Digitizing Utilities Prize Informational Webinar

Alec Schulberg
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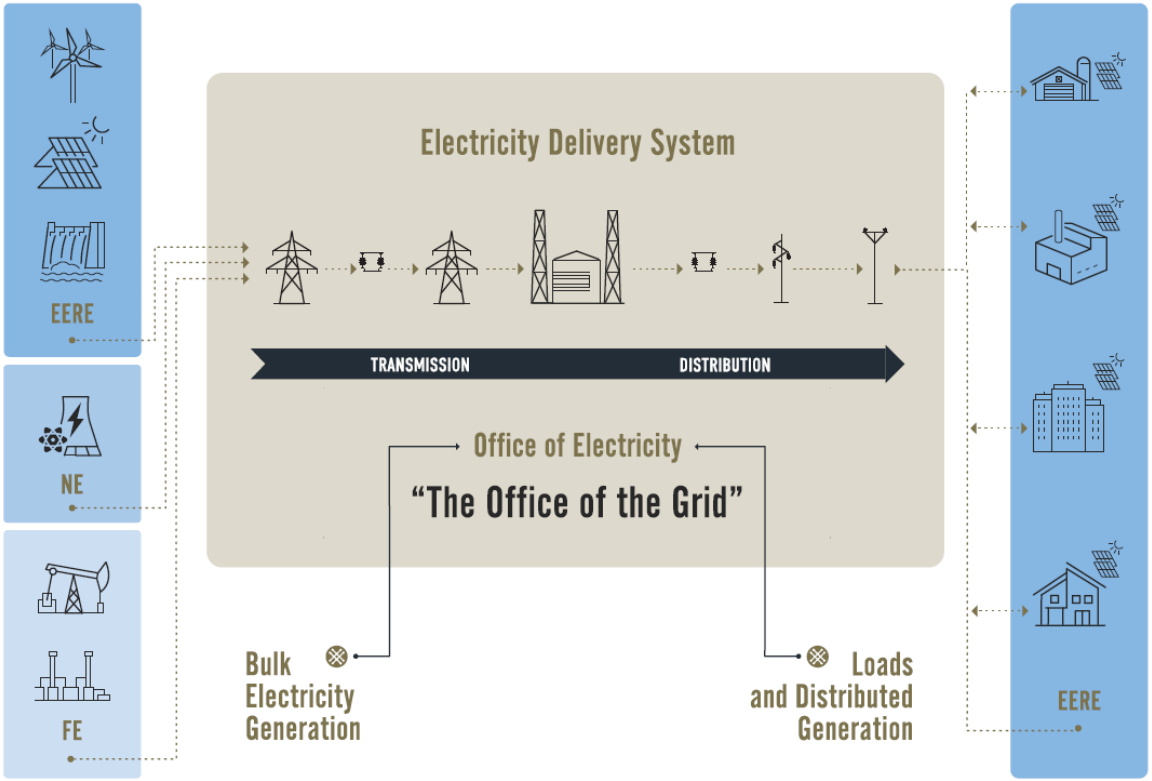
U.S. DEPARTMENT OF ENERGY

Topics

1. Office of Electricity Introduction
2. Digitizing Utilities Overview
3. Eligibility
4. Important Dates and Events
5. Submitting to the Prize
6. Get Support for Your Submission
7. Questions

The Office of Electricity



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Transmission Reliability and Renewable Integration (TRRI)

Program Areas	Goal
Advanced Applications Research and Development	Improve transmission system visibility and controllability to ensure reliability and resilience given new operational challenges.
Decision Support Systems for Transmission Operations	Build sector capability to develop effective visualizations, and to provide more useful alarms and cues for grid operation, planning, and workforce development.
Reliability Metrics, Standards, and Emerging Issues	Develop new ways of measuring and characterizing the power system to ensure high quality, accurate data for model and tool development.

