GOVERNMENT OF INDIA
MINISTRY OF NEW
AND RENEWABLE ENERGY

Confederation of Indian Industry

5th International Energy Conference & Exhibition

Global Dialogue on Energy Transformation

17 – 18 December 2024 | The Ashok, New Delhi

A Retrospect

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EXECUTIVE SUMMARY

The **5th International Energy Conference & Exhibition (IECE) 2024**, held on **December 17-18, 2024, at The Ashok, New Delhi**, stood as a landmark event in the Confederation of Indian Industry's (CII) annual calendar, showcasing its commitment to advancing India's energy transition. Themed **"Global Dialogue on Energy Transformation,"** the event aligned with CII's 2024 focus on **"Atmanirbhar Bharat through Sustainable Growth"** and brought together a diverse assembly of policymakers, industry leaders, global investors, and thought leaders to chart a sustainable, low-carbon, and energy-secure future.

Against the backdrop of India's ambitious commitment to achieving **net-zero emissions by 2070**, the conference highlighted the issues that emerge as the country moves towards **500 GW of renewable energy capacity by 2030**.

The conference was structured around four tracks of Energy Supply, Energy Access, Energy Transition and Manufacturing for Energy. Under these tracks, the sessions focussed on a variety of issues, including the transitioning of conventional fuel-based energy systems.

A report on "Energy Transition for Viksit Bharat 2047" was launched during the event, outlining actionable strategies for a low-carbon future. Key recommendations included strengthening regulatory frameworks, streamlining approvals, enhancing R&D in emerging technologies, fostering public-private collaborations, and advancing global partnerships. As a platform for thought leadership and collaboration, the conference discussed India's leadership in the global energy transition and underscored its dynamic role in shaping a sustainable and resilient energy future.

Day 1: 17 December 2024

INAUGURAL SESSION
0945 – 1040 hrs

The session aimed to inspire a collaborative vision for a greener, more resilient India, driving progress towards the nation's goal of becoming a developed, energy-efficient economy by 2047.

Background

- India added 15 GW of renewable energy capacity between April and November 2024 as compared to 7.54 GW around the same time last year**.** A capacity of 2.3 GW was added in November 2024 alone.
- *PM Surya Ghar Yojna* has added 6.3 lakhs installation within 5 months of its inception. India has added 15 GW of renewable energy between Apr – Nov 2024.
- India's total installed renewable energy capacity now stands at 214 GW and has a 14% year-on-year growth rate.
- India has achieved a 40% reduction in carbon emissions from 2005 levels and is well on its way to meeting the 2030 target of 45%.
- Peak power demand is expected to increase by 2.5 times over the next 5-6 years

Key Takeaways

- Financial health of DISCOMs, GENCOs and TRANSCOs need to be of topmost priority.
- Investments in developing evacuation infrastructure are critical.
- Honouring Power Purchase Agreements (PPAs) is crucial to accelerate the installation and adoption of renewable energy projects.
- Wind energy is significant in the renewable energy mix to achieve cost efficiency for consumers if the challenges of intermittency are managed well. The sector has a robust manufacturing ecosystem and the potential for increased government support can help generate 500 GW of renewable target before 2030.
- Bioenergy will be imperative in achieving the vision of net zero particularly in the mobility sector. Biomass aggregation is critical and would need states' active participation supported by national efforts and international cooperation.
- Role of the states and other stakeholders particularly industry is pivotal in achieving a greener and resilient India.

Launch of "Energy Transition for Viksit Bharat 2047" Report

A joint report prepared by CII and Ernst & Young (EY) was launched. The report provides a comprehensive roadmap for achieving a sustainable, low-carbon, and energy-secure India by 2047. It outlines actionable insights across renewable energy, green hydrogen, bioenergy, and nuclear power, while emphasizing the importance of skilling and public-private collaboration.

Shri Prahlad Joshi, Minister of New & Renewable Energy and Consumer Affairs, Food & Public Distribution assured that he would work towards resolving RE industry issues like

transmission through regular interactions. *"Whatever you have to do we will work out," he said. "The government is ready to collaborate with the industry to address challenges that could hinder achieving the target of 500 GW of renewable energy by 2030."*

Mr Rajiv Memani, President-Designate, CII: *"Peak power demand is expected to increase by 2.5 times over the next 5-6 years."*

Mr Girish Tanti, Co-Chairman of the CII National Committee on Renewable Energy: *"To achieve 150 GW of wind energy by 2030, the sector must add around 16 GW annually."*

Mr Vineet Mittal, Chairman of the CII Taskforce on Green Hydrogen: *"Urged the government to expedite the clearance and approval of over 48,000 pending PSAs across various states."*

PLENARY SESSION 1

1100 – 1145 hrs

Track IV- Empowering Manufacturing: Driving Innovation and Global Competitiveness

Critical Mineral Security Partnership: *Building Supply Chain Resilience for Supporting Energy Transition*

The session underscored the pivotal role of critical minerals in India's energy transition, stressing the necessity for a well-rounded strategy to secure domestic supplies, encourage innovation, and establish resilient global partnerships. Panellists reviewed India's efforts to secure critical minerals, citing initiatives such as the National Mineral Policy and the auction process for mining blocks. They also highlighted the growing demand for these minerals, driven by the rapid expansion of renewable energy and electric vehicles. Additionally, key challenges were addressed, including technological gaps, the need for robust policy support, and the geopolitical risks posed by concentrated global supply chains.

Background

- Critical minerals will drive economic growth and help India achieve energy transition goals.
- India is a member of the US-led Mineral Security Partnership.
- 50-80% of demand for critical minerals will come from clean energy technologies by the year 2050.

Highlights

1. **Ms Ruchi Kukreja, Lead Advocacy, Aditya Birla**

- **Key Drivers for Renewable Energy Targets:** Electric vehicles (EV) and solar energy are poised to be the primary drivers for India to achieve its target of 500 GW by 2030.
- **Critical Minerals Initiative:** The Ministry of Mines has identified a list of 30 critical minerals, further narrowed down to 13, reflecting a focused approach to securing essential resources.
- **Industrial Achievement:** India has successfully developed a refining and smelting capacity of 1.1 million tons, surpassing its consumption requirement of 0.9 million tons, a significant milestone in resource efficiency.
- **Current Challenges:** Issues include technological gaps, inadequate policy support and competition from low-priced Chinese exports.

2. **Ms Anubha Taneja Mukherjee, Director-Policy & Legal, Vedanta**

- **Key Drivers for Sustainable Mining:** Government has made efforts to promote sustainable mining and attract investments through:
  - The National Minerals Policy and amendments to the Mines and Minerals (Development and Regulation) Act (MMDR).
  - Introduction of exploration licenses through auctions and the exclusion of six minerals from the list of atomic minerals under the MMDR Act (amended in 2023).

- **Deep-seated and Capital-Intensive Minerals:** Following minerals require targeted policy interventions:

    - **Copper:** Current demand at 0.7 MT, projected to rise to 1.5 MT by 2030.
    - **Lithium:** Current demand at 490 KT, expected to increase to 2 MT by 2030.
    - **Nickel:** Current demand at 0.4 MT, projected to double to 0.8 MT by 2030.
    - **Cobalt:** Current demand at 140 KT, anticipated to rise to 0.5 MT by 2030.

3. Ms Gauri Singh, Deputy Director General, IRENA

- **Transport Sector in Clean Energy Transition:** In the global shift toward clean energy and achieving net zero by 2050 it is imperative that:
    - 90% of the transport sector is decarbonized with green energy solutions.
    - Approximately 33,000 GW of renewable energy needs to be deployed.

- **Lithium Resources:** Global lithium resources are sufficient to meet demand; however, the primary challenge lies in short-term mining and processing.

- **Mineral Concentrations:** The following countries have good concentrations of minerals
    - **Australia and Chile:** Rich in lithium and copper.
    - **China:** Dominates graphite and dysprosium supply.
    - **Indonesia:** Abundant nickel reserves.
    - **Democratic Republic of Congo (DRC):** Leading supplier of cobalt.
    - **South Africa:** Key source of platinum and iridium.

- **Hurdles in its energy transition**: India faces the following hurdles.
    - **Resource Nationalization**
    - **Market Manipulation**
    - **External Shocks**

4. Mr Dinesh Mahur, Joint Secretary, Ministry of Mines

"The Ministry of Mines is fully sensitized to the importance of critical minerals in driving economic growth and achieving the energy transition goals set by the Government of India."

