Open Power AI Consortium Member Representative Committee Meeting

September 2025

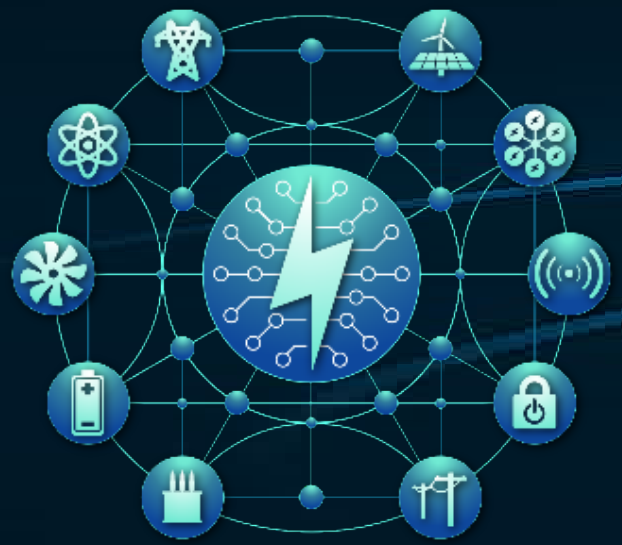
Agenda

Thursday, August 21, 2025		
Time (EST)	Topic	Lead
11:00 am	Welcome & Key Updates • Meeting Overview • Work Groups • What's Coming?	Jeremy Renshaw, EPRI
11:10 am	Storm Response & Aurora Weather Model	Pat Lo, Microsoft
11:30 am	Active Edge Network Management & Storm ERT Prediction	Rajagopal Iyengar & Jason Duncan-Wilson, Oracle
11:50 am	Roundtable Discussion	All
12:00 pm	Adjourn	All

Open Power AI Consortium

Creating an ecosystem for stakeholders to identify, develop, validate, and deploy AI solutions to transform the electric sector

- Develop AI Models, Data & Roadmaps
- Create an AI Sandbox
- Implementation and Lessons Learned



OPEN POWER AI CONSORTIUM

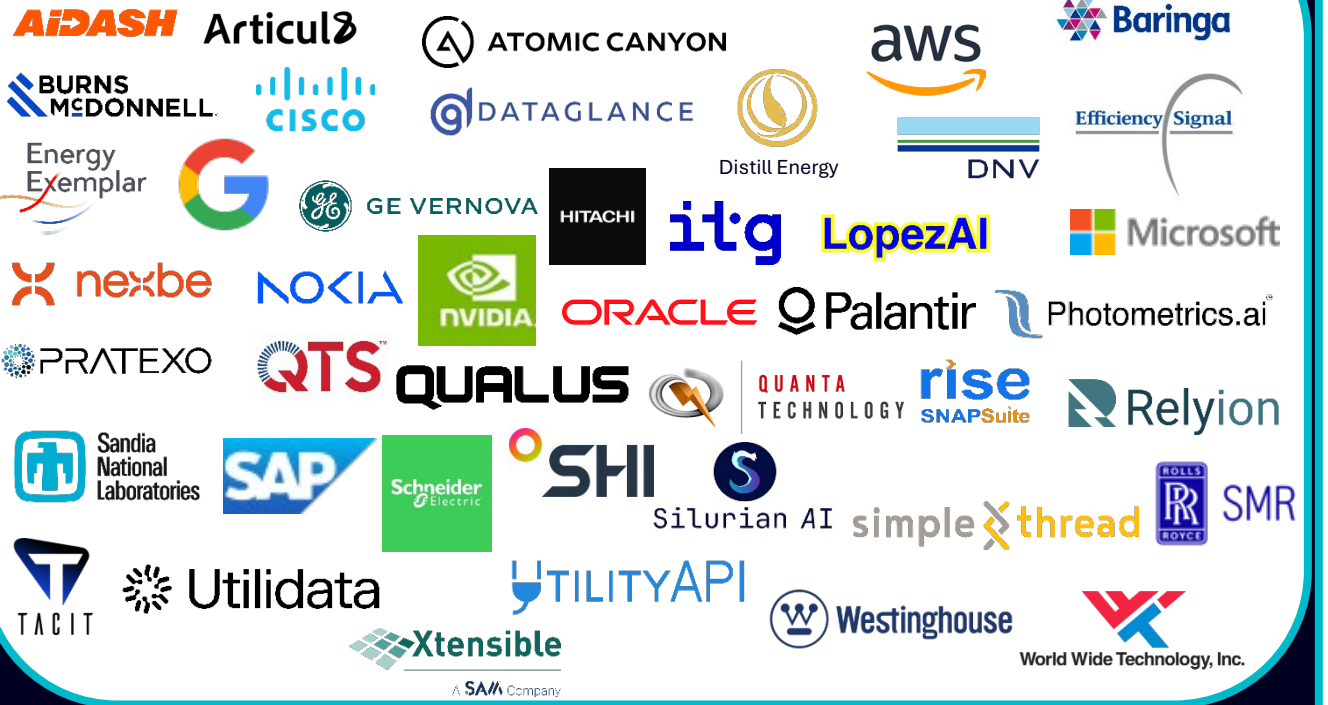
>200 Members

>100 MOU/Requests In-Process

>300 Use cases identified

OPAI Participants

AI and Energy Technology Partners



Academia & Other Strategic Partners

Energy Partners

OPAI Work Status - Initial Priorities for the Three Work Groups

Electric DSM WG

Lead: Ben Sooter

AI Use Case WG

Lead: Adrian Kelly

Deployment WG

Lead: Jason Hollern

What Do We Need from You?

- Fill out the MRC Survey
  - https://www.surveymonkey.com/r/partcipantsurvey
  - Assign staff to Work Groups (if not done)

- Share public examples of relevant use cases
  - Proposed
  - Ongoing
  - Completed

- Reach out to jrenshaw@epri.com to speak in future meetings

Participant Survey QR Code

Data Readiness White Paper

How can we properly leverage data to support AI initiatives?

EPRI

2025 White Paper

AI Readiness in Utilities: Turning Data into Strategic Advantage

The first in a series of guidance documents to accelerate AI implementation

What's Coming?

- Work Group meetings starting (October)
- Domain-specific model and benchmarking results (October)
- Use Case database published (October)
- More opportunities to engage
- New meeting invite!

