Collaborating on Artificial Intelligence (AI)

Riding the Wave

Robert Austin
EPRI

16th China International Exhibition on Nuclear Power Industry
April 29, 2025

EPRI

Vision

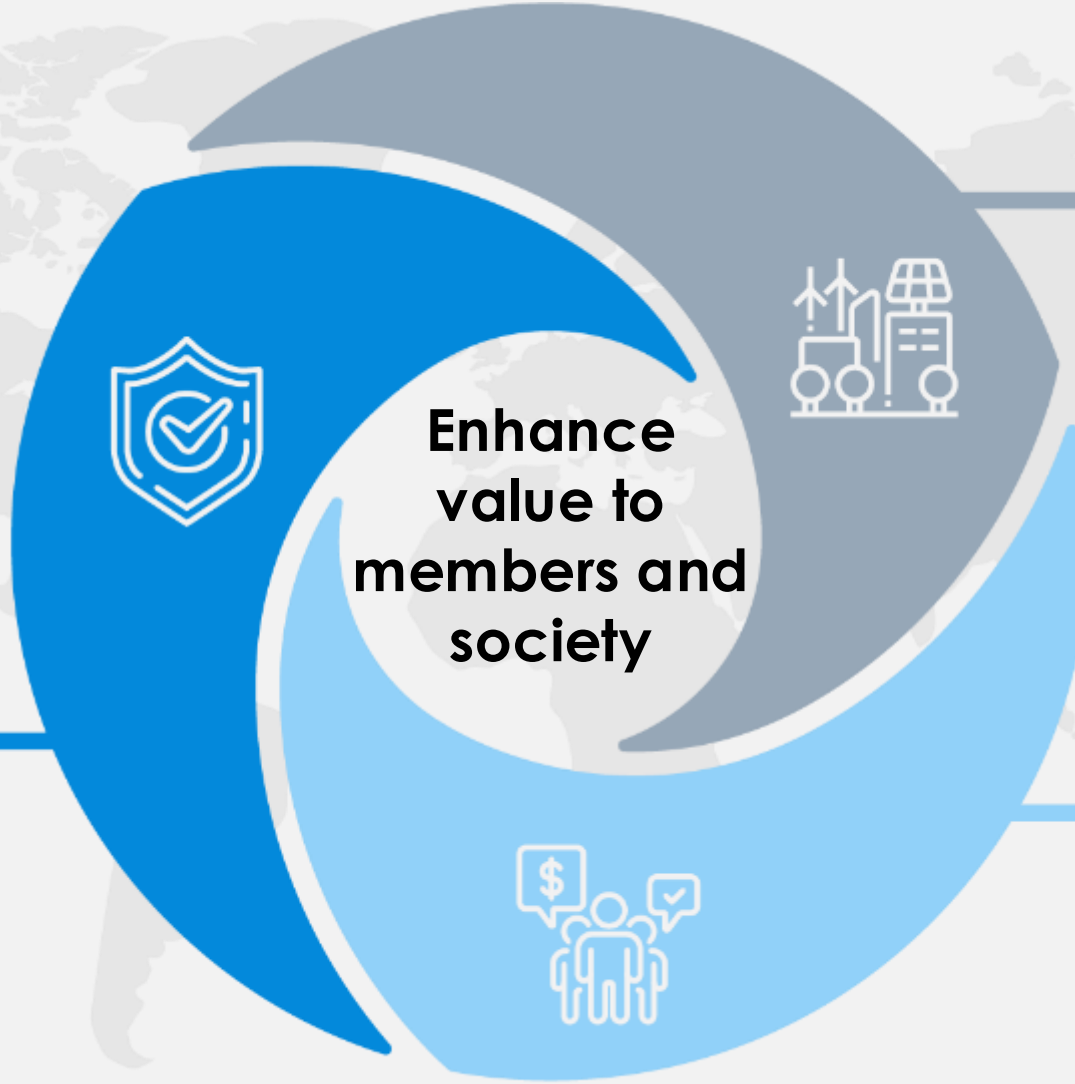
To be a world leader in advancing science and technology solutions for a clean energy future

Mission

Advancing safe, reliable, affordable, and clean energy for society through global collaboration, science and technology innovation, and applied research.

