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MINISTRY OF POWER

Confederation of Indian Industry

Economic Diplomacy Division
Ministry of External Affairs

Report

SOUTH ASIA(BBIN) POWER SUMMIT 2023

CONFEDERATION OF INDIAN INDUSTRY (CII)
THE MANTOSH SONDHI CENTRE, LODHI ROAD, NEW DELHI, 110003

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BACKGROUND

South Asia is currently in the midst of rapid economic development and population growth, resulting in a surging demand for energy. Ensuring energy security, with a focus on a continuous supply of affordable and sustainable energy, is paramount for the countries in this region. As concerns about climate change loom large, the transition to low-carbon energy sources has become imperative to mitigate environmental risks. To address energy demands and combat climate change, a vision is set by India to increase renewable capacity to 500 GW by 2030, with a target to meet 50% of energy requirements from non-fossil fuel sources**.**

Hydropower, as a renewable and low-carbon energy source, plays a pivotal role in achieving energy security and sustainability objectives. The BBIN region is blessed with abundant water resources, including numerous rivers and mountainous terrain. These geographical features make it suitable for the development of hydropower projects. Developing hydropower projects enhances energy security in the BBIN countries by reducing their reliance on imported fossil fuels. This can help mitigate the impact of energy price fluctuations and supply disruptions.

Hydropower plays a pivotal role as a balancing power source, offering critical grid stability and flexibility. Unlike intermittent renewables like wind and solar, hydropower can swiftly respond to changes in demand, making it an invaluable resource for balancing the grid. Its quick start capability and high peak load factor allows it to meet peak load requirements instantaneously, ensuring a reliable power supply during periods of high demand. It is environmentally safe, non-polluting and has the ability to run at zero loads. Additionally, pumped storage hydro plants act as energy reservoirs, storing water during low-demand periods and releasing it to generate power during peak hours, effectively balancing the grid's supply and demand. This balancing capability is essential for maintaining a stable and resilient electricity grid, making hydropower an indispensable energy resource. Besides these capabilities, hydropower projects preserve soil fertility as sediment flow is regulated, thus helping to increase agricultural productivity and replenish ground water discharge. Hydropower has now become an important ingredient of cross border power trade in the BBIN region.

Cross-border electricity trade presents a unique opportunity for South Asian nations to collaborate, integrate, and harness their renewable energy potential. This trade enables the large-scale deployment and integration of renewable energy sources to meet the region's growing energy needs and promote sustainability. Participating countries in cross-border electricity trade, particularly in joint hydropower projects, can benefit mutually. This collaboration can lead to increased energy trade, with production costs decreasing over the long run. Countries can tap into each other's strengths and resources, leading

to a win-win situation. Though currently bilateral power trade prevails, however there is need to establish and open power market which would happen only through multilateral power trading.

The power exchange in South Asia faces several problems. Each country has its domestic legal, regulatory and policy framework for electricity, which are designed with the objective of domestic requirements and therefore have limited provisions for the development of CBET projects. This absence of standardized policies exacerbates the risks associated with policy uncertainty, making it difficult for financial institutions to confidently invest in CBET initiatives. There's also no clear way to resolve disputes when things go wrong in cross-border transactions. Additionally, the absence of a robust Dispute Settlement Mechanism (DSM) for cross-border transactions further compounds uncertainties, hindering the growth of regional energy cooperation. Naturally, these uncertainties also filter down to commercial risks, affecting aspects such as exchange rates, tax and duty structures, repatriation of earnings, and transaction costs, further impeding the progress of a unified South Asian power exchange. Addressing these challenges will be essential to unlock the full potential of regional energy trade and cooperation in South Asia.

Physical transmission interconnection is a necessary pre-requisite for CBET in the region. The Energy endowments differ among the South Asian countries, and therefore, they may benefit by strengthening the mechanism of energy trade through improved connectivity. Currently, limited cross-border transmission interconnections exist between the countries in the region. As Bhutan and Nepal have Hydroelectricity, Bangladesh can provide Gas based thermal electricity and India can plan an important role by providing a transmission corridor to these countries. Any integrated cross-border transmission infrastructure may enhance the electricity trade and ensure energy security in the region. By connecting their electricity grids through efficient transmission lines, South Asian countries can create a more integrated and resilient energy network, reducing the gap in regional integration. For accelerated power trading in the BBIN sub region an adequate inter and intra country transmission line and distribution system should be established. Steps should be taken for creating a BBIN regional grid connectivity based on advanced technological adaptation ranging from open access to setting up smart grids with uniformity in grid codes.

Every power project requires adequate and timely investment. It has been observed that due to lack of sufficient investment many power projects have been jeopardized. Transmission line is a backbone of power trading which again requires huge investment. Therefore, there is a need to come out with a comprehensive strategy/policy to attract more investment in the region.

For the BBIN (Bangladesh, Bhutan, India, Nepal) region to fulfill its rising energy demands and build a sustainable power infrastructure, significant investment is needed. For Bangladesh to reach its ambitious 40% renewable energy target in total generation capacity, instance, seeks an annual investment of $1.53 billion to $1.71 billion from 2024 through 2041; the country also needs about US$193 billion for power generation and transmission by 2041, necessitating sustainable financing mechanisms. Nepal, which currently has 800 MW of installed capacity, expects domestic demand to increase to nearly 6,000 MW by 2030, necessitating an investment in downstream infrastructure of almost US$6.45 billion. To meet the India's growing energy needs and overcome integration issues, the power generation sector of the country is targeting a significant investment of Rs 33 lakh crore and 3.78 million power professionals by 2032. Furthermore, encouraging multilateral power trading within the BBIN region will significantly reduce India's capital investment in the power sector and could save the country by an estimated US$48 billion.

It is above this background the Confederation of Indian Industry with the support of Ministry of Power and Ministry of External Affairs, Government of India organised South Asia (BBIN) Power Summit on 19 December 2023 at hotel ITC-Maurya, New Delhi.

INAUGURAL

Welcome Remarks & Context Setting	**Dr Rajib Kumar Mishra,** Co-Chairman of the CII Core Group on Energy Security and Chairman and Managing Director, PTC India Limited
Address By	**Ms Malavika Pillai,** Principal Investment Officer, International Finance Corporation
Special Address by	**H.E. Mr Md. Mustafizur Rahman,** High Commissioner of Bangladesh to India
Special Address by	**Mr Srikant Nagulapalli**, Additional Secretary, Ministry of Power, Government of India,
Keynote Address by	**Mr Gopal Prasad Sigdel,** Secretary, Ministry of Energy, Water Resources, and Irrigation, Government of Nepal
Keynote Address by	**Mr Ashish Upadhyaya**, Special Secretary, Ministry of Power, Government of India
Concluding Remarks	**Ms Seema Arora,** Deputy Director General, Confederation of Indian Industry

Session Brief:

Dr Rajib Kumar Mishra, Co-Chairman of the CII Core Group on Energy Security and Chairman and Managing Director of PTC India Limited, brought attention to the energy dynamics in the region.

