

ELECTRICITY & RENEWABLES

OUR RECENT WORK



ENERGY TRANSITION

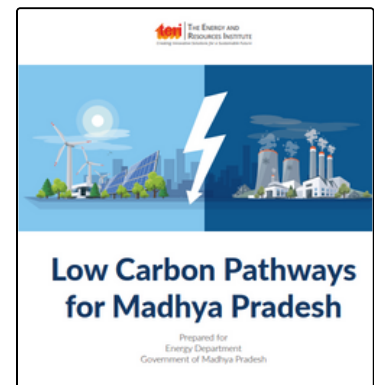
➤➤➤ ROADMAP TO INDIA'S 2030 DECARBONISATION TARGETS

This discussion paper examines the challenges in achieving the ambitious 2030 targets and discusses feasible pathways for achieving the power sector decarbonization targets. The key measures suggested include implementation of storage projects, introduction of Time-of-Use (ToU) tariffs, increase in the share of decentralized kW range solar power by introducing feed-in-tariff as well as increasing the momentum of wind power development. TERI is glad to note key policy developments in some of these suggestions by Government of India.



➤➤➤ LOW CARBON PATHWAYS FOR MADHYA PRADESH

The state-level study on decarbonization pathways for the power sector of Madhya Pradesh evaluates the future capacity and generation portfolio in the short and medium term — 2025 and 2030 — to meet the projected hourly demand profile of the state. It provides an assessment of key aspects such as the degree of VRE generation which can be integrated with the state grid, system costs, and the impact on the operation of the coal fleet, with the primary objective of finding out least cost investment in new generation plants.



➤➤➤ INDIA'S ELECTRICITY TRANSITION PATHWAYS TO 2050: SCENARIOS AND INSIGHTS

The report released by national and international experts at the World Sustainable Development Summit 2024, estimated that the electricity demand would increase fourfold by 2050 and the least cost option to meet the same across the year would be through higher RE integration where energy storage would be crucial.



➤➤➤ UI-ASSIST

The US-India collABorative for smart diStribution System with Storage (UI-ASSIST) is a project under the Joint Clean Energy Research & Development Centre (JCERDC) of the IUSSTF, funded by DST, Gol and US-DoE. The project focusses on collaborative research on smart grid technologies and energy storage for power distribution systems. As part of the project, TERI carried out load data analysis, application identification, sizing/siting & control logic development for battery energy storage systems (BESS) pilots in BRPL license area. The pilot implementations are aimed at gaining the experience for operation of grid scale BESS for applications like avoiding overloading of distribution transformers, peak shaving, energy arbitrage, etc., in Indian conditions.

➤➤➤ DISTRIBUTION SYSTEM OPERATORS

The white paper titled “Transforming the Indian Power Sector Distribution System Operators (DSOs): Need, Frameworks, and Regulatory Considerations” developed by a team of researchers from IIT Delhi, IIT Kanpur, and TERI, was published under the UI-ASSIST project. The recommendations include technical and regulatory requirements, institutional frameworks as well as pathways to establish DSOs in India.



➤➤➤ RESPONSIBLE ENERGY INITIATIVE

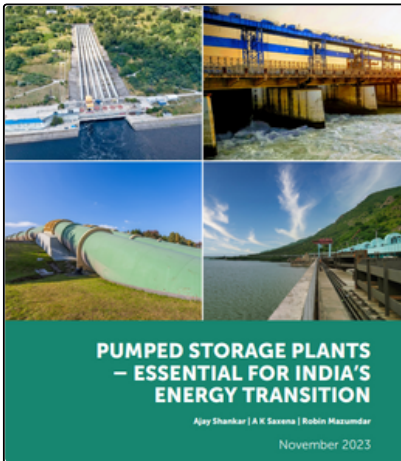
As part of the Responsible Energy Initiative (REI), that focuses on advancing RE with an environment- and people-centric approach, TERI is carrying out multi-dimensional research on the multi-land use for energy and food security through AgriPV. The aim is to identify key challenges and opportunities and contribute to policy measures for the establishment and upscaling of the technology in the country.



➤➤➤ ACCELERATING NET ZERO TRANSITION OF PUBLIC TRANSPORTATION IN KOLKATA

The study analyses the energy demand, power requirement and site suitability of charging station infrastructure for e-2W and e-4W, as well as battery swapping stations for e-3W. The potential of solar rooftops for the generation of electricity was assessed, along with the recommendations for EV charger locations and a public transport fleet decarbonisation strategy for Kolkata till 2050.