Together…Shaping the Future of Energy®

EPRI's Role



Guiding climate and grid strategy

Economy-wide modeling to optimize sustainability, reliability, and resiliency solutions

Pushing the technological frontier

Develop and evaluate solutions while engaging national labs, technical partners, and international stakeholders

A trusted source of information

Industry, lawmakers, policymakers, thought leaders, regulators, financial community

Overview

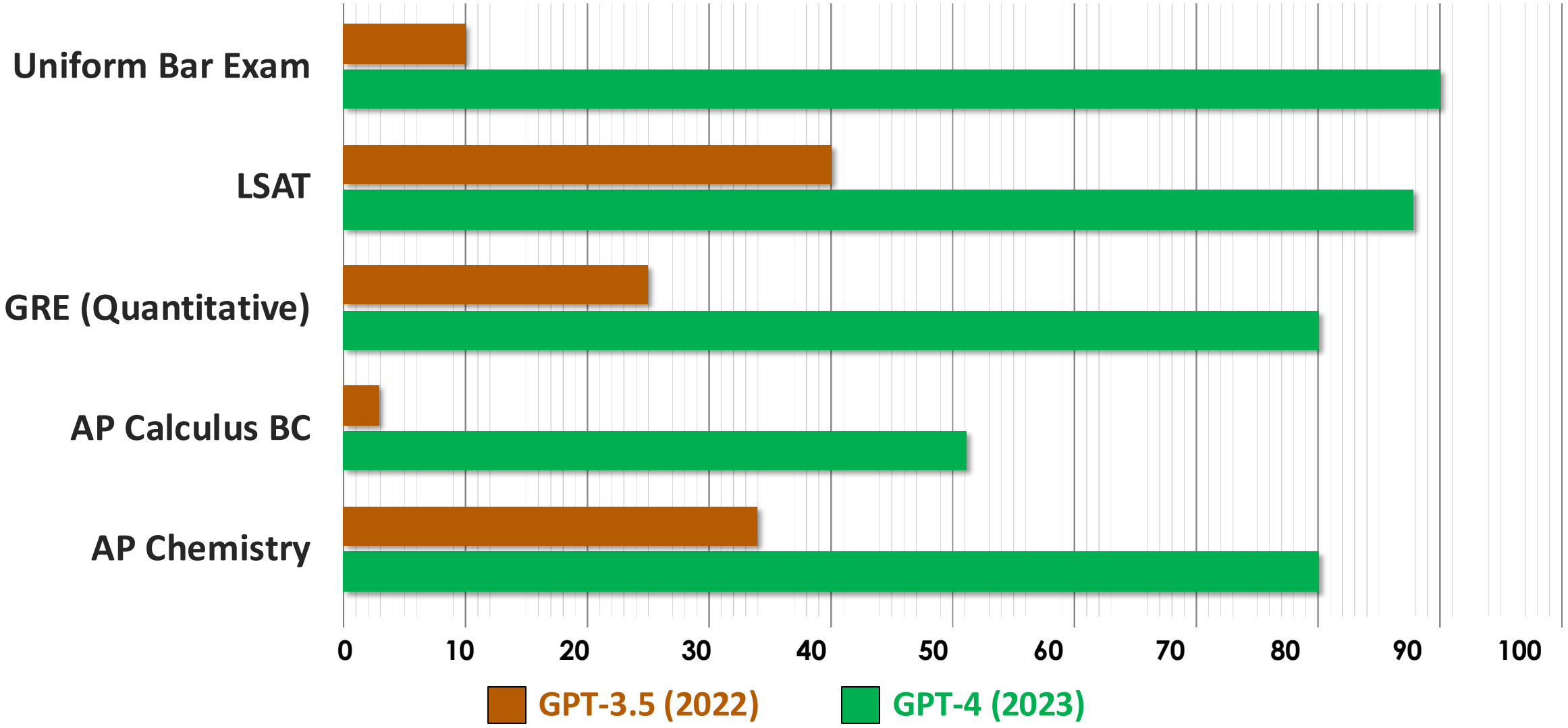
- AI is coming
- EPRI is there
- What now?