Emphasizing a remarkable 3.4 times growth in capacity addition over the past seven years, he underscored the region's progress in meeting its energy demands. Despite this achievement, he acknowledged existing challenges, particularly highlighting the pivotal role of transmission infrastructure, regulatory frameworks, and the need for ambitious cross-border targets with geopolitical stability and strong commercial and payment security mechanisms.

Dr Mishra stressed the significance of collaborative efforts to address the issue of low per capita energy consumption prevalent in the populous region. Recognizing that a unified approach is essential to tackle this issue, he urged stakeholders to work together in enhancing energy access and consumption levels. He further gave a framework for enhancing power trade in the region emphasising on standardized policies, private sector participation, and advanced grid management.

Mr Srikant Nagulapalli, Additional Secretary, Ministry of Power, Government of India, provided a comprehensive overview of the critical juncture facing South Asia's energy landscape. He underlined the delicate balance required between domestic energy demand and the region's abundant renewable resources. Mr. Nagulapalli emphasized the priority of ensuring reliable and affordable power, advocating for the interconnectedness of electric grids to share resources and enhance energy security across the region.

In his address, Mr. Nagulapalli highlighted the potential for job creation, economic growth, and a sustainable future through collaborative efforts in clean energy and regional integration of grids. While acknowledging the success of bilateral trade, however he said that the possibility of a shift towards multilateral trade can be discussed. He further highlighted the recent transformative policies in India, including the recognition of hydropower as a renewable source. Noting the untapped hydropower potential in Nepal, Bhutan, and Northeast India, Mr. Nagulapalli stressed how it could also sustain a portion of Bangladesh’s growing electricity demand and, possibly, decrease the cost of universal electricity coverage in that country. He further emphasized the necessity for a comprehensive transmission plan and fast-tracked construction of transmission lines. Mr. Nagulapalli cited initiatives such as 'One Sun, One World, One Grid' as instrumental in facilitating efficient energy transmission.

Ms Malavika Pillai, Principal Investment Officer, International Finance Corporation (IFC), stressed the significance of sustainable energy, noting that 50% of IFC's current portfolio is dedicated to renewables, with a focus on hydropower. Addressing the problems of power shortage and intermittency of supply, she proposed the establishment of a robust regional grid for efficient power distribution. Giving a private sector’s perspective, she mentioned that transmission and cross border trade is ideal and holds a lot of potential for long term funding. She further urged collective efforts to engage the private sector effectively in the transmission projects and PPP’s for power sector's development.

H.E. Mr Md. Mustafizur Rahman, High Commissioner of Bangladesh to India, highlighted the critical role of energy in sustaining the rapid economic growth of Southeast Asia. He highlighted the importance of uninterrupted supply of energy in order to maintain the momentum of growth of this region. Acknowledging the challenges of energy security in densely populated South Asia, he underscored the imperative for cross-border cooperation. Talking about the environmental costs of power trade, he stressed that ensuring energy security without addressing climate change will not yield desired outcome. Proposing a comprehensive approach, High Commissioner Rahman emphasized the need for a framework agreement for energy cooperation, a cross-border steering committee to facilitate

multilateral dialogue on energy connectivity, financial assistance, and a common platform for knowledge exchange to facilitate energy security and holistic sustainable development of the region. He urged to focus on bigger picture and to aspire to form strong regional bond that can foster regional growth and prosperity.

Mr Gopal Prasad Sigdel, Secretary, Ministry of Energy, Water Resources, and Irrigation, Government of Nepal, provided insights into the historical events shaping South Asian Power Cooperation. Emphasizing the evolving role of cross-border power trade, he underscored the significance of collaboration in the power sector for fostering regional unity. Mr. Sigdel proposed a comprehensive approach, including a framework agreement, cross-border committees, financial assistance, and a knowledge exchange platform to strengthen cooperation among South Asian nations.

Highlighting the importance of addressing climate concerns, Mr. Sigdel expressed Nepal's commitment to clean energy and outlined potential collaborations with India. He further noted a significant step towards regional energy security and economic growth, with Nepal and India signing a long-term agreement for the purchase of 10,000 MW of electricity over ten years. This strategic collaboration reflects a shared commitment to sustainable development and underscores the potential for mutual benefits through cross-border energy initiatives in the South Asian region.

Mr Ashish Upadhyaya, Special Secretary, Ministry of Power, Government of India, underscored the need of increasing energy capacities to meet the demands of a rising economy. Emphasizing the commonality in transferring energy across South Asian countries, he highlighted the diverse array of energy resources, including solar, wind, and hydropower, that could contribute to regional energy security as it is of paramount importance. In addressing climate change concerns, Mr. Upadhyaya advocated for stable policies and strategic planning to mitigate global disruptions. He particularly stressed the need for a collaborative approach, encouraging partnerships between India and Nepal for mutual economic development. Lastly, he stressed on the importance of stability of markets for long term growth and development of the region.

Ms Seema Arora, Deputy Director General, Confederation of Indian Industry, expressed gratitude for the insightful remarks and optimistic perspectives shared by the distinguished panel. Acknowledging the common purpose and diverse energy sources in the BBIN region, she emphasized the importance of leveraging this diversity for mutual benefit. Ms. Arora highlighted the crucial role of the private sector in developing investment models for sustainable energy projects. She stressed the significance of robust government frameworks and building upon successful bilateral mechanisms to create an environment conducive to private sector involvement.

Key Takeaways

Challenges

- Amidst the challenges posed by a rapidly expanding economy and population., securing a consistent, trustworthy, and economical energy provision.
- One of the major obstacles to addressing cross-border transmission and grid integration is the disruptions caused by geopolitical pressures.
- Establishing resilient transmission infrastructure and regulatory structures to facilitate efficient cross-border electricity exchange.

- Tackling the repercussions of climate change on the energy sector, the significance of sustainable and eco-friendly energy alternatives.
- Need more active involvement of the private sector in the advancement of the power sector to foster mutual economic progress.

Way Forward:

- Advocating for collaborative efforts, including framework agreements, cross-border committees, and financial assistance to foster regional growth and prosperity.
- Stable policies in order to maintain long term development and to ensure confidence of investors.
- Emphasising the integral role of hydropower and diverse renewable resources in the energy mix to ensure sustainable and clean energy solutions.
- Encouraging a shift towards multilateral trade for enhanced energy cooperation and resilience against global disruptions.
- Proposing measures like a powerful regional grid, knowledge exchange platforms, and long-term agreements for cross-border power trade to foster regional unity and economic development.

SESSION I: CREATING A FRAMEWORK FOR ENHANCED POWER TRADE ACROSS THE REGION: CHALLENGES AND OPPORTUNITIES

Session Chair	**Mr Ashish Upadhyaya,** Special Secretary, Ministry of Power, Government of India
Panelists	**Mr Prabal Adhikari,** Chief (Power Trade), Nepal Electricity Authority **Mr Kencho Dorji,** Joint Managing Director, Kholongchhu Project Bhutan **Mr Bikram Singh,** Executive Vice President, PTC India Limited

Objective of the Session:

The objective of this session is to address the prevailing trend of bilateral trade in the BBIN (Bangladesh, Bhutan, India, Nepal) region, despite the growing demand for multilateral trade. Recognizing the benefits of bilateral trade, the session aims to encourage and outline a framework for enhanced power trade within a multilateral context. By acknowledging the multifaceted challenges associated with multilateral trade, the session seeks to provide suggestions and a strategic framework to promote cooperation and efficiency in power trade among the BBIN nations, fostering economic development and regional integration.

