Virtual Dialogues on
RESILIENT INFRASTRUCTURE

ADB

Season 02: Dialogue 03
Summary

Event details

Title	**Building Resilience of the Power System in the Low-Carbon Transition**
Date	28 April 2021
Speakers	• **Priyantha Wijayatunga,** *Asian Development Bank* • **Migara Jayawardena,** *AMALA Clean* Energy Advisors • **Maythiwan Kiatgrajai,** *USAID Clean Power Asia* • **Xiaoming Jin,** *former chief specialist of China Southern Power Grid*
Moderator	**Shannon Cowlin,** *Asian Development Bank*

Overview

The third session of the webinar series focused on energy infrastructure resilience and discussed approaches and solutions to incorporate climate and disaster risk considerations into power system planning and infrastructure design.

Priyantha Wijayatunga set the scene and explained how building power sector resilience aligns with ADB's energy policy, which is currently being updated, as well as ADB's Strategy 2030's operational priority 3—tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability. Strategies and approaches such as conducting vulnerability assessments, use of multiple scenarios for extreme climate and geophysical events, preparation of emergency and recovery plans, use of smart grids, climate proofing of infrastructure, diversification of and distribution of energy system are all important for improving power system resilience. Costs associated with these approaches should also be considered to prioritize resilience investments. For example, burying distribution and transmission lines is a no regrets investment, but it is more expensive than overhead lines, so the value of this climate-proofing needs to be weighed against other options to establish priorities.

Different countries are at different stages of development of electricity grids. While most ADB's developing member countries are on track to achieve 100% electrification (or are already there), many of the grids remain underdeveloped and vulnerable to impacts of climate change. With population changes and increasing demand for clean energy, radical transformation of electricity systems is happening or will happen, with more variable-output generation sources, grid-connected energy storage, and behind-the-meter storage as key components of system resilience.

Migara Jayawardena presented the results of a study on power systems in Belize which identifies climate vulnerabilities and solutions to enhance systems resilience to adverse weather and climate change impacts. Migara explained that improving energy resilience requires adopting measures such as long-term energy planning, segmentation of transmission networks, collection and use of meteorological and hydrological data, operational and dispatch capabilities, and systems strengthening of transmission and distribution substations. Measures for rapid response and recovery are equally important to minimize damage and losses. These include emergency response plans; emergency repair access; awareness and communication plan; recovery and reconstruction plan.

Maythiwan Kiatgrajai highlighted the importance of stakeholder engagement in undertaking vulnerability assessment and resilience strategies based on a case study from Lao PDR. The vulnerability assessment covered the four main power systems components: generation, transmission, distribution, and consumers. The assessment includes identifying threats, defining impacts,

assessing vulnerabilities, calculating risks, and developing solutions. Engaging stakeholders in the process ensures context-specific inputs and buy-in from relevant organizations for implementation. Key success factors include involving relevant stakeholders, the role of experts in facilitating and encouraging discussions among stakeholders, and clearly communicating the objectives and expected outcomes of the study.

Xiaoming Jin shared measures taken by China Southern Power Grid to adapt to natural hazards, specifically to minimize impacts from typhoon and ice events which commonly affect the system. He explained procedures, and technical measures to protect the power grid including substations and power lines in the event of a typhoon or ice hazard. Measures include pre-risk assessment and pre-control measures, emergency management systems and command platforms, establishment of design standards and guidelines, use of high-level technology for collecting and transmitting real-time information, and refinement of minimum power grid such as tower reinforcement, upgrade of distribution lines, and use of underground cable.

Key Takeaways

1. The Energy sector facilitates economic growth and supports key service sectors that drive the development of a country. Understanding and addressing the sector's climate vulnerability is critical to inform efforts to improve power sector resilience, minimize damage and disruption, and sustain development.
2. The broader economic impact from unserved energy puts greater emphasis on the need to strengthen the sector's resilience and to keep the system operating. The longer there is unserved energy the more financial and economic losses that could affect the economy. These costs should be taken into account as part of economic evaluation of resilience measures.
3. Enhancing resilience of power systems requires a comprehensive approach that includes strengthening infrastructure, planning and operational capabilities, preventive measures, and emergency response and reconstruction plans. Resilience improvements, such as burying distribution lines, should be viewed as insurance policies which can avoid economic losses caused by grid failure in extreme weather events.
4. Engaging a wide range of relevant stakeholders from policymakers, planners, and system operators ensures in-depth and comprehensive analyses to identify and assess sector vulnerabilities from climate and non-climate hazards. Stakeholder engagement also creates greater buy-in to support implementation of action plans.