- **Introduction of Auction Process (2015):** A major policy reform introduced the auction process for allocating mining blocks, ensuring transparency and efficiency. 24 blocks were successfully auctioned including lithium, cobalt, and other critical minerals.
- **District Mineral Foundation Fund:**
    - Since 2015, approximately ₹1,00,000 crore has been collected through this fund.
    - About 60% of the funds have been utilized for the welfare of mining-affected population.

- **National Mineral Exploration Trust (NMET):**
    - Funded 139 critical mineral exploration projects across India to date.

    - **National Critical Mineral Mission announced in 2024-25** with an objective to boost domestic production of critical minerals, acquire critical mineral assets abroad through joint ventures, such as **KABIL (Khanij**

Bidesh India Limited) and promote the recycling of minerals to enhance sustainability.

- **Challenges:** India currently lacks efficient mineral processing technologies. There is a need for investment in this area and in mineral recycling capabilities.

5. **Mr Mahaveer Singhvi, Joint Secretary-NEST, Ministry of External Affairs**

"India has become a member of the US-led Mineral Security Partnership to engage with like-minded nations and ensure long-term access to critical resources."

"As we stand at the cusp of a global energy transition, we have the opportunity to emerge as a leader—not just in deploying clean technologies, but in creating resilient and sustainable supply chains. The energy transition is not merely a technological or economic transformation; it is a strategic imperative for our planet's future."

- **Challenges in the Global Landscape:**
  - **Geopolitical Risks:** The concentration of critical mineral reserves in a few countries poses significant geopolitical vulnerabilities.
  - **Limited Domestic Capacity:** India's domestic production capabilities for critical minerals remain underdeveloped.
  - **Disruptions:** External factors such as pandemics, conflicts, and trade restrictions continue to disrupt global supply chains.

- **Achievements of Indian Government:**
  - Diversifying Mineral Sources
  - Fostering Innovation and Technology Exchange
  - Strengthening Global Alliances such as India-US Initiative on Critical and Emerging Technologies (iCET), India-UK Technology and Security Initiative, India-UK-Korea Trilateral Technology Dialogue and India-EU Trade and Technology Council. These collaborations focus on critical areas such as clean energy partnerships, mineral collaboration, technology development, capacity building, mineral processing, data management, and mining finance.

- **Risk in India's reliance on imports for critical resources:** To mitigate this risk the government is forging partnerships with mineral-rich nations such as Australia, Argentina, Chile, and African countries to diversify its supply base.

6. **Mr Srikant Nagulapalli, Additional Secretary, Ministry of Power**

- **India has invested in Power Sector:** India has made significant investment in the power sector, with over ₹20,00,000 crore spent in the past decade. An estimated ₹42,00,000 crore will be required over the next six years to achieve energy transition and security objectives.

- **Projections for the Clean Energy Sector:**
  - **Energy Storage:** Over **330 GW of energy storage** capacity will be needed including more than **200 GWh of battery storage**.
  - **Wind Energy:** Current capacity of **45 GW** is projected to double to **100 GW**.

- **Solar Energy:** Solar energy is expected to more than triple in capacity from its present capacity of **90 GW**.

- **Infrastructure Expansion:** A substantial expansion of the transmission grid at both central and state levels will be essential to support this growth.

- **Electric Vehicle (EV) Adoption:** EV penetration, currently under **2%**, is targeted to reach **30% by 2030**, significantly increasing demand for batteries and grid capacity.

- **Manufacturing Dependencies:** The production of transformers will rely on locally sourced **CRGO (Cold-Rolled Grain-Oriented Steel)** and copper, necessitating expanded domestic manufacturing capabilities.

Key Takeaways:

- Foster strategic collaborations in technology and build a comprehensive industrial ecosystem that encompasses component manufacturers, mid-stream processors, and finished goods producers.
- Extend mining leases for critical minerals to cover their entire economic life, mirroring the recent breakthrough in the Oil Fields Regulation Act for oil production.
- Collaborate with countries like the United States and Australia to diversify critical mineral sources and strengthen domestic manufacturing capacities.
- Strengthen research and development (R&D) to improve mining efficiency and develop alternative technologies.

PANEL DISCUSSION 1

1200-1245 hrs

Track I-Enabling Energy Access: Empowering Sustainable Solutions

Scaling up Decentralised RE investment with Policy Incentives

The discussion focused on the challenges and opportunities in India's decentralised energy sector. Key points included the need for large-scale centralized generation to meet the 50 GW annual target with decentralized generation currently contributing 15-20%. Issues such as Power Purchase Agreement challenges, evacuation problems, and payment risks were highlighted. The green energy open access rules were praised for promoting decentralised energy but inconsistencies across states were noted. The potential for hybrid power stations and storage solutions was emphasized, with a focus on policy changes to support decentralised projects. The session also touched on the need for better connectivity, reduced charges, and the role of virtual power purchase agreements (VPPA) in future energy strategies.

Background:

- Need for large scale centralized generation.

- Challenges in Power Purchase Agreements
- Issues related to evacuation
- Inconsistencies across states with regard to green energy open access rules.
- Need for changes in policy to support decentralised projects.

Highlights:

1. **Mr.Neeraj Menon, Head of Projects Practice, Trilegal (Moderator of the Session)**

   - There are regulatory challenges and inconsistencies in the implementation of green energy open access rules across states.
   - Issues persist within substation capacity and the demand for hybrid power generation stations with regard to storage.

2. **Mr Parag Sharma Vice Chairman, CII National Committee on Renewable Energy and Founder & Chief Executive Officer, O2 Power**

"Ten years back solar was 3 GW currently solar is 93 GW with this year adding 25-30 GW of solar capacity in the country."

   - Decentralised generation currently accounts for 15-20% of total capacity addition in India.
   - Centralized generation would be necessary to reach the 500 GW target.

   - Identified key challenges including Power Purchase Agreements (PPA) signing delays, evacuation infrastructure issues and payment and regulatory risks for decentralised projects.

3. **Mr. S. Manikkan, Executive Director & CEO, Radiance Renewables**

   - Green energy open access rules have helped bring more commercial customers into the renewable energy fold.
   - Some states like Maharashtra and Andhra Pradesh have progressive policies defining the 30% renewable energy target.
   - ALMM policy was important for the domestic industry but had increased costs for customers in the short term.

4. **Mr. Dhananjay Kumar, Director, Engie India**:

   - Procedural delays in verifying captive project compliance have limited ISTS-connected captive project uptake.
   - Lack of real intent and commitment from DISCOMS and states have acted as a key barrier for open access projects.
   - There are challenges around changing laws and policies mid-contract.

5. **Mr. Sandeep Kashyap, CEO, Purvah Green Power Pvt Ltd RP Sanjiv Goenka Group**:

- Decentralised renewable energy is the cheapest power available which is driving industry appetite.
- Issues such as, connectivity, charges/tariffs and achieving economies of scale persist.
- There is a need for policy support on connectivity planning, charge waivers, and enabling large-scale CNI projects.

6. **Mr. Vijay Agrawal, Managing Director, Equirus Capital**:

- BSS and ESS can be aligned as tools to provide 24x7 green power supply to consumers.
- C&I industry growth in renewables is expected to mirror utility-scale growth in the coming years.
- Attributes-based procurement by consumers is currently more prevalent than pure-play VPPAs.

Key Takeaways:

- Centralized generation would be necessary to reach the 500 GW target.
- There is a need for policy support on connectivity planning, charge waivers, and enabling large-scale CNI projects.
- Issues persist within substation capacity and the demand for hybrid power generation stations with regard to storage and needs to be addressed.
- BSS and ESS can be aligned as tools to provide 24x7 green power supply to consumers.
- Revision in ALMM policy is welcomed.

PANEL DISCUSSION 2

1245 – 1345 hrs

Track II- Enhancing Energy Supply: Innovations and Strategies

Outlook for Wind Energy

The session featured a panel of industry experts, including H.E. Ms May-Elin Stener, Ambassador of Norway to India; Mr Lalit Bohra, Joint Secretary, Ministry of New and Renewable Energy; Mr RPV Prasad, Managing Director, Envision India; Mr Balram Mehta, COO & Group President, ReNew; Ms Nayantara Nag, Partner, Projects Practice, Trilegal, and was moderated by Mr J P Chalasani, Group CEO, Suzlon Group.

Background:

- India is positioned well to provide offshore wind energy.
- The demand for wind energy is high in the transmission sector.
- Wind energy sector is at a critical stage and there is an urgent need to accelerate the capacity addition in the sector.