Storm Response & Aurora Weather Model (Microsoft)

Active Edge Network Management & Storm ERT Prediction (Oracle)

Microsoft

Storm Response

AI for Power & Utilities

Leslie Connolly
AI Lead for Storm Response - Energy

Pat Lo
Americas Executive Leader – Power & Utilities

Solve for X | Utility Challenges Today

1. Unlocking New Capacity | Rapid Planning and Building to connect more customers
2. Extreme Weather and Reliability | Predict, Prevent, and Restore Power
3. Data as an Asset | Extracting more value out of existing software and systems to unlock new businesses and save opex $

Microsoft

Storm Response

Predict

- AI for Extreme Weather Forecasting
- AI for Field Worker Dispatch

Prevent

- AI for Structure Damage Assessment
- AI for Post Event Analysis

Restore

- Data & AI for Outage Reporting
- Agents for Storm Response Process

Microsoft Planetary Computer Pro

Introducing Aurora: The first large-scale foundation model of the atmosphere

Aurora is a 1.3 billion parameter foundation model for high-resolution forecasting of weather and atmospheric processes.

Aurora leverages the strengths of the foundation modelling approach to produce operational forecasts for a wide variety of atmospheric prediction problems, including those with limited training data, and extreme events. In under a minute, Aurora produces 5-day global air pollution predictions and 10-day high-resolution weather forecasts that outperform state-of-the-art classical simulation tools and the best specialized deep learning models.

Aurora's effectiveness lies in its training on more than a million hours of diverse weather and climate simulations, which enables it to develop a comprehensive understanding of atmospheric dynamics. This allows the model to excel at a wide range of prediction tasks, even in data-sparse regions or extreme weather scenarios.

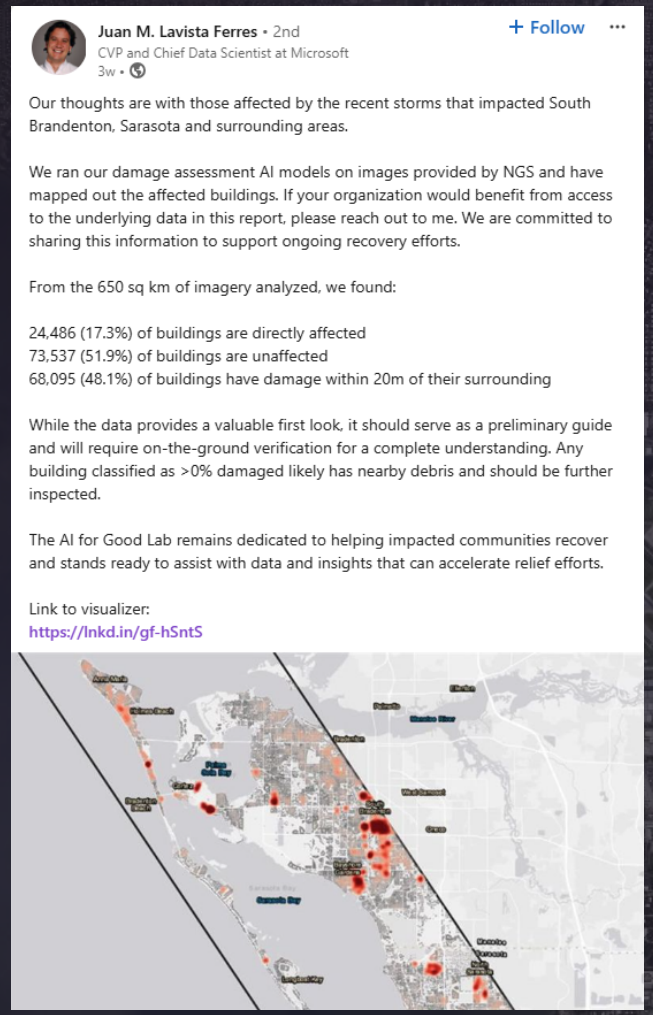
AI For Good: Microsoft Damage Assessment and Storm Recovery Tool

The frequency of natural disasters is increasing globally, affecting 350 million people annually and causing billions in damage. Providing timely humanitarian interventions like shelters, medical aid, and food is challenging.

Microsoft's solution uses high-resolution satellite imagery and a convolutional neural network model to localize buildings and assess damage levels, categorized into four levels based on the xView2 dataset.

The primary value lies in inference speed, with the solution operating three times faster than the fastest xView2 challenge-winning solution. The model achieves a pixel-wise F1 score of 0.74 for building localization and 0.6 for damage classification. Additionally, a web-based visualizer displays before and after imagery with damage predictions. This study, conducted with a humanitarian organization, aims to deploy and assess the model and visualizer for disaster response efforts.

Hurricane Milton Response



Juan M. Lavista Ferres • 2nd
CVP and Chief Data Scientist at Microsoft
3w •

+ Follow

Our thoughts are with those affected by the recent storms that impacted South Brandenton, Sarasota and surrounding areas.

We ran our damage assessment AI models on images provided by NGS and have mapped out the affected buildings. If your organization would benefit from access to the underlying data in this report, please reach out to me. We are committed to sharing this information to support ongoing recovery efforts.

From the 650 sq km of imagery analyzed, we found:

24,486 (17.3%) of buildings are directly affected
73,537 (51.9%) of buildings are unaffected
68,095 (48.1%) of buildings have damage within 20m of their surrounding

While the data provides a valuable first look, it should serve as a preliminary guide and will require on-the-ground verification for a complete understanding. Any building classified as >0% damaged likely has nearby debris and should be further inspected.

The AI for Good Lab remains dedicated to helping impacted communities recover and stands ready to assist with data and insights that can accelerate relief efforts.

Link to visualizer:
https://lnkd.in/gf-hSntS

visualizer for Hurricane Milton in
2024)

Microsoft Planetary Computer Pro

Microsoft

Power & Utility Use Cases

Compliance & Reporting

- Environmental Monitoring
- Land Use Tracking

Risk & Forecasting

- Risk Assessment & Modelling
- Supply Chain Optimization
- Weather & Climate Analysis
- Scenario Modelling

Operations & Optimization

- Asset Monitoring
- Site Intelligence
- High Resolution Mapping
- Area of Interest Modelling

Southern Company leverages Microsoft & Databricks for Outage & Storm Modelling

Southern Company

Microsoft

RAMP, which stands for Reliability Analytics Metrics and Performance, is an Azure-based reliability application that provides a comprehensive view of the power grid's performance, including reported values, customer experience values, and device failures. The application helps identify areas of improvement and provides insights into the root causes of reliability issues.

SPEAR, which stands for Storm Planning, ETR and Reporting, is a forecasting application on cloud that uses data from weather vendors and internal systems to predict the impact of severe weather events on the power grid. The application provides a detailed forecast of the number of incidents, resources needed, and estimated time of restoration, allowing the company's storm center to make more informed decisions and allocate resources more effectively.

