

# Digitisation and Decarbonisation of Power Distribution Networks in Pakistan

## Powering Pakistan's renewable energy transition

### The Challenge

Pakistan's Nationally Determined Contribution (NDC) 3.0 commits the country to unconditionally reduce greenhouse gas emissions by 17 percent, compared to 2015 levels. In the energy sector, this requires increasing the share of on-grid renewable energy from around 30 percent today (including hydropower) to 60 percent by 2030. Achieving this transition places significant demands on the national power system.

Transmission and distribution operators must plan network expansions, manage system operations, and ensure that new renewable energy projects can connect to the grid without compromising its stability or causing widespread outages. This requires improved forecasting of renewable energy (RE) generation and transmission infrastructure across different regions, as well as the effective integration of RE into the grid network, particularly at the distribution level.

Pakistan also faces high technical and commercial losses in its distribution system. These losses contribute to the growing circular debt and higher emissions by requiring more electricity generation through inefficient means. With the recent solar rush, a phenomenal uptick in grid-fed rooftop PV energy quantum causes turbulent power quality in the distribution grids, exacerbating the losses. Grid operators lack visibility over their networks, preventing them from taking active steps to remedy the situation. Addressing these challenges calls for modern digital solutions that enable real-time monitoring and more efficient management and control of distribution networks.

### Our Approach

The project supports Pakistan in advancing its energy transition by strengthening the foundations needed for a low-carbon,

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climate-resilient power sector. It works with key public institutions and power sector operators to improve planning processes, enhance technical capabilities and introduce innovative digital solutions that reduce losses and emissions, and support grid stability. By combining strategic guidance with practical measures, the project contributes to creating an enabling environment for a sustainable and future-oriented energy transition.

The project supports the Government of Pakistan through the following measures:

- Enhancing regulatory and planning frameworks for effective integration of renewable energy into the grid.
- Strengthening the capacities of distribution network operators to manage a higher share of variable renewable energy and improve operational performance.
- Assessing and demonstrating scalable automation and digitalisation concepts that can reduce losses and increase efficiency in distribution networks.
- Promoting transnational knowledge sharing and policy dialogue to inform decision making and improve coordination among key energy sector players.



Pg. 1, Left: Signing of the Project Implementation Agreement with the Ministry of Energy (MoE).

Right: International consultant shares insights at the workshop on proposed Distribution Code revisions.