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Sensors and Data Analytics (SDA)

Program Areas	Goal
 Enhanced Distribution System Resilience and Control	Utilizing sensors to improve distribution system visibility and controllability to address new operational challenges
 Data Integration and Event Detection	Data analytics for proactive resilience with high frequency data, ML/AI. Creating research data sets to develop applications.
 Sensor Valuation, Validation and Standards	Improve system sensing through better sensor placement and improved data acquisition, consistency and validity

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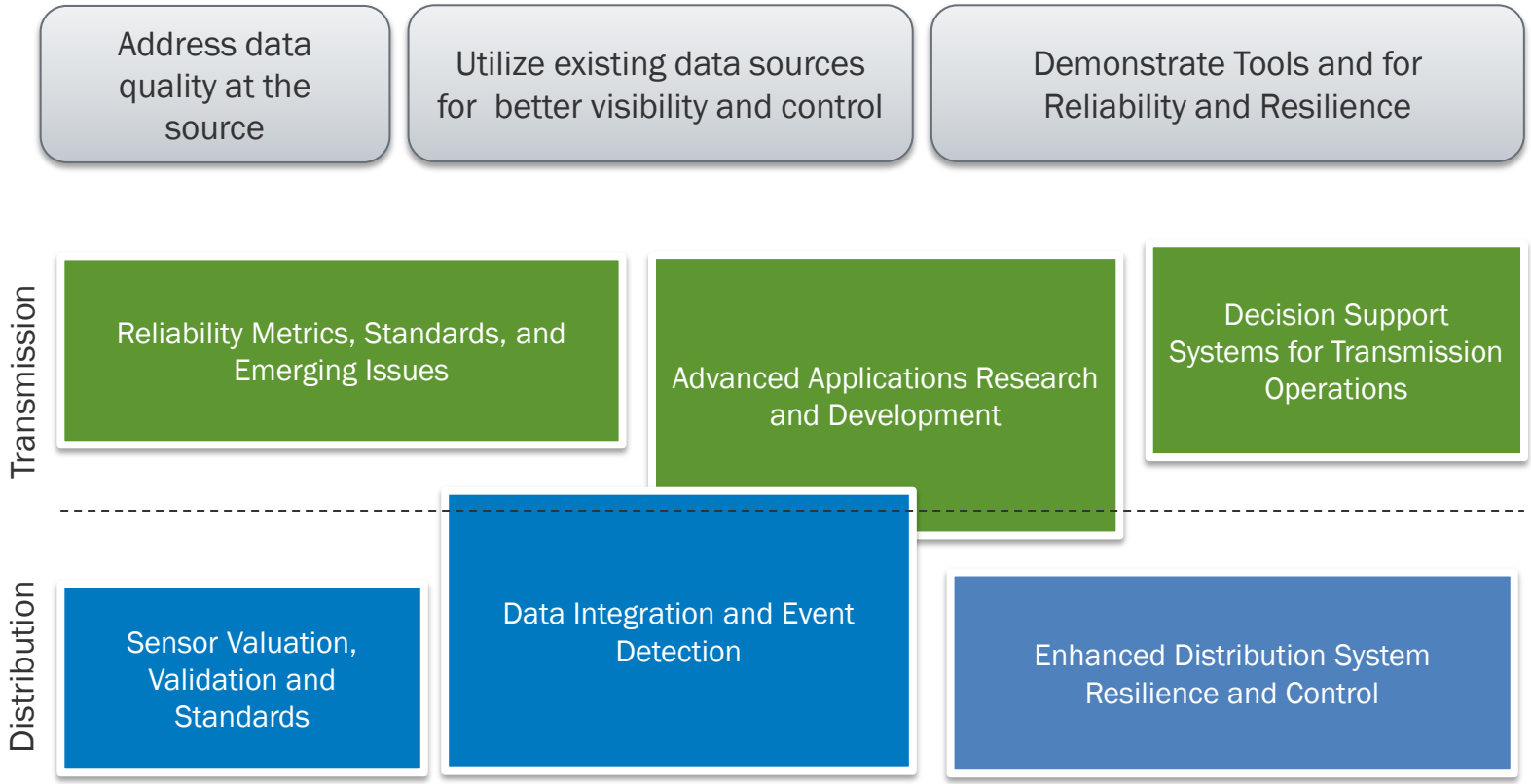
TRRI and SDA