Session Brief

Mr Ashish Upadhyaya, Special Secretary, Ministry of Power, Government of India, addressed the significant power demand in the South Asian region driven by rapid economic development. He highlighted the rising power costs, especially during peak hours in India's day-ahead and real-time markets, underscoring the imperative for additional capacities and an efficient mechanism linking capacity to demand. He further proposed the establishment of a regional market but stressed the need for collaborative efforts among countries to determine access, taxes, and priorities. He emphasized a coordinated approach for market regulation to prevent misuse, underscoring the importance of a robust regulatory framework to ensure fair and reasonable power availability across the region.

Mr. Prabal Adhikari, Chief - Power Trade, Nepal Electricity Authority, underscored the need of transitioning to trilateralism and multilateralism in the region's power trade. He emphasised on the development of robust cross-border transmission infrastructure, with a particular emphasis on the importance of transmission planning agencies in each country. Acknowledging the vulnerability of the Hindukus Himalayan region to climate change he urged for collaborative efforts to address environmental concerns affecting water resources. Mr. Adhikari stressed the necessity of policy harmonization across neighboring countries, emphasizing updates to electricity acts and regulatory frameworks. Cybersecurity emerged as a key concern, prompting a call for stringent measures to safeguard energy infrastructure. He recognised geopolitical stability as pivotal for the success of cross-border power trading, and a plea for a more liberal approach in policies was made. He also highlighted the significance of optimal energy resource allocation and regional collaboration, aligning cross-border power trading with national security and prosperity objectives. Mr. Adhikari concluded by proposing the development of a common framework, encompassing a robust transmission link, grid, and grid code, to ensure disciplined and reliable cross-border power operations.

Mr. Kencho Dorji, Joint Managing Director of the Kholongchhu Project in Bhutan, addressed the challenges and opportunities in cross-border power trading. Emphasizing Bhutan's substantial hydropower potential, he noted the need to tap into this resource for the mutual benefit of the South Asian region. Highlighting the seasonal variation in energy production due to the Himalayan winter, Mr. Dorji pointed out the existing symbiotic relationship in energy consumption among countries like India, Bangladesh, Nepal, and Bhutan. However, he underscored challenges arising from transmission issues, seasonality, and the absence of a common platform for addressing energy-related problems. Advocating for regional cooperation, he proposed transparent mechanisms for distributing transmission charges and the establishment of a common transmission access pricing mechanism. Mr. Dorji suggested that this approach would facilitate multilateral trade, allowing for the thorough utilization of available transmission capacity. He further recommended the creation of a common regional energy exchange, fostering a shared marketplace for power trade. Drawing attention to Bhutan's winter energy deficit, he highlighted the importance of cross-regional energy supply solutions, emphasizing the Indo-Bhutan relationship as a model for bilateral cooperation. In conclusion, Mr. Dorji called for a transition from bilateral to multilateral relations, emphasizing the necessity of a common platform to address shared challenges and unlock the full potential of cross-border power trading in the region.

Mr. Bikram Singh, Executive Vice President of PTC India Limited, provided a comprehensive overview of the challenges and opportunities in the BBIN region's cross-border power trading. He highlighted the region's substantial population and GDP, forming one-third of the global average. Analyzing the energy demand and mix, he pointed out the peak demand in India, Bangladesh, Nepal, and Bhutan, along with the dominance of coal in India's energy mix, which is gradually integrating renewable sources. He mentioned the vast hydro potential in Bhutan, Nepal, and India, emphasizing the need for optimized utilization and seasonal complementarity. The evolving market integration and the shift of India to a net exporter of energy since 2016-17 were significant milestones. Mr. Singh underscored the opportunities arising from untapped hydro potential, diverse energy mixes, and the high GDP growth in the region. He stressed the importance of enablers such as interconnected grids, market design, regulations, and investment for sustainable and resilient grids. He further emphasized on common goals, interventions like investor-friendly policies, and the necessity of a deviation settlement mechanism and regional power exchange and the collaborative efforts required for successful cross-border power trading in the BBIN region. He ended by highlighting the potential for regional collaboration in achieving sustainability and grid resilience through an integrated and efficient grid network.

Key Takeaways

Challenges:

- Existing grid constraints and technical challenges hinder seamless cross-border power trading. Further integration is required for a unified and efficient grid.
- Inadequate and insufficient cross-border transmission infrastructure poses a significant challenge, and it requires substantial investment and planning.
- Delays in implementing and updating policies, such as electricity acts and regulatory frameworks, are hindering the development of a conducive environment for cross-border power trade.
- Least attention given to cybersecurity which poses a substantial risk to the digitalized power systems in the region, there is a need for dedicated cybersecurity measures.
- Geopolitical issues and regulatory constraints, such as restrictions on certain types of electricity imports, can impede the growth of cross-border power trade.
- Challenges in achieving a common grid code and common transmission access pricing mechanism to facilitate efficient cross-border energy trade. There is a need for multilateral cooperation and a common regional energy exchange to streamline energy flow and address existing imbalances.

Way Forward:

- Collaborative efforts among countries to determine access, taxes, and priorities and a coordinated approach for market regulation to prevent misuse.
- To establish common norms for grid infrastructure, grid codes, market norms, and trading regulations in order to create a unified foundation for regional power trade.
- Increasing bilateral agreements as confidence-building measures, these further will evolve into a multilateral platform for enhanced regional collaboration.
- To focus on substantial investment in transmission infrastructure and ensure its adequacy and efficiency to meet the growing demand for cross-border power trading.

SESSION II: PROMOTING SUSTAINABILITY THROUGH INTEGRATING SOUTH ASIA – INTERVENTION REQUIRED

Session Chair	**Dr D. Sai Baba,** Joint Secretary, Ministry of Power, Government of India
Panelists	**Dr Netra Prasad Gyawali,** Chief Executive Officer, Rastriya Prasaran Grid Company Limited, Nepal **Mr S C Saxena,** Executive Director and Head, NLDC **Mr Sanjay Johari,** Head-Business Development, Adani Energy Solutions Limited **Mr Ashok Pal,** Deputy COO, CTU

Objective of the Session:

The focus of this session is to emphasize the critical need for the creation and implementation of a comprehensive transmission planning strategy, aimed at establishing a robust power grid in the BBIN region. The focus is on promoting sustainability and addressing climate change concerns by strategically integrating renewable energy sources, particularly hydropower. While efforts have been made to encourage solar and wind power, the session seeks to highlight the untapped potential of hydropower as a balancing force. By exploring areas of promise, identifying key impediments, and proposing necessary policy interventions, the session aims to facilitate a regional approach to power trading and energy exchanges that not only enhances economic cooperation but also contributes significantly to mitigating climate change challenges in South Asia.

