Conference on
Power System Operational Reliability through Flexibility

19th June 2025, New Delhi

(L-R) Shri K.K. Singh, Director (WR) CBIP; Shri Vivek Pandey, CGM, Grid India & Chairman, CIGRE NSC C2; Dr. Subir Sen, Former ED, POWERGRID & Chairman, CIGRE NSC C1; Shri A.K. Dinkar, Secretary, CBIP, and Shri Sanjeev Singh, Director (Energy), CBIP

Brief Report

The opening session of the two-day conference on 'Power System Operational Reliability through Flexibility' was held on 19th June 2025 at the CBIP Conference Hall, New Delhi. The event brought together distinguished experts and professionals from the power sector to deliberate on enhancing operational reliability in view of increasing system flexibility, driven by growing integration of renewable energy. The conference was organised by CBIP jointly with CIGRE India. The conference supported by Central Electricity Authority and sponsored by Grid India.

The opening session was graced by the presence of the following dignitaries on the dais:

- Shri A.K. Dinkar, Secretary, CBIP
- Dr. Subir Sen, Former Executive Director, POWERGRID & Chairman, CIGRE NSC C1 – Guest of Honor
- Shri Vivek Pandey, CGM, Grid India & Chairman, CIGRE NSC C2 – Special Address
- Shri Sanjeev Singh, Director, CBIP
- Shri K. K. Singh, Director, CBIP

Auspicious Start: Lighting of the Traditional Lamp

1. Shri A. K. Dinkar, Secretary, CBIP, extended a warm welcome to all dignitaries and participants. He highlighted the timely relevance of the conference theme in the context of India's ambitious energy transition targets and increasing demand for a reliable, flexible power system. He also expressed gratitude to Grid India for their support in organizing the event.

   Shri Samir Saxena, CMD, Grid India & Chairman, CIGRE SC C5, was scheduled to deliver the Keynote Address, but was unable to attend due to an urgent meeting at the Ministry. His presence was acknowledged and appreciated.

2. Shri Vivek Pandey, CGM, Grid India, in his remarks, highlighted that the theme of the conference was highly relevant in the present scenario. He noted that India being declared the third-largest economy brings with it a rise in energy demand, making reliable power and operational flexibility more critical than ever. He stressed that the power system is the backbone of any economy, and appreciated CBIP for organizing the event and inviting him to the session.

3. Dr. Subir Sen, Former ED, POWERGRID, in his address, thanked CBIP for the opportunity to speak on such a significant subject. He emphasized that energy transition and transmission have become central themes not only in India but globally. He noted that consumer expectations for reliable, affordable, and acceptable power supply are rising, making such forums extremely important. He appreciated the support of the six National Study Committees (NSCs) of CIGRE for this conference and provided vision into the current scenario of India's power sector – including installed capacity and the growing role of solar and wind energy.

4. The session concluded with a Vote of Thanks delivered by Shri Sanjeev Singh, Director, CBIP. He expressed his sincere appreciation to all dignitaries, especially Shri Vivek Pandey and Grid India, for their active support and valuable contributions. He also acknowledged the continued support of all participating organizations, speakers, and delegates, and wished the conference great success.

The opening session successfully set the tone for two days of engaging discussions and technical sessions focused on enhancing power system reliability through greater operational flexibility.

Following the opening session, the conference moved into technical discussions, with presentations by eminent experts from organizations such as the Central Electricity Authority (CEA), Grid Controller of India Ltd., National Load Despatch Centre (NLDC), POWERGRID, ANDRITZ Hydro GmbH, EnTruist Power and Bechtel Corporation, delivered across various technical sessions.

Welcome Address by Shri A.K. Dinkar, Secretary, CBIP

Shri Vivek Pandey, CGM, Grid India & Chairman, CIGRE NSC C2, addressing the participants during inaugural session

Dr. Subir Sen, Former ED, POWERGRID & Chairman, CIGRE NSC C1, addressing the participants during inaugural session

DAY 1: 19TH JUNE 2025 – TECHNICAL SESSIONS

Session Highlights:

1. **Flexibility Requirement vis-à-vis Resource Availability by 2032**
   - Presented by: Apoorva Anand, Deputy Director, CEA (on behalf of Ms. Ammi Ruhu Toppo, Chief Engineer, CEA)