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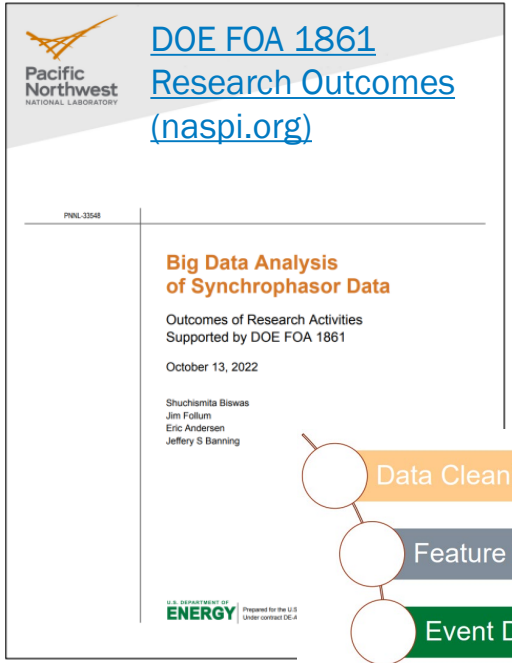
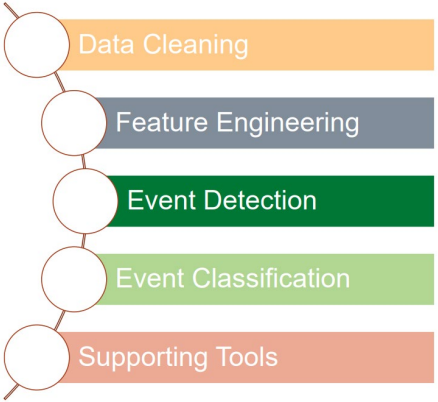
Data Analysis in Power Systems

- Multiple steps required to get value of data from the power system
- It can be difficult for developers to obtain real data for research due to confidentiality
- Demonstrated value of data at utilities for business practices is required for cost recovery on data analysis investment





https://www.energy.gov/oe/big-data-synchrophasor-analysis

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Digitizing Utilities Prize Overview

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The American-Made program is your **fast track to the clean energy revolution**. Funded by the U.S. Department of Energy, we incentivize innovation through prizes, training, teaming, and mentoring, connecting the nation's entrepreneurs and innovators to America's national labs and the private sector.

supercharge

A REVOLUTION OF **BOLD IDEAS**

Fast track your ideas for the clean energy revolution

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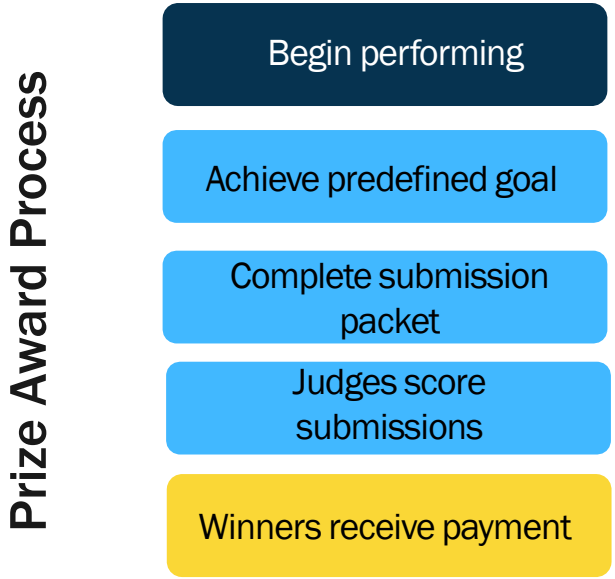
$100M
in cash prizes and support

30+
prizes

300
Network members

Grants vs. Prizes



Digitizing Utilities Prize

- Connect utilities with interdisciplinary teams of software developers and data experts to facilitate transforming digital systems in the energy sector and data analytics for utilities.

Submission Deadline: January 26, 2023

Prize Structure

Phase 1: **Plan**

Form teams and propose a solution for one of the utility issues presented.

Up to nine winners of Phase 1 will receive a cash prize of **$75,000.**

Phase 2: **Progress**

Develop your proposed solution and demonstrate how this method and process could be utilized by other utilities in the future.

Up to four winners of Phase 2 will receive a portion of the **$425,000** total cash prize pool.

Prize Tracks

Track1 – Load Modeling

Competitors will use load modeling to help correctly forecast future power demands, specifically addressing the dynamic nature of weather-sensitive loads for residential and commercial buildings.