Session Brief

Dr. D. Sai Baba, Joint Secretary, Ministry of Power, Government of India, emphasized and highlighted India's dedication to sustainable energy practices, particularly in the integration of renewable energy (RE) within the South Asia region. With an existing RE capacity of 179 gigawatts and a robust plan to achieve 500 gigawatts by 2030, he underscored the significance of these efforts. He specifically highlighted the ongoing power trading initiatives, exemplified by a substantial long-term agreement with Nepal for 10 gigawatts, showcasing India's commitment to collaborative energy partnerships. He brought attention to the bilateral cooperation with Bhutan and Bangladesh, portraying India's pivotal role in fostering regional alliances.

Mr. S.C. Saxena, Executive Director and Head, NLDC, provided valuable insights into the multifaceted landscape of cross-border energy cooperation, he underscored the dual nature of the energy sector, encompassing both the hard infrastructure and the softer aspects of regulatory frameworks, policies, implementation aspects and delivery. Stressing the imperative of leveraging renewable energy (RE) to meet sustainability goals, Mr. Saxena highlighted the pivotal role of transmission in expanding the grid footprint. He outlined the existing interconnections with neighboring countries with a capacity of 4.5 gigawatt, signalling significant capacity growth. Noteworthy milestones, such as HVDC block commissions and phased project charging, reflect the commitment to timely implementations. The participation of neighboring countries in various markets including spot market, day ahead market and real time market, along with optimization strategies and seasonal patterns, underscores the collaborative approach which helps in harnessing the diversity and load generation patterns. He stressed on the importance of cooperation between the neighboring countries especially in times of exigencies. He further mentioned the optimisation of power generation and the price responsive nature of electricity demand. Lastly he identified the key success factors for successful cooperation such as robust transmission system, control area demarcation and boundary metering, streamlined scheduling and settlement mechanism, compliance monitoring and regulatory oversight.

Dr. Netra Prasad Gyawali, CEO, Rastriya Prasaran Grid Company Limited, Nepal, highlighted the technological marvel of the BBIN transmission network, connecting millions of consumers and facilitating seamless power supply-demand balance. He emphasized the importance of transmission networks in accommodating diverse power usage patterns, reducing reserve obligations, and integrating renewable energy for sustainability. Importantly, he highlighted the role of the transmission system in promoting sustainability through renewable integration. He shed light on Nepal's transmission planning, emphasizing the distributed nature of generation that enables optimized network planning with lower voltage levels and shorter distances. Addressing challenges, Dr. Gyawali acknowledged the need to overcome obstacles in integrating renewables, such as high construction costs and right-of-way issues. He stressed the importance of system reform in BBIN countries, cautioning against ad hoc and politically influenced transmission planning. Additionally, he advocated for harmonized cross-border cooperation, fostering an environment that allows equal participation for entities, regardless of their origin, thereby ensuring the sustainable and cost-effective operation of the transmission network.

Mr Sanjay Johari, Head of Business Development, Adani Energy Solutions Limited, underscored the significance of promoting sustainability in the BBIN region by harnessing its vast untapped hydro

potential, amounting to around 150 gigawatts out of a total of 220 gigawatts. He highlighted the role of hydropower in contributing to clean energy goals, aligning with the renewable plans of the four countries in the region. Drawing insights from global examples such as the Nordic Pool and the South African Power Pool, he underscored the feasibility of successful multilateral agreements and shared grid systems. However, Mr. Johari also addressed the challenges that were ahead, emphasizing the necessity of common energy policies, robust frameworks, and the resolution of issues like right-of-way. Financial considerations and private sector involvement were highlighted, along with the importance of empowered regulatory bodies and the promotion of competition. He emphasized the need for empowered regulatory bodies, competition promotion, and proper transmission planning as crucial components for effective energy cooperation in the region.

Mr Ashok Pal, Deputy COO, CTU, gave planner's perspective on India's power scenario, highlighting the current 31% renewable capacity, and aim to reach 62-63% non-fossil capacity by 2030. Each region in India has distinct energy characteristics, contributing to a diverse energy mix and are interconnected. He emphasized inter-regional transmission capacity enhancement within India and extending it to neighbouring countries. He discussed the synchronized transmission connectivity that will benefit Bangladesh's grid stability once connected with the Indian grid. He emphasized the advantages of enhanced grid stability, increased power markets, and regional energy sharing through various forms of linkages amongst BBIN region. Analyzing load curves and correlation among South Asian countries, he identified opportunities for a seamless energy transition, optimal utilization of energy resources, and availability of economically viable electricity.

Key Takeaways

Challenges:

- Improving transmission capabilities to handle the increasing penetration of renewable energy (RE) can be challenging. Comprehensive analysis of load forecasts, generation resources, and economic considerations is necessary for planning interconnections.
- Defining control areas, implementing boundary metering, and devising robust scheduling and settlement mechanisms are all necessary to establish a successful market mechanism. It is necessary to address concerns related to payment security and dispute resolution.
- Coordinated planning is vital at both national and regional levels. While robust planning mechanisms exist within countries, effective cooperation with neighboring nations is essential to optimize cross-border energy exchange.

Way Forward:

- Focus on increasing transmission capacities across geographical regions is imperative. This includes upgrading existing interconnections and planning for new ones, fostering a seamless flow of power.
- Continual refinement of market designs and mechanisms is necessary. Providing flexibility to buyers and consumers in procuring energy fosters a dynamic and responsive cross-border energy market.
- Align sustainability objectives with energy integration plans. The push towards renewable energy should be accompanied by strategies to harness the benefits of diverse generation patterns and load profiles.

- Establish transparent and non-discriminatory regulatory oversight mechanisms. Regular compliance monitoring ensures that all stakeholders adhere to the agreed-upon rules and regulations.
- Develop an effective dispute resolution mechanism to address conflicts promptly. A robust mechanism promotes trust among nations and facilitates smoother cooperation during exigencies.
- Strengthen collaborative planning efforts and knowledge exchange between nations. Sharing experiences, insights, and best practices enhances the efficiency of cross-border energy integration.
- Addressing tariff challenges and providing tax exemptions for cross-border electricity trade can incentivize private sector involvement.

SESSION III: BALANCING INFIRM POWER: ROLE OF HYDROPOWER AND PUMP STORAGE

Session Chair	**Mr Nabin Raj Singh,** Joint Secretary, Ministry of Energy, Water Resources and Irrigation, Government of Nepal
Panelists	**Mr Tshewang Dorji,** Director (HR), Druk Green Power Corporation Limited, Bhutan **Mr Ashish Garg,** Vice President, Independent Power Producers Association Nepal **Mr Rahul Varshney,** Managing Director and Country Head – India, Statkraft **Mr Vivek Sharma,** Head-Energy Strategy, Adani Energy Solutions Ltd

Objective of the Session

The objective of this session is to systematically examine the potential, challenges, and necessary policy interventions related to leveraging hydropower as a balancing force for Indian intermittent green power, particularly from solar and wind sources. By exploring the untapped capabilities of hydropower in Nepal and Bhutan, the session aims to identify areas of promise for efficient power trading and energy exchanges within the region. The focus is on understanding and addressing key impediments that may hinder the optimal utilization of hydropower as a stabilizing factor in the power grid. Ultimately, the session seeks to formulate strategic policy recommendations to foster hydropower trade

to promote a balanced and sustainable energy ecosystem, enhancing the effectiveness of power trading and energy exchanges between these nations.