Highlights:

1. **Mr J P Chalasani, Group CEO, Suzlon Group**

   - The wind sector is currently at a critical stage and urgently needs to accelerate wind capacity addition to meet the country's energy transition goals.
   - There is a misconception about the difference between energy transition and renewable energy capacity addition. The true goal of energy transition is to replace fossil fuel generation with renewable energy generation.
   - Wind energy is more expensive than solar energy. The focus should not be on wind versus solar, but rather on the combined potential of both wind and solar energy to achieve a sustainable energy future.

2. **H.E. Ms May-Elin Stener, Ambassador of Norway to India**
   - There are shared challenges between Norway and India in transitioning to sustainable renewable energy storage. Despite Norway being a small country, it is a major energy producer and has been a leader in renewable energy innovation, exemplified by the world's first floating offshore wind turbine.
   - India has an ambitious target of 500 GW of non-fossil fuel energy, which underscores the country's strong commitment to the energy sector.
   - India is uniquely positioned to harness offshore wind energy due to its extensive coastline.
   - Continued partnerships in the renewable energy sector between countries like Norway and India will help drive progress in achieving these goals.

3. **Mr. Lalit Bohra, Joint Secretary, Ministry of New and Renewable Energy**

- Wind energy has a crucial role in the overall energy transition. A combination of solar and wind offers the best pathway for this transition. There is need to reach a target of 10 GW of renewable energy capacity every year to meet growing demands.
- One of the significant challenges in the renewable sector is the high demand for key components, particularly in the transmission sector, such as transformers, where the supply chain is currently inadequate. Government needs to focus on strengthening the transmission sector to address this gap.
- The industry must accelerate its efforts to execute projects more swiftly. The pace of project execution needs to improve as it could otherwise lead to a decline in investments which would be detrimental to the growth of the sector.
- Government and industries need to identify necessary interventions and implement them promptly.

4. Mr. RPV Prasad, Managing Director, Envision India

- Execution remains the most significant challenge in the renewable energy sector. There is a need for all stakeholders to come together and form a taskforce to address these issues collectively.
- A key concern has been the number of wind turbines that have been erected but are not yet commissioned, which indicates inefficiencies and delays in project completion.
- Overcoming these execution hurdles is crucial for the growth and success of renewable energy in the country.

5. Ms Nayantara Nag, Partner, Projects Practice, Trilegal

- There are challenges around cost overruns. Significant portion of these overruns is linked to delays in securing the Right of Way (ROW) for the 33 kV lines, which often come much later than expected. The uncertainty surrounding the ROW, along with the frequent need to change locations, tends to arise closer to the commissioning phase, leading to increased costs.
- There is a need to streamline this process to avoid such delays and costs. Some states have clarified that certain sections of ROW are not required, offering some relief. A key challenge is the time-consuming regulatory process forces Independent Power Producers (IPPs) to enter private agreements to bypass regulatory delays and meet project timelines. Unfortunately, this approach often creates further complications, including lack of clarity and uncertainty surrounding the ROW, making the process even more problematic.

6. Mr Balram Mehta, COO & Group President,ReNew

- There are challenges and potential of renewable energy, particularly in the context of wind power.
- The first RTC (Round-the-Clock) project aiming for 80% of its generation through renewable energy faced significant issues, especially with wind energy execution. Due to these difficulties, many are shifting away from wind power and opting for a combination of solar energy and batteries instead.
- One of the major concerns with wind power is its inherent variability, which complicates its integration into energy grids and impacts reliability.

- Ensuring the execution process for renewable projects is seamless is crucial for the industry's success. If these execution hurdles can be overcome wind energy has the potential to be irreplaceable as a sustainable power source.

Key Takeaways:

- India is uniquely positioned to harness offshore wind energy due to its extensive coastline.
- Combined potential of both wind and solar energy to achieve a sustainable energy future.
- Continued partnerships in the renewable energy sector between countries like Norway and India will help drive progress in achieving these goals.
- Government needs to focus on strengthening the transmission sector to address challenges in the wind energy sector.
- Number of wind turbines that have been erected but have not yet been commissioned
- Lack of clarity and uncertainty surrounding the ROW (Right of Way) needs to be addressed.

PLENARY SESSION 2

1430 – 1515 hrs

Track IV- Empowering Manufacturing: Driving Innovation and Global Competitiveness

Turning Trade Disruption into Opportunities for Energy Transition Goods and Services

This session focused on potential to turn disruptions into opportunities for trade in energy transition goods and services. Discussions centred on how policy convergence can strengthen supply chain resilience, foster collaboration, and unlock new trade opportunities in the global energy transition market. Experts explored strategies to enhance cross-regional partnerships, improve manufacturing capabilities, and position India as a key player in the global energy supply chain. The session identified actionable pathways for driving innovation, competitiveness, and sustainable economic growth within the energy transition sector.

Background:

- India has created world's fourth largest renewable energy ecosystem.
- Trade disruptions have disrupted supply chains and it is critical to relook at flow of goods and technologies that are critical to clean energy transition.
- Policy convergence can strengthen supply chain resilience, foster collaboration and unlock new trade opportunities in the global energy transition market.

Highlights:

1. **Mr Sameer Gupta (Chairman, CII Task Force on RE, Manufacturing and CMD, Jakson Group)**

- Disruptions in supply chains, such as in solar panels, batteries, and green hydrogen electrolyzers, could delay progress in freight costs and create barriers to achieving global climate goals.
- India can leverage 10 key factors to overcome these disruptions, such as regional collaboration, policy convergence, and streamlining trade practices.
- Focus on incentivizing local manufacturing, knowledge &technology sharing, strengthening institutions, scaling up production, export competitiveness and investing in R&D to make India a global hub for energy transition.
- India should align trade policies with sustainability goals, promoting low-carbon supply chains and encouraging the use of recyclable materials in manufacturing.

2. **Mr Søren Nørrelund Kannik-Marquardsen (Minister Counsellor Director of the Trade, Council South Asia and Head of Trade, Economic & Commercial Affairs, Embassy of Denmark)**

- Trade disruptions, whether caused by the pandemic or geopolitical tensions, pose a challenge to clean energy transitions. But this challenge has also presented an opportunity, an opportunity for India to build a resilient domestic industry, create jobs, and become a global leader in energy transition.
- The opportunity lies in building resilient domestic industries in India, especially in areas like wind energy and green technologies.
- By leveraging technology and innovation (such as energy storage and grid solutions), India can accelerate its energy transition and become a leader in the sector.

3. **Dr. Ajay Mathur (Director General, International Solar Alliance)**

- Solar and wind energy are increasingly cost-effective compared to fossil fuels, providing a significant economic benefit.
- Power purchase agreements (PPAs) and regulatory changes are crucial for attracting private sector investment in solar and wind energy projects.
- A focus on solar module manufacturing and creating solar-powered electric vehicles can help meet demand in emerging markets.
- There is significant opportunity to export Indian-made solar cells to other nations, driving job creation and economic growth.

Shri Jitin Prasada (Hon'ble Union Minister of State for Ministry of Commerce & Industry and Ministry of Electronics & Information Technology, Government of India)

"India has made tremendous progress in energy under the leadership of Prime Minister Modi. India has already created the world's fourth largest renewable energy ecosystem."
"After creating one of the world's largest unified power grids in India, Prime Minister Modi has mobilized global participation under one umbrella by giving slogan of one world, one sun, one grid and the other one put one earth, one family and one future."
"The next five terms are about achieving a developed India and the next five decades about making the country completely net zero emissions. Driving this mantra of reform, perform and transform, India is marching strongly ahead on its path to achieving these goals and building a sustainable and Viksit Bharat by 2047."

- India has met its Paris 2030 climate commitments nine years ahead of schedule, positioning itself as a global leader in climate action.

- The government is leveraging policies such as the PLI scheme to strengthen domestic manufacturing in sectors like solar panel production.
- India is well-positioned to lead the global energy transition, supported by initiatives like Made in India energy products and increasing domestic production capacity.
- India's solar mission, including schemes like Prime Minister Surya Dharm, aims to make every household a power producer, creating millions of green jobs. This vision aligns with India's goal to make renewable energy 50% of the national energy mix in the next five years.
- Despite global disruptions, India has created opportunities by focusing on policy actions, global partnerships, and making energy transition goods more resilient to supply chain shocks.

Key Takeaways:

- There is a need to focus on incentivizing local manufacturing, knowledge &technology sharing, strengthening institutions, scaling up production, export competitiveness and investing in R&D to make India a global hub for energy transition.
- There is significant opportunity to export Indian-made solar cells to other nations, driving job creation and economic growth.
- The government is leveraging policies such as the PLI scheme to strengthen domestic manufacturing in sectors like solar panel production.
- Despite global disruptions, India has created opportunities by focusing on policy actions, global partnerships, and making energy transition goods more resilient to supply chain shocks.