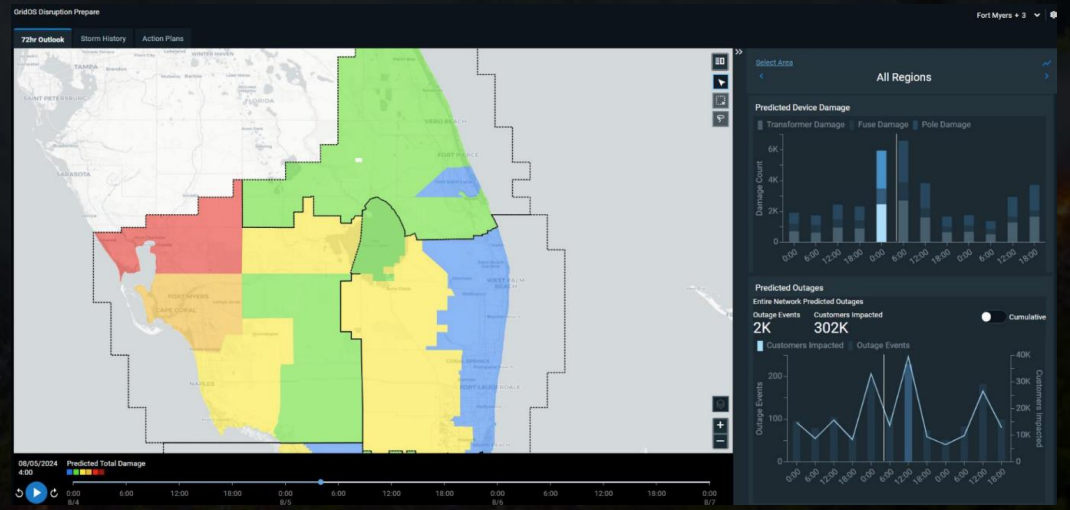
Forecasted Impact:

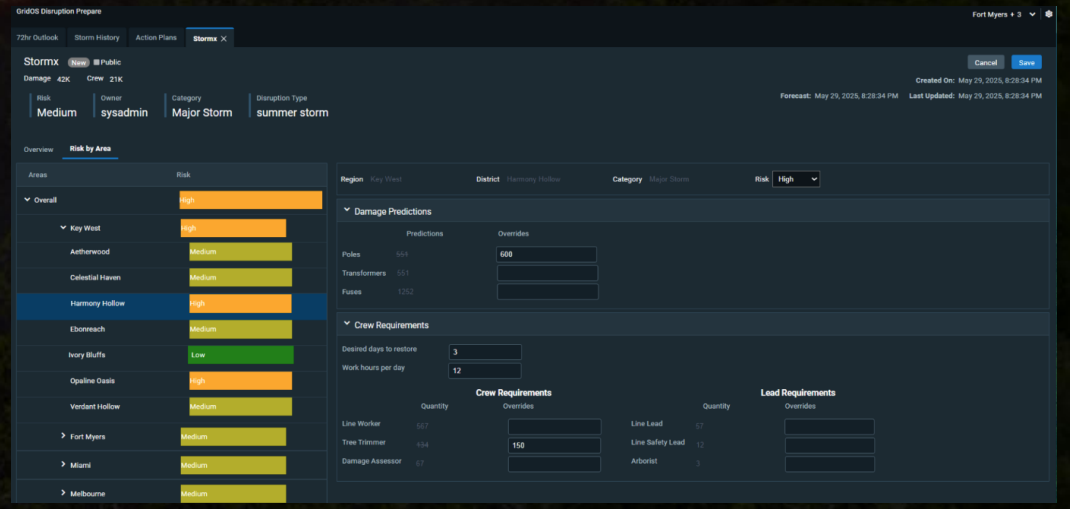
- 5% targeted reduction (3500 outages) to save **$17.5M**
- 99.7% (3600x) efficiency gain historical customer outage history recovery
- Potential savings of **$2.8M** per 10-day storm event

Prevent | AI for Reliability

Disruption Prepare

Together, GE Vernova and Microsoft are equipping operators with tools to reduce risks and recover quickly from large-scale disruptions such as wildfires and storms. Using Vision AI, GIS, LIDAR, drone, and satellite data, the companies are equipping operators with a single data plane to enable resilient operations.





GE VERNOVA

Microsoft

Storm Response Agents

Microsoft AI for Grid Resiliency

Microsoft

AI For Storm

Weather Prediction

- Better Predict extreme weather events with generative models
- Forecast Accuracy/Confidence Agent
- Forecast
- Impact and timing chat bot.

Storm Response

- Outage Detection Agent
- Intelligent Dispatch optimizer
- Grid Reconfiguration Advisor
- Excluded event predictor

Storm Response Planning

- Storm Impact Prediction
- Storm material planning
- Crew resource forecasting
- Grid resilience planning
- Vegetation management
- Proactive reliability action agent

Storm Assessment

- Remote sensing storm damage assessment.
- Exclusions
- Generate compliance-ready financial reports

Storm Restoration

- Equitable Store restoration agent
- Restoration validation
- Lessons learned compilation
- ETR Optimization

Customer Outage Support

- Customer Communication Bot
- Call center agent assist

Storm Recovery

- Storm exclusion agent.
- Data review and correction
- Storm reporting agent for regulators and leadership

Response Coordination

- Mutual aid mobile chat bot
- Invoice review and approval agent
- Storm data correction/reconciliation
- Storm Material reconciliation

StormGrid Collaborative

Microsoft

Microsoft is forming a first-of-its-kind industry consortium to co-develop AI-powered storm response tools—predictive outage models, intelligent crew dispatch, and resilient infrastructure strategies.

Shaped by utility leaders, this is your chance to turn weather into a solvable equation and lead the future of operational resilience

Microsoft Research

Microsoft Planetary

Microsoft Energy

lconnolly@microsoft.com

patlo@microsoft.com

Asset Health Failure AI Models

Microsoft and EPRI are entering into a partnership to leverage EPRI's vast data sets and build first of its kind asset health failure models.

These models will be available exclusive to EPRI members and be enabled on a customer's Azure tenant.

Transformer Health through Dissolved Gas Analysis

Microsoft and EPRI collaborated on accelerating the creation of AI Asset Health Failure models leveraging the technology used traditionally for diagnosis of health issues from blood samples. The Dissolved Gas and Oil Analysis model (DGA) will allow utilities to feed their own transformer DGA data into the EPRI and Microsoft AI accelerator to diagnosis the true health condition of these transformers, leveraging the knowledge, expertise, and data from EPRIs existing Transformer Asset Health Database

Outcomes

- ***100%*** *improvement in predicting at risk transformers*
- ***23%*** *improvement in false positive rate*

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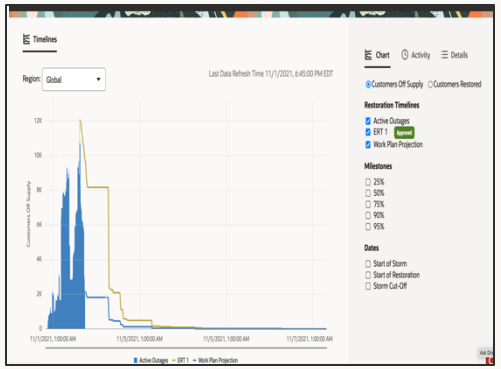
AI Solutions for the Modern Electric Grid

