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ISGF
India Smart Grid Forum

DISTRIBUTION UTILITY MEET
DUM 2024

Session 4: EMERGING TECHNOLOGIES FOR NET ZERO POWER SECTOR

ARTIFICIAL INTELLIGENCE APPLICATIONS FOR UTILITIES

Presented By

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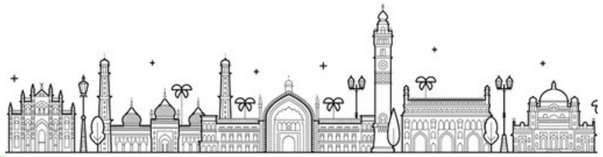
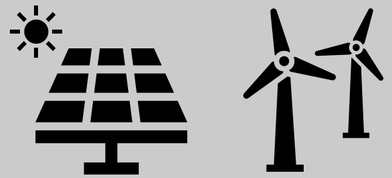
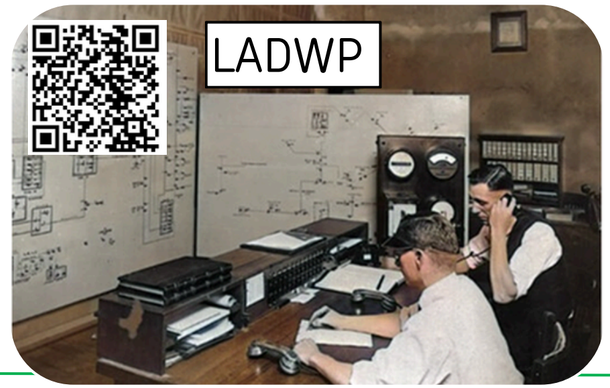


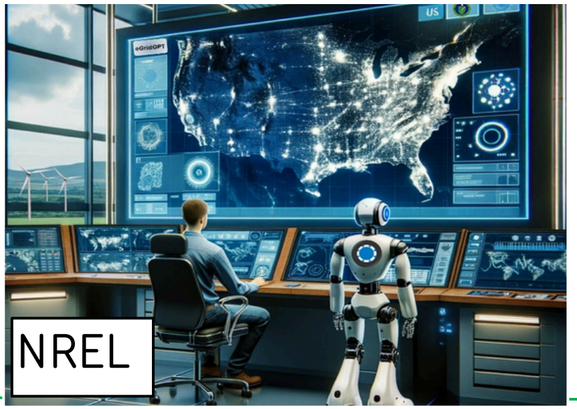
INTRODUCTION

- Why AI Applications for Utilities?
- Web 3.0, Blockchain and Immersive Technologies
- AI to Enhance Customer Service
- Workforce Transformation
- AMI Based Grid Planning and Operations
- Analytical Insights, Visualization & Vol/Var Control
- Key Takeaways / Recommendations

Why AI Applications for Utilities?



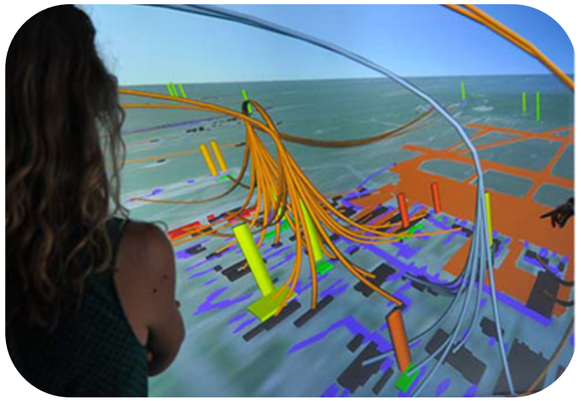




Web 3.0, Blockchain and Immersive Technologies

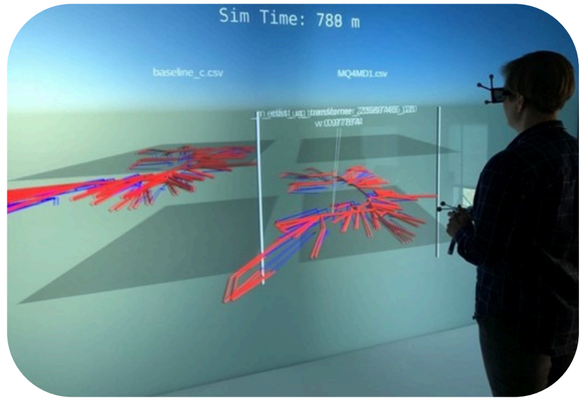
Secure Transaction s

Decentralized blockchain technology provides a secure, transparent, and tamper-proof platform for the exchange of renewable energy, enabling trust among all parties involved



