



विद्युत मंत्रालय
MINISTRY OF
POWER

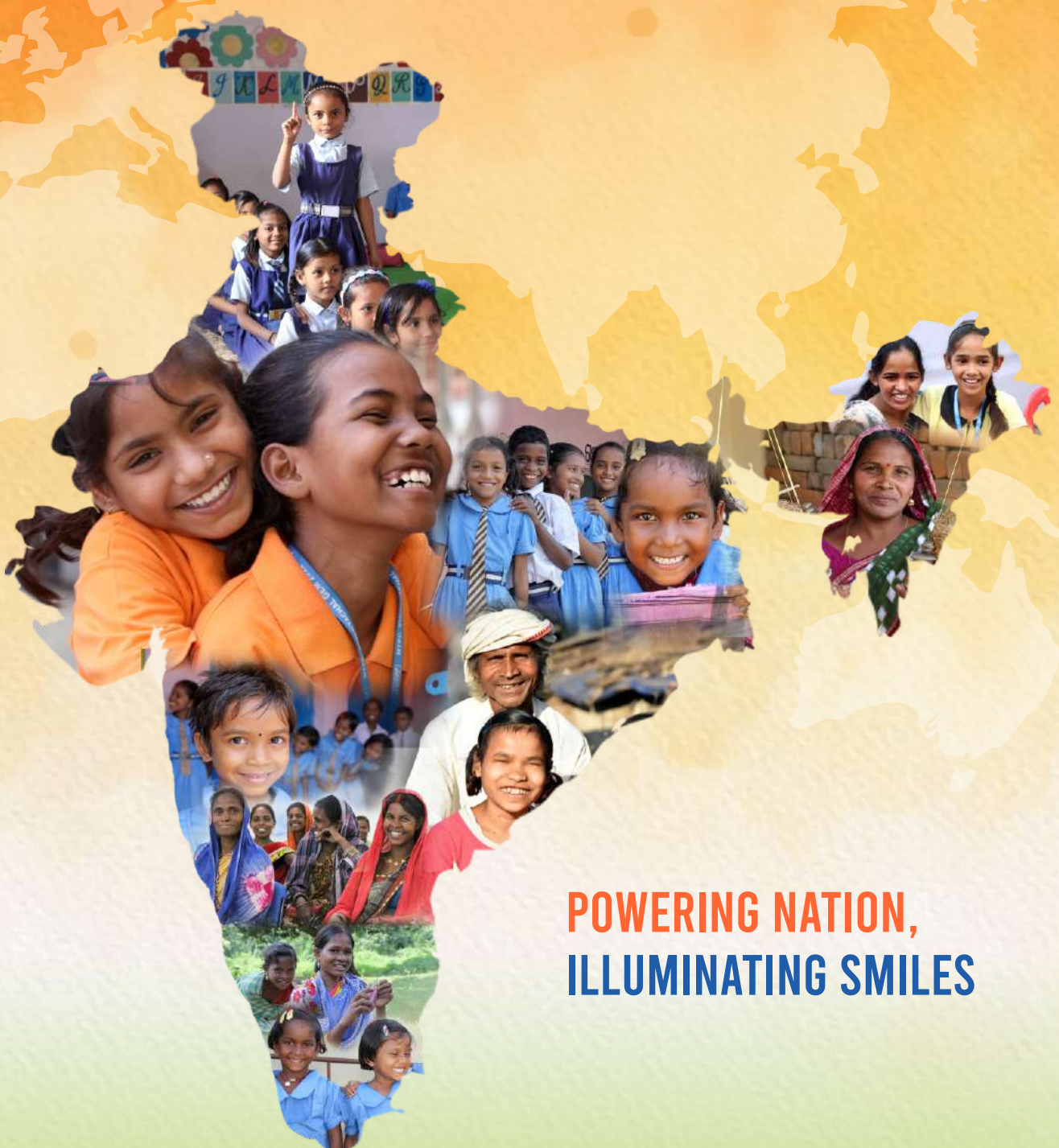
सत्यमेव जयते



MINISTRY OF POWER PAVILION

42nd INDIA INTERNATIONAL TRADE FAIR (IITF) 2023





**POWERING NATION,
ILLUMINATING SMILES**

*MAP NOT TO SCALE



Achievements of the Power Sector

- **4,25,406 MW of Total Installed Capacity from Fossil and Non-Fossil fuels**
- **Growth of about 8.87% with 1624.158 BU generation during 2022-23 in the last year**
- **100% household electrification 2.86cr households electrified in 18 months**
- **100% village electrification 18,374 villages electrified in record 987 days**
- **Average power supply in rural areas - 12.5 hours in 2015 to 22.5 hours in 2022**
- **Largest integrated grid in the world - 1.6 lakh ckm transmission lines added**

Sustainable power for a green future

India's deep commitment to aspirational Climate Goals has been widely acknowledged in the comity of nations. India has the fastest growing Renewable Energy capacity in the world. As India has set its sight on becoming energy independent by 2047 and achieving Net Zero by 2070, we recognise the critical role of Green Hydrogen and Carbon Capture technologies.

In the recent years, pilot projects by NTPC have been undertaken for production of Green Hydrogen through electrolysis of water using renewable electricity, and from biomass through thermochemical and biochemical routes. It is part of the The Green Hydrogen Mission which aims to develop and scale up Green Hydrogen production technology and make it affordable and widely accessible.



