

# OPAI AI Use Case Work Stream – Survey Results

February 2026 Update  
Preliminary Results



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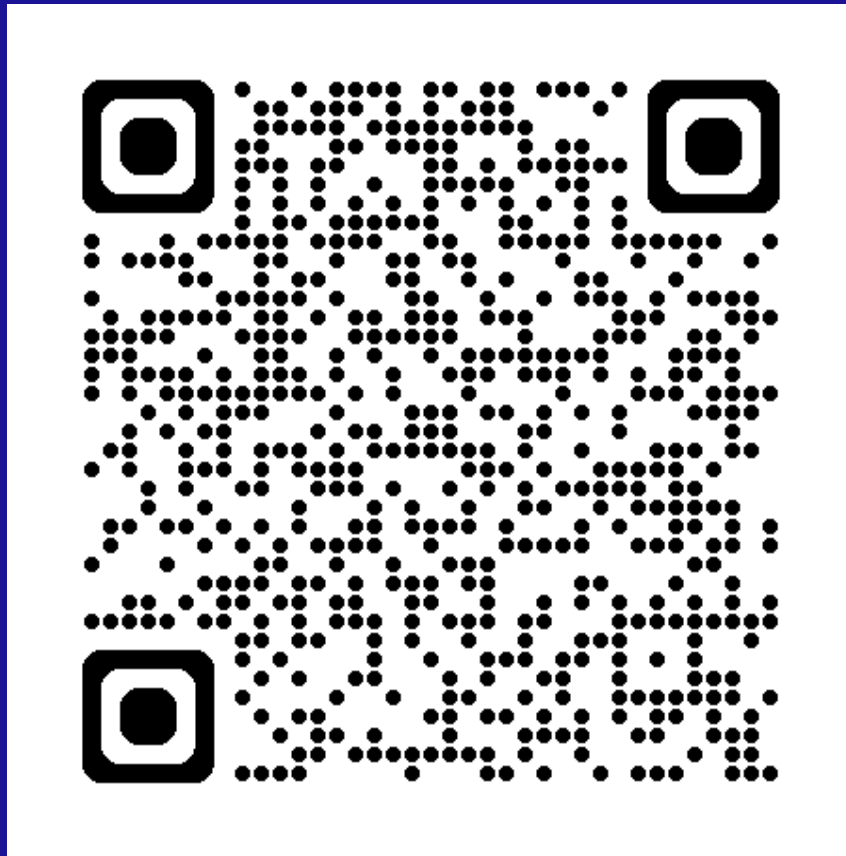
# OPAI Use Case Survey Links – Remains Open Indefinitely



Energy Utility Survey



Technology Provider Survey



Click or Scan



<https://www.surveymonkey.com/r/OPAI-Use-Cases-Utilities>

<https://www.surveymonkey.com/r/OPAI-Use-Cases-Tech-Providers>

# Use Case Survey By the Numbers – So Far!



Utilities

Technology Providers

54

*79+ Entities Submitted at  
Least 1 Response*

25

260

*Use Cases Evaluated by at  
Least 1 Person*

156

290

*347+ People Evaluated*

57

10986

*11393+ Data Entries (Evaluation,  
Maturity or Comment)*

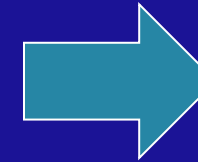
407

*Assuming ~20 Seconds Entry – Cumulative Total of ~63 hours of data entry  
Thank You!*

# Transforming Survey Data to OPAI Member Value

Use Case  
Assessment  
Criteria  
Prioritization

- Top 5-10 Reliability and Resilience
- Easiest to implement
- Least risky...etc
- Company confidential benchmarks relative to industry



Utility and  
Industry Demo  
Spotlights

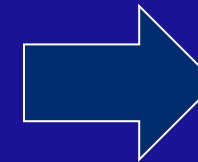
- Reference and spotlight utility or technology use case implementations

Use Case  
Functional  
Prioritisation

- Top 5 10 Asset Management
- Top 5-10 Operations
- Top 5-10 Markets, Nuclear....etc