Track 2 – Data Analysis Automation

Competitors will propose methods for automation of data analysis to help engineers scrutinize and evaluate a data-driven approach to resolving nuanced complexities across the system.

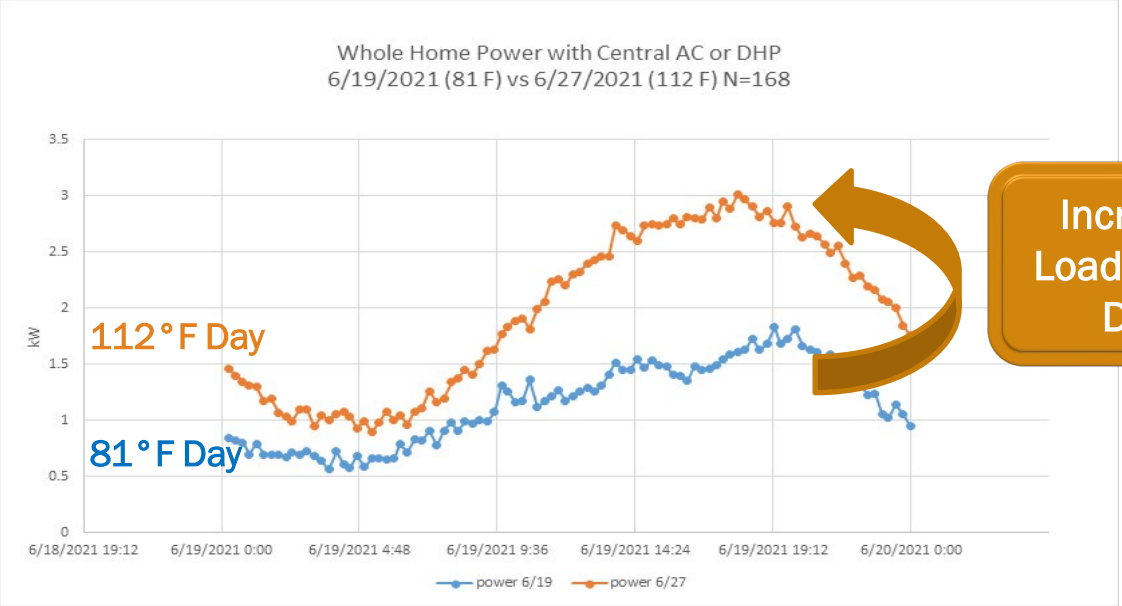
Track 3 – Competitor-Identified Challenge

Teams with an existing utility partner may apply with their own digitization or data challenge and proposed solution. Eligible topics are outlined in the official prize rules.

Track 1 – Load Modeling

- Four primary tasks under BPA track
  - Temperature sensitivity of loads
  - Estimating electrification from measurement data
  - Impact of future electrification
  - Projection for regional-specific results
- Partnership with Clark PUD in Vancouver, WA