GREEN HYDROGEN PILOTS BY NTPC

- First Green hydrogen blending with Piped Natural Gas project commissioned in Gujarat
- First Green Hydrogen Mobility project under implementation at Leh and another at Delhi
- MoU with Indian Army for setting up Green Hydrogen Projects in its establishments



HYDROGEN R&D INITIATIVES BY NTPC

- First Green Hydrogen based 25kW AC power generation along with metal hybrid-based storage system at NETRA campus.
- Pilot AEM based Hydrogen generation plant started generation at NTPC Dadri.
- R&D works in Hydrogen Storage & Compression in Metal Hydrides, Sea Water Electrolysis, High Temperature Steam Electrolyser.

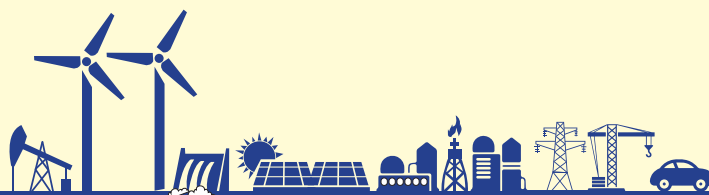


Carbon Capture Utilization and Storage (CCUS) is crucial for reducing emissions in the industrial sector, where it's tough to switch to clean energy due to fossil fuel reliance. CCUS also plays a vital role in decarbonizing the power sector, particularly in India, where coal supplies more than 70% of electricity. India has set an ambitious target of achieving 500 gigawatts (GW) of renewable energy capacity by 2030.

Carbon Capture technology

Carbon Capture is the process of capturing carbon dioxide (CO₂) before it enters the atmosphere. Capturing CO₂ is most cost-effective at point sources, such as large carbon-based energy facilities, industries with major CO₂ emissions, natural gas processing, and fossil fuel-based hydrogen production plants.

NTPC has worked on all three (3) technology routes – (i) Physical Process, (ii) Chemical Process & (iii) Biological Process