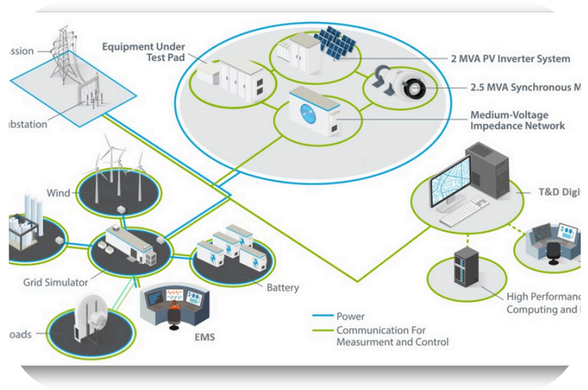
Immersive Training

"Virtual Reality (VR) and Augmented Reality (AR) technologies significantly improve workforce training experiences, while also optimizing field operations through enhanced visualization, immersive simulations, and real-time data analysis."



Remote Guidance

Personalized coaching and expert consultation available through immersive Virtual Reality experiences



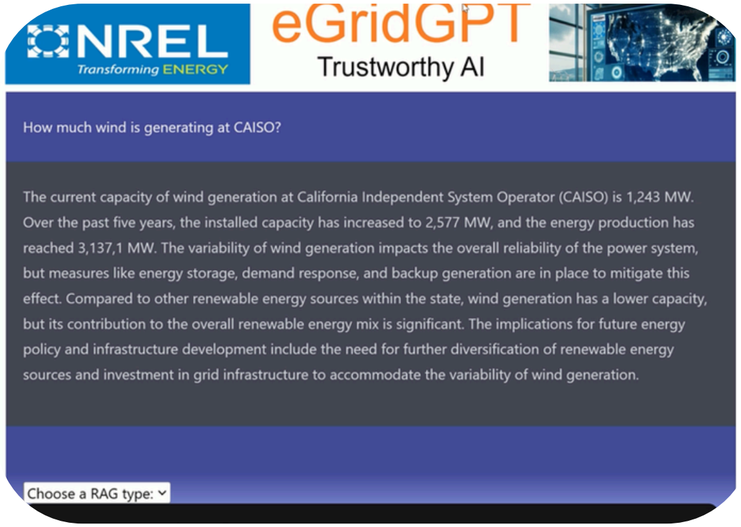
Digital Twin

The Metaverse technology enables the creation of highly accurate virtual twins of critical utility systems, facilitating proactive risk assessment, predictive maintenance, and streamlined collaboration among stakeholders

AI to Enhance Customer Service

AI Chatbots

24/7 customer support powered by natural language processing.



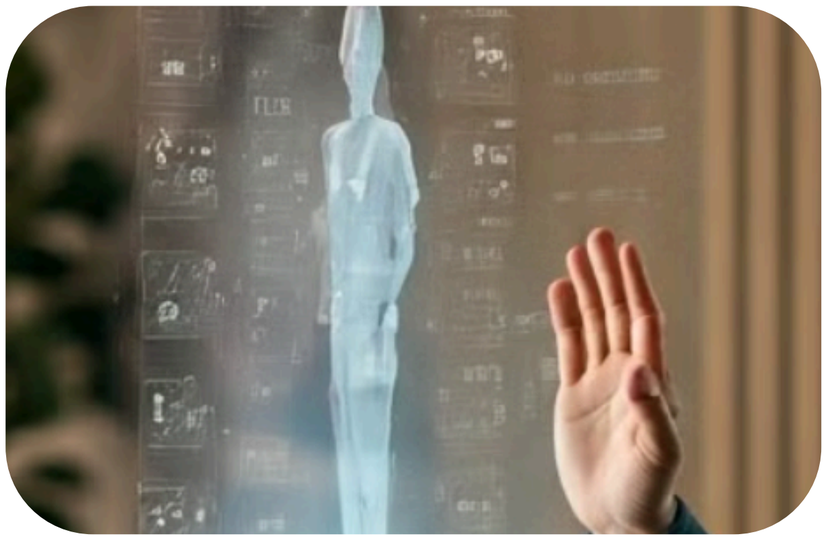
Voice Assistants

Voice-activated services for handling billing and outage reporting.

NREL eGridGPT: Trustworthy AI in the Control Room

Personalized Offerings

AI-driven recommendations for energy-saving plans and services.



Predictive Support

Anticipating customer needs before they arise.