Session Brief

Mr. Tshewang Dorji, Director (HR), Druk Green Power Corporation Limited, Bhutan, highlighted Bhutan's significant hydropower potential, standing at 36,000 megawatts, with 23,760 megawatts proven to be feasible. Currently operating at 2,343 megawatts, Bhutan exports over 70% of its hydroelectricity to India, contributing significantly to its GDP. Acknowledging hydropower as the cornerstone of Bhutan's economy, he highlighted ongoing and upcoming projects, including Mangdechhu and Dagachhu, designed to augment the energy sector and address firm power deficits. The importance of continued cooperation with India, especially in financing major projects and to address power deficit was underscored. Mr. Dorji also shed light on Bhutan's diversification efforts into solar energy and the commitment to clean, affordable energy production. With 16 projects under construction and plans for solar energy, Bhutan seeks financial and technical assistance for sustainable development, aiming to generate 10,000 megawatts of hydropower and 1,000 megawatts of solar energy by 2035 and 2030, respectively. The call for continued regional cooperation and support to achieve these goals was emphasized, aligning with Bhutan's commitment to becoming a model for green energy production in the region.

Mr. Nabin Raj Singh, Joint Secretary, Ministry of Energy, Water Resources, and Irrigation, Government of Nepal, focused on Nepal's hydropower status and its crucial role in addressing the growing electricity demand in BBIN countries. With an emphasis on the need for hydropower projects, he outlined Nepal's ambitious targets, with plans to develop 28.5 gigawatts by 2035, and discussed the vast project pipeline, emphasizing the potential of hydropower projects in various basins for balancing power in the BBIN region. He particularly highlighted the potential of hydropower and pump storage projects in mitigating grid intermittency, showcasing Nepal's commitment to long-term hydropower export agreements, totalling 10,000 megawatts to India over the next decade. Government initiatives, such as landmark agreements for long-term hydropower exports, increasing installed capacity, and progress on transmission lines, highlighted Nepal's dedication to regional energy cooperation. He stressed the importance of cross-border transmission line integration, policy harmonization, and a liberalized power trade agreement. Challenges, including funding requirements and policy gaps, were acknowledged, with Mr. Singh stressing the need for collaborative regional efforts and India's leadership role. He called for collaboration under the slogan "Sabka Saath, Sabka Vikas, Sabka Vishwas, Sabka Prayaas" emphasizing India's role as a big brother and concluded by calling for policy interventions, outlining ongoing reforms, and extending an invitation for investment in large storage and pump storage projects in Nepal.

Mr. Ashish Garg, Vice President, IPPAN, discussed and highlighted various crucial facets of Nepal's hydropower sector and its role in regional energy dynamics. He emphasized Nepal's ambitious target of achieving 28,000 megawatts by 2035, showcasing its commitment to leveraging hydropower for economic growth. Challenges in pricing and competition with alternative energy sources, such as solar and wind power, , were emphasized, raising concerns about fetching a premium for hydropower, demanding policy interventions and strategic market positioning. The involvement of numerous private sector developers in small-scale projects added a distinctive aspect to Nepal's hydropower landscape. The need for streamlined approvals and addressing geopolitical influences on energy trade

emerged as critical points. Furthermore, he shed light on the seasonal surplus during the rainy period, raising questions about finding markets for Nepal's hydropower during such phases. He pointed out constraints such as the interstate transmission charges and the need for long-term power purchase agreements (PPAs). Lastly, he stressed on the impact of climate change on hydropower resources and the importance of preserving these resources in the face of both commercial challenges and environmental considerations.

Mr. Rahul Varshney, Managing Director and Country Head, Statkraft India, emphasized the crucial role of hydropower and pump storage in balancing infirm power. While acknowledging the declining share of hydropower in India between 2010 and 2020, he emphasized the importance of pump storage and batteries, especially in managing large grids with significant solar influx. Pump storage projects, with their longer lifespan and cost-effectiveness, were considered attractive. Varshney discussed the evolving phases of integrating variable renewable energy (VRE) into grids, emphasizing the flexibility of hydropower in meeting the ramp-up and ramp-down requirements. He pointed out the potential for pump storage projects in India, projecting around 96 gigawatts in the pipeline. He emphasized the importance of well-established market mechanisms, particularly in India, for private sector investments in hydropower projects across Nepal, Bhutan, and India. Achieving synergy and a mature market mechanism are vital for realizing the full potential of cross-border hydropower trade.

Mr. Vivek Sharma, Head of Energy Strategy, Adani Energy Solutions Limited, stressed the importance of regional collaboration, especially with neighboring countries like Nepal and Bhutan, aligning with the vision of "one nation, one sun, one grid." He discussed the private sector's exploration of opportunities in Nepal and Bhutan, pointing out the need to evolve and streamline public-private partnership (PPP) structures, concession agreements, and royalty frameworks for projects to be viable. In the context of Bhutan, he addressed concerns about equity requirements and the need for an attractive structure for private sector investment. He called for discussions on majority stake possibilities for private players to facilitate investments and contribute to Bhutan's gigawatt goals.

Key Takeaways

Challenges:

- Hydropower projects have seen little to no technological improvement in comparison to solar or wind power, which have seen rapid advancements in technology.
- The rising cost of implementing hydropower projects mainly due to inflationary pressures. This poses financial challenges for investors and project developers, impacting the overall feasibility and economic viability of hydropower initiatives.
- Interstate transmission charges act as a bottleneck for Nepalese hydro projects, limiting their economic competitiveness. Waiving these charges could significantly benefit the projects by reducing operational costs and by attracting private investors.
- The disparity between the short-term focus prevalent in the Indian energy market and the long-term nature of hydropower projects creates challenges in securing extended Power Purchase Agreements (PPAs).
- The effects of climate change on hydropower projects are significant. Receding glaciers and alterations in hydrological patterns pose significant risks. Balancing energy demands with ecological preservation is a pressing concern.

Way Forward

- Creating clear and well-defined market mechanisms for power trading to guarantee favourable circumstances for investments from the private sector and addressing cost issues making power trading as a viable option.
- Policy reforms that will make it easier for hydropower projects to flourish, further addressing concerns related to equity requirements, concession agreements, and ensuring the viability of private sector investments.
- Recognizing the role of hydropower in balancing intermittent renewable sources like solar and wind. There is a need to actively promote the integration of pump storage and batteries for grid stability.
- Promoting long-term PPAs to give investors assurance and guarantee the financial sustainability of hydropower projects.