PANEL DISCUSSION 3

1515 – 1605 hrs

Track III-Energy Transition: Seizing Opportunities for Growth and Investment

Pathway to Gas based Economy

The session featured a panel of industry experts, including Mr Sanjay Khanna, Director, BPCL; Mr Suresh P. Manglani, CEO, Adani Total Gas; Mr Chandler Matthew, Managing Director, ExxonMobil Gas (India) Pvt Ltd and Mr Akhil Mehrotra, MD & Chief Executive Officer, Pipeline Infrastructure Limited (PIL), and was moderated by Ms Soma Banerjee, Deputy Director General, Confederation of Indian Industry.

The session underscored the critical role of natural gas as a transitional and long-term energy source in India's journey towards a low-carbon economy. Speakers highlighted the challenges of infrastructure, taxation, and regulatory uniformity while emphasizing the importance of gas in complementing renewables. Key policy reforms, including a CGD Act, single-window clearances, and Consumption Linked Incentive (CLI) for MSMEs, were proposed. Infrastructure expansion, decarbonization technologies, and a focus on enabling market access were also recommended to boost natural gas adoption. The session concluded with a consensus that gas will remain a cornerstone of India's energy mix for decades to come.

Background:

- Natural gas is a transitional and long-term energy source in India's journey towards a low-carbon economy

- Currently gas contributes 6-7% share and needs to be taken to 15% in our goal towards ne zero.

Highlights:

1. **Mr. Sanjay Khanna, Director, BPCL**
   "Gas will play a very, very important role as a bridge fuel in the long run.Today, we are targeting just 18,000 tons of CBG, but with the right policies and focus, achieving 15 million metric tons in line with the 15% target is doable. We believe that it will happen and it will make a big impact on the environment."
   - The coexistence of renewable and fossil fuels as essential for a secure and sustainable energy future.
   - Natural gas was highlighted for its purity, lower emissions, and versatility in decarbonization, power generation, and industries like petrochemicals, fertilizers, and refining, while boosting grid stability.
   - Natural gas was recognized as an essential contributor to India's energy mix, particularly in domestic applications like cooking and in transportation, driving sustainability in these sectors.
   - Challenges like right-of-way access and last-mile connectivity need to be addressed through single-window clearances and expedited approvals to ensure the seamless integration of gas infrastructure.
   - CBG was identified as a game changer, needing policy interventions to scale production to 15 million metric tons and unlock its full potential.

2. **Mr. Suresh Manglani, Chief Executive Officer, Adani Total Gas**
   "A real clean India will happen when 6,30,000 MSMEs have access to natural gas and use natural gas. Today, hardly 30,000–40,000 MSMEs are partly on natural gas. Our view has been that for natural gas consumption in MSMEs and Small-Scale Industries, like we are giving PLI for manufacturing, we should give consumption-linked incentive (CLI) for MSMEs and SSIs for three to five years."
   - Natural gas is a long-term energy source that will continue to play a significant role even in the net-zero era, beyond 2070.
   - Significant progress has been made in expanding CGD networks, covering over 300 GAs and 777 districts, with more than 7,000 CNG stations now operational.
   - Despite the National Gas Grid's expansion to 32,000 km, nearly 50% of Indian districts still lack pipeline access. Mr. Manglani called for a clearer vision to ensure nationwide natural gas connectivity.
   - **Consumption-Linked Incentive (CLI)** program for MSMEs o drive natural gas adoption, boosting cleaner energy use and demand.
   - The need for uniform regulations and a possible CGD Act was highlighted to streamline approvals, eliminate policy fragmentation, and create a cohesive development framework.

3. **Mr. Chandler Matthew, Managing Director, ExxonMobil Gas India**
   "Gas is growing like crazy, from a demand perspective. It's set to grow by 50 percent by 2030, and gas demand will double in the next 15 years by 2040. Domestic production is set to decline in 2027 or 2028, and LNG is going to be more and more important as an imported product into India to meet gas demand. Terminal capacity, which currently sits at about 42 MTA in the country, will need to increase to about 60 MTA by 2030."

- There is a need for a holistic energy transition strategy involving renewables, gas, biofuels, and hydrogen.
- Policies focused on outcomes rather than favoring specific energy sources, rewarding decarbonization efforts instead of industry-specific incentives are needed.
- Drawing from US experience, tax credits for decarbonization efforts, like carbon capturespurred innovation and attracted investment in low-carbon technologies.
- India's gas demand, set to grow 50% by 2030 and double by 2040, stressing the need to expand LNG terminal capacity to 60 MTA by 2030 and enhance pipeline infrastructure.
- Opening pipeline access to more players to boost competition, lower commodity costs, and ensure broader market participation in India's energy sector.

4. **Mr. Akhil Malhotra, MD & Chief Executive Officer, Pipelines India Limited**

"Today, we have something like under-construction pipelines together, about 30,000 kilometers planned. In my view, we need another 20,000-30,000 kilometers to reach every nook and corner of this country and take gas from the current 6-7% share to 15%, which is our goal towards net zero."

- Despite gas emitting 50% less CO_2 than coal, it needs carbon pricing and favorable taxation like GST inclusion to level the playing field.
- Adopting NHAI's ROU bidding model can attract capital and expand pipelines by 20,000–30,000 km, addressing pipeline development challenges.
- Key sectors—SMEs, LNG transport, city gas distribution, and gas-based power plants—were vital in increasing gas consumption, but infrastructure and affordability support are still needed.
- The gas industry focused on reducing methane emissions, blending hydrogen, and promoting CBG from waste, demonstrating commitment to cleaner operations and innovation.
- Coal, oil, gas, renewables, and nuclear are essential to meet India's doubling energy demand in 15 years, requiring balanced policies and infrastructure.

5. **Ms Soma Banerjee, Deputy Director General, Confederation of Indian Industry**

- Gas is a crucial bridge fuel for complementing renewables, ensuring 24/7 power vital for India's low-carbon and net-zero goals.
- India's shift from a 20,000 MW solar target in 2014 to 175 GW of renewables has to be driven by strong policies and collaboration.
- Despite a 15% gas target, its share remained at 6%, underscoring the need for infrastructure, tax reforms, and consumer incentives to boost adoption.

Key Takeaways:

- Natural gas as a transitional and long-term energy source in India's journey towards a low-carbon economy.
- A uniform CGD Act to streamline regulations across stakeholders.
- Implement single-window clearance and fast-track mechanisms for gas infrastructure projects.
- Provide Consumption Linked Incentives (CLI) for MSMEs to encourage the use of natural gas.

- Significant gaps in the pipeline network and LNG infrastructure hinder natural gas adoption. Expansion of the national gas grid and building an additional 20,000–30,000 kilometers of pipelines is required.
- LNG terminal capacity needs to be increase from 42 MTA to 60 MTA by 2030.
- Develop sub-transmission lines to ensure last-mile connectivity for city gas distribution.
- Introduce carbon pricing and uniform taxation for gas to enhance affordability.
- Support compressed biogas (CBG) projects to utilize waste-to-energy potential.
- Incentivize stranded gas-based power plants to balance the grid.
- Reduce methane emissions to near zero using advanced technologies.
- Invest in hydrogen blending projects for cleaner transmission and distribution.
- Promote LNG for transport and city gas distribution to address pollution concerns.

PLENARY SESSION 3

1615 – 1715 hrs

Track II- Enhancing Energy Supply: Innovations and Strategies

Opportunities in the Green Hydrogen and Derivatives Value Chain

The discussion highlighted India's potential to become a global leader in green hydrogen production. Key factors driving this potential include strong government support, favourable policies, and India's unique advantage of combining solar and wind energy for cost-effective production. Panellists emphasized the need for successful pilot projects, accelerated grid infrastructure, robust R&D, addressing domestic offtake barriers, and international cooperation to realize this potential. Industry leaders stressed the importance of government support in securing timely grid connectivity and developing clear port guidelines for green molecule offtake. The discussion also underscored the growing domestic demand for green hydrogen, driven by sectors like steel and shipping, and the need for international collaboration to ensure India's leadership in this emerging sector.

Background:

- India has the potential to be leader in green hydrogen production.
- There is need for discussing successful pilot projects, accelerated grid infrastructure, robust R&D, addressing domestic offtake barriers, and international cooperation to realize this potential.