Use Case to  
Technology  
Matching

- Map high priority use cases to medium to high technology solution maturity

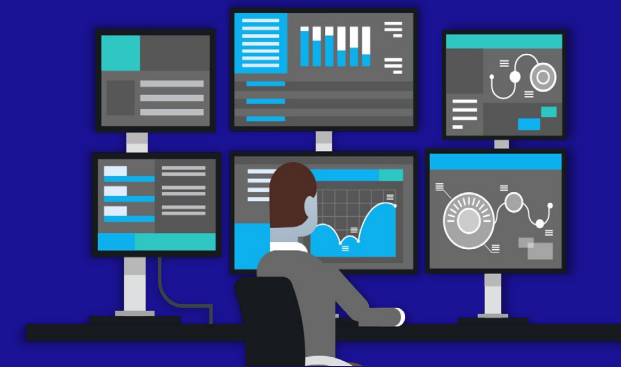


Use Case Co-  
Development

- OPAI will bring forward the highest priority use cases for co-development
- Potential data availability identified in survey, utilities with highest need may provide

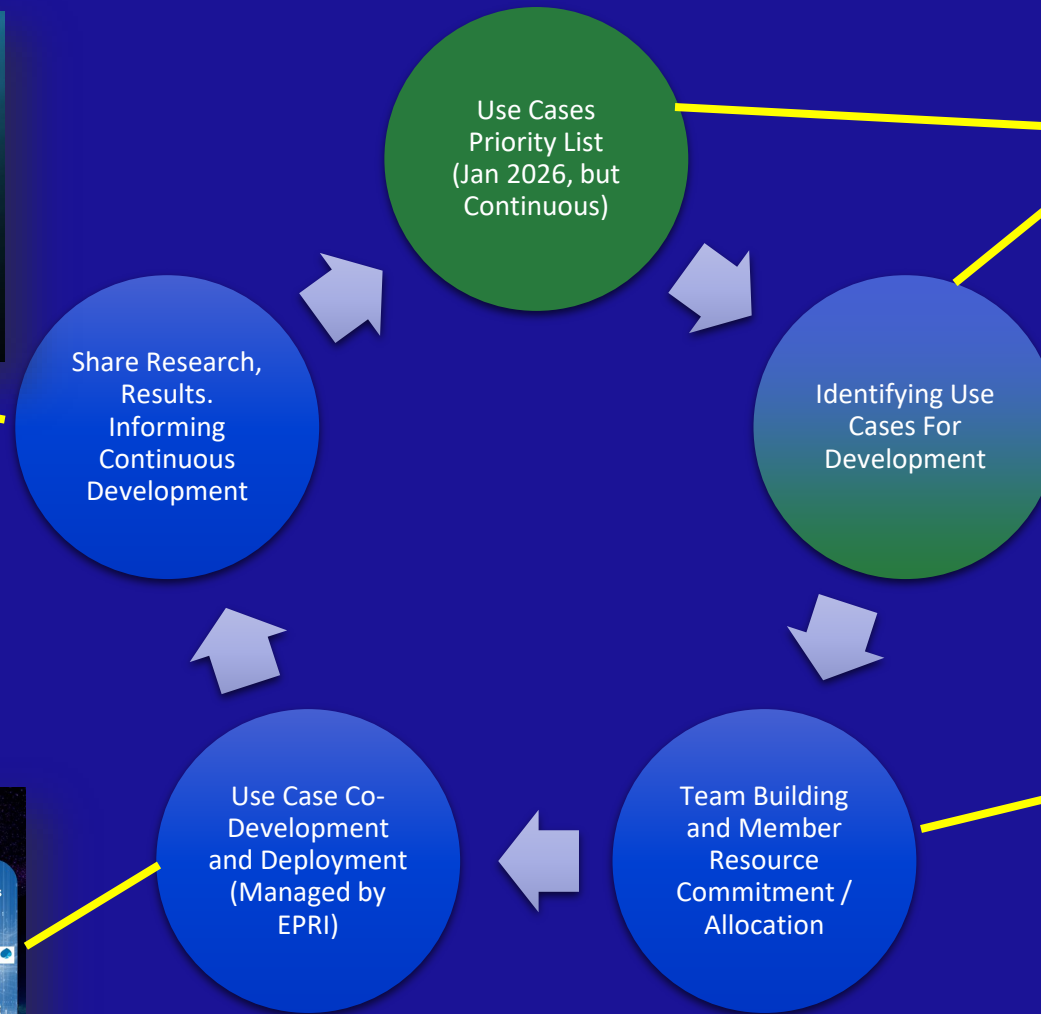
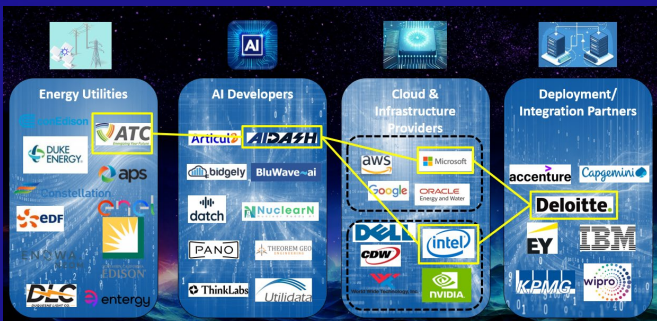