   The Presentation covered future flexibility needs of the Indian grid and the expected resource availability by 2032, focusing on the importance of planning to address operational challenges arising from the energy transition.
2. **The Impact of Variable Renewable Energy (VRE) on Power System Stability – The Renaissance of Synchronous Condensers**
   - Presented by: Robert Neumann, ANDRITZ Hydro GmbH (via VC)
   - Co-authors: Gerfried Maier, Serdar Kadam, Werner Ladstätter

   The presentation emphasized the crucial role of synchronous condensers in enhancing system inertia and voltage support in high VRE scenarios.
3. **Consideration in Grant of Connectivity to Facilitate Flexibility**
   - Presented by: Chinmay Sharma, Chief Manager, POWERGRID

   The presentation outlined regulatory and operational considerations for granting grid connectivity with an aim to support flexibility and reliability.
4. **Case Studies from the US: 'Reliability Guideline – Reactive Power Planning'**
   - Presented by: Sanjeev Bhatia, Bechtel Corporation

The case studies provided deep understanding into best practices from the US regarding reactive power management to enhance grid resilience.

Shri Sanjeev Singh, Director (Energy), CBIP, addressing the participants

DAY 2: 20TH JUNE 2025 – TECHNICAL SESSIONS & PANEL DISCUSSION

Session Highlights:

1. **Flexibility through Generation Technology**
   - Presented by: Mr. Balkrishn Kamath & Mr. Jayant Sinha, Sr. Principal Consultants, EnTruist Power

   The presentation focused on advancements in generation technologies that can offer enhanced operational flexibility.
2. RE Integration through BESS: Policies, Regulations and Schemes
   - Presented by: Dr. Veepin Kumar, Dy. Director – ES&SD Division, CEA & Deepak Chaudhary, Dy. Director, CEA

   The presentation emphasised Covered regulatory landscape and government schemes supporting the integration of Battery Energy Storage Systems (BESS).
3. Flexibility through Power Market Design & Scheduling
   - Presented by: Shri Debajyoti Majumdar, Chief Manager, NLDC

The speaker discussed market-based mechanisms to incentivize flexibility and the role of advanced scheduling systems.

4. Enabling Flexible Operation through Operation / Information Technology
   - Presented by: Sh. Rohit Shukla, Manager, Grid Controller of India Ltd

   The speaker highlighted the role of IT-OT integration, SCADA/EMS systems, and forecasting tools for flexible grid operation.
5. **Enhancing Flexibility in Grid Operations through Technology-Driven Innovations**
   - Presented by: Mr. Balkrishn Kamath & Mr. Jayant Sinha, EnTruist Power

   The last presentation showcased emerging technological solutions and pilot projects supporting operational flexibility.

PANEL DISCUSSION

Challenges and the Way Forward in Flexible Grid Operation with Higher Renewable Penetration

Chairperson : Ms. S. Usha, Executive Director, National Load Despatch Centre, Grid Controller of India Ltd.

Panelists : Mr. Balkrishn Kamath and Mr. Jayant Sinha, EnTruist Power

Ms. S. Usha, ED, NLDC Grid Controller of India Ltd.

Ms. S. Usha emphasized the importance of the conference topic, highlighting the following key points in her address:

- India's current installed capacity stands at approximately 475 GW, with nearly 50% (220 GW) contributed by renewable energy sources.
- The Indian power sector is on a rapid growth path, aiming for an ambitious 2,100 GW installed capacity by 2047, including 1,200 GW of solar and over 400 GW of wind energy.
- Hydro Pumped Storage is a major focus area, with a projected increase from the current 4.7 GW to 116 GW by 2047.
- Thermal power generators are being requested to revise their technical minimum load from 55% to 40%, a challenging task due to plant-specific operational constraints.
- She emphasized the pivotal role of Grid Controller of India in planning and coordinating future grid expansion and reliability enhancement.

CONCLUSION

The two-day conference provided a comprehensive platform for knowledge sharing and important discussions on enhancing grid flexibility and ensuring power system reliability. The technical sessions covered technological, regulatory, operational, and market-based approaches to manage the evolving power system changing aspects due to increased variable renewable energy integration.

The discussions concluded with a consensus that healthy policy frameworks, innovative technologies, and combined efforts are vital for transitioning to a flexible, secure, and reliable power grid in India.

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