

Sixteenth session of the Assembly  
Abu Dhabi, 11-12 January 2026

## Background Note

### Ministerial Dialogue on the Role of Artificial Intelligence in Accelerating the Energy Transition

#### *Background*

1. The global energy transition is entering a decisive decade: Electricity is projected to become the dominant energy carrier, powering more than half of final energy consumption by 2050. This shift requires power systems that are secure, affordable, and resilient. Artificial Intelligence (AI) and Digitalisation are essential to prepare electricity systems for future needs, including an additional demand surge expected from data centres.
2. Two self-reinforcing questions arise: How can AI and digitalisation best support accelerated deployment of renewables and address the complexity of power system? How can accelerated deployment of renewables be used to ensure that data centres are powered sustainably and cost-effectively? Grids remain the backbone of this transformation, requiring investments and coordinated planning to deliver clean electricity where and when it is needed.
3. AI and Digitalisation bear great potential for power systems and their users, and the assessment and quantification of these benefits are essential to incentivise their implementation, as identified by IRENA in one of its latest reports (*Digitalisation and AI for Power System Transformation. Perspectives for the G7*):
  - **Reduced electricity costs for end users** through optimisation of operation, market participation and integration of low-cost generation assets.
  - **Improved security of supply** by ensuring continuous, reliable electricity delivery even under stress conditions, including during outages or extreme events, with faster recovery from disruptions.
  - **Greater integration of renewables** through effective management of variability in the generation mix. AI-enhanced forecasting and automation can effectively minimise renewable energy curtailments.
  - **Added value for end users**, helping them experience greater comfort and have more control and awareness of optimisation opportunities.
  - **Improved business performance** of energy companies and in other sectors, which demonstrate greater operational and economic efficiency, higher asset utilisation and enhanced competitiveness.
4. This Ministerial Dialogue will convene High-level representatives to discuss the role of Artificial Intelligence and Digitalisation to support the acceleration of the energy transition, while safeguarding energy affordability and security. Ministers will share national experiences and

engage in a dialogue with the private sector to explore how utilities, industries and data centre providers address rising power needs and how public and private sector can work jointly on designing strategies to conceal new demands and support electricity system transformation through the use of AI and digital applications in various geographies. Speakers will also be asked to discuss actionable strategies to integrate AI across the electricity supply chain, the grids, mobilise investment, adapt regulation to integrate AI and digital solutions to cope with structural transformation and address the energy planning dimension.

### *Objectives of the session*

- **Strengthen power system security and affordability:** Discuss how AI and Digital applications support requirements for cost effective electricity system transformation in an energy transition with high shares of renewables in a secure and affordable manner.
- **Grids are both enablers and bottlenecks:** Emphasise the central role of electricity grids and outline the investments, planning, and regulatory measures needed for AI use and the support AI can provide to optimise the existing use of assets and physical upgrades.
- **Address rising electricity demand from data centres:** Engage the private sector to co-design strategies ensuring that rapidly expanding digital infrastructure is powered sustainably.
- **Define policy and regulatory priorities:** Share national experiences to identify enabling regulations and governance frameworks for safe, effective integration of AI across the power sector.
- **Promote international cooperation:** Identify global collaboration opportunities, especially for emerging and developing economies, and clarify the role of IRENA in supporting Members.

### *Expected Outcomes*

- **Shared understanding of opportunities and challenges:** Participants gain a clearer, evidence-based understanding of how digital solutions can accelerate renewable integration and address rising electricity demand.
- **Identification of policy and regulatory priorities:** Ministers and stakeholders outline key regulatory and investment priorities needed to integrate AI into power systems, while safeguarding affordability and security.
- **Commitment to public–private collaboration:** Identification of concrete areas for cooperation between governments, regulators, utilities, and technology providers to scale digital solutions and share best practices from IRENA’s global Membership.

### *Guiding Questions*

- How well understood are the benefits of AI and digitalisation among policy makers and stakeholders for the energy transition and power system in particular?
- How can AI and digital solutions help improve grid reliability and resilience as electricity demand grows, including from data centres and new industries?

- What are the main challenges, such as infrastructure readiness, regulation, or skills, that could slow down the use of AI and digital tools in the energy sector?
- What actions can be taken to promote that new data centres electricity demand has a renewable origin and other sustainability measures?
- What role do you see AI and digitalisation playing in your country's energy transition today and in the coming years?
- What forms of cooperation between governments, regulators and industries are most needed to scale these solutions and share best practices globally? How should IRENA support this?

*Associated Publications*

- IRENA (2025), Digitalisation and AI for power system transformation: Perspectives for the G7.
- IRENA (2025), IRENA Innovation Week 2025: Summary report.
- IRENA (2024), Smart electrification of end-use sectors: Benefits for distribution grids.
- IRENA (2023), Innovation landscape for smart electrification.