Published soon on  
<https://openpowerai.org/>



Use Case Co-Development

# Proposed Use Case Solution Development Process



#### 4. Grid and Asset High-Speed Recording Data Insights

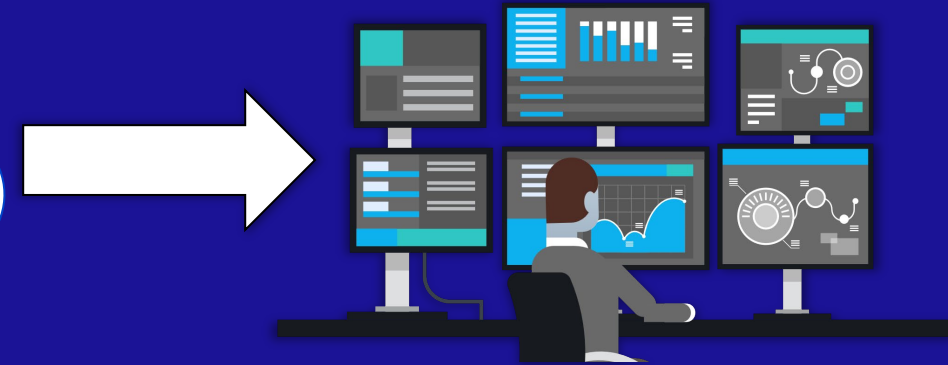
High-frequency data from Digital Fault Recorders (DFRs) and transient recorders is analyzed using deep learning to detect sub-cycle events and transient disturbances as well as power quality. AI models can automatically classify fault types, identify affected components, and reconstruct event timelines. Pattern recognition and clustering models identify recurring issues and affected network areas. Insights support root cause analysis and corrective actions. This helps utilities maintain compliance with power quality standards and improve customer satisfaction. These insights support root cause analysis and post-event reporting. Integration with asset condition monitoring enhances predictive maintenance strategies.



	Energy Utility	Technology Provider
Use Case Scoping Support (e.g. Persona Development)	<input type="checkbox"/>	<input type="checkbox"/>
Engineering Oversight and Guidance	<input type="checkbox"/>	<input type="checkbox"/>
Engineering Development Resources (software development, data collation)	<input type="checkbox"/>	<input type="checkbox"/>
Data Visualization User Interaction Design and Guidance	<input type="checkbox"/>	<input type="checkbox"/>
Data - Structured - Models or Streaming Data (Could be Real or Capable of Being Synthesized)	<input type="checkbox"/>	<input type="checkbox"/>
Data - Unstructured - Images, Documents, Videos, Sound	<input type="checkbox"/>	<input type="checkbox"/>
Hardware or Physical	<input type="checkbox"/>	<input type="checkbox"/>

# What Does This Look Like for a Typical Use Case?

## Use Case Priority #2 Grid and Asset High-Speed Recording Data Insights

High-frequency data from Digital Fault Recorders (DFRs) and transient recorders is analyzed using deep learning to detect sub-cycle events and transient disturbances as well as power quality. AI models can automatically classify fault types, identify affected components, and reconstruct event timelines. Pattern recognition and clustering models identify recurring issues and affected network areas. Insights support root cause analysis and corrective actions. This helps utilities maintain compliance with power quality standards and improve customer satisfaction. These insights support root cause analysis and post-event reporting. Integration with asset condition monitoring enhances predictive maintenance strategies.