Raj Iyengar (Oracle Utilities Data Science Lead) Jason Duncan-Wilson (Industry Data Platform Lead)

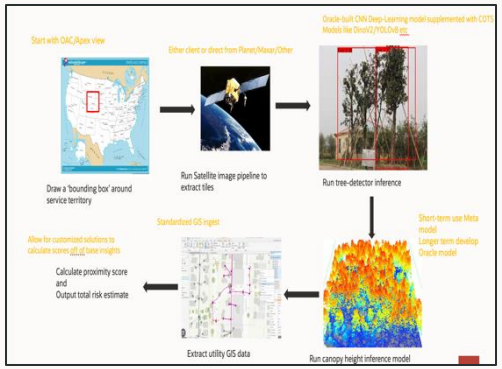
Operate – Service Interruptions

Reliability and safety are critical. Extreme weather and other events can disrupt lives and services. Utilities need tools to predict, prevent, and protect against interruptions.



Predict….

Using AI, historic weather and outage data, utilities can now model future events and prepare their storm response.



Prevent….

AI analysis of satellite, drone and ground-based footage with GIS, spatial and network models: Improve vegetation management.

Protect….

Respond to power line incursions in milliseconds. Combining the sensor technology + AI enabling time critical decision making at the edge.

Predict

Storm Estimated Restoration Time (ERT)

Storm ERT

A solution designed to help plan and manage storm restoration more effectively

Pre-Storm

Scope & crew

Post-Storm

Approval plan

Evaluate

Adjust & update

- ✓ Single source of truth
- ✓ Integrated tools
- ✓ Progress updates
- ✓ AI/ML-based estimates
- ✓ Regulatory audits

Collaboration partner: conEdison

Example Workflow: Pre-Storm Scope and Actions

1: Landing page: inputs here

Create Storm Model

Storm Model Details

Name: 1/29 Overhead Event

Start Date: 1/29/2025, 2:00:00 PM EST

Cut-Off Date: 1/30/2025, 11:00:00 PM EST

End of Restoration: 2/1/2025, 7:00:00 PM EST

Operating Company: Cecony

☐ Exclude Single Customer Outages

2: Similar storm selector

Create Storm Model

Similar Storm Events

The new Storm Model will be based on one or more ERTs. Choose up to six Storm Events and Approved and Archived Models to use for the first ERT. Results are ordered by similarity scores which indicate how much their weather matches that for the current storm. Some Storms may be selected by default.

Selected Storm Events

10/16/19 Northern Region 16-OCT-19 | Weight: 5 ✕ 5/15/18 Northern Region 15-MAY-18 | Weight: 5 ✕

State Historic ✕ Duration Hours 24 - 72 ✕ Season (3) ✕

Type | Level | Customers 500 - 1,500 | Outages 50 - 150 | More Filters

19 items

	State	Name	Season	Storm Start	Storm Cut-Off	Duration Hours	Type	Level
☐	Historic	4/03/24 Northern Region 04/04/24	Spring	4/3/2024	4/6/2024	57	Plus 10 2 0 Hrs	MAJOR_STORM
☑	Historic	10/16/19 Northern Region 16-OCT-19	Fall	10/16/2019	10/18/2019	34	Plus 0 0 0 Hrs	
☐	Historic	4/15/18 Northern Region 15-APR-18	Spring	4/15/2018	4/17/2018	29	Plus 0 0 0 Hrs	
☐	Historic	8/21/21 Con Edison 21-AUG-21	Summer	8/22/2021	8/24/2021	50	Plus 0 0 0 Hrs	
☑	Historic	5/15/18 Northern Region 15-MAY-18	Spring	5/15/2018	5/17/2018	37	Plus 0 0 0 Hrs	

