APEC Expert Group on
New and Renewable Energy Technologies

Asia-Pacific
Economic Cooperation

EGNRET

Outcome sharing of EGNRET Forum on AI-Powered Renewable Energy Innovation

EGNRET Secretariat

EGNRET 63 Meeting

Hosted by Republic of Korea

November 19, 2025

EGNRET Forum on AI-Powered Renewable Energy Innovation

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- **Forum Date:** November 17, 2025
- **Forum Venue:** Premier Room (5F), Oakwood Premier COEX Center Seoul

Participating Economies (7)

Chinese Taipei; People's Republic of China; Republic of Korea; Malaysia; Thailand; The Philippines; Canada

APEC fora (4)

APEC Secretariat; EWG; APERC; EGNRET

Non-APEC fora (2)

IEA; IRENA

Energy and AI

AI & Electricity Demand

- Global data center use: **415 TWh** (2024) → 950+ TWh (2030).
- Growth driven mainly by **AI-optimized servers**.

Why AI Matters for Energy

- Rising system complexity: more electrification, more **solar/wind**.
- AI enables system **forecasting**, **optimisation**, and **integration**.

Power Supply Trends

- **Renewables** provide most new electricity for data centers by 2035.
- Over **50%** of global demand growth comes from **renewables**.

AI & Innovation

- AI accelerates discovery, offering major potential for new batteries, **solar materials**, and **energy technologies**.

AI Applications in Renewable Energy

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IRENA

- **Five Key Digitalization Benefits:** smart monitoring, **AI forecasting**, operational optimization, end-user automation, and data transparency.
- **The Case for Digitalization:** digitalization delivers high, measurable returns, including lower costs, reduced emissions, and stronger grid security.

ITRI

- **Predictive maintenance:** ML anomaly detection for geothermal wells and equipment to reduce downtime.
- **Real-time optimization:** RL/MPC control of valves, output, and storage for fast stability and efficiency.
- **Demand-side AI:** Smart load selection and pre-cooling via μ-BEMS, linked with cloud carbon tracking

KEPCO

AI-Based Metering Solution: **LossPro**

- **Target of LossPro:** Addresses especially **metering errors**.
- **Field results in Korea & Indonesia:** Detected **wiring errors** and Current Transformer defects (1,770 AMI data, flagged 23 suspicious customers).

Policy and Regulatory Frameworks for AI in Energy Sector

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APERC

- **Data Center Power:** 24/7 stable supply to avoid interruptions.
- **VRE-Dominated Grids:** reduce thermal capacity, challenge evening ramps.
- **Reliability Support:** storage, hydrogen, demand-response, and siting.
- **Hybrid Approach:** nuclear plus VRE with storage for reliability.

Chinese Taipei

- **AI for Single Function**: Utilizes autonomous devices (Drone / UAV) for unmanned inspection of offshore wind farms.
- **AI for Prediction**: Employs integrated systems—USV + ROV for the autonomous underwater inspection.
- **AI for Decision-Making:** Establishes a remote operation system.

Thailand

- AI strengthens **renewable energy**
- Better forecasting, better stability.
- National AI Strategy & Governance Foundation
- AI Integration in Energy Transition
- Smart Grid Roadmap & Incentives

Conclusion

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Key Conclusions from EGNRET Forum

- AI enhances **renewable energy** integration
- Digitalisation improves **renewable energy** performance
- Targeted AI applications reduce barriers
- Supportive policies accelerate adoption
- Collaboration and innovation are essential

Thank You For Your Attention!

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EGNRET website

http://www.egnret.ewg.apec.org/