Development Phase	 Energy Utility Contributions	 Technology Provider Contribution
Requirements Discovery & Prototyping	Define the problem, scope, personas, define data, define end state.	Defining architecture, app requirements, building blocks available.
Environment Setup & Data Engineering	Data provision, synthesization, quality checking	Compute resource design and allocation
Core Development & Model Integration	Oversight on product direction, features	App and AI model development, CI/CD pipelines
QA, Security, and UAT	User testing and feedback, integration oversight and design (IT/OT teams)	Test harness development, cyber security, AI model validation
Deployment & Operational Monitoring	Demo of application, sandboxing, feedback on prototype	Deploy and troubleshoot prototype application

# What is the Ask of OPAI Members

## Energy Utilities

- Review the top use case lists based on your asset and functional responsibilities
- Cross reference with your company specific results.
- Huddle internally to determine which use cases you would be interested in contributing to.
- Is there data available that can be brought to OPAI either real or synthetic to co-develop.

## Technology Providers

- Review the high priority use cases with reference to your technology.
- How mature is the technology ? Can it be used as part of a co-development effort.
- What resources can you bring to the co-development effort?

# Next Steps

## MRC

- Meeting MRC next week to discuss results so far and the preferred approach.

## Direct Feedback to EPRI ([akelly@epri.com](mailto:akelly@epri.com))

- Start with this approach
- Relies on email management etc?

## Another Survey

- Preferred approach for EPRI but survey overhead for users.
- Can clearly link to direct response from person or company
- Can link to existing survey data use cases.

# Example Survey Format

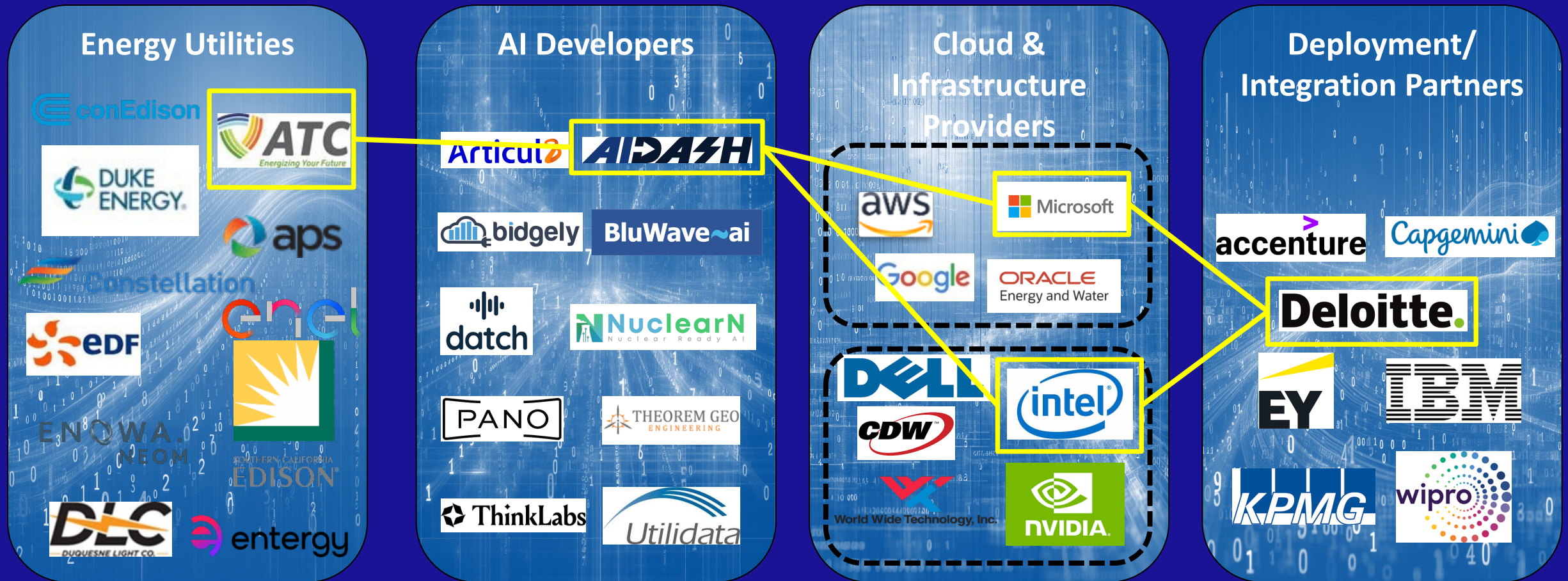
## 3. Grid and Asset High-Speed Recording Data Insights