SESSION IV: EVOLVING A COMMON REGULATORY AND COMMERCIAL FRAMEWORK FOR ENERGY EXCHANGES IN BBIN

Session Chair	**Mr Arun Goyal,** Hon'ble Member, CERC
Panelists	**Mr Satyajit Ganguly,** MD & CEO, PXIL **Mr Shyam Kumar,** Head- Power Trading, NVVN Ltd **Mr Hiranmay De,** Executive Director, PTC India Ltd **Mr Naveen Godiyal,** Vice President, HPX Ltd

Objective of the Session

The session aimed to review the recent fluctuations in the electricity market over the past two years, examining the structural, commercial, and regulatory facets that have influenced these changes. It focussed on identifying necessary policy interventions to improve and optimize the power exchange scenario. Specifically, the discussion revolved around the concept of Market Coupling, aiming to establish a uniform market clearing price for cross-border power trade. The session explored strategies to enhance market efficiency, mitigate price disparities, and foster smoother cross-border energy transactions through this approach.

Session Brief

Chairing the session, **Mr Arun Goyal**, Hon'ble Member, CERC, provided an insightful overview of the evolution of power exchanges within the BBIN region. He highlighted significant milestones,

including the provisions outlined in the Electricity Act to foster competition and identified electricity trade as a distinct activity. He emphasized the historical context of cross-border electricity trade, citing instances from as early as 1966 when India began exporting electricity to Bhutan, eventually expanding to Nepal in 1971 and Bangladesh in 2013. He highlighted the substantial growth in cross-border electricity transactions, especially between BBIN countries, citing recent developments allowing international trade via power exchanges. He pointed out the significant increase in electricity units traded between India and Nepal, emphasizing the positive impact of opening power exchanges for international trade. Overall, he provided a comprehensive view of the historical context, legislative developments, market dynamics, cross-border trade, and regional integration efforts within the BBIN region.

Mr Satyajit Ganguly, Managing Director and CEO, Power Exchange India Limited, provided a detailed insight into the short-term power market and cross-border electricity trade dynamics within the BBIN region. He highlighted the growth and segmentation of the short-term market, with the day-ahead market transitioning to incorporate real-time market participation. He elucidated the diverse contracts available, encompassing electricity contracts, certificates, financial derivatives, ancillary services, and renewable energy certificates. He stressed the advantages of cross-border trade, including enhanced energy security, economic transformation, and resource optimization. He underlined the need for standardization in technical, operational, and commercial aspects, advocating for a common dispute settlement mechanism and a uniform regulatory framework.

He stressed that market coupling holds significance for BBIN nations as it offers several advantages such as market price discovery, maximising overall economic surplus, optimal use of transmission infrastructure, liquidity and hedging. Market coupling represents a strategic approach to create a more integrated, efficient, and liquid electricity market across the region. It presents a framework that harmonizes pricing, enhances participation, optimizes resource utilization, and promotes liquidity while offering improved risk management through advanced hedging instruments.

Mr Hiranmay De, Executive Director, PTC India Limited highlighted the essential aspects necessary for the smooth functioning of cross-border energy trade within the BBIN region. He emphasized the need for collaborative frameworks involving various organizations such as SAFOP, SAFTU, SAFSO, SAFAS, and SAFEI, each playing a role in Operational Planning, Transmission Utilities, System Operations, Accounts and Settlements, and Energy Investments, respectively. He further highlighted the significant potential in the BBIN region, with available hydropower, wind, and solar energy capacities totaling 380 GW, along with significant investments required (approximately $1390 billion USD) for harnessing renewable energy, which aligns with the global shift from fossil fuels to renewables. He highlighted the various sections in the Common Minimum Grid Code, emphasizing the benefits of optimization of regional energy resources, technological advancements, and accurate load forecasting.

Mr Naveen Godiyal, Vice President, HPX Limited delved into the significance of introducing long-term, medium-term, and short-term exchange products in India's power market. He explained the necessity by breaking down the dynamics of the Indian power market, ranging from long-term contracts with fixed prices and dedicated transmission systems to medium-term solutions to address exigencies. He highlighted the gradual progression toward more futuristic and sophisticated markets, such as the term-ahead market featuring auction-based systems for transparent price discovery. He

stressed the increasing participation in short-term transactions on exchanges, particularly in the day-ahead and real-time markets, while pointing out the seasonal load patterns of neighboring countries like Bhutan and Nepal. These countries, facing deficits during certain months, could benefit from exploring the term-ahead market through reverse auction-based systems.

He highlighted the need for policy reforms to create a holistic approach, similar to the EU, and emphasized the importance of market coupling to address current challenges like differing market prices across exchanges. He outlined the benefits of market coupling such as creating a unified reference price, boosting liquidity, enhancing social welfare, and fostering innovation and competitiveness in the market. Finally, he stressed upon the potential of such coupling to enable diversified generation methods, improve service quality, and overcome financial constraints through the derivatives and capacity markets. In conclusion, he pointed out the importance of a more comprehensive approach for the South Asian market, underlining the necessity to address India's current challenges and look toward a more integrated regional exchange system.

Mr Shyam Kumar, Head – Power Trading, NVVN Ltd provided insights into cross-border power trading. He highlighted the regulatory framework facilitating cross-border power trading, emphasizing its significance in providing energy security to neighboring countries. He explained that while cross-border power purchase under bilateral mode has certain qualifications, power exchanges offer an open platform, presenting a more accessible opportunity for cross-border entities. Addressing the grid connectivity, he noted that Bhutan and Nepal have surplus power during the wet season and a deficit in the dry season. He emphasized India's role as a significant source and consumer in the region, stating that Indian power exchanges could serve as a cornerstone for efficient transactions between cross-border entities. He suggested that the power consumption profile of Bhutan and Nepal aligns well with trading through power exchanges, as their requirements fluctuate seasonally. Reflecting on the growth of cross-border power trade in the last two years, he highlighted a significant increase in volume, which has positively impacted the GDP of respective countries. Moreover, he suggested improvements in approval periods for power exchange transactions to facilitate more secure energy supplies. Overall, he emphasized the importance of a coordinated and efficient cross-border trading framework that ensures security, reliability, and mutual benefit among participating countries.

Key Takeaways

Challenges

- The potential challenges include political, regulatory, security, infrastructure, technical constraints, and financial considerations. These challenges could be mitigated through mutual discussions and considerations among BBIN countries, paving the way for effective strategies and long-term cooperation in the energy sector.
- Differing market prices across power exchanges and limited grid connectivity.
- Issues in commercial settlements and a need for a credible payment security environment.
- There are concerns regarding the sequence of approval and signing of agreements in medium-term bilateral trading in which we need to explore ways to streamline this process in adherence to criteria agreed upon by BBIN countries.
- Need regulatory push from the regulators to introduce reverse auction-based systems in term ahead market so that open access can be made available for all neighbouring countries

Way Forward

- Permit the Day Ahead Market and Real Time Market to do the longer-term tenure. It will give them stability and it will also give them the required investment.
- It is important to have a Common Minimum Grid Code for the enhancement of BBIN countries' power exchange.
- To facilitate harmonised regulations in the BBIN region especially with regard to the payment securities.
- Allowing term ahead markets into cross-border entities that will help them to mitigate the seasonal variations.
- Improvements in approval periods for power exchange transactions to facilitate more secure energy supplies.
- Need for a more inclusive term-ahead market contracts, uniform regulatory standards for REC e-certificates and carbon credit trading schemes across South Asia to facilitate seamless product inclusion for BBIN nations without additional marketplace investments.
- Market coupling represents a strategic approach to create a more integrated, efficient, and liquid electricity market across the region.

