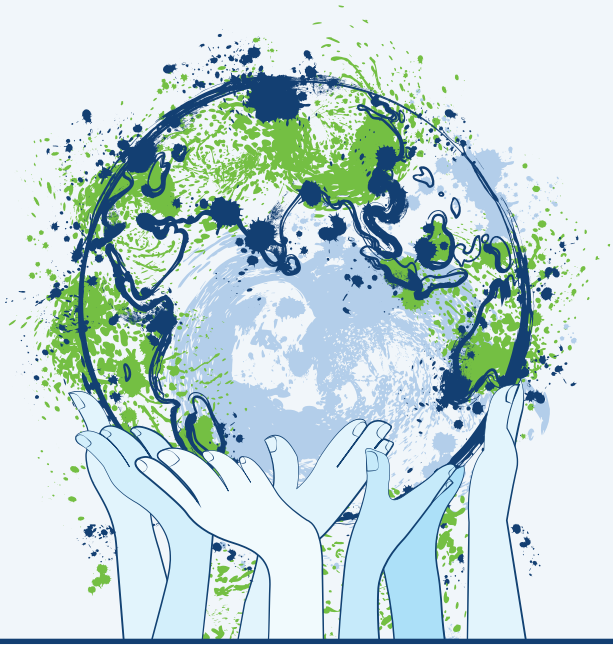
WORLD SUSTAINABLE DEVELOPMENT SUMMIT 2022

TOWARDS A RESILIENT PLANET:
ENSURING A SUSTAINABLE AND EQUITABLE FUTURE



Virtual Stakeholder Roundtable on 'India's Renewable Energy Vision of 450 GW by 2030' for COP26 Charter of Actions

UN CLIMATE CHANGE CONFERENCE UK 2021
IN PARTNERSHIP WITH ITALY

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SHAKTI SUSTAINABLE ENERGY FOUNDATION

TATA CLEANTECH CAPITAL LIMITED

Date: 18 August 2021
Time: 15:00–16:30 hrs (IST)
Duration: 90 minutes

COP26 CHARTER

THE ENERGY AND RESOURCES INSTITUTE

The Energy and Resources Institute (TERI) is an independent, non-profit organization, with capabilities in research, implementation and outreach. TERI has multidisciplinary expertise in the areas of climate change, natural resources, environment, energy, and sustainable development goals. TERI's research and research-based solutions have had a transformative impact on industries and communities. It has fostered international collaboration on sustainability action by creating a number of platforms and fora. Research gets translated into technology products, technical services, as well as policy advisory and outreach. Headquartered in New Delhi, TERI has regional centres and campuses in Gurugram, Bengaluru, Guwahati, Mumbai, Panaji, and Nainital.

WORLD SUSTAINABLE DEVELOPMENT SUMMIT

The World Sustainable Development Summit (WSDS) is the annual flagship event of The Energy and Resources Institute (TERI). Instituted in 2001 as the Delhi Sustainable Development Summit (DSDS), the Summit series marked 20 years in its journey of making 'sustainable development' a globally shared goal. Over the years, the Summit platform has brought together thought leaders, heads of state and government, scholars, corporates, youth groups, and civil society representatives from across the world. The Summit series has established itself as a responsible and an effective platform for mobilizing opinion-makers to identify and advance pioneering actions to address some of the most relevant issues concerning sustainable development. Perhaps the only Summit on global issues, taking place in the developing world, WSDS now 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 21st edition of WSDS will be held between **16-18 February 2022,** under the theme, **Towards a Resilient Planet: Ensuring a Sustainable and Equitable Future.**

ACKNOWLEDGMENTS

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DOCUMENTATION

The documentation is not an exact transcription and some editing was done to make the messages clearer for the reader.