High-frequency data from Digital Fault Recorders (DFRs) and transient recorders is analyzed using deep learning to detect sub-cycle events and transient disturbances as well as power quality. AI models can automatically classify fault types, identify affected components, and reconstruct event timelines. Pattern recognition and clustering models identify recurring issues and affected network areas. Insights support root cause analysis and corrective actions. This helps utilities maintain compliance with power quality standards and improve customer satisfaction. These insights support root cause analysis and post-event reporting. Integration with asset condition monitoring enhances predictive maintenance strategies.

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Data - Unstructured - Images, Documents, Videos, Sound	<input type="checkbox"/>	<input type="checkbox"/>
Hardware or Physical Energy System Assets (In a lab or in service)	<input type="checkbox"/>	<input type="checkbox"/>

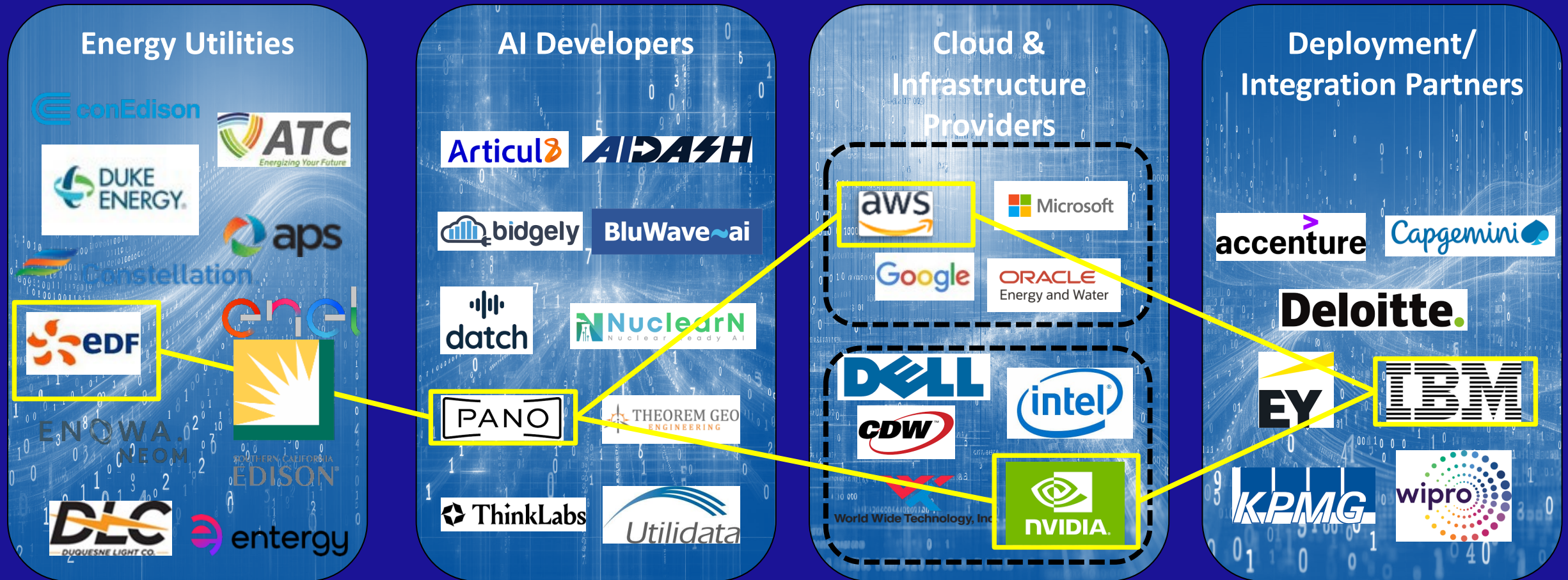
# Co-Developing and Deploying AI Solutions with Partners