CO2 to Methanol 10 TPD Plant at NTPC Vindhyachal

20 TPD CO2 Capture Plant

- Technology: Modified Tertiary Amine
- Commissioned on 15th Aug'22

2 TPD Hydrogen Plant

Technology: Proton Exchange Membrane Electrolyzer

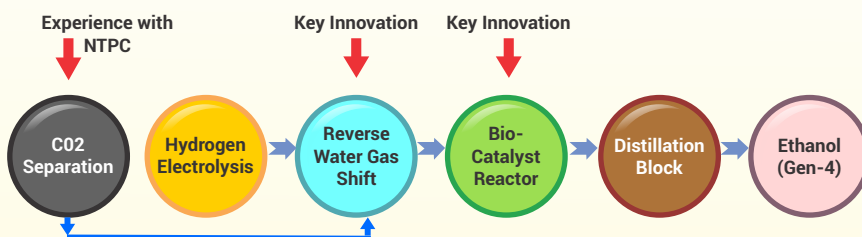
10 TPD Methanol Plant

Technology: Heterogenous Catalytic Hydrogenation of CO2



CO2 to Generation - 4 Ethanol 10 TPD Plant at NTPC Lara

Positioning : First 'CO2 to Green Ethanol' Plant, globally



One Sun, One World, One Grid - Connecting globe, transforming lives

Globally, energy transition and energy security, driven by renewable capacity addition are the thrust areas towards sustainability. Sun never sets and every hour, half the planet is bathed in sunshine. Harnessing energy from sun, wind and water would facilitate generation of clean energy, enough to meet the needs of everyone on the earth. However, this requires transnational exchange of electricity through grid interconnections.

Following the theme of G20 "Vasudhaiva Kutumbakam" i.e. One-Earth, One-Family and One-Future, India under its G20 presidency highlighted the importance of transnational grid Interconnections in enhancing energy security, fostering economic growth, and facilitating universal energy access for all, in affordable, reliable and sustainable manner which will accelerate integration of Renewable Energy towards energy transition, with enhanced resiliency.

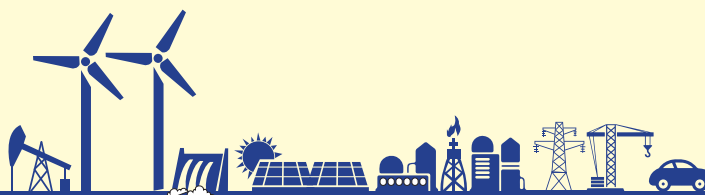
India has one of the largest synchronous grid in the world and is leading the global renewable revolution especially, solar energy. At present, India has cross-border interconnections with Nepal, Bangladesh, Bhutan for bulk power transfer and more



transmission interconnections are under discussion/ implementation.

OSOWOG proposes to foster development of transnational transmission links by integrating Regional power systems. Considering time diversity in peak demand and generation, this initiative would facilitate realization of global potential of renewable energy sources, especially solar energy.

OSOWOG will unite the world in a large sustainable electric grid having security, reliability & affordability thereby paving the way to the goal of 'Vasudhaiva Kutumbakam' (One Earth One Family).



Smart Metering

Smart Metering & RDS Distribution Sector Scheme (RDSS)

The government of India has approved the Revamped Distribution Sector Scheme (RDSS) to help DISCOMs improve their operational efficiencies and financial sustainability by providing result-linked financial assistance to DISCOMs to strengthen supply infrastructure based on meeting pre-qualifying criteria and achieving basic minimum benchmarks. The scheme has an outlay of Rs 3,03,758 Crore over 5 years i.e. FY 2021-22 to FY 2025-26. The outlay includes an estimated Government Budgetary Support (GBS) of Rs 97,631 Crore.

- The scheme aims to meet the following objectives:
- Reduction of AT&C losses to pan-India levels of 12-15% by 2024-25.
- Reduction of ACS-ARR gap to zero by 2024-25.

- Improvement in the quality, reliability and affordability of power supply to consumers through a financially sustainable and operationally efficient distribution sector

Introducing Smart Meters under Revamped Distribution Sector Scheme (RDSS)

Smart meters are here to provide quality power, enhance reliability & increase efficiency. Make the switch today to enjoy its benefits.

Benefits of Smart Meters:

- Accurate and timely bills
- Greater control over consumption
- Quick resolution of power cuts
- Flexible & easy recharge options



Pumped Hydro Storage-solution to Grid Stability

Under the aegis of Ministry of Power, Government of India, SJVN, NHPC, THDCIL, NEEPCO, DVC and BBMB are working to harness untapped hydro potential in India to power the nation with clean and renewable energy resource.