SUGGESTED CITATION

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EXECUTIVE SUMMARY

The Indian power system has undergone massive transformation from achieving a fully interconnected grid to huge renewable energy (RE) capacity addition as part of meeting its 175 GW target by 2022. In August 2021, India accomplished an exceptional feat as the total RE installed capacity (excluding hydro) reached 100 GW. Currently, RE capacity represents almost 25% of the capacity mix of 387 GW, contributing ~9–10% in the total electricity generation mix. The government has made concrete efforts with policy decisions to promote RE transition in the last decade including focused schemes on the development of solar energy parks, promotion of hybrid solar and wind projects with storage, waiver of transmission charges for evacuation of RE through Inter-State Transmission System, green energy corridors, and so on. Government of India has renewed its commitment to address climate change by revising the targets to 450 GW of RE capacity by 2030. For achieving the ambitious target set for 2030 the current policies would need to be redesigned to accommodate grid flexibility, reliability, and affordability of electricity supply for the end consumers. To discuss the underlying issues and gather experts' perspectives on realizing the 450 GW target, a virtual stakeholder roundtable was organized. The panel discussion focused on the following themes:

- Actions to realize the 450 GW ambition by 2030;
- Measures to be taken until 2030 and also the ones to be implemented by 2050 to address climate change concerns;
- Scope for enhancing capabilities to match the policy targets requiring substantially higher RE integration including through strengthened governance.

The panellists presented their perspective regarding supporting actions and cooperation required to achieve targeted RE integration by 2030. They also discussed the importance of attaining flexibility across the entire value chain at the supply and demand sides of the grid. Some of the key discussion points included the following:

Enhancing power flexibility: The discussants unanimously mooted for mission mode approach for power system flexibility which can drive the existing policies beyond 2022 to increase zero carbon generation by 2030. This could be achieved through policy formulation for the mid-term (2030) with targets, market reforms, regulatory initiatives, institutional innovations, all considered in a holistic manner. A high variable renewable energy (VRE) share in the generation implies balancing the demand both diurnally and seasonally. Battery energy storage renders itself suitable for managing intra-day variation from VRE generation, and by 2030, India would require significantly high quantum of energy storage to manage the variability. Apart from chemical storage, brownfield expansion of existing hydro reservoirs is an economic option for providing long-term energy storage for seasonal balancing.

Electrifying the end-use sectors: Being surplus in generation capacity with a huge renewable expansion plan, there is a need to electrify more end-use sectors. However, it is vital that this demand is met by green sources of energy. Smart charging, grid support, and demand response must be incentivized further to enable EV charging at source from RE. With the announcement of National Hydrogen Mission, India has paved a path to bring green hydrogen to the end-use sector. However, at present, the costs of production of hydrogen is much higher than its cost of production from natural gas. Electrolysers' manufacturing, pilot testing in industrial clusters, infrastructure for transportation will be required to boost demand till 2030 and beyond.

Improving financial health of DISCOMs and Just Transition: The financial woes of distribution utilities have further widened due to the ongoing pandemic combined with operational and financial inefficiency in the past. The government has tried to monetize the debt through various schemes, which have, however, proved to be futile. Revamping of the distribution sector has been proposed through various schemes by providing result-linked financial assistance to DISCOMs, given that they achieve a trajectory to reduce AT&C losses, closing ACS-ARR gap, etc. Further, there is a need for DISCOMs to slowly move away from legacy power purchase agreements (PPAs) since over-contracting coal capacity has increased the fixed cost liability. With cost-competitive renewables, states must assess their generation portfolio to plan for future commitments. An increased focus on phasing out coal has also put stress on livelihoods and the local economy of coal belts. A multi-pronged strategy including capacity building for improving operational efficiency and financial viability of DISCOMs, support to boost green sector jobs for a fair and just transition would go a long way in meeting the challenges.

Virtual Stakeholder Roundtable on "India's Renewable Energy Vision of 450GW by 2030" for COP26 Charter of Actions

18 August 2021 | 3 PM - 5 PM, IST

PROCEEDINGS

Opening Remarks, Introduction, and Welcome Address

Mr A. K. Saxena, Senior Director, TERI

Mr Saxena welcomed all the distinguished panellists and attendees to the 2nd stakeholder roundtable discussion on India's Renewable Energy Vision by 2030 as part of COP26 Charter of Actions. In his introductory remarks, he underlined the steadfast commitment of Government of India, raising of RE capacity addition targets, realization of 100 GW capacity in 2021 and the significant capacity that is under installation and bidding. He mentioned that India is well on track to achieve its Paris commitments. Though the degree of confidence in achieving 450 GW RE capacity by 2030 is increasing, the challenge is huge and it can be met only with a well-planned strategy and roadmap. Further, he opined that the stakeholder roundtable will help in shaping TERI's recommendations for COP26 Charter of Actions to meet the challenge.

