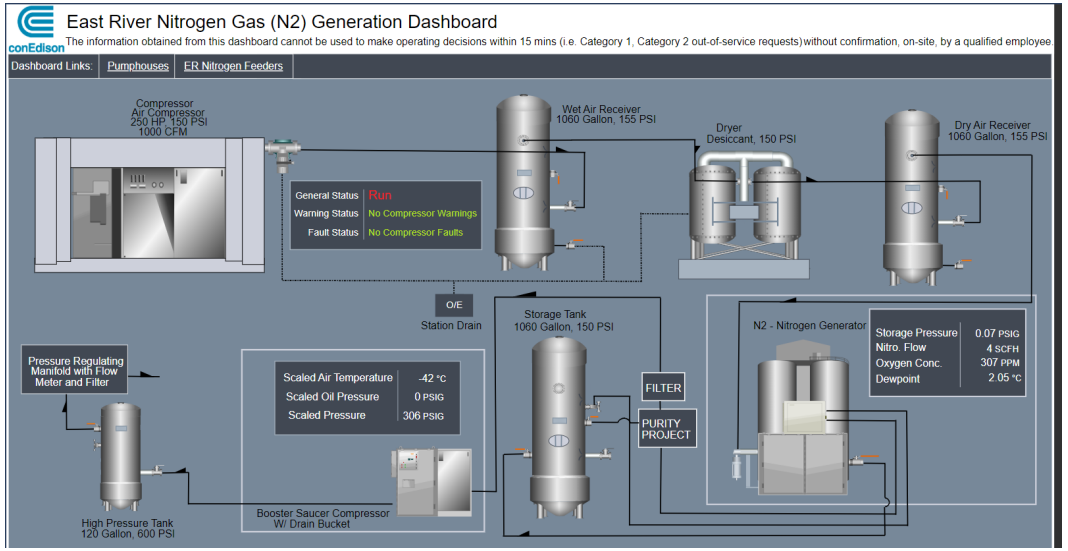
Dashboards - - Building Visibility









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Implementing Innovations: Leveraging Machine Learning

Capital Portfolio Optimization

- **Reduced Switching to complete Capital and O&M Work**
- **Efficiency attaining outages for Capital Work**
- **Reduction of Corrective Maintenance Backlog**
- **Incorporating a Value Framework for Capital Work**
- **Meeting our PSC commitment**
- **Identifying Capital Project bundling opportunities**

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