AI is coming – a pictorial representation

Image generated with MS Copilot

Performance Increases from Model Scaling

(percentile on common exams compared to human test-takers)



Getting ready to ride

AI is NOT new in nuclear

- "Early" AI
  - Advanced Pattern Recognition
  - Computer vision
  - Early language models

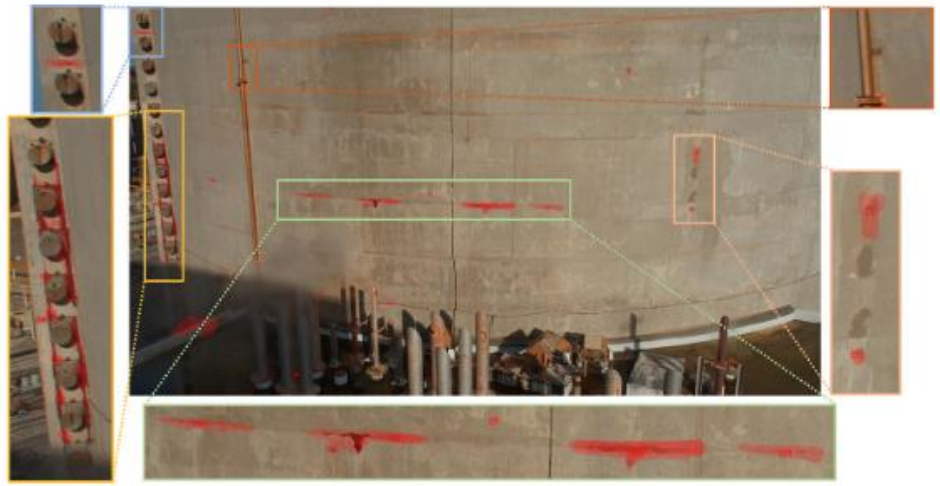
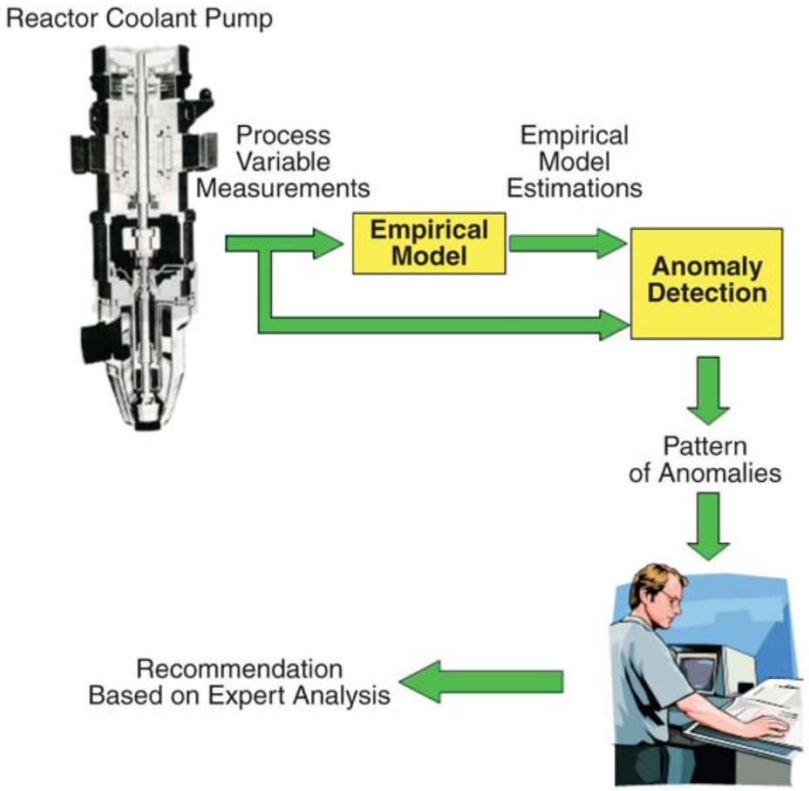


