



Title of the Thematic Track: **Decarbonizing India’s Electricity Sector – Facilitating Energy Transition through Emerging Storage Technologies and Solutions**

Date: Wednesday, 5<sup>th</sup> of March 2025

Time: IST 2:00pm – 3:45pm

Venue: Gulmohar Hall, India Habitat Centre, Lodhi Road, New Delhi

India’s commitment to achieving net-zero emissions by 2070 requires a transformative shift in its electricity sector, prioritizing high renewable energy (RE) penetration while ensuring grid stability, seasonal balancing, and resource adequacy. According to India’s [National Electricity Plan](#) (NEP) by the Central Electricity Authority (CEA), the country’s solar and wind installed capacity is projected to exceed 480 GW by 2031-32, significantly increasing the share of intermittent renewables in the grid. Globally, solar capacity of 75,000 GW by 2050 has been estimated by International Solar Alliance (ISA) and the [LDES Council](#). Large-scale RE integration poses challenges related to grid stability and uninterrupted power supply. Energy Storage Systems (ESS) play a critical role in addressing these challenges by mitigating RE generation variability, facilitating greater RE penetration, improving grid stability, enabling peak shifting, and providing ancillary support services. Additionally, energy storage helps reduce peak deficits & peak tariffs, lower carbon emissions, defer transmission and distribution (T&D) infrastructure investments, and enable energy arbitrage.

The [International Energy Agency \(IEA\)](#) estimates that energy storage capacity must increase sixfold by 2030 to support a tripling of global RE capacity, reaching 1,500 GW of energy storage under the Net Zero Emissions (NZE) by 2050 scenario. According to the NEP, India’s Battery Energy Storage System (BESS) requirement is expected to reach 47.24 GW by 2031-32. A [TERI’s study](#) projects that to meet national demand in a no-fossil-fuel scenario, India will need approximately 50 GW (5.4 hours) of BESS by 2030 and 116.9 GWh (6.1 hours) by 2050.

India has launched multiple initiatives to support BESS deployment. In March 2024, the Ministry of Power approved Viability Gap Funding (VGF) guidelines for BESS, allocating 40% capital expenditure (CAPEX) support for 4 GWh BESS projects from 2023-24 to 2025-26. As of January 2025, a total of 118 GWh of energy storage tenders have been floated in India, including 13.7 GWh for standalone BESS. Battery storage costs in grid-scale tenders have significantly decreased – by approximately 80% from the SECI tender in August 2022 to the RRVUNL tender in January 2025. Today, solar PV plus battery storage is already cost-competitive with new coal-fired power in India and is expected to reach parity with new coal in China and new natural gas-fired power in the United States within the next few years.

ISA is committed to accelerating the adoption of solar energy and contribute to sustainable development among its member countries. According to the ISA-LDES Council report, long-duration energy storage has an estimated installed capacity potential of 8 TW and is projected to grow into a \$4 trillion industry by 2040. To support large-scale energy storage deployment, ISA is actively fostering an enabling ecosystem through its ‘Scaling [Solar E-Mobility](#) & [Storage](#)’

programme. This initiative promotes various energy storage technologies, including batteries, compressed air energy storage, gravity energy storage, and pumped hydro storage. It assesses common concerns like efficiency, safety, reliability, and recyclability. ISA plans to evaluate the compatibility of these technologies with solar energy under various use case scenarios and support member countries in shaping policies and regulatory frameworks for faster energy storage adoption. Going forward, ISA envisages to support pilot projects implementation in member states.

Currently, short and medium duration ESS are integrated into global electrical grids and infrastructure. Despite their widespread use, these have scope for improvement in safety, storage duration, and lifespan related aspects. The Least Developed Countries (LDCs) and Small Island Developing States (SIDS) face unique challenges in harnessing solar energy due to grid infrastructure limitations and the need for a reliable power supply. ESS can play a crucial role in addressing these challenges by enabling grid integration, enhancing energy access, and improving energy security. Concerning this, ISA, in partnership with ADB, is conducting a study: '[Prioritization Framework for Energy Storage System for Accelerating Solar Project Deployment in LDCs and SIDS](#)'. This study will help identify suitable countries for solar-integrated energy storage implementation.

Long-duration energy storage (LDES) offers extended storage capabilities ranging from hours to months or even seasons. For developing nations, deploying LDES technologies, like green hydrogen, pumped hydro etc., is essential for unlocking the full potential of solar energy and facilitating the integration of renewable sources into the grid. ISA, in partnership with ADB, is conducting a study on 'Scaling Solar integrated Long Duration Energy Storage Technologies (LDES): Developing Implementation Roadmap and Identification of project pipelines in Developing Nations' through which a framework for identifying countries with LDES potential is being developed.

In this context, **The Energy and Resources Institute (TERI), in collaboration with ISA** is organizing a **thematic track** on '**Decarbonizing India's Electricity Sector – Facilitating Energy Transition through Emerging Storage Technologies and Solutions**' during the **World Sustainable Development Summit (WSDS) 2025** (<https://wsds.teriin.org/>). This thematic track, scheduled for **5<sup>th</sup> of March 2025**, at the **India Habitat Centre, New Delhi**, will take place under the broader **WSDS 2025 theme: 'Partnerships for Accelerating Sustainable Development and Climate Solutions'**.

The proposed session will showcase key learnings, case studies, and field demonstrations from battery energy storage projects worldwide, including those from ISA member countries. It will cover diverse applications such as long-duration and short-duration energy storage, distributed-scale storage, renewable energy round-the-clock (RE-RTC) solutions, firm and dispatchable renewable energy (FDRE), behind-the-meter storage, and second-life battery applications. Discussions will also focus on cost trajectories, business models, financing mechanisms, safety considerations, and policy & regulatory frameworks at both central and state levels.

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### **About the World Sustainable Development Summit (WSDS)**

The World Sustainable Development Summit (WSDS) is the annual flagship Track II initiative organized by The Energy and Resources Institute (TERI). Instituted in 2001, the Summit series has a legacy of over two decades for making 'sustainable development' a globally shared goal. The only independently convened international Summit on sustainable development and environment, based in the Global South, WSDS strives to provide long-term solutions for the benefit of global communities by assembling the world's most enlightened leaders and thinkers on a single platform. The 24th edition of the annual flagship event of The Energy and Resources Institute (TERI) – the World Sustainable Development Summit (WSDS) – will be held from 5-7 March 2025 in New Delhi. The Summit deliberations will focus on the umbrella theme: Partnerships for Accelerating Sustainable Development and Climate Solutions.