Highlights:

1. **Mr Vipul Tuli, Chairman, Sembcorp**

   - India's remarkable advancements in the global green hydrogen sector can be attributed to the following key factors:
     - Strong Government Support: The National Green Hydrogen Mission has provided a significant boost, ensuring policy backing and actionable frameworks.
     - Renewable Energy Synergy: India’s ability to combine solar and wind energy—an achievement only a few countries have mastered—has created a robust foundation for green hydrogen production.

- Bold, Ambitious, and Progressive Regulations.

➢ **Key Developments and Recommendations have included:**

- **Domestic Pilots and Demand**: Pilots in the steel, fertilizers, and refining sectors are crucial for domestic demand and technological advancement. There is a need to expand pilots to sectors like shipping and port operations to increase impact.

- **Infrastructure and Connectivity**: There is a need to accelerate the construction of grid infrastructure. It is important to reduce grid connectivity expansion cycles from four years to two to ensure timely project execution. There is a need to promote research and development in green hydrogen technologies, which is essential for driving innovation and reducing costs. There is an importance of aligning domestic taxes and duties with those removed for exports to encourage local consumption and production.

- **There is a need for Standardization and International Cooperation**: Harmonizing carbon intensity standards across countries will facilitate global trade. Leveraging UNFCCC Article 6.2 will enable seamless cross-border credit transfers. Pursuing G2G and industry-to-industry agreements with countries like Singapore, Japan, and Korea will establish institutional-level cooperation.

2. Mr Anil Taparia, COO-Ammonia, ACME

"With innovation and the industry's ongoing research and development efforts to create better and more economical solutions for converting water into hydrogen and subsequent molecules, we anticipate that, within the next 3 to 4 years, this alternative energy source will become as viable and competitive as the grey energy sources currently used in the industry."

➢ **Ministry of New and Renewable Energy**'s can provide assistance in securing timely connectivity for transporting solar power to the process plant.
➢ Ministry of Ports, Shipping, and Waterways can help by providing clear policy guidelines for the off-take of green molecules from ports.

3. Mr Abhay Bakre, Mission Director-National Green Hydrogen Mission, Ministry of New and Renewable Energy

➢ India has the ability to replicate the success of the solar energy sector in green hydrogen, as evident by existing strengths in renewable energy infrastructure and policymaking.
➢ A strategy for green steel production has been launched, which will generate significant domestic demand for green hydrogen.
➢ The growing demand for green ammonia in the shipping sector with 15 dual-fuel ships already operational and projections of 200 by 2030, presents India with a unique opportunity to become a leading green energy exporter. Establishing bunkering facilities along the southern coastline for ships traveling between Europe and the East, along with port storage capacities. This can drive export-focused growth. This initiative will not only meet international

demand but also revolutionize India's hydrogen derivative manufacturing industry.
- There is a need for the development of international-level testing facilities and centers of excellence.

Key Takeaways:

- India has the potential to become a global leader in green hydrogen production.
- Key factors driving this potential include strong government support, favourable policies, and India's unique advantage of combining solar and wind energy for cost-effective production.
- There is a need for successful pilot projects, accelerated grid infrastructure, robust R&D, addressing domestic offtake barriers, and international cooperation to realize this potential.
- Industry leaders stressed the importance of government support in securing timely grid connectivity and developing clear port guidelines for green molecule offtake.
- There is a growing domestic demand for green hydrogen, driven by sectors like steel and shipping, and the need for international collaboration to ensure India's leadership in this emerging sector.

PLENARY SESSION 4

1715 – 1815 hrs

Track I-Enabling Energy Access: Empowering Sustainable Solutions

From Policy to Practice: Accelerating Solar Energy Deployment

India's solar energy sector is rapidly evolving, driven by ambitious government schemes such as PM KUSUM and PM Surya Ghar Muft Bijli Yojana, which aim to expand access to clean energy through solar pumps and grid-connected solar power systems. This session will provide an overview of these schemes, highlighting their objectives, key components, and the progress made in their implementation across various states. The broader solar market landscape in India, including emerging trends, growth potential, and technological advancements, will also be explored, offering a comprehensive view of the future of solar energy in the country.

Background:

- The government’s long term vision to meet renewable energy targets presents an opportunity for private sector investment and collaboration.
- PM KUSUM and PM Surya Ghar Muft Bijli Yojana have aimed to expand access to clean energy through solar pumps and grid-connected solar power systems.

Highlights:

1. Shri Shripad Yesso Naik, Hon'ble Minister of State, Ministry of New and Renewable Energy

"A 3kW system will be able to generate more than 300 units a month on an average for a household."

"The government's long-term vision to meet renewable energy targets presents a strong business case for private sector investment and collaboration."

- India's solar energy sector has undergone a transformative journey. The government has played a crucial role in promoting clean and sustainable energy.
- Key objectives of the PM KUSUM Yojana, which includes the installation of 10,000 MW of decentralized solar power plants, the installation of 14 lakh standalone off-grid solar water pumps, and the solarisation of 35 lakh existing grid-connected agriculture pumps. This initiative will involve various stakeholders such as farmers, cooperatives, and solar developers.
- A 3-kW solar system could generate over 300 units of electricity per month for a household. Additionally, the scheme is expected to add 30 GW of solar capacity through rooftop solar installations in the residential sector.
- India's solar energy market is poised for significant growth, with the potential to become one of the largest solar markets globally. The government's long-term renewable energy goals provide a strong business case for private sector investment.
- Ongoing innovations in solar panel efficiency, battery storage, and smart grid technologies, which will further enhance solar power systems' effectiveness and affordability.
- Continued government support, private sector involvement, and public-private collaborations, India's solar energy sector is on track to meet its ambitious targets.

2. Mr Parag Sharma, Vice Chairman, CII National Committee on Renewable Energy and Founder & Chief Executive Officer, O2 Power

"Ultimately, Battery Storage System aims for a 24/7 green power supply. Storage is crucial during power gaps, and converting hydro assets into Pumped Storage Plants is a great step toward ensuring reliable round the clock power for consumers."

- There has been a remarkable growth of the solar sector in India, with capacity rising from 3 GW a decade ago to 93 GW currently, and an additional 25-30 GW expected to be added this year.
- There is importance of using domestically produced materials, noting that 80 GW of module production capacity is already in place in India.
- Despite this success there are still several challenges facing the sector. One of the key issues is the difficulty in converting Letters of Award (LOA) into Power Purchase Agreements (PPA), which remains a significant hurdle.
- Another major concern is the evacuation of power for large solar plants, as installing more than 100 MW of capacity requires contiguous land, which is only

available in Rajasthan. However, obtaining connectivity in Rajasthan is not expected to be feasible before 2030.

- It is important to strengthen state nodal agencies. Without a focus on enhancing their capabilities, the process of obtaining clearances and approvals could slow down, which would hinder the growth of the solar industry in India.

Key Takeaways:

- India's solar energy market is poised for significant growth, with the potential to become one of the largest solar markets globally.
- Several challenges facing the sector. One of the key issues is the difficulty in converting Letters of Award (LOA) into Power Purchase Agreements (PPA), which remains a significant hurdle. Another major concern is the evacuation of power for large solar plants.
- It is important to strengthen state nodal agencies.

Day 2: 18 December 2024

PLENARY SESSION 5

1000 – 1045 hrs

Track IV- Empowering Manufacturing: Driving Innovation and Global Competitiveness

Challenges to Cost Competitiveness in Domestic Manufacturing

The session focused on India's rapid growth in the consumer durables and renewable energy sectors, highlighting the need for sustainable practices to meet ambitious goals. It discussed the significant growth in industries like air conditioning, driven by rural demand, and the importance of green building initiatives. The session also addressed the challenges of building domestic manufacturing capabilities in renewable energy, reducing reliance on imports, and the need for consistent policies to remain globally competitive. Additionally, it emphasized the crucial role of adopting sustainable technologies to achieve India's net-zero goals amidst growing urbanization and construction activities.

Background:

- India's energy transition, aiming for 500 GW, presents a multi-trillion-dollar economic opportunity by 2030.
- There are challenges with regard to enhancing manufacturing capabilities in renewable energy, reducing reliance on imports, and the need for consistent policies to remain globally competitive.

Highlights:

1. **Mr B Thiagarajan, Chairman, IGBC and Managing Director, Blue Star Limited**

"Since its launch in 2001, CII's Green Business Center and sustainability initiatives have driven India's green building progress. The Indian Green Building Council is set to become the global leader in certifications, with 13 billion square feet of green buildings registered, soon surpassing the US. With over 95% market share, it sets standards across various sectors, including metro systems, inspired by Delhi Metro's green initiatives. By 2030, India aims to double its green building footprint, saving 100 billion units of energy, 320 billion liters of water, and reducing 83 million tons of CO2, while focusing on reducing carbon footprints in manufacturing."