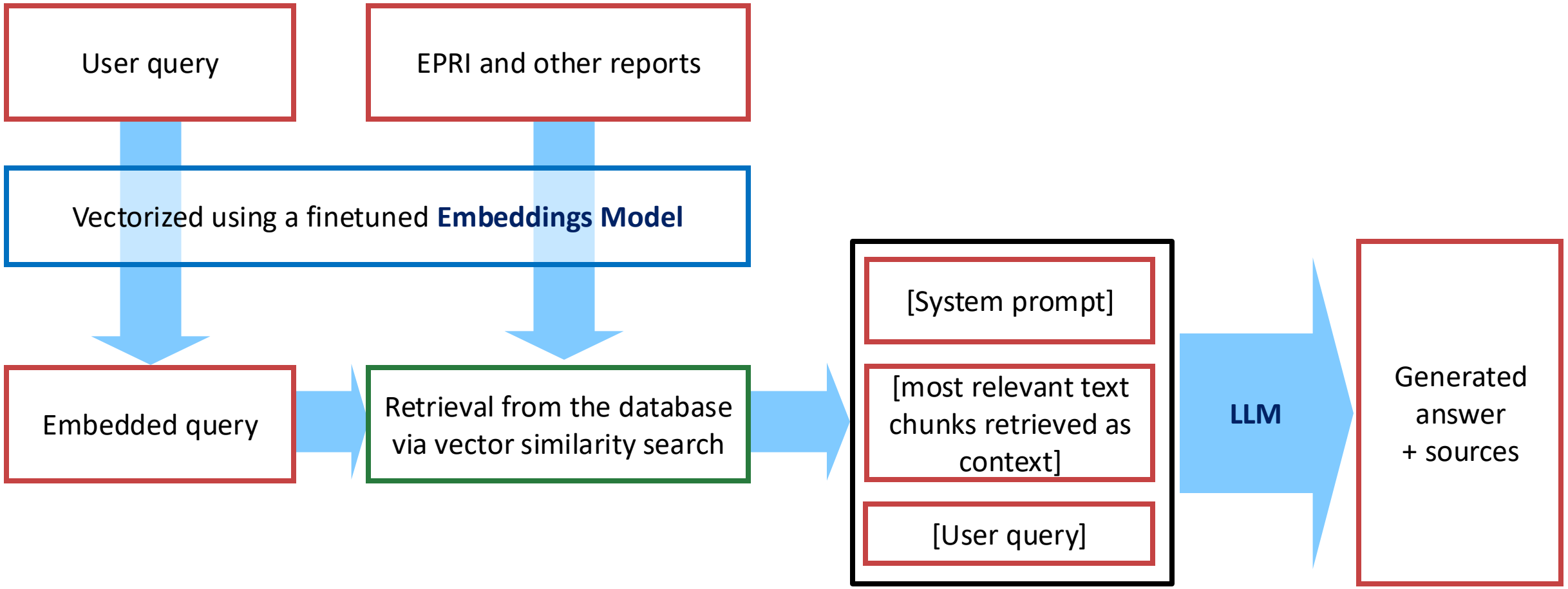
Figure 3 – Example of the Results of the Damage Detection Model. Details show: a crack detected between tendon caps (top left); grease stain detection around tendon caps (bottom left); crack and grease stain detections on the wall, with a miss-called efflorescence (bottom); a missed spall (top right); and corrosion detection (bottom right).



- Collaboration opportunities
  - AI/DX Summits (2021, 2022, Jan 2025)
  - Data-Driven Decision Making (3DM)

Learning how to ride the wave

Large Language Model
Retrieval Augmented Generation (RAG): Basics



How to ride the AI wave

- "Don't tell me what to do. Tell me how to do it." Matt Hall, Evergy
- How to develop a strategy, project selection, business cases:
  - Digital Transformation Roadmap
- How to execute, testing, metrics - see
  - Automating Corrective Action Programs in the Nuclear Industry (3002023821)
  - Good Practice Guide for Setting Up Large Language Model-Powered Projects (3002030935)
- Data sharing
  - "No one should have to have their own wildfires to collect wildfire data." Jason Glickman, PG&E, 2025 AI / DX Summit

What is needed?