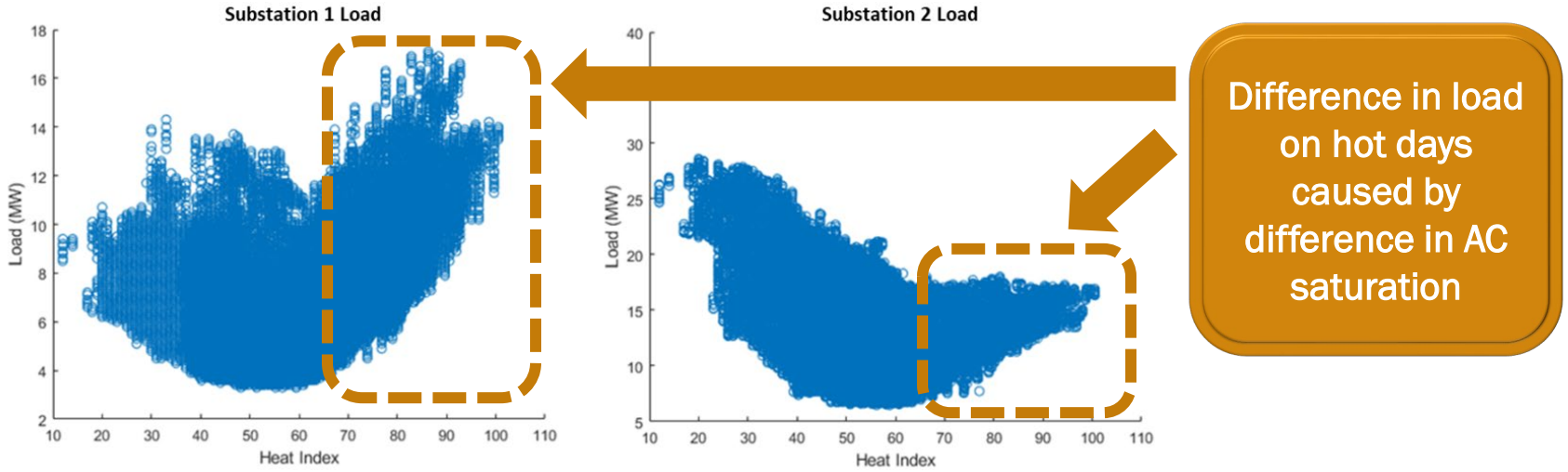
Task 1: Weather Sensitivity



Increased Residential Load Primarily Due to AC During Heatwave

- Perform weather sensitivity analysis and develop models correlating weather conditions and end use loads

Task 2: Electrification Estimation

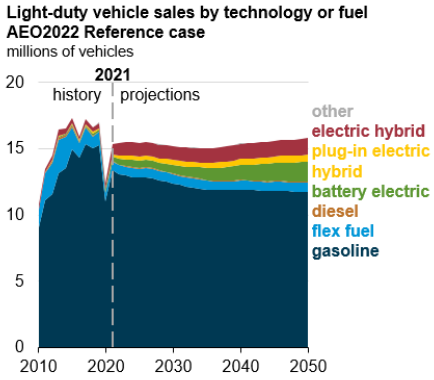


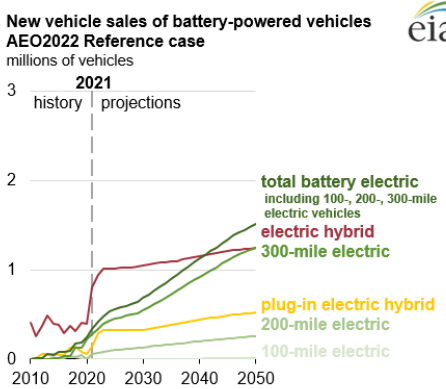
- Use historical measurement data to estimate electrification (% AC, % heating, etc.) at unique substations/feeders

Task 3: Impact of Future Electrification

- Increase in electric vehicles, heat pumps, etc.
- Changes in building codes, retrofitting
- Incentive programs at state and federal level

- Generate *realistic* electrification scenarios and address the impact on future demand





Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case

Task 4: Regional Projection

- Regional variability in weather sensitivity, electrification, incentive programs
  - Extreme hot/cold climate zones
  - Natural gas vs. electric saturation
  - State by state future electrification efforts
- Address impact of regional variability on end use load shapes, weather sensitivity models, and electrification estimates

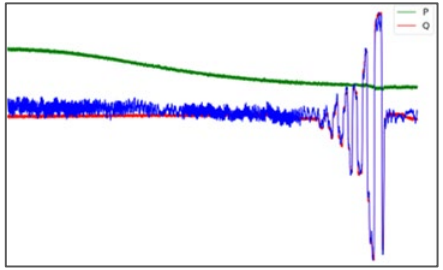
Track 2 – Data Analysis Automation

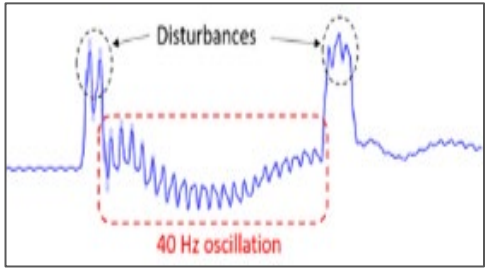
- **Dominion Energy**
- Competitors will:
  - Propose methods for automation of data analysis.
  - Capitalize and innovate on growing data resources and provide a clear roadmap to help meet a vision of maintaining reliability and resiliency as part of the evolving system.