- Discussed the growth of the air conditioners industry in India, with 65% growth this summer and 35% projected growth for the full year.
- Highlighted the rural demand and first-time buyers driving this growth.
- Mentioned the projected double-digit growth for many consumer-durable categories by 2030.
- Discussed the huge energy demand this growth will create and the need to ensure energy availability.
- Regulations and energy labelling programs in the consumer durables industry.
- Mentioned the steel industry's aim to reduce emission intensity by 20% by 2030
- Discussed the building sector's contribution of 37% to global carbon emissions and India's rapid construction growth projections.
- Highlighted the work of CII's Indian Green Building Council (IGBC) in promoting green buildings and their goal to double the green building footprint by 2030.

2. Mr Sujoy Ghosh, Vice-President and Country MD-India, First Solar

- Provided context on India's renewable energy goals by 2047 and 2070 to achieve net zero.
- Discussed China's dominance in solar manufacturing globally and the need for India to build its own manufacturing capabilities to ensure economic security.
- Highlighted the challenges of competing with Chinese manufacturing due to factors like subsidized electricity and cost of capital.
- Mentioned the opportunities in domestic demand and exports, especially to the US, which is looking to reduce reliance on China-origin supply chains.

3. Mr Dinesh Jagdale, Former Joint Secretary and Renewable Energy Expert

"India's energy transition, aiming for 500 GW, presents a multi-trillion-dollar economic opportunity by 2030. Key enablers like the Approved List of Models and Manufacturers (ALMM), Renewable Energy Linked Models (RLM) in wind, and Production-Linked Incentive (PLI) in solar are essential to achieving four main objectives: energy security, domestic value capture, export competitiveness, and structural economic transformation."

- India is becoming one of the top three economies globally within the next 5-6 years, with manufacturing playing a prominent role in this growth.
- There are achievements in solar and wind manufacturing in India, reaching over 70 GW of solar manufacturing capacity and 18-20 GW of wind capacity.

- There are challenges in domestic manufacturing, including the need for long-term consistent policies, global price and trade factors affecting competitiveness, and the importance of developing economies of scale and cost-competitive production.
- Policy interventions, such as imposing domestic content requirements in finished products and restricting imports of certain components where India has manufacturing capabilities.
- There is impact of global policies like the Inflation Reduction Act (IRA) and the need for India to position itself competitively to attract investments.
- There are challenges in accessing technology and manufacturing equipment, and the high cost of capital in India compared to other countries.
- There is a potential for India to emerge as a global manufacturing hub for certain renewable energy components like wind turbine blades.

4. Ms Soma Banerjee, Deputy Director General, Confederation of Indian Industry

- Given India's fast-growing economy and the expected increase in urbanization and construction activities in the coming years these are critical topics that need to be discussed.
- It is important to address sustainability and adopt the right technologies for India to achieve its net-zero goals.

Key Takeaways:

- There are opportunities in domestic demand and exports especially, to the US which is looking to reduce reliance on China-origin supply chains.
- Policy interventions are required in imposing domestic content requirements in finished products and restrict imports of certain components which India is capable of manufacturing.
- Regulations are needed in energy labelling programmes in the consumer durables industry.

PANEL DISCUSSION 4

1045 – 1145 hrs

Track II- Enhancing Energy Supply: Innovations and Strategies

Innovations and Strategies for Utility-Scale Renewable Energy Integration

As the world transitions to cleaner energy, integrating large-scale renewable power into existing grids presents both challenges and opportunities. Innovations and strategies for incorporating renewable energy at the utility scale, while maintaining grid stability and reliability, are crucial. Strengthening grid connectivity through expanded and modernized transmission infrastructure, such as the Inter-State Transmission System (ISTS), is critical for effective integration. Land use challenges are being addressed with innovative solutions and successful case studies from around the world, highlighting effective strategies for large-scale renewable energy integration.

Dr D. Sai Baba, Joint Secretary, Ministry of Power

"From the present level of 454 GW of generation we are planning to go up to 900 GW by 2032."

Mr Vivek Srivastava, CEO- India Business, Suzlon Group

"Networks are critical enabler for the economy decarbonization."

Mr RK Tyagi, Chairman, PGCIL

"Our 765 KW transmission network is the largest network in the world even more than USA, Korea, Canada, Russia."

Mr R P Gupta, Chairman & Managing Director, Solar Energy Corporation of India Limited

"Fundamental difference between conventional (thermal) energy and renewable energy is the variability part of It."

Mr Arun Sharma, CEO-Infra Business, Sterlite Power Transmission Ltd

"If we look at the debt funding while majority are coming from the government owned NBFCs but there are NBFCs which are willing to provide debt funding."

Background:

- It is important to integrate large-scale renewable power into existing grids this presents both challenges and opportunities.
- Innovations and strategies for incorporating renewable energy at the utility scale, while maintaining grid stability and reliability, are crucial.

Highlights:

1. **Mr Vivek Srivastava, CEO- India Business, Suzlon Group**

   - There are challenges within the evolving landscape of decarbonizing the economy.
   - While the focus was once on solar deployment, manufacturing, and wind energy, most projects are now being developed on a central transmission organization (CTO) basis, with states playing a less active role.
   - There are several challenges associated with variable renewable energy, including its uncertainty, intraday and seasonal variability, and issues like resource droughts. These factors impact grid stability, causing concerns around resource adequacy, frequency stability, and voltage stability.
   - It is important to be realistic about renewable energy integration and understanding the pressures it places on the grid.
   - The key areas for improvement, including unlocking the potential of distributed energy resources, enhancing network balancing and operation, connecting large-scale renewable energy projects, and improving overall network resilience.
   - While the Indian grid is versatile and resilient, it will need to be designed and adapted to address these emerging challenges.

2. **Dr. D. Sai Baba, Joint Secretary, Ministry of Power**

- The power sector plays a pivotal role in the economic development of the country. Ambitious goals include a target of 500 GW of renewable energy by 2030 and reducing fossil fuel-based power generation to less than 50% by 2070.
- The national electricity plant has been recently launched last year and has begun transmission this year.
- Collaborative efforts of the Ministry of Power and the Central Electricity Authority (CEA) in both policy and technology advancements are needed. To address grid stability, several startcoms have been deployed in renewable energy (RE) concentrated areas, along with new technologies like synchronized conductors.
- The importance of AI and ML technologies for accurate forecasting in the renewable energy sector is to be taken note of.
- Addressing the challenges of Right of Way (ROW), which has become a significant bottleneck.
- By emphasizing the crucial role of battery storage systems in energy storage, which helps manage the variability of renewable energy generation and improves grid stability.

3. Mr RK Tyagi, Chairman, PGCIL

- Highlighted India's position as having one of the largest grids in the world, with over 450 GW of storage capacity, more than 13 lakh MVA of capacity, and 460,000 circuit kilometers.
- The country has an ambitious plan to integrate 500 GW of renewable energy into this extensive transmission network.
- The typical grids are not designed to handle variations or low inertia, which presents challenges when integrating renewable energy. However, India’s 765 kV transmission network, the largest in the world, surpassing even those of the USA, Korea, Canada, and Russia, is a strong system capable of supporting such integration.
- There are successful examples in states like Rajasthan and Gujarat, where renewable energy integration has been achieved, and potential solutions can be discussed from these instances to improve the sector further.
- There is a challenge of balancing demand and generation across different regions, emphasizing that while it is a complex issue, it is a good challenge to have in the context of India’s energy transition.

4. Mr. R P Gupta, Chairman & Managing Director, Solar Energy Corporation of India Limited

- Discussed the fundamental difference between conventional (thermal) energy and renewable energy, emphasizing the variability of renewable sources. While thermal energy provides assured power, renewable energy is only available when the sun is shining or the wind is blowing.
- Conventional energy sources, like coal, are not universally available, whereas renewable energy is more evenly distributed across the country.
- Highlighted the importance of utilizing renewable energy to its fullest potential and stressed the need to reduce transmission and distribution costs.
- Government had previously encouraged the establishment of renewable energy plants in high-potential areas by socializing transmission costs, particularly in regions like Gujarat and Rajasthan. This strategy facilitated the development of

renewable energy infrastructure in these areas, which was crucial for supporting the growing renewable energy capacity.