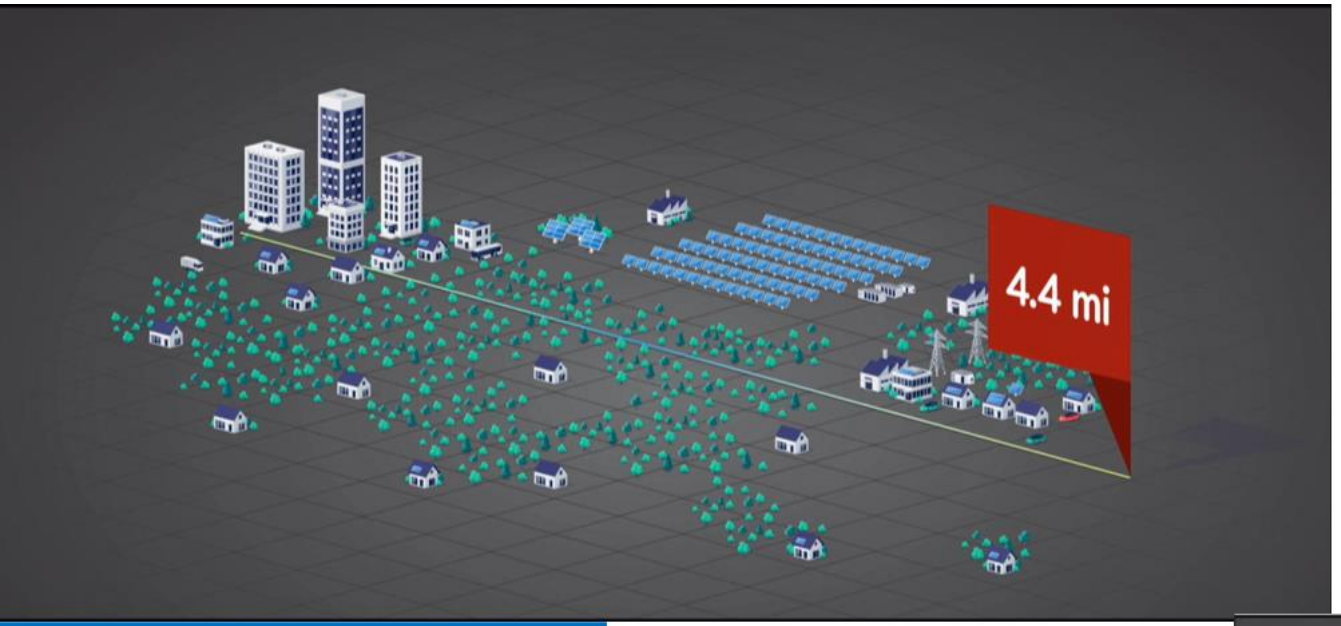
AI Assisted Inspections

UT Weld Inspections – Generate LOTS of Data for Inspectors to Review

Figure 2. *Straightforward implementation: (1) the UT data is copied to the locally-connected edge computing device, which (2) automatically detects and processes the files, (3) generating output file with flagged regions for the data analyst to review.*