SESSION V: STREAMLINING THE INVESTMENT FLOW FOR BBIN ENERGY COOPERATION

Session Chair	**Mr Sushil Bhatta**, CEO, Investment Board Nepal
Session Moderator	**Ms Monali Zeya-Hazra,** Regional Energy and Clean Energy Specialist, IPO/USAID India
Panelists	**Mr Uttam Bhlon Lama**, Director, NMB Bank, Nepal **Mr Bhishma Pandit**, Upstream Operation Officer-Asia Infra International Finance Corperation, World Bank **Mr Bikram Singh**, Executive Vice President, PTC India Limited

Objective of the Session

The session focused on addressing the substantial financial requirements inherent in power projects and infrastructure development, particularly the construction of transmission lines within the BBIN region. It aimed to explore strategies to promote both public and private investments crucial for enhancing financial cooperation among these nations. Through in-depth discussions, the session highlighted and deliberated on the various challenges hindering these investments in the BBIN region.

Session Brief

Mr. Sushil Bhatta, CEO, Investment Board Nepal, emphasized the significance of cross-border cooperation among Bangladesh, Bhutan, India, and Nepal within the framework of the BBIN Initiative. He highlighted the potential for this sub-regional collaboration to enhance economic ties and connectivity, emphasizing the importance of energy cooperation among these nations. He stressed the critical role of reliable, affordable, and sustainable energy in supporting the economic growth of rapidly

developing nations like India and Bangladesh, as well as catering to the increasing domestic consumption in Nepal and Bhutan. He highlighted the potential in the hydro resources of Bhutan and Nepal, indicating opportunities for optimizing energy resources, ensuring energy security, grid stability, and meeting the escalating electricity demands of the region. Recognizing the importance of creating a repository of credible and investable project pipelines, he discussed the need for associated infrastructure development, especially in cross-border transmission lines and hydro stations. Mr. Sushil Bhatta concluded the discussion by emphasizing the significance of market readiness and project life cycles in critical infrastructure endeavors.

Ms Monali Zeya-Hazra, Regional Energy and Clean Energy Specialist, IPO/USAID India highlighted the substantial clean energy resources within the South Asia region, noting the immense hydro potential of 350 GW. To effectively harness this clean energy, an estimated investment of $1390 billion between 2015 and 2040 is required. This investment is aimed at installing approximately 750 GW of new energy generation capacity and 443.8 GW of cross-border transmission capacity. She emphasized the need for a collaborative effort involving public finances, private sector investments, and support from multilateral financing institutions to mobilize such significant investments for regional energy projects in South Asia. This theme set the stage for the panel's discussion on streamlining the investment flow for BBIN Energy Cooperation.

Mr Uttam Bhlon Lama, Director, NMB Bank, Nepal, emphasized Nepal's strong focus on hydro projects, considering it a cornerstone of national prosperity among four identified key pillars. The bank is mandated to allocate 20% of its total portfolio to hydro investments, aligning with Nepal's regulatory framework requiring 10% of portfolios to be directed to the clean energy sector, primarily hydro, by 2026. Currently, Nepal has over 4,000 MW under construction, with another 3,000 MW awaiting syndicated loan agreements and 11,000 MW awaiting power purchase agreements. Around 30,000 MW of power projects is in various stages of development, requiring a substantial $40 billion investment. While domestic resources may cover $10 to $15 billion in the next decade, the remaining $25 billion needs to be sourced internationally. The country's willingness to invest in clean energy has strengthened, especially after agreements to export 10,000 MW to India and subsequently 5,000 MW to Bangladesh. He believes that with proper implementation of the Open Access policy in the BBIN region, these 30,000 MW projects will be bankable and investment-ready, uniquely available in Nepal. Additionally, he highlighted the regional challenges and proposed de-risking instruments and policy interventions.

Mr. Bhishma Pandit, Upstream Operation Officer-Asia Infra, International Finance Corporation, World Bank highlighted several critical challenges and strategies related to cross-border energy projects in the BBIN region. He underlined the importance of regional energy transition and tapping into the significant renewable energy potential, particularly hydro resources in Nepal and Bhutan. Identifying key areas for private sector investment, Mr. Pandit highlighted key critical factors. Firstly, emphasizing the necessity of long-term power purchase agreements (PPAs) supported by government consistency to mitigate off-taker risk and political uncertainties. Secondly, he stressed the importance of regulatory harmonization among the BBIN nations to facilitate larger-scale projects. Thirdly, he highlighted the significance of transmission and distribution infrastructure alongside power generation, urging clarity in policies governing these aspects. He called for open market mechanisms within countries to create a conducive environment for domestic and international investments and highlighted the need for project financing that involves robust risk mitigation strategies from

governments. He emphasized several limitations hindering the region's realization of its potential in cross-border power trade and attracting investments. He underscored the significance of wise regulatory frameworks tailored to technological needs. He stressed the need for revisiting the electricity act and advocated for regional grid integration with a common regulatory framework and platform for exchanges. He highlighted the distinction between public and private financing, emphasizing the need to identify where private financing is lucrative and where the public sector needs to step in, such as with large storage projects.

Mr. Bikram Singh, Executive Vice President, PTC India Limited delved into the challenges and potential solutions regarding private sector investments in regional cross-border energy trade projects. He highlighted the predominant role of governments in guaranteeing or supporting most energy projects, mentioning the limited participation of private sectors due to existing project assurances favoring government entities. He emphasized the necessity of government guarantees that extend to private sector players, encouraging private investments. He stressed the importance of developing domestic markets within each country, citing the example of India's success in renewable energy based on open-access regulations. However, this requires more robust market development and clarity on cross-border regulations and power exchanges. He highlighted the significance of transparent transmission pricing and suggested that neighboring countries take cues from India's regulations for fair transmission cost recovery, enabling cross-border infrastructure planning. He advocated for standardizing regulations and encouraging market openness to attract investors for infrastructure projects. He suggested that Governments should also facilitate mechanisms wherein private sector-led transmission projects are underwritten or backed by the government to ensure financial security. He underscored the significance of creating multilateral transactions among countries. This would provide developers with the confidence that they can trade power across borders, even in the face of uncertainties or risks in one particular country.

Key Takeaways

Challenges

- The main challenge lays in political will, urging stable policy environments, predictable licensing processes, and geopolitical insurance for investors.
- Off-taker uncertainty about selling power to regional markets and the lack of openness to private sector investments in transmission, distribution, and trading.
- Transmission bottlenecks, especially with increasing renewable energy integration, have become a hindrance. It needs holistic transmission planning and development.
- There are limitations/constraints to regional governments' financial capacity, hence it needs leveraging international financial institutions and mobilizing private sector investment.

