IEA - PLN Integration of variable renewable energy technologies and smart grid deployment

Online webinar

05 March 2025

14:00 – 16:15 Jakarta Time (GMT + 6)

International Energy Agency

Background

Indonesia is one of the world's fastest-growing economies, with rapidly rising energy demand. As the nation works towards achieving its net zero emissions target by 2060, decarbonizing the power system has become a priority. The country's Electricity Supply Business Plan (RUPTL) and the Just Energy Transition Partnership (JETP) have set ambitious targets for renewable energy integration. However, Indonesia continues to face significant challenges, such as the dominance of coal in its energy mix and the need to modernize its grid infrastructure.

In 2023, the International Energy Agency (IEA) and Perusahaan Listrik Negara (PLN), Indonesia's state-owned utility, signed a Memorandum of Understanding (MoU) to support this transition. As PLN faces the complexities of integrating higher shares of renewable energy and developing smart grids, there is an urgent need for capacity-building efforts to enhance its capabilities.

Objectives

The goal of this online webinar is to facilitate an exchange of experiences on power system transformation, including the integration of variable renewable Energy (VRE), and smart grid technologies. By sharing insights from the latest IEA reports, such as Integrating Solar and Wind, and engaging in technical discussions on advanced operational practices, the event aims to support PLN in strengthening its capacity for integrating high levels of Variable Renewable Energy (VRE) and modernising grid infrastructure.

Moreover, the webinar will provide an opportunity for PLN to share their planning, operational, and dispatch practices, as well as outline their current and future challenges, including their smart grid deployment. By actively listening to PLN's experiences and challenges, IEA staff will gain valuable insights to further tailor technical assistance efforts, ensuring continued relevance and impact in the years ahead.

The key topics include:

- **VRE Integration and Challenges:** Discussing known and proven measures to successfully integrate VRE into power systems integration.
- **Advanced Operational Practices:** Explore techniques for managing power systems with large shares of VRE. This topic will cover advanced operational practices and other solutions that could be used to solved operational practices in systems with large penetration of VRE. Solutions may include real-time grid management strategies, grid forming inverters, and flexibility options such as energy storage and demand response.

- **Planning for High VRE Penetration and Grid resilience:** Discussing long-term planning approaches for systems with increasing levels of VRE. This session will address grid expansion and reinforcement strategies, capacity adequacy assessment in VRE-rich systems, and scenario planning for various VRE penetration levels.
- **System Stability and Reliability:** Addressing methods to maintain grid stability and reliability with increasing VRE penetration, focussing on frequency and voltage control techniques, inertia management, and collaboration between grid operators and VRE developers, as well as the role of grid codes.
- **Smart Grid Fundamentals:** Providing an overview of smart grid concepts, components, benefits and the role of digital technologies. This will include an introduction to advanced metering infrastructure, distribution automation, and grid communication systems**.**

Meeting login link

Zoom
Launch Meeting

Meeting id : 892 5763 9821
Passcode : AKHLAK

Agenda

14:00 - 14:15 **(15 minutes)**	**Welcome and Opening** **IEA** – Pablo Hevia-Koch **PLN** - Pak Warsono
14:15 – 15:00 **(45 minutes)**	**Session 1: Integration Solar and Wind – Global Experience and Challenges** Moderator: Isaac Portugal • **Scene setting, deployment of wind and solar energy, perspectives for the future (5 min)** Isaac Portugal • **IEA phases of integration framework (8 min)** Camille Paillard • **Assessment of selected systems 2023 and 2030 (8 min)** Isaac Portugal • **Stocktake of VRE Integration measures (9 min)** Rena Kuwahata • **Emerging challenges and solutions (9 min)** Jacques Warichet • **Key Policy Actions to accelerate VRE Integration (5 min)** Jacques Warichet
15:00 – 15:15 **(15 minutes)**	• **Q&A and Discussion**
15:15 – 15:50 **(25 minutes)**	**Session 2: Indonesian super grid and Smart grid** Moderator: Isaac Portugal • **Scene setting by moderator (5 min)** • **Roadmap for Indonesian super grid – challenges ahead (10 min)** Pak Warsono – PLN • **Smart Grid deployment in support of VRE integration (10 min)** Brendan Reidenbach
15:50 – 16:05 **(15 minutes)**	• **Q&A and Discussion**
16:05 – 16:15 **(10 minutes)**	**Closing Remarks** • **PLN** ○ Pak Warsono • **IEA** ○ Isaac Portugal