What We Are Looking For

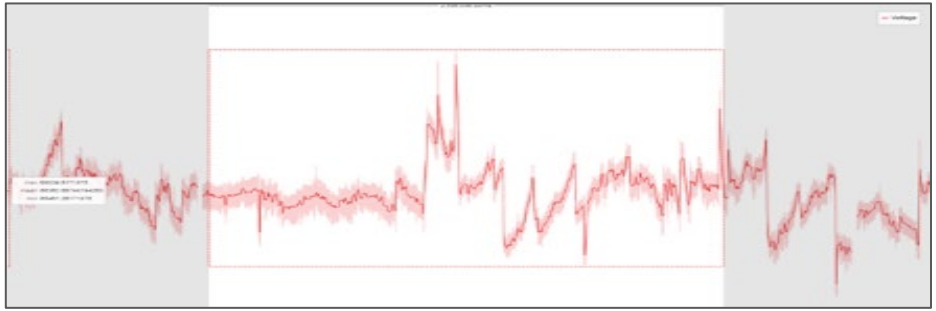
- All data is not created equal. Looking for people that are excited about the unique opportunities for high-resolution & ultra-high-resolution sensor data from the grid.
- Not looking for a “hero.” Looking for collaborators!
- Looking for highly motivated teams/individuals that are able to quickly self-educate.
- Not looking for fancy/exotic solutions. Looking for practical, scalable approaches.
- Not looking for black-box machine learning approaches. Looking for domain knowledge coupled with interdisciplinary skills like Physics, Signal Processing, Control Theory, Statistics, Time-Series Data Analysis, etc. that require physical intuition of complex systems.
- Not looking for custom architectures or cloud infrastructure solutions. We have our own platform that you’ll work in with everything that you’ll need.

A Paradigm Shift in Studying Grid Dynamics

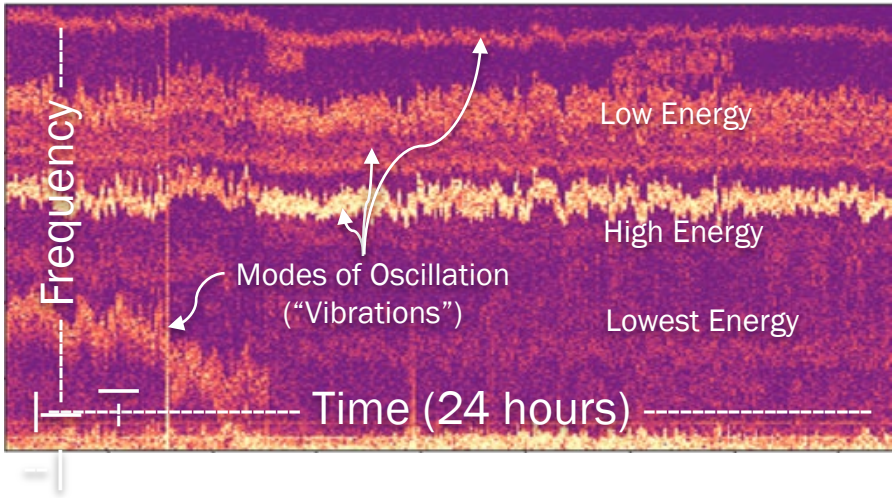




Events are great, but rare…



“Ambient” data is rich and underrated!



Track 3 – Competitor-Identified Challenge

- Teams with an existing utility partner apply with their own digitization or data challenge and propose their plan for solving it.
- Competitors will propose challenges and solutions must have an implementation path within the utility they are working with.

Eligibility

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Who Can Compete?

Target Audience:

- Software developers
- Automation Engineers
- Data scientists

Eligible Teams:

- Private entities (for-profits and nonprofits)
- Non-Federal government entities such as states, counties, tribes, and municipalities, academic institutions, and individuals

Eligibility Requirements

Individuals, teams of individuals, private entities (for-profits and nonprofits), and nonfederal government entities (such as states, counties, tribes, municipalities, and academic institutions) are eligible to compete in this prize.

