A Roundup on 2021

& Outlook to 2022

India's energy transition and power system



an estimated ith population of more than 1.3 billion (and counting) we have an ever-increasing demand for energy. India is home to 18% of the world's population but uses only 6% of the world's primary energy. According to the British Petroleum's recent Energy Outlook Report, India's energy consumption will more than double by 2050. As per CEA estimates, by 2029-30, the share of renewable energy generation in India will increase from 18% to 44% while that of thermal is expected to reduce from 78% to 52%.

The ambition

With nearly 80% of total power generation coming from coal, India has taken a very progressive leap of faith to push for the energy transition to non-fossil fuel-based power. At COP-26, India announced its intent to achieve 500GW of its installed capacity through non-fossil fuels with 50% of its energy requirement from renewables by 2030. By mid-November 2021 the reported installed capacity for renewable sources including hydro exceeded 150 GW. The renewable energy (RE) capacity addition target of 400 GW in 8 years has goaded the Government to take this up in a mission mode.

This transition to a lower-carbon energy system is likely to lead to a fundamental restructuring with greater consumer choice, more localised energy markets, improved flexibility in generation sources, increasing levels of integration, and competition. A 'Mission 500GW' action plan will be drawn up soon by the government anchored by a joint committee of the Ministry of Power and Ministry of New and Renewable Energy to take up India's RE capacity to 500GW by 2030, hopefully addressing attendant issues of transmission, technology-choice, energy-mix (primarily solar and wind) for the 500GW target, storage-requirements and an investor friendly regulatory framework. India's power sector is projected to attract investment of around \$125 billion to \$140 billion between FY 2019 and FY 2023.

Policy support for energy transition & domestic capacity

Certain policy measures taken up recently are expected to go a long way towards creating indigenous manufacturing capacities for this energy transition, viz,

- Increased electrification due to schemes like Deen Dayal Upadhyay Gram Jyoti Yojana (DDUGJY), Ujwal DISCOM Assurance Yojana (UDAY) and Integrated Power Development Scheme (IPDS).
- Exemption granted to solar PV projects, solar thermal projects and solar parks by Ministry of Environment, Forest and Climate Change (MoEF&CC) from requiring environment clearance.
- Projected investment of around US\$ 335 billion (24%) in power sector as part of the National Infrastructure Pipeline, with total expected capital expenditure of INR111 trillion (approximately USD1.4 trillion).
- Allocations as per the Union Budget 2021–22 of:
 - Approximately USD42 billion for a revamped, reforms-based and result-linked new power distribution over next five years.
 - USD41.42 million to increase the capacity of the Green Energy Corridor Project.
 - USD152 million for wind projects.
 - USD327 million for solar projects.



Acetate sheets, glass, etc) on imports from various countries such as China, Malaysia, Thailand, etc.

Market mechanism - ancillary services and convergence

The emerging market design has the potential to usher in the next generation of electricity contracts and market comprising:



India's lead in the formation of the International Solar Alliance (ISA) initiative in 2015 along with France with more than 121 countries as members to collectively address key common challenges to scaling-up of solar energy.

INR181 billion production-linked incentive (PLI) scheme to incentivise batterv makers to manufacture Advanced Chemistry Cell (ACC) battery storage locally, reducing import dependence, to give a boost to electric vehicles (EVs). ACCs can store electrical energy either as electrochemical or as chemical energy and convert it back to electrical energy as and when required, and is expected to a net savings of INR 2-2.5 trillion by oil import substitution.

PLI scheme with a financial outlay of INR45 billion over a period of five years aims to support about 21 GW of module supplies from domestic manufacturers, reducing import dependence (both price and reliability of supply).

Measures like BCD imposition on anti-dumping solar cells. and countervailing duties on other raw materials (for eg, Ethylene Vinyl

- A real-time electricity market where buyers and sellers willhave a platform to trade energy in real time, providing utilities distribution alternative mechanism to access the larger market at a competitive price while allowing generators to sell their unrequisitioned capacity.
- Derivatives and futures/forward contracts in electricity with potential to transform financing providing certainty for developers.
- Incentivizing interventions that support reliability, safety and security of the grid through frequency and voltage regulation, power factor stability, grid stability, demand side management, et al - in the firm of draft Ancillary Services Regulations.
- Projects being implemented to monetise convergence of the supply of renewable energy, energy storage and proliferation of eVehicles.

Challenges ahead

There is an urgent need for an overhaul of the governance-regulatorystructural framework power sector balancing the interests of all stakeholders.New structures must be

tested in regulatory sandboxes, stabilized and then rolled out in a timebound manner to address constraints faced - re. creditworthiness, capacity (institutional and structural bottlenecks), risk allocation and expeditious dispute resolution.Issues that must be addressed with urgency include:

- Enforcement of contracts to instil investor confidence with regulatory certainty, by implementing the Specific Relief (Amendment) Act, 2018.
- Effective and timely implementation of projects, salvaging stranded capital and stalled projects, mitigating delays in adjudicating regulatory and contractual disputes has exacerbated the situation.
- Implementing comprehensive а market design which has been in the making for over 4 years with ancillary services and market based economic desptach not yet fully functional.
- Addressing the large unpaid dues (tariff and subsidy) owed to Discoms causing a spiral in the entire value chain - generating and transmission companies besides banks not being paid intime.
- Open access and market access increasingly being blunted by protective cross subsidy surcharge and additional surcharge barriers averaging ₹2.10 per unit with Karnataka's ₹5.35 per unit and Delhi's ₹3.56 per unit.
- Retire old, derated and inefficient coal plants that have completed over 25 years of life and substituting them with more efficient, less polluting supercritical plants. EP(World



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