



Panel #4

**VALENCIA
March 2026**

Theme

**Energy Challenges and Green-energy
Related Models**

InfoSys 2026 & InfoWare 2026



Speakers

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Moderator

Dr.-Ing. Eric Veith, OFFIS e.V. - Oldenburg, Germany

Panelists

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

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

**Prof. Dr. Huamin Ren, Kristiania University of Applied
Sciences, Norway**



Chair Introduction

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The Challenge Landscape

- AI energy consumption projected to increase 4-6x by 2026
- Renewable integration creates grid instability challenges
- Need for price stabilization across international markets
- Balancing computational demands with carbon neutrality goals



Challenge Duality

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- **Neuromorphic computing** (brain-inspired chips) represents a breakthrough, offering 1,000× efficiency improvements over traditional GPUs
- **28-30% emissions reductions** come from AI-optimized smart grids that predict demand and balance renewable integration
- **1.5-4% global emissions reduction by 2030** represents AI's potential across all sectors through intelligent optimization



Key Technologies

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- **Digital Twins & Smart Grids:** Virtual replicas of physical grids that simulate scenarios in real-time, enabling utilities to test renewable integration strategies without risking actual infrastructure
- **Contracts for Difference (CfD):** EU policy mechanism where governments guarantee renewable producers a fixed price, absorbing market volatility and enabling long-term investment
- **Energy-Efficient AI:** Hardware innovations (photonic chips using light instead of electrons, neuromorphic architectures mimicking brain efficiency) that dramatically reduce computational energy requirements



Carbon-Aware Computing

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- **Dynamic scheduling:** Workloads delayed or accelerated based on grid carbon intensity (e.g., training AI models when solar/wind production peaks)
- **Regional routing:** Cloud tasks directed to data centers in regions with cleaner grids (Iceland's geothermal vs. coal-heavy regions)
- **CarbonScaler:** Real-world Kubernetes implementation showing 51% emissions reductions through resource scaling based on carbon signals
- **Cloud integration:** AWS, Google Cloud, Microsoft Azure now provide carbon intensity APIs that developers can use to make their applications carbon-aware



The Path Forward

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- **65% hyperscaler commitment:** Major cloud providers (AWS, Google, Microsoft, Alibaba) have committed to 100% renewable energy by 2026
- **Prosumer coordination:** Digital twins manage bidirectional flows from buildings/homes that both consume and produce energy (solar panels, batteries)
- **Green-first design:** Shift from retrofitting existing data centers to sustainability to building new facilities with renewables, liquid cooling, and circular hardware from day one
- **Cross-sector collaboration:** Emphasizes that solving these challenges requires cooperation between energy providers, tech companies, policymakers, and researchers



Panelist Position

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- **Huamin Ren**

Associate Professor at Kristiania University of Applied Sciences, Oslo, Norway

- **Research in areas of machine learning, energy informatics and computer vision, including:**

- ✓ Load forecasting, load profiling
- ✓ Non-intrusive Load monitoring
- ✓ Anomaly detection
- ✓ Image segmentation and classification
- ✓ Other machine learning applications w.r.t. smart grid systems and fishery

- **Teaching and supervising students at all levels (bachelor, master and Ph.D.), mainly teaching:**

- ✓ Deep learning and NLP relevant courses

Huamin Ren





Panel #4: Panelist Position

ENERGY 2026
8-12 March 2026
Valencia, Spain

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”?



Panelist Position

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Energy Challenges and Green-energy Related Models

- Sustainable computing and energy-efficient AI
- Smart-grid resilience and wildfire-aware operations
- Data-driven planning for utilities and public agencies
- Digital twins for testing scenarios before deployment



Vivian Sultan, PhD
California State
University, Los Angeles



Panelist Position

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Key Directions

- AI can support grid reliability and community safety when used with clear goals
- Real-time data and modeling help manage renewable variability
- Digital twins improve planning for extreme weather and grid stress
- Resilience, transparency, and measurable impact should guide energy-related AI systems



Vivian Sultan, PhD
California State
University, Los Angeles



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