From EPRI Report Number 3002029360

Value in Perspective: Faster, Focused Data Analysis



Without AI

Data for Review

~4.4 mi ~7.0 km

With AI

Data for Review

~460 ft ~140 m

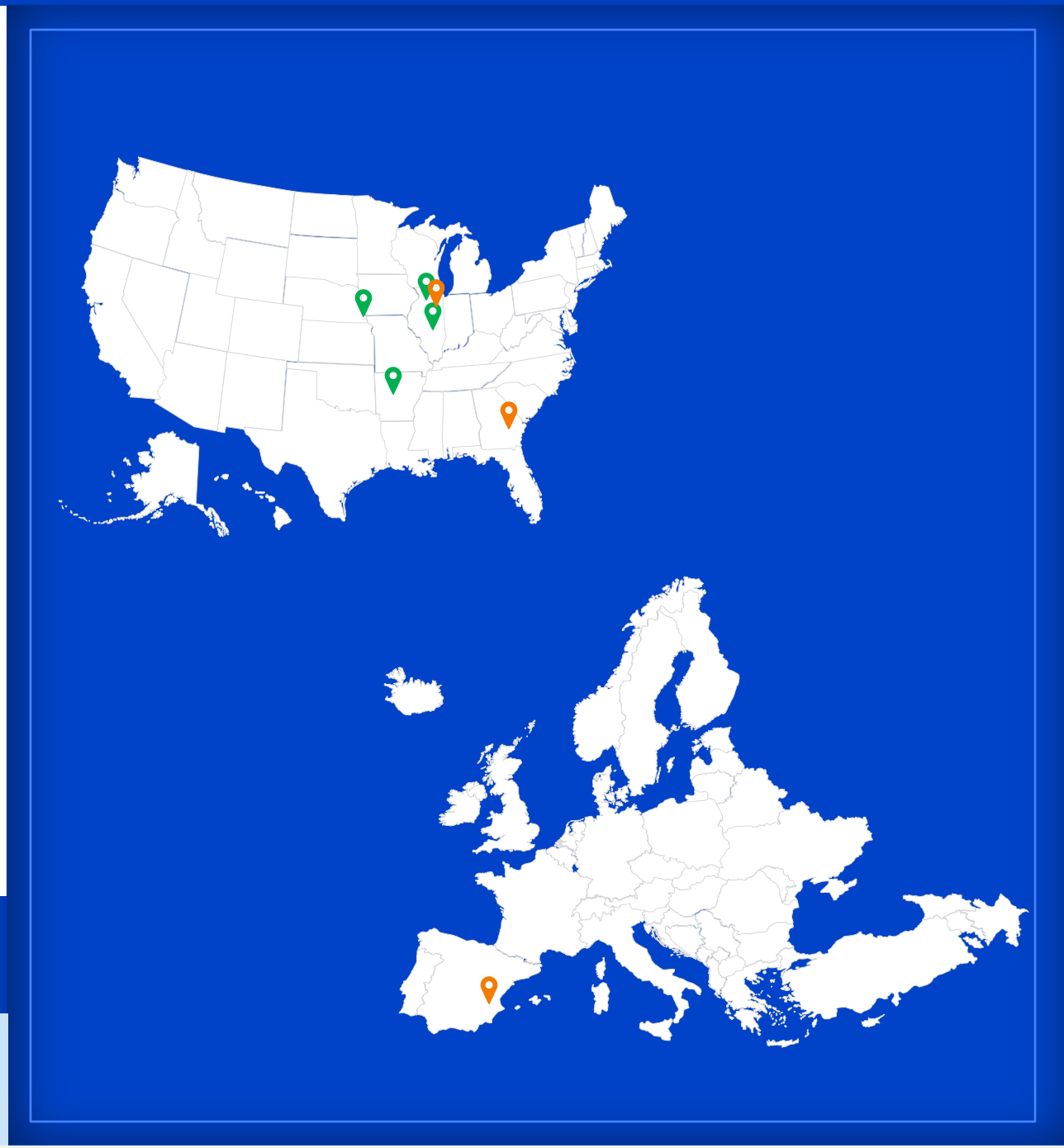
Watch the video

Read the success story

Field Trials

	Inspection	Timeframe
✓	RVUH UT	April 2022
✓	RVUH UT	April 2023
✓	DMW UT	September 2023
✓	IVVI	October 2024
🕐	Core Shroud UT IVVI	February 2025
🕐	DMW UT Core Shroud UT IVVI	September 2025

✓ Completed 🕐 Planned



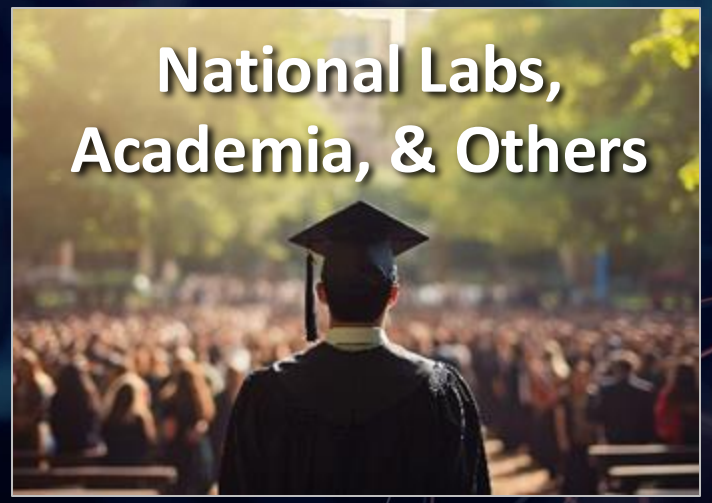
Amazing support from industry!

Field trials continue to be crucial to technology development

What's next?