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Speakers Profiles

Dr. Pablo Hevia-Koch
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Dr. Pablo Hevia-Koch is the Head of Renewable Integration and Secure Electricity at the International Energy Agency (IEA). In this role, he oversees work on integration of renewables in power systems, electricity security, power grids, and electricity market design, focused on both emerging and established economies. An electrical engineer by training, Dr. Hevia-Koch holds a Ph.D. in Energy Economics from the Technical University of Denmark. Prior to joining the IEA, he worked on shaping international energy policy, with a focus on the creation of long-term energy scenarios and development of power markets in China, India, and Southeast Asia

Ms. Camille Paillard
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Camille Paillard is an Energy Analyst at the International Energy Agency (IEA) within the Renewable Integration and Secure Electricity Unit. Her work focuses on power markets design, distributed energy resources & demand-side flexibility and regional interconnectors. She has regional expertise on China and Southeast Asia. Prior to joining the IEA, Camille served as an Economic Attaché at the French Embassy in China for several years, where she led the reporting and analysis of energy and climate policies. She holds a double Master's degree in Engineering from ENSTA Paris and in Energy Economics from Paris-Saclay University (France).

Dr. Isaac Portugal Rosas
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Dr. Isaac Portugal Rosas is an Energy Analyst at the International Energy Agency (IEA), where he contributes to in-depth analyses of the integration of renewables, electricity markets, technologies, and policies. His work supports strategic decision-making on clean energy transitions, with a particular focus on Indonesia, Latin America, and broader global renewable energy initiatives. An expert in electricity markets, system planning, and policy development, Dr. Portugal Rosas has held key roles across ministries, regulatory bodies, consulting firms, and international organisations, including IRENA, Mexico's Ministry of Energy, the Board of Administration of CFE Generation, and the Energy Regulatory Commission. He holds a Ph.D. in Mechanical and Electrical Engineering from the University of Edinburgh and has extensive experience in power system modelling, market design, and the integration of renewables into electricity grids.

Ms. Rena Kuwahata
Energy Analyst – Power System Transformation
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Rena Kuwahata has been working in the electric power sector for 20 years, dedicated to renewables integration into power grids and markets. From assessing wind and gas power grid compliance and transmission losses in Australia, to testing the robustness of European power grid planning and operation, her career has spanned continents and from technical to policy levels. Now, since joining the IEA last year, she has been leading the agency's work on regional interconnection for decarbonisation and enhancing energy security.

Dr. Jacques Warichet
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Dr. Jacques Warichet is working in the Renewable Integration and Secure Electricity Unit at the IEA as a Power System Transformation analyst. His focus areas are power markets, power system security, flexibility and stability, and the grid integration of renewables and new electricity end-uses. Before joining the IEA, he has spent 15 years in electricity transmission, as a planning and operation specialist, contributing to the development of grid codes, advanced monitoring systems and operational agreements in Europe, Africa and the Middle East. Jacques Warichet holds a Master in Electromechanical Engineering and a PhD in Power Engineering from the University of Brussels, Belgium.

Mr. Brendan Reidenbach
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Brendan is the digitalisation lead in the Office of Energy Efficiency and Inclusive Transitions (EEIT) at the International Energy Agency (IEA). He specialises in power system modernisation, digitalisation, and digitally related electricity demand from data centres and transmission networks.