



ازدهار البلدان كرامة الإنسان



Shared Prosperity Dignified Life



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ARAB UNION OF ELECTRICITY
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Capacity-Building Workshop on the Integration Costs of Wind and Solar Power

30-31 July 2024, Amman, Jordan

Info Note

Background

The Arab region has recently made progress on achieving Sustainable Development Goal (SDG) 7 targets where access to electricity in the Arab region was at almost 91 per cent in 2022 meaning that nearly 43 million people remained without electricity access. Rural areas suffered the largest deficits, with only 83 per cent of the rural population having electricity access compared to 98 per cent in urban areas.¹ The promotion and adoption of renewable energy technologies and applications in rural areas can help increase access to energy and result in economic development and job creation.²

Electricity generation from modern renewables continues to accelerate in the Arab region with utility-scale solar photovoltaics (PV) projects leading the way as some of the largest projects globally boasting record low prices for energy are being developed and commissioned in the region, particularly in the Gulf Cooperation Council (GCC) countries. In fact, the installed renewable energy (RE) capacity in the Arab region grew from 26.7 GW in 2022 to 32.5 GW in 2023 (+22 per cent) where wind power capacity grew from 4.6 to 5.4 GW (+17 per cent) and solar power capacity grew from 12.6 to 17.5 GW (+39 per cent).³ However, RE accounted for only 5 per cent of total final energy consumption in the Arab region in 2021.⁴

This rapid growth in installed RE capacity, particularly for variable renewable energy (VRE) such as wind and solar, brings with it a set of numerous risks and challenges to power grids in terms of stability and reliability due to the variability and intermittency of the wind and solar natural resources. Unlike conventional power plants, which provide steady and predictable output, wind and solar generation fluctuates with weather conditions, potentially leading to mismatches between supply and demand and causing voltage fluctuations, frequency deviations, and even blackouts. Hence, integrating large amounts of VRE into the grid can strain infrastructure and requires careful coordination and investment in grid flexibility measures, such as energy storage, demand response, and grid upgrades. Equally important, the geographical distribution of wind and solar resources often necessitates extensive transmission infrastructure, adding complexity

¹ [ESCWA, Review of progress in the Arab region under the Decade for Sustainable Energy](#)

² [ESCWA, REGEND Operational Toolkit](#)

³ [IRENA, Renewable Capacity Statistics 2024](#)

⁴ [ESCWA, Review of progress in the Arab region under the Decade for Sustainable Energy](#)



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and cost to grid expansion efforts. Finally, as VRE penetration increases, traditional utility business models may face disruption thereby requiring regulatory and market reforms as well as innovative approaches to grid operation and market design to ensure resilience and financial sustainability.

These risks and challenges culminate in the realization that integrating VREs into power grids entails significantly different costs compared to dispatchable power plants. Effectively estimating and managing these integration costs is crucial for optimizing the integration of VREs while maintaining grid reliability and minimizing economic impacts. Therefore, comprehending and accurately estimating these costs, such as wind and solar PV, is crucial for determining the total economic cost.

Scope

[The Economic and Social Commission for Western Asia \(ESCWA\)](#) is one of five regional commissions under the jurisdiction of the United Nations Economic and Social Council. The role of the Commission is to promote economic and social development of Western Asia through regional and subregional cooperation and integration.

[The Arab Union of Electricity \(AUE\)](#) works on improving and developing the generation, transmission, and distribution of electrical energy in the Arab World. Almost all Arab ministries and utilities of electricity are active members in AUE which develops, improves, and coordinates their area of interest as well as strengthening the relationship among them.

Within the framework of collaboration between ESCWA and AUE and by building on previous related capacity-building workshops organized in [2015](#), [2016](#), and [2017](#), ESCWA and AUE are organizing a [capacity-building workshop on the integration costs of wind and solar power](#) on 30-31 July 2024 in Amman, Jordan.

Objective and topics of the workshop

This capacity-building workshop will delve into the complexities of integration costs associated with incorporating VRE sources like wind and solar photovoltaic (PV) power into existing power grids by:

- providing a comprehensive understanding of integration costs, encompassing their purpose, definition, and key discussion points.
- covering the intricacies of accurately estimating integration costs through different methodologies used to quantify grid costs, balancing costs, and the economic impacts on conventional power plant utilization.
- exploring the range of these costs, shedding light on potential reasons for variations in estimates to inform decision-making.
- covering the total system cost approach, including its strengths and limitations, and



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providing a comprehensive framework for comparing integration costs across different scenarios.

- studying practical integration cost analysis applications using real-life case studies and experiences.

To maximize reverse knowledge, the workshop will also feature the experience of some of the participants who have gone through the process of planning and integrating VREs into their national power grids.

Participants

This capacity-building workshop will target relevant government officials from the Arab region who are nominated from ministries, electrical utilities institutions, sector regulatory bodies, and relevant institutions.

The nominated participants shall be:

- Professionals who would like to get a detailed insight into the economics of grid integration of wind and solar PV power.
- Professionals who want to compare grid integration costs with benchmark data.
- Professionals who need to develop grid integration strategies for wind and solar PV power.

Date and Venue

The workshop will be organized in Amman, Jordan on 30-31 July 2024.

Languages

The workshop will be conducted in the Arabic and English languages.

Correspondence

All correspondence related to the workshop is to be sent to either one of the below addresses:

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