5. **Mr. Arun Sharma, CEO-Infra Business, Sterlite Power Transmission Ltd**

- There is significant opportunity for India to reduce its dependency on energy imports, which cost the country nearly 150 billion dollars annually, by integrating renewable energy (RE) into the system. If RE is fully integrated and utilized, it could transform India into a different nation altogether.
- There is a crucial role of private players across the entire supply chain, from equity investors, debt funding partners, and EPC players to developers and the transmission sector.
- While most debt funding comes from government-owned NBFCs, private NBFCs are also willing to invest, alongside private sector OEMs involved in supplying transformers and conductors.
- Private EPC companies have significant capacity, and many developers have already made contributions to the sector, though more involvement is needed.
- It is important to have greater developer participation,. Developers seek risk-adjusted returns, and addressing key challenges like Right of Way (ROW), land acquisition, and the dynamic nature of the market can reduce risks. By tackling these issues, the role of developers in India's renewable energy sector can be significantly expanded.

Key Takeaways:

- The country has an ambitious plan to integrate 500 GW of renewable energy into this extensive transmission network.
- There are successful examples in states like Rajasthan and Gujarat, where renewable energy integration has been achieved, and potential solutions can be discussed from these instances to improve the sector further.
- Private EPC companies have significant capacity, and many developers have already made contributions to the sector, though more involvement is needed.

PANEL DISCUSSION 5

1200 – 1300 hrs

Track I-Enabling Energy Access: Empowering Sustainable Solutions

Financing Energy Transition

The session featured a panel of Industry experts, including Mr Shyam Sharma, Chief Financial Officer, O2 Power ;Mr Abhishek Poddar, India Country Head & Executive Director, Macquarie Infrastructure & Real Assets; Mr Siddharth Gauba, Executive Director, Eversource and Mr SK Dey, General Manager, IREDA. The session was moderated by Mr Somesh Kumar, Partner & Leader (Power & Utilities) GPS and EY India.

The panel on financing India’s energy transition discussed challenges, opportunities, and mechanisms to meet the nation’s net-zero target by 2070. Moderator Mr Somesh Kumar highlighted the $10 trillion funding requirement and the need to lower capital costs and risks. Panellists noted the availability of capital but emphasized improving risk-adjusted returns to attract investments, addressing issues like land acquisition and high capital costs. They stressed the role of blended finance, concessional funding, and government subsidies in

scaling up private investment and financing technologies like green hydrogen. The session concluded with a call for structural innovations and policy support to drive climate financing.

Mr. Abhishek Poddar, India Country Head & Executive Director, Macquarie Infrastructure & Real Assets

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Mr Shyam Sharma, Chief Financial Officer, O2 Power

Mr Siddharth Gauba, Executive Director, Eversource

Mr SK Dey, General Manager, IREDA

"Today, we are sitting at around 203 gigawatts of installed renewable energy capacity, and out of the 500-gigawatt target, 282 gigawatts still need to be installed in the next five years. For this, we require an investment of at least ₹30–32 lakh crores. With a 70-30 debt-equity ratio, ₹8–10 lakh crores will come from equity, while bonds and NBFCs like IREDA, PFC, and REC will fund the rest."

Background:

- India will need about $10 trillion by 2070 to fund its energy transition. Both domestic and international funding resources to bridge this gap.
- India must try to provide for best risk-adjusted return situation for global investors.

Highlights:

1. **Mr Somesh Kumar, Partner & Leader (Power & Utilities) GPS and EY India**

"India obviously has a target to achieve net zero by 2070, and it is estimated that probably India will need about $10 trillion by 2070 to fund its energy transition. Bridging this gap will require a mix of domestic and international funding resources. Financing is required not just for setting up renewable capacity but for the whole ecosystem of the energy sector, including modernizing the grid, enhancing storage capacities, and supporting innovative technologies like green hydrogen and electrifying transport."

- India's energy transition to achieve net zero by 2070 requires an estimated $10 trillion in funding necessitating both domestic and international financing sources.
- This financing was essential not only for renewable energy generation but also for modernizing grids, expanding storage capacities, and supporting emerging technologies like green hydrogen and electric mobility.
- Existing financing from international institutions such as the World Bank, ADB, and the Green Climate Fund was significant but inadequate to meet the overall requirements.
- Mobilizing finance from domestic sources, including banks, NBFCs, and pension funds, was critical to addressing the funding gap.
- Developing a robust risk framework and leveraging innovative financing mechanisms, such as green bonds and carbon pricing, was essential to attract investments and reduce the cost of capital.

2. **Mr Abhishek Poddar, India Country Head & Executive Director, Macquarie Infrastructure & Real Assets**
"*We've invested about $3.5 billion of equity in India over the last 10–15 years in the infra and energy transition space. While capital availability is not an issue, whether on the debt or equity side, India does not always present the best risk-adjusted return situation for global investors. The capital will go wherever the risk-adjusted returns make better sense."*

- Capital availability was not an issue for India's energy transition, with $3.5 billion invested by **Macquarie Infrastructure & Real Assets** over the past 10–15 years. However, the challenge lay in ensuring risk-adjusted returns that were competitive on a global scale.
- Emerging technologies like green hydrogen and energy storage offered significant opportunities but required long-term capital, as short-term or public market funding was inadequate for such projects.
- The largest pools of infrastructure capital globally came from pension funds and retirement benefits, but Indian institutions like EPFO, NPS, and insurance companies had minimal exposure to private investments in renewables.
- The developers faced conflicting pressures from policymakers, with demands to reduce costs while bearing risks like land acquisition, transmission, and penalties, driving up investor return expectations.
- Private sector participation in renewable energy financing remained limited, as most private banks and NBFCs preferred retail and customer loans due to better risk-adjusted returns.
- Policies to reduce risks, like blended finance or regulatory reforms, were essential to attract more domestic and international capital.

3. **Mr. Shyam Sharma, Chief Financial Officer, O2 Power**

"On the debt side, institutions like IREDA, PFC, REC, and others have raised a lot of capital to fund green projects. However, the average lending rate is still 9.5–10%, which is high for infrastructure projects with a life of 25–30 years. To lower costs, solutions like a robust green bond market, clear green taxonomy, and mandatory investments from insurance companies could provide funding at more optimal rates."

- Capital was available but required at competitive costs, with equity investors seeking high returns and lenders prioritizing strong projects and management.
- Long-term financing was essential for 25–30-year projects, requiring deeper capital markets and greater use of green bonds and insurance funds.
- Delays in land acquisition and right-of-way issues hindered financing and execution, especially for large hybrid projects with wind, solar, and storage.
- Borrowing costs, averaging 9.5–10%, remained high due to inflation and limited refinancing options for commissioned assets.
- Expanding green bonds and mandating insurance investments in renewables could lower costs and enhance sector liquidity.

4. **Mr. Siddharth Gauba, Executive Director, Eversource**

"*Globally, the amount of climate finance is about one-fifth of where it needs to be. In India, we are attracting around 18–20% of our annual climate finance requirements, with 72% of this focused-on power and transportation."*

- Climate finance globally was at only one-fifth of the required levels, and in India, only 18–20% of annual climate finance needs were being met, with most funding focused on power and transportation sectors.
- Institutional investors preferred sectors with well-defined business models, clear cash flows, and medium-to-large ticket sizes, leading to hesitancy in investing in areas with high upfront costs, perceived risks, and concerns like greenwashing.
- Blended finance proved effective in company's first fund, which leveraged the UN Green Climate Fund to secure a 27X multiplier in commercial capital, showcasing the potential of concessional funding to crowd in private investments.
- Mechanisms like currency depreciation protection, viability gap funding, and grants for early-stage technologies needed to coexist to address different sectoral and technological risks.
- Expanding tools like green bonds and Infrastructure Investment Trusts (InVITs) could create balanced portfolios and attract broader funding for renewables, land acquisition, and infrastructure, accelerating timely execution of projects.

5. **Mr. SK Dey, General Manager, IREDA**

"Today, we are sitting at around 203 gigawatts of installed renewable energy capacity, and out of the 500-gigawatt target, 282 gigawatts still need to be installed in the next five years. For this, we require an investment of at least ₹30–32 lakh crores. With a 70-30 debt-equity ratio, ₹8–10 lakh crores will come from equity, while bonds and NBFCs like IREDA, PFC, and REC will fund the rest."