- Employees of the Track 1 and Track 2 utility partners are not eligible to apply.
- Private entities must be incorporated in and maintain a primary place of business in the United States with majority domestic ownership and control.
- Academic institutions must be based in the United States.
- An individual prize competitor or group of competitors who are not competing as part of an incorporated private entity must all be United States citizens or legal permanent residents.
- Individuals competing as part of an incorporated private entity may participate if they are legally allowed to work in the United States.

Refer to the official rules for the complete eligibility requirements.

Important Dates & Events

Important Dates

Now!

- Follow the Digitizing Utilities Prize on HeroX and start working

January 26, 2023, 5 p.m. ET

- Deadline to submit an entry to the Digitizing Utilities Prize

Submitting to the Digitizing Utilities Prize

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Read the Rules

Official Rules for the American-Made Digitizing Utilities Prize are available online

https://americanmadechallenges.org/challenges/digitizingutilities/docs/digitizing-utilities-official-prize-rules.pdf

What to Submit

1. 90-second video (public)
2. Cover page content
3. Narrative that answers three questions about the team, solution, implementation plan (not to exceed 2,500 words)
4. One summary PowerPoint slide (public)
5. Letters of commitment or support (optional).

Online Public Video

- **Suggested content**
  - Describe your team and how it is uniquely qualified to solve the selected utility's problems.
  - Describe your proposed solution and why it is the best approach to the utility's problem.
- **Judges will consider these criteria**
  - While there are no specific scoring criteria for the video, it will be evaluated as part of the entire submission package. The video serves as a first introduction of your team and solution to the reviewers

TIPS and TRICKS

- This is your first impression
- Be creative and focus on content
- Watch previous winners' videos
- Get feedback before you post online

Three Questions

1. TEAM

Describe your team's past experience providing solutions for this or related problems

2. SOLUTION

What is your solution to the problem?

Word Limit: 2,500 words
Up to 5 images, graphs, or figures

3. IMPLEMENTATION PLAN

Question 3: How will you measure the success of your approach?

TIPS and TRICKS

- Remember your audience
- Be specific (this portion isn't public)
- Pay attention to the word count

Narrative Content & Review

Question 1: Team – Describe your team's past experience providing solutions for this or related problems.

Suggested Content Competitor Provides

- Describe your team, the organizations that comprise your team, and the backgrounds and expertise of your team members.
- Describe the unique past experience or combination of capabilities that your team brings to the table.
- Describe the relevant algorithms, software models, or concepts that your team has developed and can leverage for this prize.
- Demonstrate that your team understands (for tracks 1-2) or describe (for track 3) the utility partner's problem, its broader context, and its negative impact on the utility.
- Describe if and how your approach could be applied to other utilities facing a similar problem.

A single score on a scale of 1-6 is provided, taking the following statements into consideration

- The competitor has the relevant skills and expertise to solve the proposed problem.
- The team has access to relevant resources that can be leveraged for this prize.
- The team demonstrates a thorough understanding of the utility's problem, its broader context, and the importance of solving this problem.
- The team has sufficient interdisciplinary expertise to develop and integrate digital infrastructure and data analytics tools effectivity.

Narrative Content & Review

Question 2: Solution – What is your solution to the problem?

Suggested Content Competitor Provides

- Describe your solution to the problem and why you chose this method.
- Describe the specific benefits your solution will provide to the utility.
- Describe how the benefits can be quantified and measured following deployment.
- Describe how this work expands on your team's prior experience and capabilities.
- Describe what other solutions you considered and why you chose not to implement them.
- Describe the benefits of your approach over alternatives that a utility might consider.

A single score on a scale of 1-6 is provided, taking the following statements into consideration

- The proposed solution is clear and directly addresses the utility's problem.
- The team has identified appropriate metrics for success.
- The team's past experience and capabilities indicate a high likelihood of success.
- The team is familiar with alternative solutions and provides strong justification for the selection of their approach over other's.
- The team has a well-defined plan for implementing their solution.

Narrative Content & Review

Question 3: Implementation Plan – How will you measure the success of your approach?