Workforce Transformation

Data Science

- Rapidly increasing demand for data scientists to handle and interpret the large volumes of data produced by smart grids.

AI Engineering

- AI engineers will play a vital role in developing and deploying AI solutions for grid optimization, predictive maintenance, and other applications.

Cybersecurity

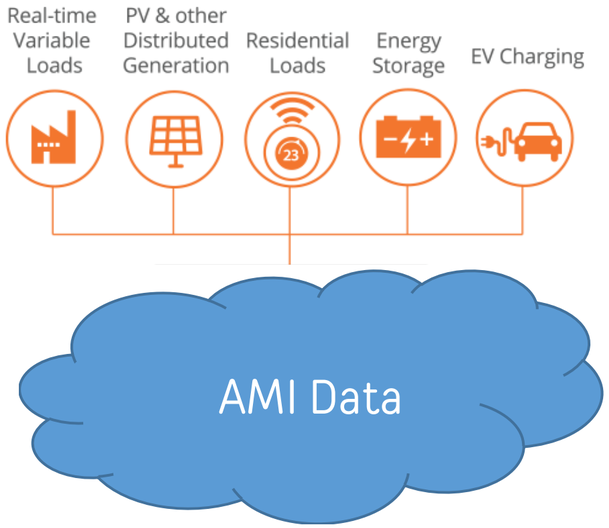
- As cyber threats continue to rise, cybersecurity professionals are becoming essential for safeguarding utility infrastructure and data.

Traditional Roles

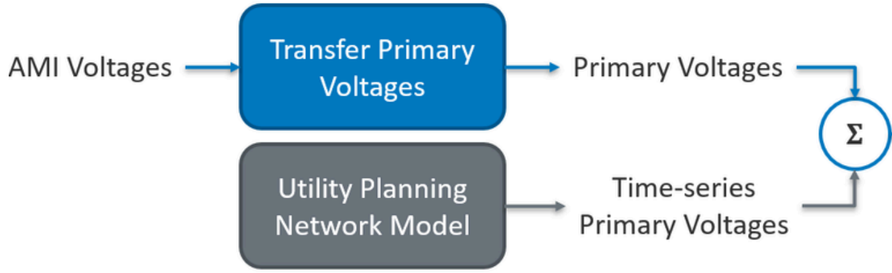
- As AI and Digital Twin automation advance, traditional roles will shift, with a greater emphasis on collaborating with AI systems and utilizing emerging technologies.

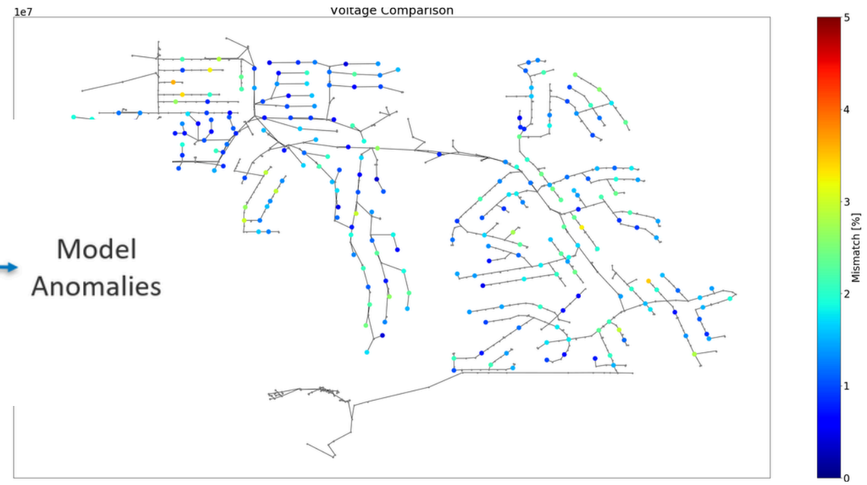
AI/ML Use Case: AMI Based Grid Planning and Operations

Develop algorithms for leveraging existing Advanced Metering Infrastructure (AMI) to provide a foundational, pervasive secondary voltage monitoring network solution



- Identify network model discrepancies
- AMI data-based insights
- Novel visualization tools
- AMI-based controls