ENERGY STORAGE

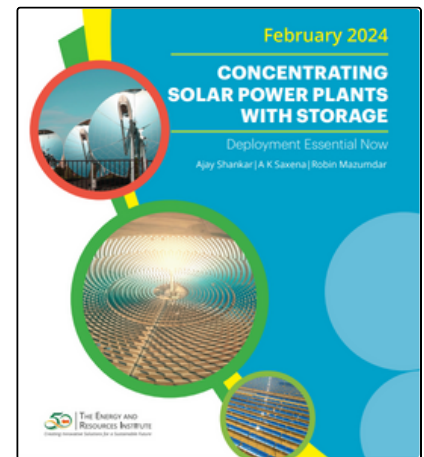


◀◀◀ PUMPED STORAGE PLANTS

“Pumped Storage Plants - Essential for India's Energy Transition” details ways of creating large-scale capacity of these plants in this decade, to achieve India’s ambitious decarbonisation goals. The report recommends development of on-river and off-river pumped storage plants, bidding based on capacity charge per MW or tariff for round-the-clock supply, developing standard bid documents to put adoption of these plants on fast track.

▶▶▶ CONCENTRATED SOLAR PLANTS WITH STORAGE

The report focusses on the actions required for developing concentrated solar plants with storage to achieve India’s 2030 power sector decarbonization targets. The report suggests identification of new sites based on optimum DNI levels, development of solar parks in collaboration with state governments and with the support of financial institutions. Tariff-based competitive bidding in a phased manner was also suggested.



▶▶▶ BID PROCESS MANAGEMENT

Review of bid documents, technical and financial evaluation and bid process management (for design, supply, testing, installation, commissioning, O&M) of 20 MW/40 MWh BESS, under tariff-based competitive bidding for BSES Rajdhani Ltd (BRPL), Delhi. The single part tariff in the form of capacity change discovered through the bidding has been adopted by the Hon’ble Delhi Electricity Regulatory Commission vide their order dated 1-May-2024.

SOLAR BIOMASS HYBRID DRYER

The TERI research team has developed and successfully tested a first-of-its-kind Solar Biomass Hybrid Dryer integrated with thermal energy storage and controller under a research project funded by IUSSTF. The dryer system has maximum loading capacity of 50 kg fresh produce per batch, and has particularly been designed to empower rural tribal communities, women, and differently abled persons. The integrated system features a seamlessly integrated Thermal Energy Storage (TES) device and a Biomass-based Heat Exchange (B-HE) system to provide backup drying, both working in conjunction with a solar dryer developed by SEED. This enables continuous operation and efficient utilization of the hybrid system in food drying, increasing its capacity utilization factor and the quality of the dried product. With an electrical energy requirement of less than half a unit (for a 10-hour operation), the entire system is mounted on a mobile base structure with wheels for easy movement.

JUST TRANSITION



JUST TRANSITION FRAMEWORK

“Just Transition Framework for a sustainable future in India’s coal mining regions” released by the Secretary, Ministry of Coal during the World Sustainable Development Summit 2024, aims to facilitate a structural as well as functional transformation to address concerns in regions affected by closure of coal mines. Grounded in theories of procedural, distributive, and restorative justice, it proposed a two-pronged approach—institutional changes at various levels of governance and targeted interventions on consensus-building, socio-economic transformation, and green development.

GENDER-JUST TRANSITION <<<

“Establishing Women as Critical Stakeholders in India’s Just Energy Transition: Evidences from Odisha, Jharkhand and Chhattisgarh” highlights the gender perspective of the present vulnerability in coal-producing geographies of India. Under-representation in the energy sector, concentration of women in informal work, loss of agricultural and homestead land, unemployment-induced alcoholism, and domestic violence are some of the key issues that exacerbate women’s vulnerabilities.



>>> SHE-UDYAMI: PILOT PROJECT IN GIRIDIH, JHARKHAND



A pilot initiative - SheUdyami - was started in the coal-affected villages of Giridih, Jharkhand, to financially empower women through imparting a skill that can be monetized. Till date, four villages have been covered in the Giridih open cast and Kabribad coal mines and ~240 household surveys have been conducted. Based on business idea generation training, 4-6 focus areas have been selected and need-based skilling have been done.