Cancel | Continue

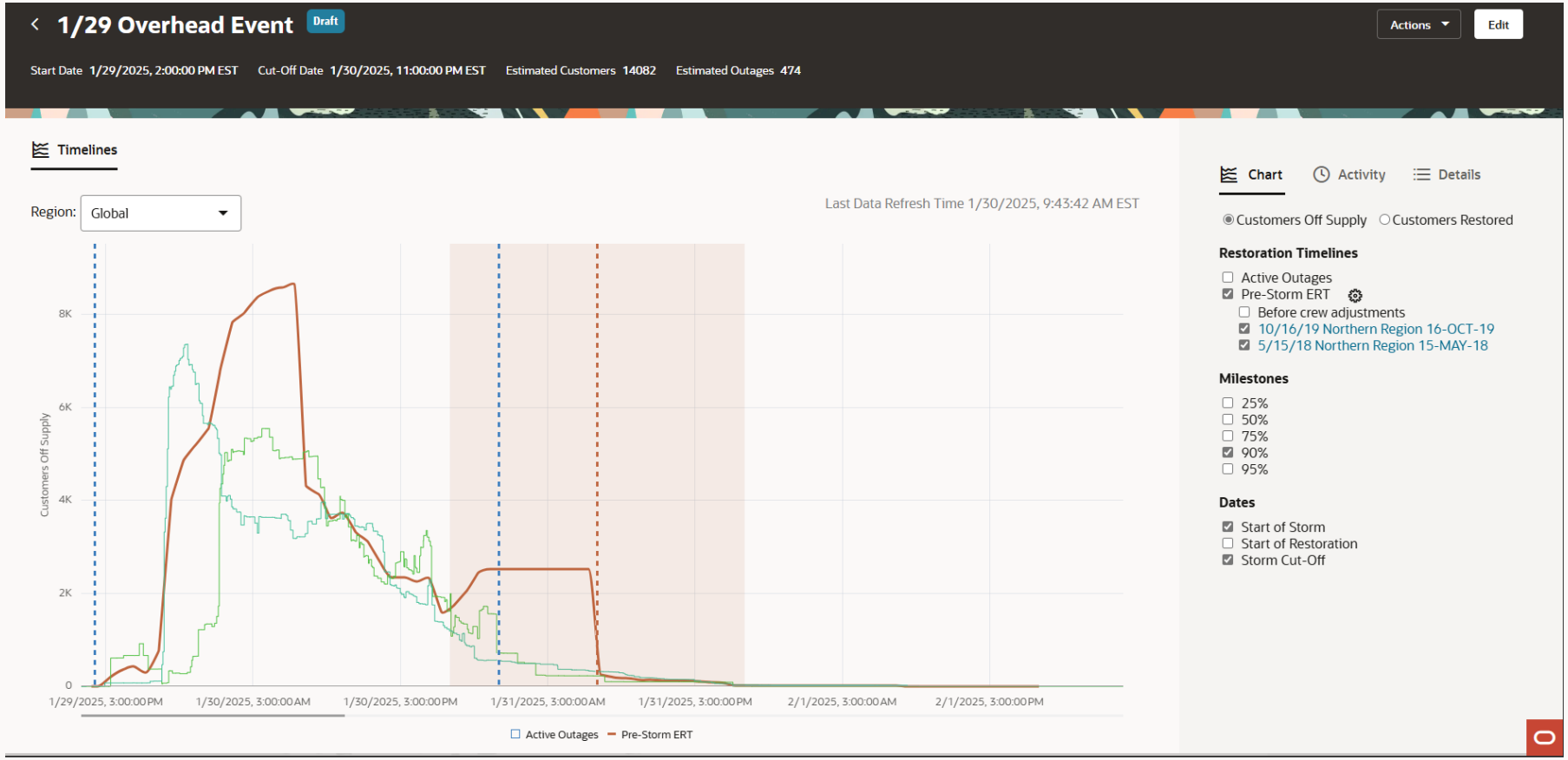
Name: Pre-Storm ERT

Crew Schedules

Zone	Estimated Customers	Actual Customers	Estimated Outages	Actual Outages	90% Restoration Date	1/29/2025 7:00am Crews	Efficiency	1/29/2025 7:00pm Crews
Global	14,082	15,454	474	1,119	1/31/2025, 7:01:54 AM EST	107	5	0
Con Edison	14,082	15,454	474	1,119	1/31/2025, 7:01:54 AM EST	107	5	0