Bringing Enduring Value to the Global Electric Sector

OPEN POWER AI CONSORTIUM



Technology Partners

NVIDIA

aws

Microsoft

Articul8

ORACLE

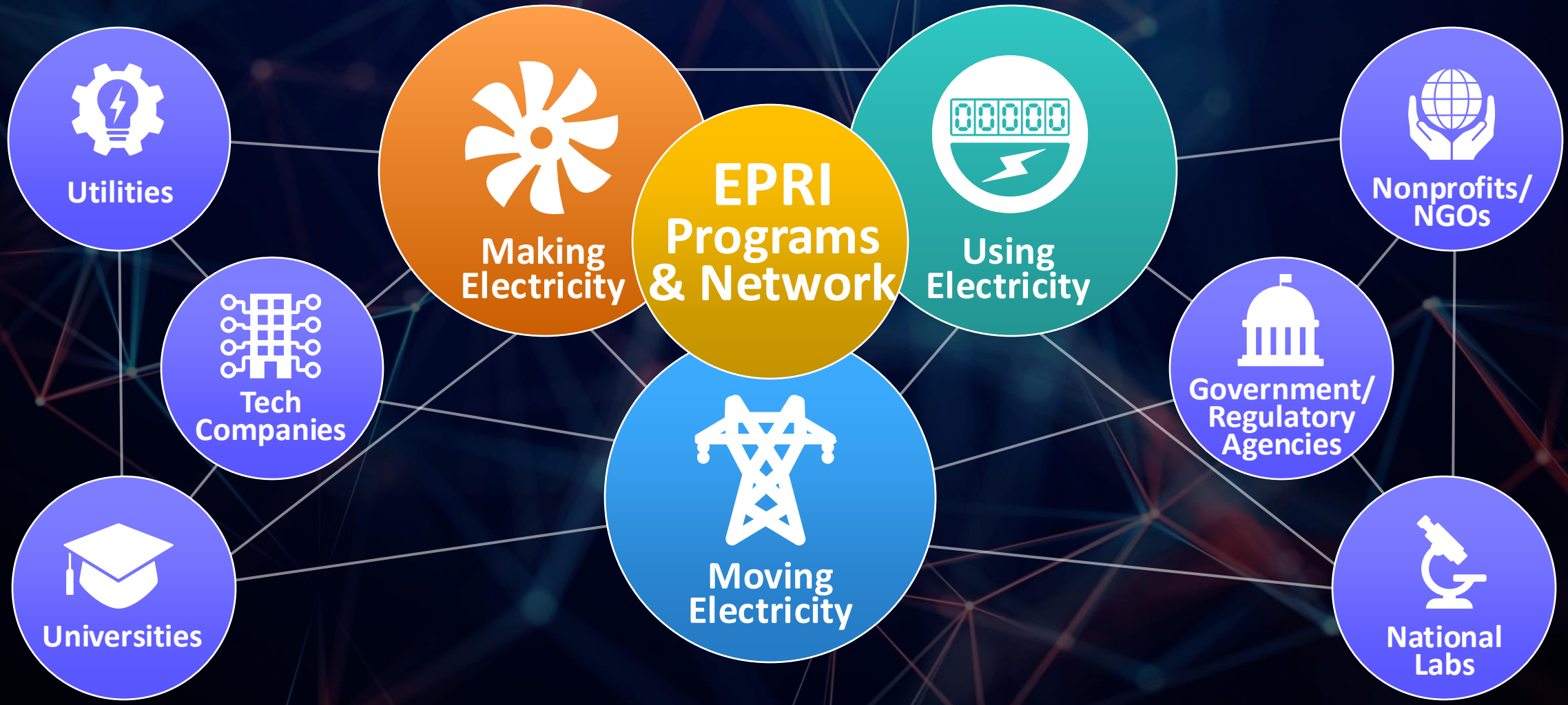
... and more

Three Key Pillars of Open Power AI

OPEN POWER AI CONSORTIUM

Images created with Copilot

Powering Global Collaboration and Innovation



How to Get Involved and Ride the Wave

Data-Driven Decision Making (3DM)	• Rob Austin raustin@epri.com • Christine Lee clee@epri.com
Open Power AI Consortium	• OpenPowerAI@epri.com • Share your priority use cases • Work with a global collaboration network
AI.EPRI	• Jeremy Renshaw jrenshaw@epri.com • https://msites.epri.com/spn/research/113080/ai.epri-supplemental

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