Generally, Hydro Projects are located in most remote areas tough terrain, in challenging climatic conditions. Hydropower Projects, have a life span of almost 100 years, during which they silently contribute to the growth story of nation, while enabling country to be carbon neutral. Over the period, they provide a consistent and dependable socio-economic platform, in the vicinity of the projects, such as roads, bridges, schools, community assets, hospitals, providing multiple opportunities of employment, scholarships for availing better educational opportunities and skill development & income generation trainings to make Locals financially independent under

Corporate Social Responsibility initiatives. Various initiatives in infrastructure, skill training, education, health and environment conservation have brought positive change in the socio-economic environment in people's lives over the years.

The local population in projects is being benefitted in form of better healthcare facilities, technical knowhow in agriculture and better employment skills to improve their economies. The students and economically less privileged are getting more avenues for employment and self-employment, besides specially-abled getting help and assistance in becoming more independent to lead a dignified life in society.

Hydropower projects also work for preservation and promotion of culture & sports, preservation of heritage and provide aid & assistance in the times of natural disasters.

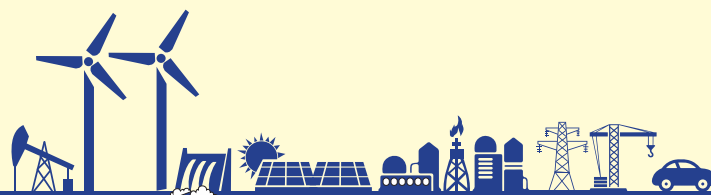
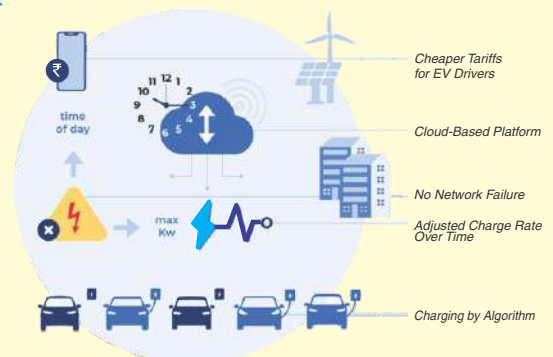
Energy transition for a sustainable development

Improving energy efficiency meets the dual objectives of promoting sustainable development and of making the economy competitive. Recognizing the formidable challenges of meeting the energy needs and providing adequate and varied energy of desired quality in a sustainable manner and at reasonable costs, improving efficiency have become important components of energy policy. In addition, the environmental and health burdens arising out of the use of hydrocarbons may also force mankind towards energy efficiency and clean energy systems. Energy Conservation has also assumed enhanced importance with a view to conserve depleting energy resources.

Charging Infrastructure for Electric Vehicles

Electric vehicles draw power from battery packs which get discharged during their running. An Electric Vehicle(EV) Charger converts the AC power, provided by power distribution company, to DC power which charges the battery of the electric vehicle.

The public charging infrastructure, analogous to petrol stations for internal combustion engines, pertains to all the facilities and equipment which are required for charging of electric vehicles by general public. It generally includes EV Chargers along with associated equipments like Transformers, distribution boards etc. To create an eco-system of safe, affordable and reliable public EV charging infrastructure, guidelines and standards for public EV charging infrastructure have been issued on 14th January, 2022.



National Electric Bus Program

Under the National Electric Bus Program (NEBP), Tender-I (Without Subsidy) was successfully completed for an aggregated demand of 6,465 e-buses. Price discovered without subsidy was 24% lower than diesel buses and 19% lower than CNG buses.

Through the Grand Challenge initiative, CESL successfully concluded its first with-subsidy tender for an aggregated demand of 5,450 e-buses across five cities, under FAME-II. The Prices discovered were 31% lower than diesel buses and 18% lower than CNG buses.

Till date, CESL has concluded tenders for approximately 12,000 electric buses.

CESL is now assisting the Ministry of Housing and Urban Affairs on the bidding against the PM e-bus sewa scheme as well as readying herself to host the joint India-US Payment security mechanism (PSM) through the Ministry of Heavy Industries.

The transport sector is responsible for 14% of India's energy-related carbon emissions, with road transport accounting for 90% of those emissions. The transition of the transport sector to cleaner fuel sources is a critical component of India's climate action. In line with its long term goal of reaching net-zero by 2070, India has been aggressively working towards electrification of the public transport system.