Context Setting Presentation

Mr Raghav Pachouri, Associate Fellow, TERI

In his presentation, Mr Pachouri set the context by discussing the past growth of RE, RE targets and the associated challenges, and recommendations from various studies to achieve the desired goal. Some of the highlights are as follows:

- Policy-driven mechanism for flexibility enhancement in a high RE regime – a portfolio approach which includes demand-side and supply-side options;
- RE integration and increasing VRE through state policy;
- Promotion of various other generation sources, such as battery energy storage, pump hydro storage, geothermal, hydrogen, concentrating solar power (CSP) with thermal storage, and others;
- Periodic review of electricity demand and demand profiles;
- Restore financial health of DISCOMs through private sector participation, tariff dispensation, implementation of direct benefit transfer (DBT);
- Feed-in-tariff for direct sale of solar power from rural areas;
- Demand Response (DR), peak load management;
- Power procurement planning tools and capacity building at state level;
- Grid stability studies;
- Economic and social issues;
- Long-term plans: Fossil fuel-free electricity and associated just transition;
- Investments: Long-term financing through pension funds, insurance companies, etc.

Roundtable Discussion

Chair: Mr A. K. Saxena, TERI

At the outset, Mr Saxena emphasized the timely action by policy and regulatory push from the centre as well as states on various fronts such as RE capacity addition, flexibility requirements, and use of energy storage systems in order to meet the ambitious target of achieving 450 GW capacity. He then opened the floor for discussion by inviting his fellow panellists.

The key points from the panellists perspective are :

Dr K. Balaraman, NIWE

Dr. Balaraman mentioned how the integration of high scale wind and solar is going to be challenging, and reaffirmed that NIWE is committed to support such an energy transition. He highlighted the latest work of NIWE on estimation of 695 GW onshore wind potential at 120 metre hub height and ongoing efforts

to estimate the resource potential at 150 metre hub height. He added that the electricity supply-and-demand mismatch due to a high VRE integration will prevail and explained how the OSOWOG adoption could be a game changer in balancing the demand-supply at a global scale while promoting green growth. He stressed for creation of water-energy-food nexus where we can meet the demand such as lift irrigation, solar-powered agricultural pumping, and agrovoltaics through clean energy sources,.

Dr Akilur Rehman, ABB

Dr Rehman stated that the coming decade will be arduous given the surging VRE generation and more electrification of the end-use sectors including industry, transport through emerging technologies such as electric vehicles (EVs), and energy storage. He was of the view that the role of power electronics will be crucial to support this transition due to increasing EV charging and hydrogen production by electrolysis. He urged to focus on detailed simulation studies exploring power reliability for grid with high VRE penetration. He further mentioned the role of VRE generation and demand forecasting, and suggested that for high degree VRE penetration, IOT system integration with RE power plants and load centres is essential apart from SCADA systems, which can give comprehensive real-time data for studying variation in the grid. In conclusion, he asserted that a robust collaboration is key for achieving the 450 GW RE target.

Mr Udit Mathur, DFID

Mr Mathur succinctly made the key recommendations that must be implemented to achieve India's high RE capacity addition targets by 2030. Given the low demand growth rates in recent years, there is an urgent need to revisit aggregate energy requirements as the states are signing PPAs with coal plants, he said. Further, he suggested to do away with the old, inefficient, and economically unviable coal fleet and introduce new coal plants with enhanced capabilities. Expediting clearances on land requirements to the project developers will increase the confidence among overseas investors, he added. Focusing on various fronts including dispatchable generation flexibility, consumer end flexibility, and digitization are extremely important, Mr Mathur said. While moving towards a high RE system, currently, battery energy storage will help in daily balancing. However, the major focus on lithium-based batteries is hindering other technologies and there is a need to study other battery chemistries as well. In his concluding remarks, he mentioned that at the state level, more capacity building is necessary and more institutions can support state energy agencies through structured trainings, demand forecasting, integrated resource planning, etc.