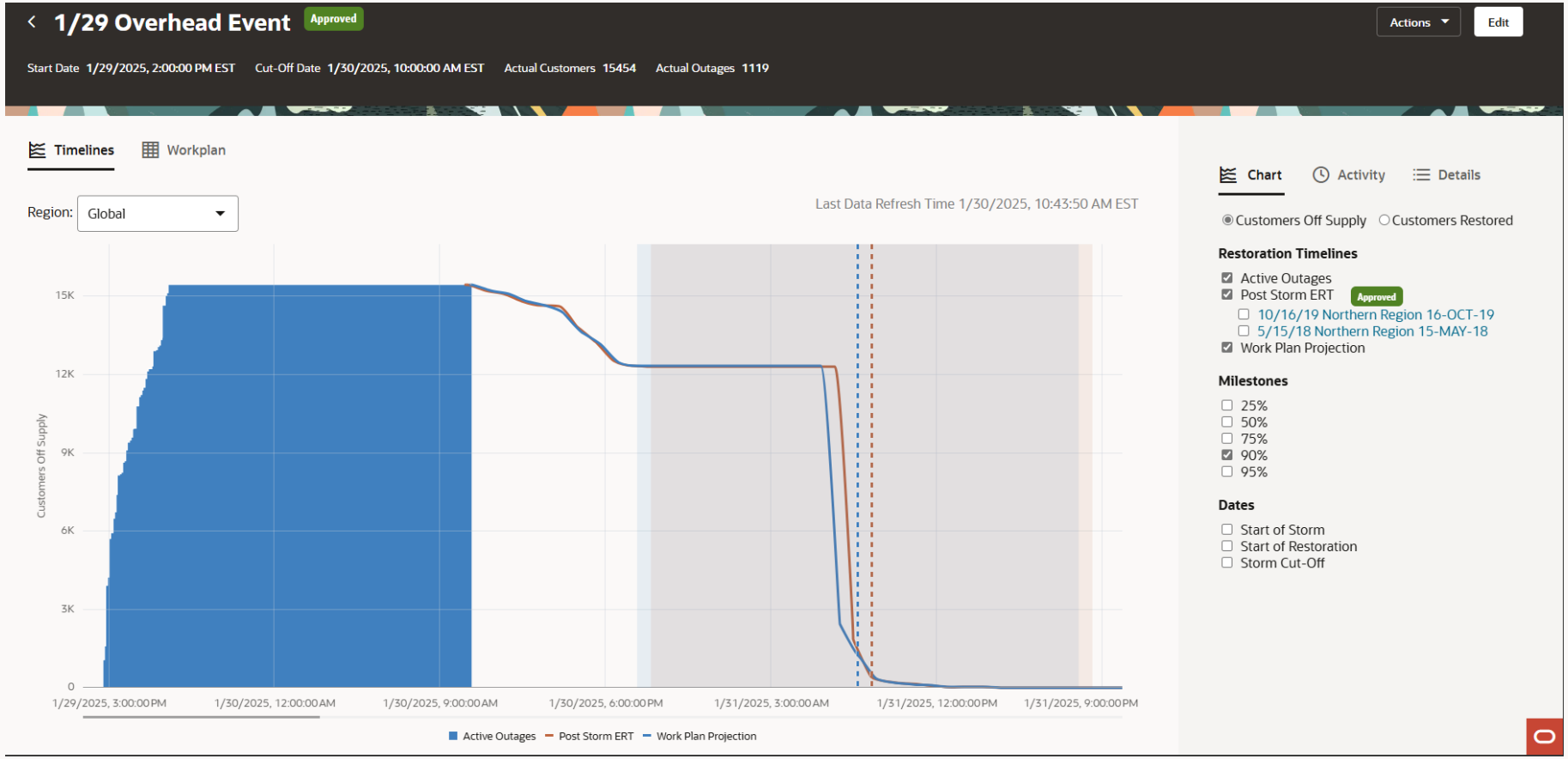
3: Crewing Adjustments

Example Workflow: Pre-Storm Prediction



4: Evaluate Pre-Storm Curve & Make Adjustments

Example Workflow: Adjustments During Restoration

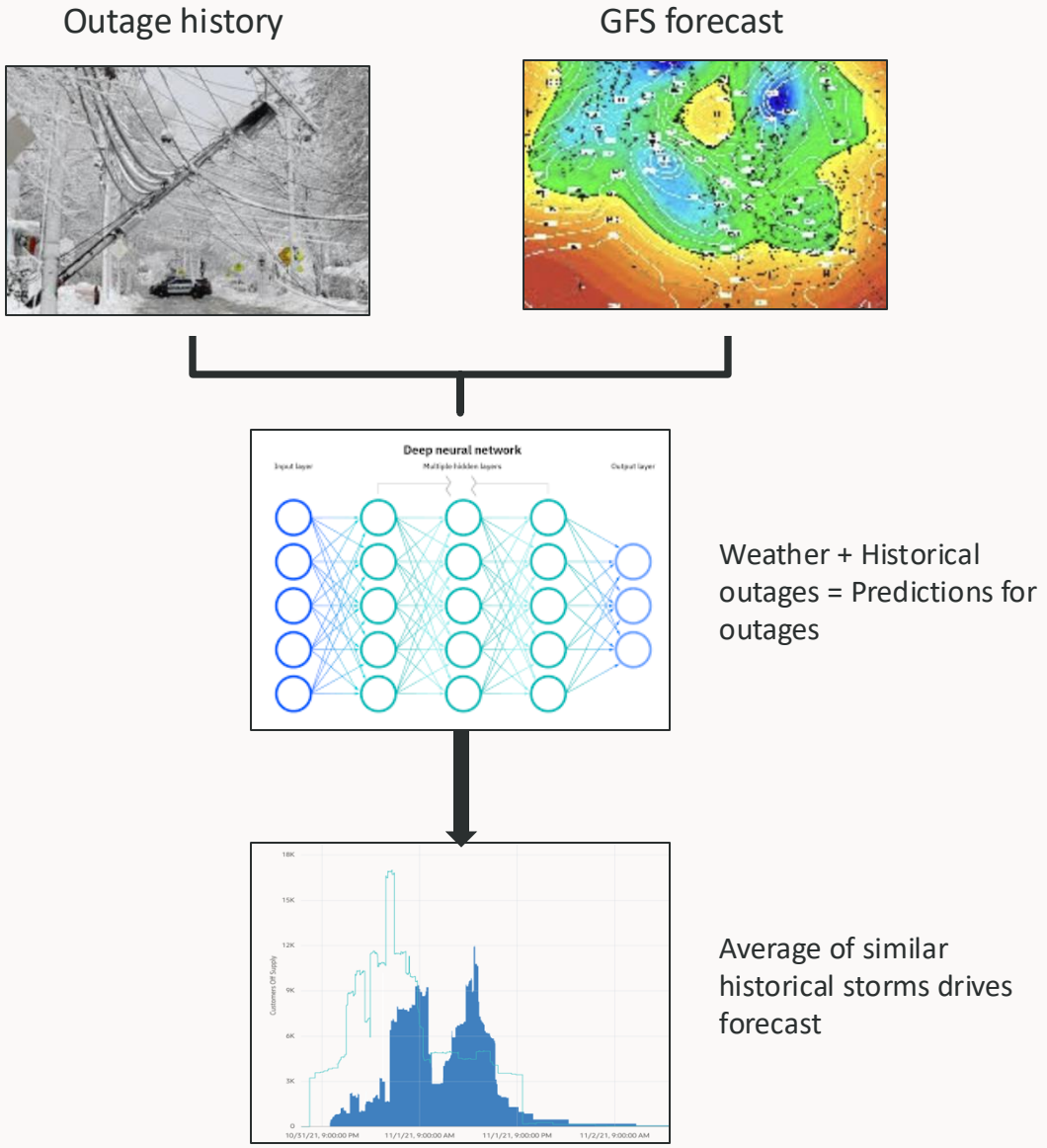


5: Evalute Effects / What-if analysis on work-plan adjustments

Modeling Storm Similarity

- ***Automates*** similar storm selection
- "Select the *top 'n' most-similar storms* to the forecast period"

Storm name	Duration	"Distance"	Outages	Customers Count
Snow Event d011622	64	0	86	12,767
Storm Event d032921	67	39.01	176	16,210
Storm Event d04212021	55	43.49	116	8,568
Zeta d103020	55	43.65	131	16,570
Wind Storm d121121	61	44.00	96	3,298