Focusing on accelerate electric vehicle manufacturing and adoption across vehicle segments, the Government has initiated multiple fiscal and regulatory measures with special emphasis on electric buses. A mega step towards the quest for an electrified public road transport system is the National Electric Bus Program (NEBP).

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Universal Energy access through Renewable Energy

- **DDUGJY-Decentralized Distributed Generation (DDG) Scheme** – Offgrid electrification Decentralized Distributed Generation (DDG) under DDUGJY (RE & New) was introduced by the Ministry of Power for providing electricity access to the un-electrified villages/habitations where grid connectivity was either not feasible or not cost effective. DDG can be from conventional or renewable sources such as biomass, biofuels, biogas, Mini hydro, Solar etc. Apart from providing access to electricity to rural households in such villages, electricity access to street lights, schools, community buildings, Panchayat Bhawan were also envisaged under DDG.

- The Modes of electrification of off-grid villages were sanctioned by the MoP through Standalone and Mini-grid systems under DDG scheme.

- **Solar Standalone system:** The System consists of 150/200/300 Wp SPV Module and Lithium Ferro phosphate Battery. The system would cater to the Load of 5 Nos. of LED, 1 D.C. Fan, 25-watt DC power plug, provision for Mobile Phone Charging etc. for 5-6 hrs. /day.

- **Distributed Solar Power Plants:**

EESL is implementing distributed solar power projects, which is first of its kind large scale program wherein existing agricultural feeders are being solarized via implementation of decentralized solar power plants at vacant/un-used lands at DISCOM substations. Power generated from these decentralised solar PV based power projects are fed to Agriculture feeders, leading to savings on the transmission network cost, reduced T&D losses for DISCOM and productive utilization of unused DISCOM's land. The farmer also gets benefitted as he gets quality daytime power for irrigation at an affordable price.

- **Mini-grid system:** The system consists of solar PV modules made up of crystalline silicon solar cells connected in Series and hermetically sealed with high transmission toughened

glass on top and suitable lamination materials. The laminates are fabricated using anodized aluminum channels. Modules are fixed on corrosion resistant MS structures. The Solar Power Conditioning Unit (PCU) used to charge batteries and feeding power to load. The Power Conditioning Unit Mainly Comprises of MPPT based (Maximum Power Point Tracking) Charge Controller and a Bi-directional Inverter. The Power is distributed through LT lines to the households.

- **Saubhagya scheme:** Saubhagya scheme was launched in Oct, 2017 with the objective to achieve universal household electrification by providing last mile connectivity and electricity connections to all remaining un-electrified households in rural and urban areas.

- For the households located in remote/ difficult areas, SPV based standalone systems (off-grid electricity connect) was provided to such households under the scheme.

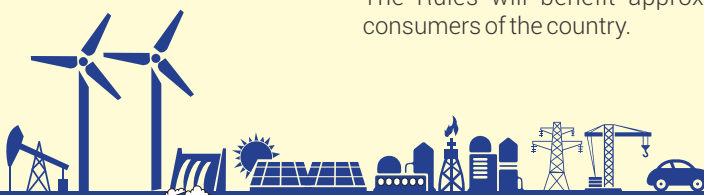
Rights of Consumers :

The Electricity (Rights of Consumers) Rules, 2020, notified by the Government of India, are pivotal in empowering electricity consumers in India. These rules lay down the responsibilities, and standards that electricity distribution companies (DISCOMs) must adhere to when serving consumers.

The rules aim to create a fair, transparent, and accountable system that ensures all a reliable, affordable, and quality electricity supply to the consumers. The rules address the various issues faced by the consumers, be it related to billing, installation of meters or quality of supply. They also provide the consumer with a grievance redressal mechanism in case of any complaint and the right to get timely compensation in case of any default in performance of distributor licensee.

The implementation of these Rules will ensure that electricity consumers will have access to not only quality supply but also quality services from their distribution licensee.

The Rules will benefit approximately 30 crore existing consumers of the country.





Conserve Today
Empower Tomorrow



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MINISTRY OF
POWER

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