Mr Manu Maudgal, SSEF

Sharing his remarks, Mr Manu revisited the growth that RE has witnessed from 2010 till today; and highlighted how the growth curve has been exponential, almost five times since the last decade, and said that it is going to be a steeper curve by 2030 owing to the current ambitious targets. He added that given the present RE penetration at 8%, the previous decade was comfortably placed in terms of achieving such a feat. Moving on, however, it will be more challenging to ensure RE generation share up to 30–35% by 2030. Flexibility tweaks in the power system, including a change in the regulatory and policy regime could be considered, he suggested. He also stressed for distribution sector reforms and stated that retail electricity prices have surged in the past decade owing to high losses and inefficient power procurement strategy. Therefore, states must actively engage in renewable portfolio building and optimally contracting generation PPAs because the share in VRE in capacity mix is increasing. Recently, a few state governments moved away from fossil fuels but they should also follow a just transition pathway where livelihoods and job opportunities could be created, he signed off.

Ms Nidhi Sarin, GIZ

Ms Sarin described the role of GIZ in achieving India's energy transition. She affirmed that the announcement of National Hydrogen Mission and Battery Manufacturing Mission is a step forward in realizing the 450 GW target by 2030. GIZ has been actively engaged with the central and state governments, including other agencies, to support this energy transition, she explained. GIZ's robust work (in six states) includes long-term power system planning, which considers a data-driven approach to provide policy recommendations at both the supply and demand sides. At the supply end, Ms Sarin elaborated on GIZ's interventions to move away from coal to renewables through scaling up solar rooftop in utility area, and investment strategies in emerging technologies to accomplish the 2030 target. Electrification at end-use demand is important and is supported by GIZ through decentralized solar water pumps, decentralized solar power, and financial assistance to MSMEs, she added. Coordination with non-energy departments is crucial to boost further demand through renewables in achieving India's RE targets by 2030, shared Ms Sarin in her concluding comments.

Mr Mohit Bhargava, NTPC Limited

In its commitment to decarbonize the Indian power system, NTPC has taken a leap in RE capacity addition that 5 GW is under its current portfolio and it targets to reach 20 GW by 2025 and 60 GW by 2030, said Mr Bhargava as he discussed why the present decade poses enormous challenges. The generation portfolio will be a mix of solar, wind, hybrid RE and storage, and NTPC will encourage new emerging technologies, he reaffirmed. The peak demand as projected by CEA will be trailing behind the RE capacities by 2030, he shared. and there is a need to balance the intraday generation variability. NTPC has been actively engaged in meeting the green ammonia and methanol demand through green hydrogen, and it is currently piloting the projects, Mr Bhargava added. Coordination in planning is a must and should be done at the central and state levels to integrate high levels of VRE into the grid, he concluded.

Mr Y. K. Sehgal, Greenko

Mr Sehgal shared his opinion by giving a brief outlook on the Indian power system that existed two decades ago when the focus was mostly on grid development and power infrastructure. However, with an increase in VRE intermittency, the grid has become dynamic and the peak demand instances have increased over time, he said. The balancing demand is vital. Transmission system and the grid-scale energy storage will have a role in managing the intermittent generation from solar and wind, he added. By 2025, India would need 200 GWh and 720 GWh of energy storage by 2030, which could be realized through a decline in the capital costs of storage component, he opined. The economic viability of energy storage will be prudent only if it can provide multiple revenue streams and in turn multiple services, including energy shifting, ancillary services, and reducing DSM penalties for distribution utilities, he said. The increased emphasis on battery storage must be balanced with other energy storage technologies, he advised. India has immense potential in brownfield expansion of pumped hydro storage over existing reservoirs, which can be used for seasonal balancing given that at least 30% of VRE penetration is estimated by 2030, he said in his final remarks.