Way Forward

- Thorough preparations before project implementation, acknowledging the challenges and learnings in handling big projects effectively.
- Public sector interventions on commercial terms.
- Implementing Open Access regulations, establishing geopolitical insurance, ensuring bankable power purchase agreements, introducing carbon trading mechanisms, promoting regional investment, and offering incentives and tax relaxations for investors.
- Opening markets for private sectors in various energy domains and devising innovative transmission tariff mechanisms or hybrid annuity models to encourage private sector participation.

- Multilateral transactions could act as a risk-mitigation strategy by enabling the shift of power sales to other countries if issues arise in a specific region.
- Timely and adequate investments and leveraging private investments through Public-Private Partnership (PPP) projects, particularly in harnessing the potential of renewable energy sources.
- Government concessions and assurances to incentivize private sector involvement are important, as it will strengthen the private sector confidence in cross border energy projects.
- Need for robust financial planning, distinguishing public and private sector roles for effective project implementation.
- Urging Bangladesh and Nepal to transition from monopoly markets to open markets, supported by government guarantees and sovereign off-taker assurances to attract investments.

AGENDA

1000 – 1100 hrs: INAUGURAL SESSION		
1000 - 1005 hrs	**Welcome Remarks & Context Setting**	**Dr Rajib Kumar Mishra** Co – Chairman, CII Core Group on Energy Security & Chairman, PTC India Limited
1005 – 1010 hrs	**Address By**	**Ms Malavika Pillai** Principal Investment officer and Infrastructure country Anchor of India, IFC
1010 - 1020 hrs	**Special Address by**	**H. E. Mr. Md. Mustafizur Rahman** High Commissioner of Bangladesh to India Bangladesh High Commission
1020 – 1030 hrs	**Special Address by**	**Shri Srikant Nagulapalli** Additional Secretary Ministry of Power, Government of India
1030 - 1040 hrs	**Keynote Address by**	**Mr Gopal Prasad Sigdel** Secretary Ministry of Energy, Water Resources, and Irrigation Government of Nepal
1040 – 1050 hrs	**Keynote address by**	**Mr Ashish Upadhyaya** Special Secretary Ministry of Power, Government of India
1050 - 1100 hrs	**Concluding Remarks**	**Ms Seema Arora** Deputy Director General Confederation of Indian Industry

1100 – 1200 hrs

Session I: Creating a Framework for Enhanced Power Trade Across the Region: Challenges and Opportunities

Though there is a demand of open market shifting from bilateral to multilateral trade however, still the trend of bilateral trade prevails which has been fruitful and beneficial, but it requires encouragement for the multilateral trade which has multifaced challenges. This session will try to come out with a suggestive framework for enhanced power trade in the BBIN region.

1100 - 1110 hrs	**Session Chair**	**Mr Ashish Upadhyaya** Special Secretary Ministry of Power Government of India
1110- 1155 hrs	**Panel Discussion**	**Mr Prabal Adhikari** Chief (Power Trade), Nepal Electricity Authority **Mr Kencho Dorji** Joint Managing Director, Kholongchhu Project Bhutan **Mr Bikram Singh** Executive Vice President, PTC India Limited
1155 - 1200 hrs	**Interaction**	

1200 – 1300 hrs

Session II: Promoting Sustainability through Integrating South Asia: Intervention Required

Creation and implementation of a comprehensive transmission planning for establishing a robust power grid is needed for integrating BBIN region. There is a need to promote sustainability to address the climate change concerns. Exploitation of renewable energy including hydro power can play an important role to mitigate the climate change challenges. There is an effort to encourage solar and wind power. However, there is a need to exploit hydropower as balancing power which will enhance power trading and energy exchanges in the region. This session explores areas of promise, key impediments, and the policy interventions needed to promote sustainability through integrating South Asia.

1200 - 1205 hrs	**Session Chair**	**Dr D. Sai Baba** Joint Secretary Ministry of Power, Government of India
1205 - 1255 hrs	**Panel Discussion**	**Dr Netra Prasad Gyawali** Chief Executive Officer Rastriya Prasaran Grid Company Limited, Nepal **Mr S C Saxena** Executive Director and Head, NLDC **Mr Ashok Pal** Deputy COO CTU **Mr Sanjay Johari** Head-Business Development Adani Energy Solutions Limited
1255 - 1300 hrs	**Interaction**	
1300 - 1340 hrs	**Lunch**	

1340 – 1445 hrs

Session III: Balancing Infirm Power: Role of Hydropower and Pump Storage

There is an effort to encourage solar and wind power. However, there is a need to exploit hydropower as balancing power which will enhance power trading and energy exchanges in the region. This session explores areas of promise, key impediments, and the policy interventions needed to balancing Indian infirm green power from hydropower of Nepal and Bhutan.

1340 - 1345 hrs	**Session Chair**	**Mr Nabin Raj Singh** Joint Secretary Ministry of Energy, Water Resources and Irrigation, Government of Nepal
1355 - 1440 hrs	**Panel Discussion**	**Mr Rahul Varshney** Managing Director and Country Head – India Statkraft **Mr Ashish Garg** Vice President Independent Power Producers Association Nepal **Mr Tshewang Dorji** Director (HR) Druk Green Power Corporation Limited, Bhutan **Mr Vivek Sharma** Head-Energy Strategy Adani Energy Solutions Ltd
1440 - 1445 hrs	**Interaction**	

1445 – 1545 hrs

Session IV: Evolving a Common Regulatory and Commercial Framework for Energy Exchanges in BBIN

In the last two years electricity market has witnessed many ups and downs. It will deliberate and discuss structural, commercial, and regulatory aspects and required policy interventions, if any, for an enhanced power exchange scenario. Market Coupling – Uniform Market Clearing Price for Cross Boarder Power Trade.

1445 - 1450 hrs	**Session Chair**	**Mr Arun Goyal** Hon'ble Member, CERC
1450 - 1540 hrs	**Panel Discussion**	**Mr Satyajit Ganguly** MD & CEO, PXIL **Mr Shyam Kumar** Head- Power Trading, NVVN Ltd **Mr Hiranmay De** Executive Director, PTC India Ltd **Mr Naveen Godiyal** Vice President, HPX Ltd
1540 - 1545 hrs	**Interaction**	

1545 – 1635 hrs

Session V: Streamlining the Investment Flow for BBIN Energy Cooperation

Power projects and creating an infrastructure like building transmission lines require huge investments. There is a need to promote public and private investments for enhancing financial cooperation in the BBIN region. However, there are many challenges which need to be discussed and deliberated to come out with specific policy recommendations.

1545 - 1555 hrs	**Session Chair**	**Mr Sushil Bhatta** Chief Executive Officer Investment Board Nepal
1555-1600 hrs	**Session Moderator**	**Ms Monali Zeya-Hazra** Regional Energy and Clean Energy Specialist IPO/USAID India
1600- 1630 hrs	**Panel Discussion**	**Mr Uttam Bhlon Lama** Director NMB Bank, Nepal **Mr Bhishma Pandit** Upstream Operation Officer-Asia Infra International Finance Corperation, World Bank **Mr Bikram Singh** Executive Vice President PTC India Limited
1630- 1635 hrs	**Interaction**	
1635 hrs	**Tea/Coffee and End of the Summit**	