- India needs to install 282 GW of renewable energy capacity over the next five years to meet its 500 GW target, requiring an investment of ₹30–32 lakh crores, with 30% from equity and the rest from bonds and NBFCs like IREDA, PFC, etc.
- IREDA, with over 36 years of experience, planned to fund ₹2.5–3 lakh crores in the next five years, supported by its strong track record of over ₹2 lakh crores in sanctioned loans and NPAs of less than 1%.
- Regulatory reforms, such as raising SPV funding limits from 15–20% and establishing a green taxonomy, were critical to reduce funding costs and attract investments through green bonds.
- Mandating insurance companies to allocate 5–7% of their AUM to renewable bonds could unlock ₹60–70 lakh crores, providing low-cost funding for the sector.
- IREDA actively funded new technologies like hydrogen and electrolyzers and offered competitive loans in foreign currencies through its Gift City office to support domestic and international renewable projects.

Key Takeaways:

- Mandate institutional participation: Require large domestic institutions like EPFO, NPS, and insurance companies to allocate 5–7% of their assets under management (AUM) to renewable energy bonds or infrastructure investments.

- Encourage public-private partnerships and blended finance models that include concessional loans or first-loss capital from development banks.
- Provide low-cost currency risk mitigation for foreign investors to make dollar-denominated capital more viable for Indian projects.

- Establish a comprehensive green taxonomy: Define standardized criteria for projects to qualify as "green" to build investor confidence in green bonds and avoid greenwashing.
- Allow NBFCs to exceed net worth limits for single-project lending.
- Streamline land and right-of-way (ROW) approvals at state and central levels.

- Offer tax benefits, risk guarantees, or co-lending schemes for renewable investments.
- Expand Infrastructure Investment Trusts (InVITs) to recycle developer capital and attract retail investors.

- Provide financial support for green hydrogen, battery storage, and pumped storage.
- Use global funds like GCF for early-phase high-risk technology projects.
- Viability Gap Funding (VGF): Offset upfront costs for nascent technologies to reach commercial viability.

- Engage Multilateral Banks: Secure concessional financing and technical aid for energy transition projects.
- Leverage Carbon Markets: Implement carbon pricing to fund renewable and decarbonization efforts.

- Expand R&D Tax Credits: Offer enhanced tax benefits for investments in renewable technology R&D, particularly for startups and small-scale innovators.
- Encourage Public-Private R&D Collaborations: Use pooled funding to foster innovation in areas like energy storage, grid modernization, and green hydrogen production.

PANEL DISCUSSION 6

1300 – 1345 hrs

Seizing Opportunities for Growth and Investment

Hydropower Generation for Advancing Energy Transition

The session highlighted a resurgence of interest in hydropower and pumped storage in India, driven by the government's Net Zero goals. Key policy updates include a forthcoming revised PSP policy, streamlined DPR processes and increased support for hydro developers, particularly in the Northeast. Efforts are underway to expedite project approvals, reduce costs through ISTS exemptions and address infrastructure challenges. Industry leaders emphasized the importance of financial viability, meticulous planning and risk assessment for successful project implementation while cautioning against hasty adoption of pumped storage. While summing up the conference, the Deputy Director General of CII, Ms Soma Banerjee highlighted the CII and EYreport launch on “Energy Transition for Viksit Bharat 2047” and the launch of 2nd edition of *“Energy Transition Investment Monitor”. She also announced the 6th Edition of IECE scheduled for the 22nd and 23rd September 2025.*

Mr Mohammad Afzal, Joint Secretary-Hydro, Ministry of Power

Mr Bharat Parekh, Executive Director, CLSA India Private Limited

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Background:

- There is a resurgence of interest in hydropower and pumped storage in India, driven by the government's Net Zero goals.
- Key policy updates include a forthcoming revised PSP policy, streamlined DPR processes and increased support for hydro developers, particularly in the Northeast.

Highlights:

1. **Mr Mohammad Afzal, Joint Secretary-Hydro, Ministry of Power**
   "Today we have 42 GW of conventional hydro, about 5 GW of PSP in the system, and we plan to add more than 24 GW by 2031 with large-scale integration of PSP."

   - **A** new PSP policy is expected soon, with updates to the 2023 guidelines. He emphasized efforts to streamline the Detailed Project Report (DPR) process for PSPs, aiming for completion within two years, and plans to rationalize bank guarantees to facilitate smoother project implementation.
   - Detailed comprehensive support services for conventional hydro developers, including enabling infrastructure and tariff support to offset higher costs compared to solar and wind projects.
   - Highlighted central financial assistance for hydro projects in the Northeast region of India, focusing on state government equity support and fostering joint ventures between CPSEs and state governments, particularly in Arunachal Pradesh.

   - Encourage developers by escalating tariffs as an incentive for signing Power Purchase Agreements (PPAs). Additionally, he stressed the importance of independent engineers and dispute-resolution mechanisms to avoid delays.

   - There is an urgent need to address the lack of testing labs for large-scale turbines, emphasizing its criticality for the successful development of hydropower projects.

2. **Mr. MG Gokhale, Member-Hydro, CEA**

   - Emphasized ongoing efforts to expedite the clearance of Detailed Project Reports (DPRs) and reduce delays to accelerate hydropower project implementation.
   - The government has waived ISTS charges for hydropower projects, reducing the landed cost by at least ₹1 per kilowatt-hour, making projects more financially viable.
   - The government is extending significant support to hydropower projects in the Northeast part of India, offering 24% equity, funding up to ₹750 crores in projects, and providing enabling infrastructure.
   - Regulators are ensuring a 17% post-tax return for hydropower projects, enhancing their attractiveness to developers and investors.
   - There are timely and cost-effective hydropower projects, demonstrating the potential for efficient project execution in the sector.

3. **Mr Sandeep Batra, Executive Director, NHPC**

- Highlighted NHPC's active exploration of 14 GW of pumped storage projects, with projects under consideration across various states.
- Acknowledged the lengthy and time-consuming nature of the Detailed Project Report (DPR) process and stressed the need to expedite it for more efficient project execution.

4. **Mr Bharat Parekh, Executive Director, CLSA India Private Limited**
"Over the last decade, under Prime Minister Modi's leadership and the Net Zero vision, we are witnessing a renaissance in hydropower and pumped storage, which I believe will serve as India's battery for achieving the Net Zero scenario."

- Expressed enthusiasm about the resurgence of hydropower and pumped storage, calling it a "renaissance" driven by India's Net Zero vision.
- Emphasized the significance of risk-adjusted returns for financial markets, underscoring the need for sustainable and profitable project models.
- Highlighted the critical role of meticulous planning and risk assessment in hydro projects, particularly concerning tunnel length and related engineering challenges.
- Warned against the hasty adoption of pumped storage, emphasizing that inadequate planning could diminish its potential, turning it into a fleeting trend rather than a sustainable solution.

Key Takeaways:

- Comprehensive support services are being provided for conventional hydro developers, including enabling infrastructure and tariff support to offset higher costs compared to solar and wind projects.
- Central financial assistance is being provided for hydro projects in the Northeast region of India focusing on state government equity support and fostering joint ventures between CPSEs and state governments particularly in Arunachal Pradesh.
- Regulators are ensuring a 17% post-tax return for hydropower projects, enhancing their attractiveness to developers and investors.
- Meticulous planning and risk assessment in sustainable projects is a must to ensure risk-adjusted returns.

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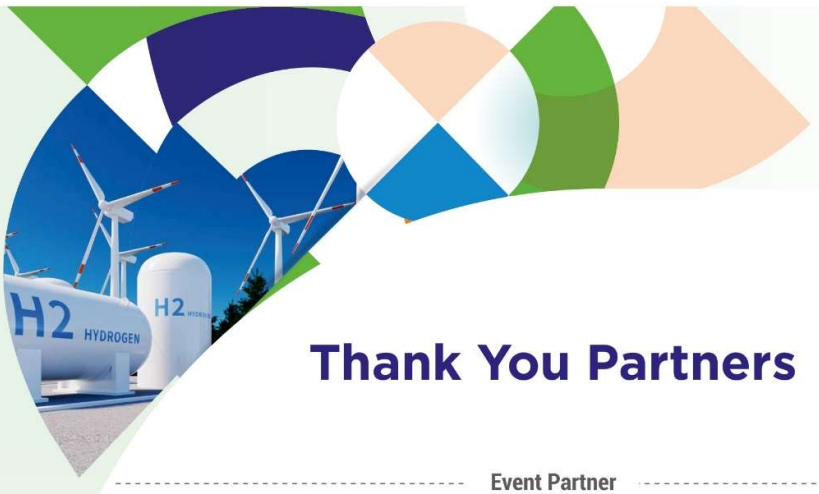

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