Priority Use Case #1: Interested OPAI Members commit to developing, piloting, and (potentially) deploying solutions (hypothetical example for Use Case #1)



# Co-Developing and Deploying AI Solutions with Partners

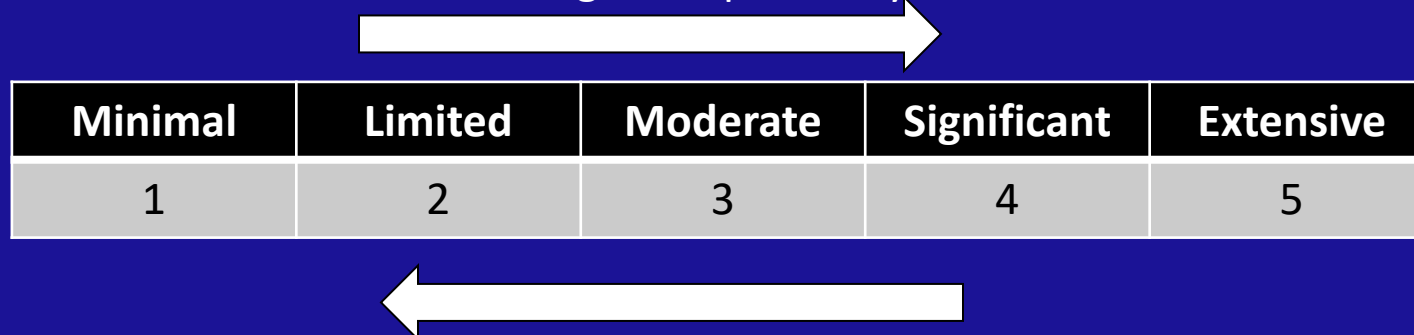
Priority Use Case #2: Interested OPAI Members commit to developing, piloting, and (potentially) deploying solutions (hypothetical example for Use Case #2)



# Methodology for the Utility Evaluation Survey

- Only utilities who were distinguishable by their name and who added at least one data entry were included
- Each use case was evaluated by OPAI members, according to the use case name, and description for how a data / AI based solution solution might work. The evaluation was parameterized 1-5.

Impact scores for: reliability, resiliency, security, safety, and cost + Data availability were graded positively 1-5



Minimal	Limited	Moderate	Significant	Extensive
1	2	3	4	5

Scores for Implementation Complexity and Risk of Mis Operation Were Graded Negatively from 5-1

- Only use cases with at least 5 response were considered - to eliminate small sample size bias, and to measure interest in the topic
- The average score was collated for each use case evaluation and the averages of the scores was calculated
- Example: If a use case was graded as Significant (4/5) for impacts and data availability + Limited (2/5) on implementation complexity and risk of misoperation.
  - $(4+4+4+4+2+2) / 6 = 4$  out of 5
- If 5 different respondents graded the same use cases as: 4, 3, 4, 2, 2 - then the use case score is the average:  $15/5 = 3$

# Methodology – Technology Providers

## Utilities

- Only technology providers who were distinguishable by their name and who added at least one data entry were included
- Each use case was evaluated by OPAI members, according to the use case name, and description for how a data / AI based solution might be addressed by an existing technology solution.

*Technology Providers were asked to grade their technology based on TRL 1-9 for the same use cases*

TRL	TRL	TRL	TRL	TRL	TRL	TRL	TRL	TRL
1	2	3	4	5	6	7	8	9

- Use Cases technology solution maturity were averaged – but it's a small sample size for most use cases.



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