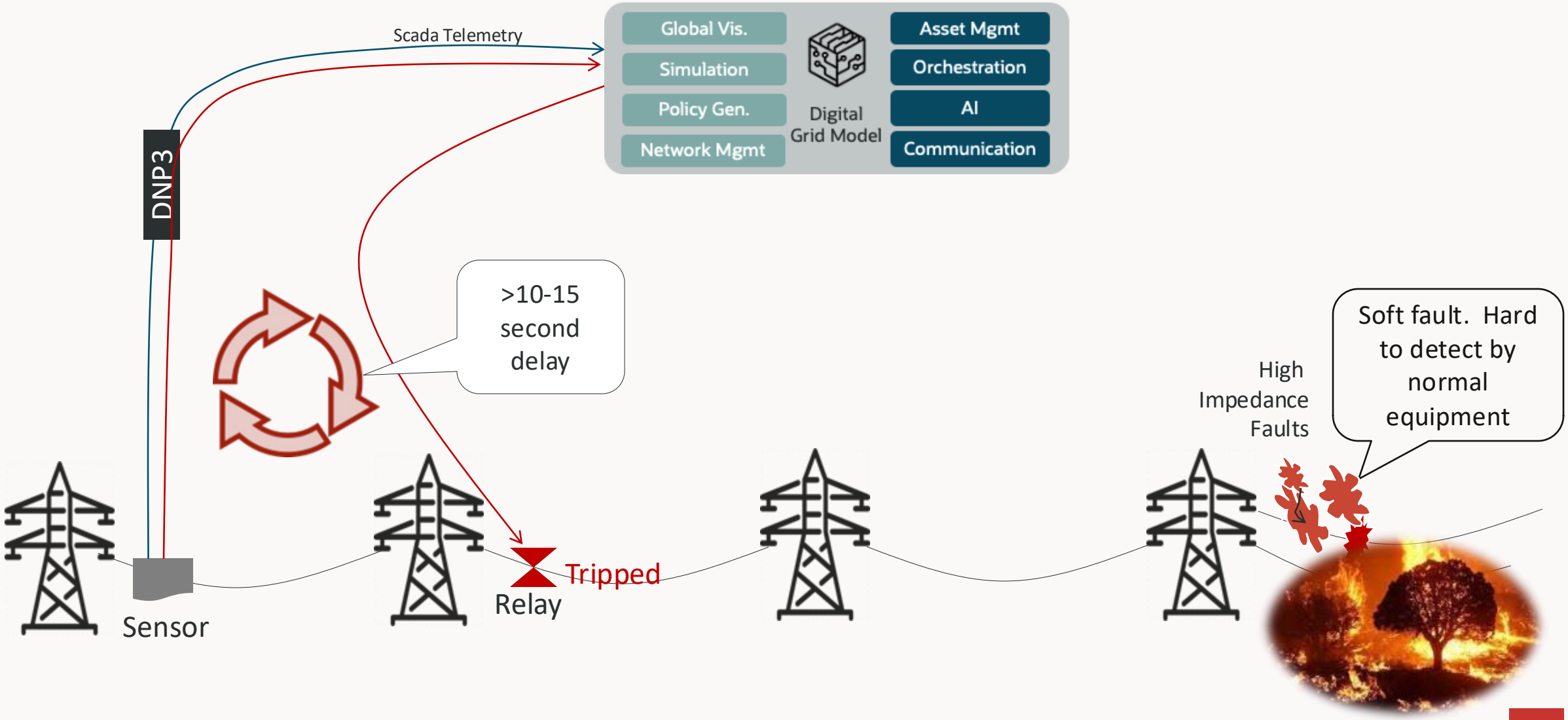


Protect

Active Edge Network Management

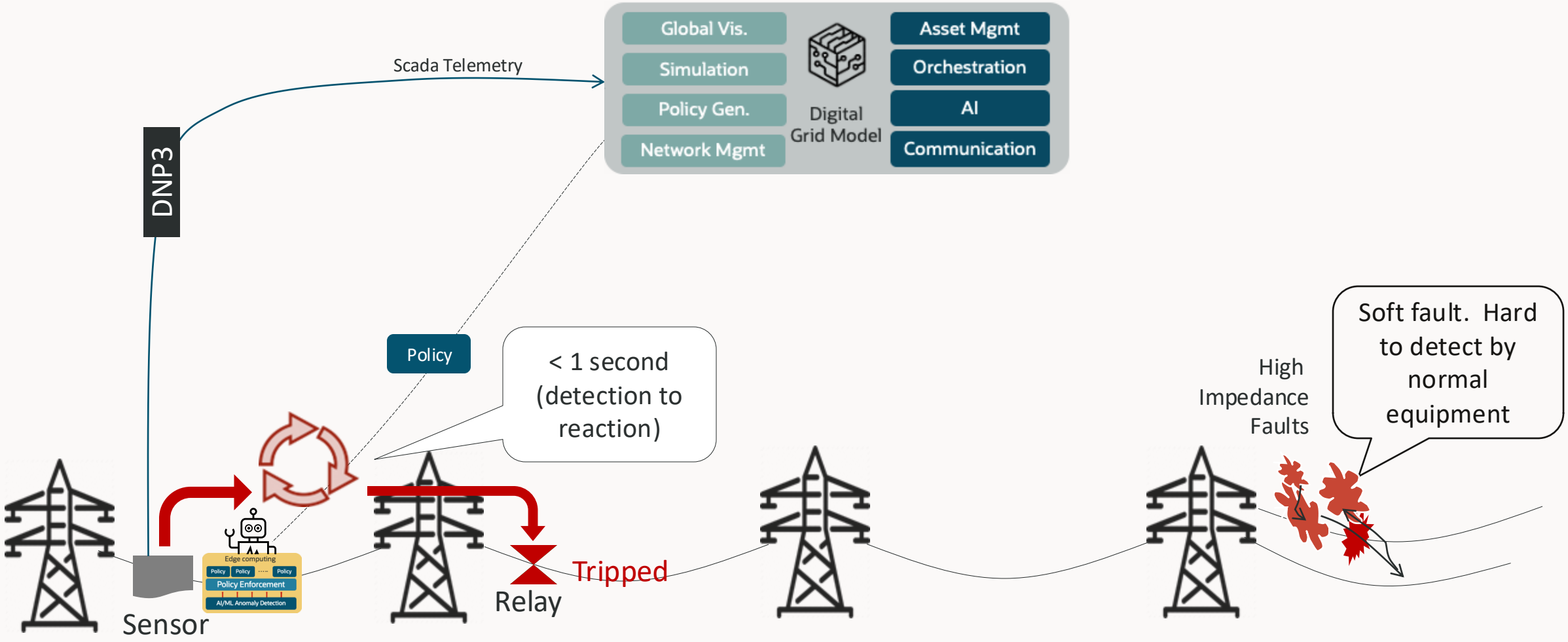
Existing grid protection mechanism

High impedance fault & wildfire mitigation



Existing grid protection with AENM

High impedance fault & wildfire mitigation

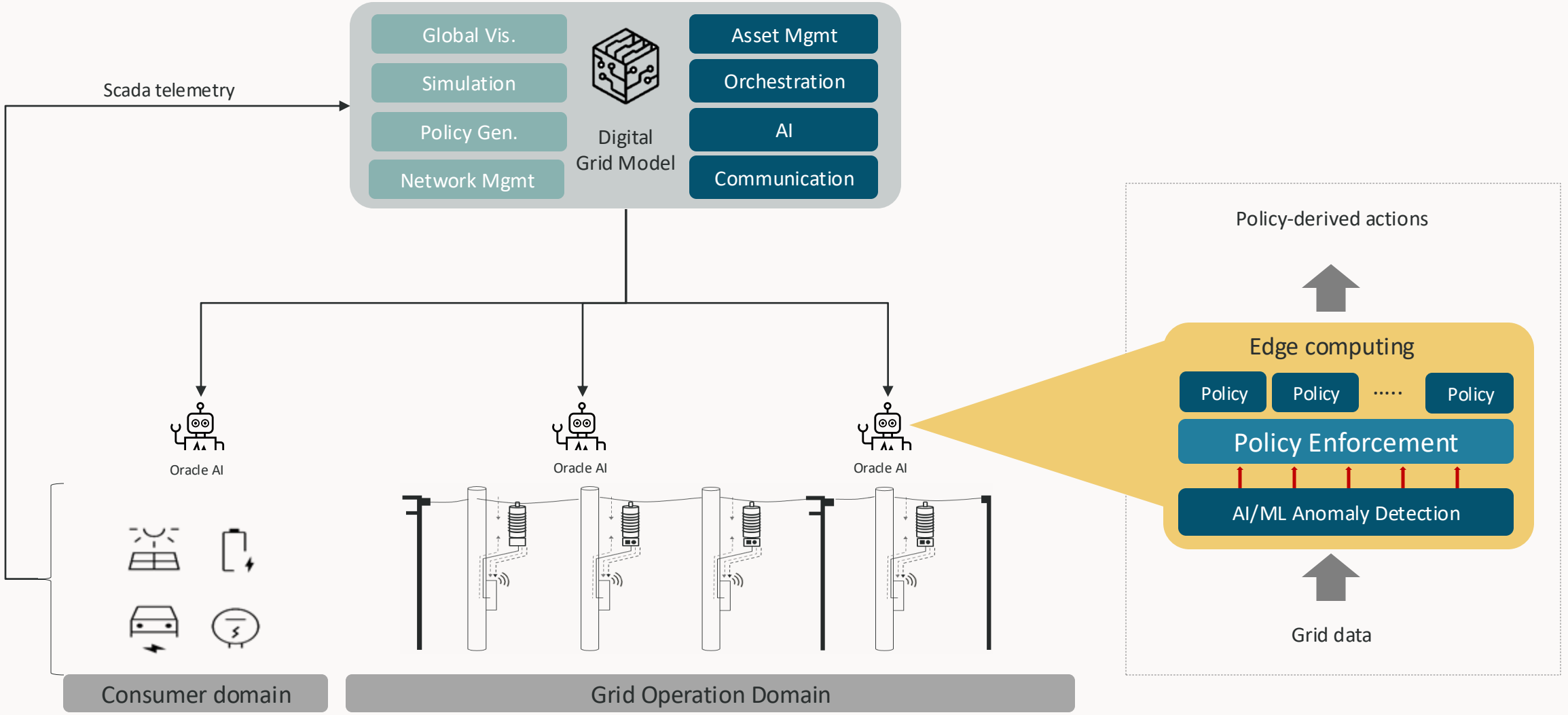


High Impedance Fault (HIF) ML Model

- Developed a classifier to detect high impedance faults (HIFs) in power distribution networks, to prevent fire and ensure grid safety
- Data sources
  - Department of Energy's Grid Events Signal Library (GESL)
  - Micatu sensor data (lab-generated)
- Datasets: Labeled events from DoE GESL covering a range of fault types
- The initial model is built with a binary classification model to detect whether an event is normal (label 0) or fault (label 1)
- 80% of data used for training, 20% used for testing