Mr Sabyasachi Majumdar, ICRA

Mr Majumdar gave a diverse perspective regarding credit rating, grid integration costs, and DISCOM finances. He began his talk by giving an overview on the need for distribution utilities to improve their financial and operational performance and how non-compliance is reducing their credit rating. He further said that the revamped distribution scheme will help minimize AT&C losses and improve DISCOM finances given a certain trajectory and target-oriented results. He said that optimal resource planning is the immediate need today, since the last few years have witnessed an energy growth rate lower than the GDP

growth rate. Also, the capacity addition target and demand estimation must be carried out correctly. He emphasized the need for an approach to assess fully inclusive RE grid integration costs and asserted that energy storage and intermittent sources of energy will have a higher penetration in the future. DISCOMs should focus on assessing RE integration costs before adding more thermal fleet to their PPA contracts, he advised. The rationalization of tariff structures is necessary to avoid more cross-subsidizing by high paying consumers, he added.

Mr Mitheel Mody, Tata Cleantech

Mr Mody spoke from the lenders' perspective in realizing the huge RE capacity addition targets by 2030. He said that the 100 GW achievement by the government has been due to sufficient credit availability and interest among Indian and overseas investors in supporting the clean energy growth. He said that meeting the 175 GW target by 2022 already seems to be challenging given the capacity addition rate slowdown due to the lockdown and that is why there needs to be a mechanism to boost growth. The solar and wind bids are not being successfully converted following cancellation by the state-owned DISCOMs, he pointed out. Instilling confidence among investors is crucial to increase RE growth in the country, he added and said that DISCOMs' outstanding dues to the generators is a cause for concern. Going ahead, he said that DISCOMs' privatisation will invite competition and bring down the AT&C losses, thereby optimizing power purchase costs.

Concluding Remarks

Mr Ajay Shankar, Distinguished Fellow, TERI

In his concluding remarks, Mr Shankar drew attention to phasing out fossil-based generation in the country and said that enhanced VRE grid integration will help in achieving the cause. He added that cost economics of various balancing sources from the supply side to the demand side in the grid must be assessed. Alternative energy storage technologies should be evaluated for viability, he urged and further pushed to boost pumped hydro storage among financing communities. Low carbon growth is the need of the hour and India is already equipped with competent policies to act upon, he signed off.

KEY TAKEAWAYS

The degree of confidence for meeting the 450 GW target is increasing. However, for a holistic RE strategy, many considerations need to be taken into account. The key takeaways from the roundtable include:

- Power sector de-carbonization will need huge amounts of energy storage to enable daytime RE generation to meet evening peak demand, given that storage can stack multiple revenue streams, thereby providing economic viability by 2030.
- Demand creation for new RE sources is the need of the hour, especially for the next decade; 450 GW RE target will be propelled by meeting end-use demands, such as green hydrogen, green methanol, EVs from clean energy sources.
- Institutional reforms at state level will increase the pace of clean energy transition; this implies structured training, utility loss reduction programmes, resource planning, and creation of job opportunities for a fair and just transition.

ABOUT COP26 CHARTER OF ACTIONS

Under the presidency of the UK in partnership with Italy, the 26th UN Climate Change Conference of the Parties (COP26), to be held from 1–12 November 2021 in Glasgow, will aim to mobilize the action on mitigation, adaptation, and resilience, and strengthen the narrative for better alignment with sustainable development goals. COP26 is to deliberate on four key goals: (i) Secure global net zero by mid-century and keep 1.5 degrees within reach; (ii) Adapt to protect communities and natural habitats; (iii) Mobilise finance; and (iv) Work together to deliver. COP26 will bring together countries, companies, civil society, and citizens on a common platform to work towards to a more sustainable future through adaptation, mitigation, finance, and collaboration.

There is a need to address the developmental deficit in emerging economies such as India while simultaneously taking measures to limit global warming as agreed in the Paris Climate Change Agreement. TERI is preparing a COP26 Charter of Actions which will assimilate questions and challenges posed by keys sectors in India, propose probable and sector specific options which can advance climate action and ambition in the country, and also propose a normative framework for a global agenda on climate ambition and action. The Charter is expected to be released at the COP26 in Glasgow. The discussions from COP26 would culminate in a review at a plenary session at the World Sustainable Development Summit 2022, which would assess the efforts of international climate negotiations in securing a sustainable future, and deliberate on future actions.The Charter will examine the themes of energy, clean transport, nature-based solutions, adaptation & resilience, green finance, business and industry, and equity. The Charter activities are supported by the British High Commission, Bloomberg Philanthropies, Shakti Sustainable Energy Foundation and Tata Cleantech Capital.

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