



PANEL #2

LISBON
March 2025

Theme
Energy Analytics

InfoSys 2025 & InfoWare 2025



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Moderator

**Prof. Dr. Vivian Sultan, California State
University, USA**

Panelists

Prof. Dr. Wallis Alexander, HAW Landshut, Deutschland

**Prof. Dr. Michael Negnevitsky, University of Tasmania,
Australia**

Prof. Dr. Ahmad Karfoul, Université de Rennes, France



Chair Introduction

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1. Introduction

- Explore the intersection of infrastructure modernization and cybersecurity.
- Emphasize the dual-edged nature of technological progress: innovations bring opportunities but also vulnerabilities.

2. Key Topics of Discussion

- **Grid Modernization:** Advancements in electric grids, including smart meters, EV charging stations, and monitoring technologies.
- **Cybersecurity Implications:** New vulnerabilities introduced by modern infrastructure.
- **Data Challenges:** The need for clean, granular data to support analysis.
- **Methodologies:** Use of tools like ArcGIS and Excel for spatial analysis and visualization.
- **Findings and Recommendations:** Identifying hotspots for vulnerabilities and proposing strategies to enhance security.



Vivian Sultan, Ph.D.
California State
University, Los Angeles
College of Business and
Economics



Chair Introduction

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1. Objectives of the Panel

- Highlight the correlation between modernization efforts and cyberattack patterns
- Discuss limitations in data availability and analysis tools
- Share actionable insights and policy recommendations for resilient infrastructure

2. Call to Action

- Encourage active participation and discussion
- Foster a collaborative environment to drive innovative solutions and strategic thinking



Vivian Sultan, Ph.D.
California State
University, Los Angeles
College of Business and
Economics



Panelist Position

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• Smart grid optimization & energy consumption forecasting

- Smart energy systems require high-quality real-time data, but how to proceed in those regions that lack the infrastructure for extensive data collection?
- Robust multimodal-based approaches are necessary to integrate several renewable energy sources.
- Energy data come from multiple sources (smart meters, weather forecasts, consumer behavior), requiring not only standardized integration frameworks.
- How can federated learning be used to train AI models across multiple energy grids while maintaining privacy?
- Beyond standard signal processing approaches, graph signal processing and graph-based IA models are a promising techniques in the framework of energy analytics.



Ahmad KARFOUL
(Associate Professor)
Univ. Rennes, France



Panelist Position

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- **Two Paradigm Shifts**

Renewable energy integration and decentralized energy systems, such as microgrids, must be developed together. As electricity production shifts toward the consumer side, production and consumption predictions must also be made at that level.

- **Grid Optimization & Management**

The potential of LLMs and AI agents for control optimization must be leveraged while ensuring data privacy and security.

Automatic detection of inefficient electricity consumption can enhance energy management at household level.



Alexander Wallis
HAW Landshut



Panelist Position

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Michael Negnevitsky

Can AI keep a Modern Power System Secure?

- **Are we prepared to jump ahead?**

AI applications in power systems... no much progress so far. Low-hanging fruit – forecasting models (loads, wind, solar; demand response); data management (smart grids, smart meters, etc.); predictive maintenance (monitoring and analyzing the performance of energy assets)

- **Decision support systems... really?**

No silver bullet... but it works for fault analysis and outage management; AI models are not perfect and make mistakes (data imprecision and uncertainty); who is responsible for a “mistake”?