Event Type	Number of Samples	Label
Tripped	27	Fault
Tree Contact	23	Fault
Arcing	2	Fault
Capacitor Switching	5	Non-Fault
Motor Starting	8	Non-Fault
Load Changing	18	Non-Fault
Normal	35	Non-Fault

X-Domain Agentic AI for Utilities



Lab PoC with partners and customers

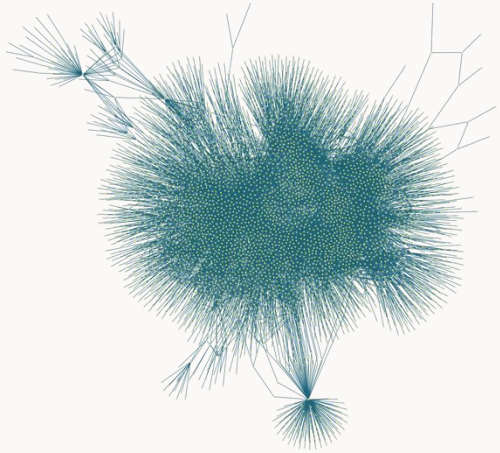
AENM innovation paves the way for additional use cases

- ✓ Over/under frequency management
- ✓ Feeder load balancing
- ✓ Autonomous microgrid islanding
- ✓ Distributed Volt/VAr optimization
- ✓ Loss of central plants and their spinning inertia needed for grid system stability
- ✓ And many more

Scale

Oracle Utilities Data Exchange

Industry Depth, Public Cloud Scale



Ontology

connected industry intelligence with shared meaning

Industry Data

data from utilities, emerging innovators, & broader industry data (e.g. EIA, NOAA, DOE)

ORACLE CLOUD Infrastructure

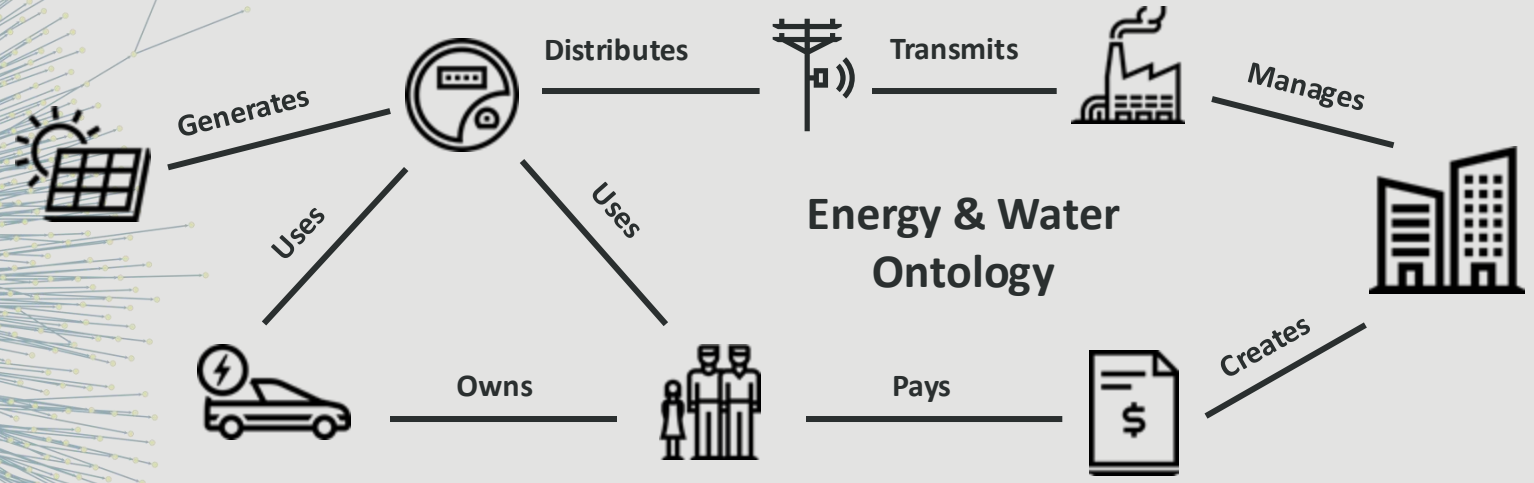
Public Cloud

Enables velocity, scale, & secure collaboration

ORACLE

Energy & Water
Data Exchange

From raw data to actionable data



Enterprise data

PER_T : ID A 98234 PER_C : F_NAME = "Bob"
ACCT : ID = YT0293 PER_C : L_NAME = "Jones"
BILL_P : CURR_AMT = 360.93

To language data for Gen AI

Bob Jones is a person
and has a utility bill
with an amount due of $360.93
with a total account balance of $360.93.

Industry Data

Data from companies

from utility companies…

Customer, Grid, DER, CX, etc

from emerging innovators…

Customer, Grid, DER, CX, etc

Data from industry organizations

Independent Statistics and Analysis
U.S. Energy Information Administration

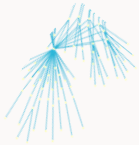
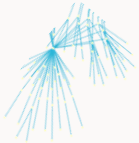
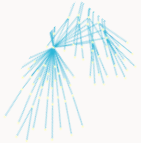
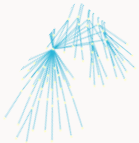
ODIN OUTAGE DATA INITIATIVE NATIONWIDE

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy
Alternative Fuels Data Center

United States Census Bureau

NOAA

Panoramic View of Anything for AI

	Employee AI Conversations	Utility Customer AI Conversations	Smarter bulk insights
	Data prepped by Data Exchange		
	More Intelligent Interactions with Gen AI		
 **Customer E2E** all data connected to a customer	*"Why is this customer's bill so high? What changed?"*	*"Why is my bill higher this month than it was before?"*	Calculate an overall sentiment for this customer
 **Grid Circuit E2E** all data connected to a grid circuit	*"Which customers on this grid circuit have smart thermostats?"*	*"Why am I experiencing an outage right now?"*	Propose options for circuit management based on customer attributes and risks
 **Asset E2E** all data connected to an asset	*"Propose a more optimal maintenance schedule for this asset based on history"*	n/a	Calculate asset risk based on all data and shifting conditions
 **Transformer E2E** all data connected to a transformer	*"Is this transformer at risk from rising EV adoption?"*	n/a	Calculate transformer load scores that factor in behavior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Open Discussion