Suggested Content Competitor Provides	A single score on a scale of 1-6 is provided, taking the following statements into consideration
• Define your goals and implementation plan during the Progress Phase, including tasks, milestones timeline, and what you will deliver to the utility. • Identify the datasets you will need to be successful and highlight any additional datasets needed that are not currently offered publicly or in the appendices. • Describe any anticipated challenges and how they will be addressed. • Provide evidence that if selected to move forward, your team can successfully complete the Progress Phase.	• The plan shows a commitment to solving the utility's problem. • The plan is ambitious, yet reasonable, and the team has a high likelihood of successfully implementing it. • The plan is built on reasonable assumptions and lessons learned from other notable efforts in this space. • The required datasets are likely to be available. • The team has the resources available to successfully implement the plan in the next phase.

American-Made Challenges

150 Share Follow (2)

Digitizing Utilities Prize

Connecting utilities with teams of software developers and data experts to transform digital systems in the energy sector for utilities.

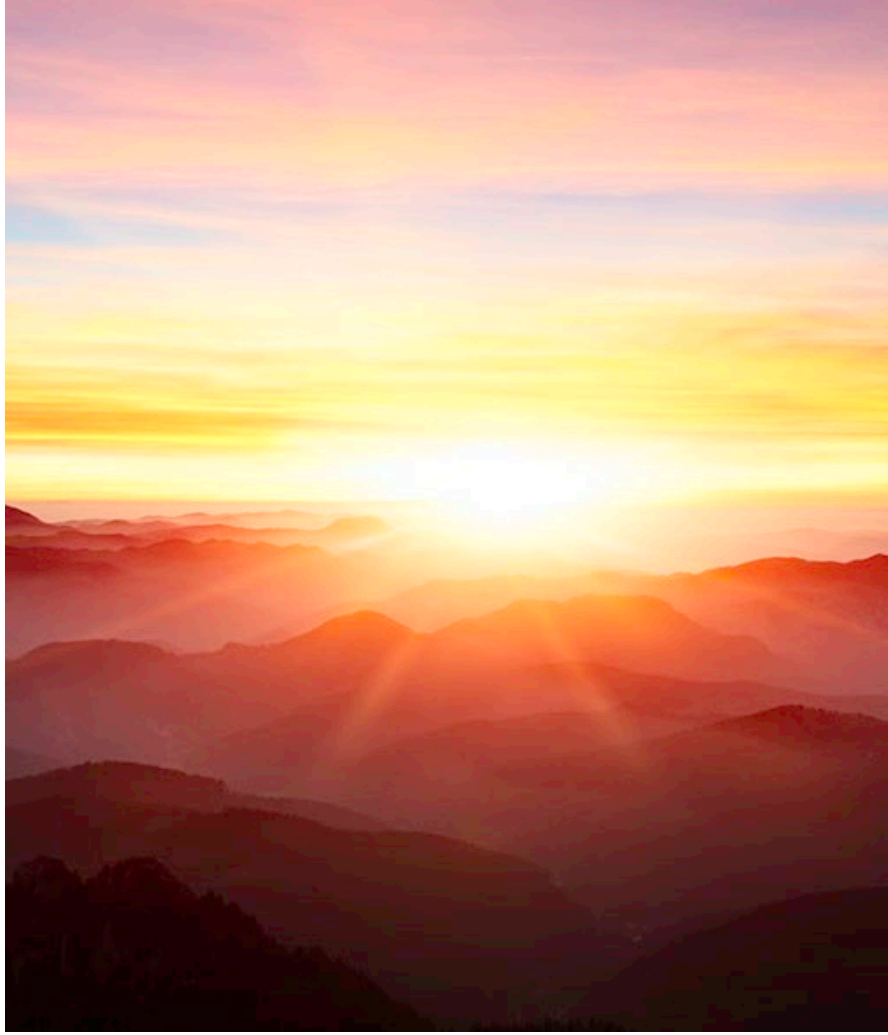
Energy, Environment & Resources | Government | Technology

Stage:
Enter

SOLVE THIS CHALLENGE

What's Next?

1. Follow the challenges on HeroX https://www.herox.com/digitizingutilities
2. Read the rules https://americanmadechallenges.org/challenges/digitizingutilities/docs/digitizing-utilities-official-prize-rules.pdf
3. Sign up in the Matching Tool and connect https://network.americanmadechallenges.org/
4. Start innovating
5. Submit by January 26, 2023



Questions?

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