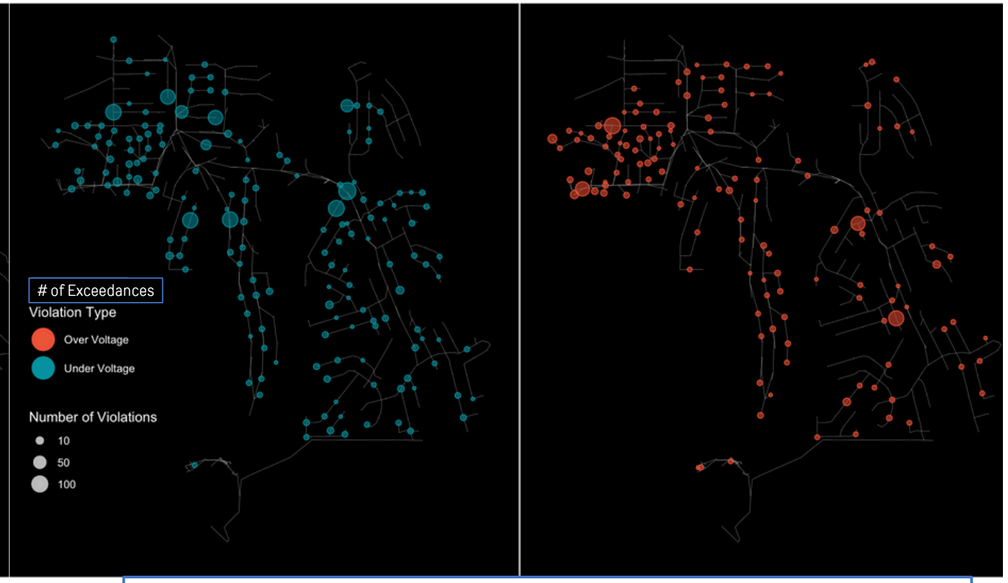




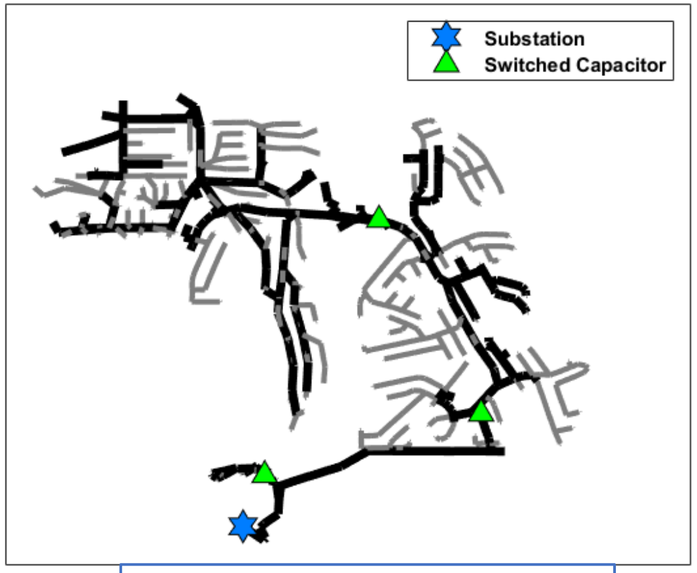
AI/ML Use Case: Analytical Insights, Visualization & Vol/Var Control

- What areas of the feeder see voltages exceed a certain threshold?
- How deep are the exceedances and how do they correlate with weather?
- How many EVs, and when and at what levels do they charge?

Potential EV locations



Locations of voltages exceeding a certain threshold



Data-Driven Volt/VAR Control

KEY TAKEAWAYS / RECOMMENDATIONS

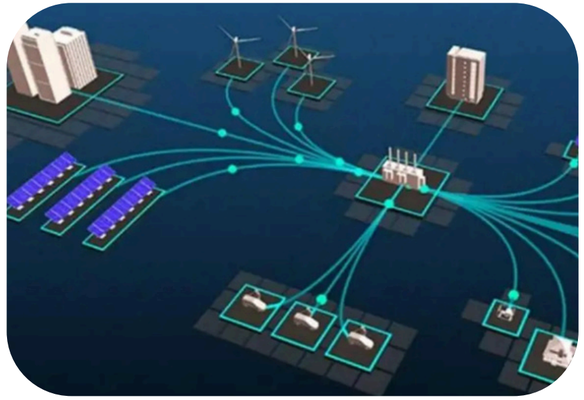
- Research Collaboration
  - Industry Partnerships & Academic Networks
- Challenges & Ethical Considerations

Trustworthy AI

Guaranteeing accuracy in automated decision-making processes

Privacy Concerns

Maintaining a balance between data collection and consumer privacy rights.



Data Security

Safeguarding sensitive utility data from cyber threats.

Regulatory Compliance

Adapting to the evolving AI regulations within the utility sector.

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