UK Government

iDeeksha

Bureau of Energy Efficiency
Ministry of Power, Government of India

ASPIRE Programme

Accelerating Smart Power & Renewable Energy in India

SECTORAL WORKSHOP & STUDY TOUR ON

BEST PRACTICES IN ENERGY EFFICIENCY IN PULP & PAPER SECTOR: A PATH FOR DECARBONISATION

WORKSHOP

Date: *13th February 2024*
Time: *09:00 – 17:30 IST / 03:30 – 12:00 GMT*
Venue: *Hotel Radisson Blu, Amritsar Punjab*

STUDY TRIP

Date: *14th February 2024*
Time: *09:00 – 13:00 IST / 03:30 – 07:30 GMT*
Venue: *Khanna Paper Mills, Amritsar*

Contents

1. About ASPIRE Programme

Accelerating Smart Power and Renewable Energy (ASPIRE) is a clean energy bilateral programme being implemented by the Foreign Commonwealth and Development Office (FCDO), Government of UK in association with the Ministry of Power and Ministry of New and Renewable Energy (MNRE), Government of India (GoI). Key objective of the ASPIRE Programme is to facilitate India's transition towards a sustainable, low carbon energy ecosystem to fulfill its net-zero commitments. KPMG is the implementing partner for the ASPIRE programme and Idam Infrastructure Advisory Private Limited (India) is a key consortium member.

Industrial Energy Efficiency and Decarbonisation (IEED) is a key thematic area of support under the ASPIRE programme which is being implemented in association with Bureau of Energy Efficiency (BEE), GoI.

2. About IDEEKSHA Platform

The Industrial Decarbonisation and Energy Efficiency Knowledge Sharing (IDEEKSHA) Platform has been developed under the ASPIRE Programme in collaboration with the BEE to promote and share best practices and energy-efficient technologies among large-scale industries. The IDEEKSHA platform was launched by Mr. R.K. Singh, Hon'ble Cabinet Minister for Power and New and Renewable Energy, Government of India during the 21st Foundation Day Event of BEE on 1st March 2023, in Delhi.

Snapshots from IDEEKSHA Platform and Newsletter launch during BEE's Foundation Day Event

The IDEEKSHA platform is a one-stop shop for all energy efficiency/ decarbonisation needs of large industries covered/ expected to be covered under BEE's PAT Scheme. The IDEEKSHA platform would thus facilitate:

- Exchange of knowledge and information to enhance peer to peer learning.
- Designated Consumers (DCs) in adoption of new and emerging IEED tools & technologies by facilitating access to Indian and global (including from the UK) technology suppliers.
- Access to a database of financial institutions.
- Access to IEED tools, technologies & technology providers available in India and globally.
- Access to data sources and knowledge repositories to support knowledge translation.
- Sector/ industry specific workshops/ seminars to enhance EE measures.
- Knowledge and commercial partnerships.

The IDEEKSHA platform facilitates knowledge exchange and partnerships among industry and technology suppliers for 8 hard-to-abate industrial sectors (Cement, Aluminium, Iron & Steel and Textile, Fertiliser, Chlor-Alkali, Pulp & Paper, and Refinery) which are also covered under BEE's Perform Achieve and Trade (PAT) scheme. Under the IDEEKSHA Platform, support was extended to four (4) energy-intensive industrial sectors (Cement, Aluminium, Iron & Steel and Textile) in terms of providing access to database of global industrial energy efficiency & decarbonisation (IEED) technologies, organising capacity building workshops and study tours, etc. Four sectoral workshops and study tours were organised in 2022 and 2023, each focusing on key industries: Aluminium, Textile, Cement, and Iron & Steel. These events are aimed at understanding industry-specific challenges, opportunities, and identifying strategies for sustainable development. The details of the events, including background notes, presentations, event summary reports, etc., can be accessed through the IDEEKSHA Platform under 'Past Events' tab. Below are the direct links to access the resources:

S.No.	Sector	Past Events	Reference Links
1	Aluminium	Sectoral Workshop on Best Practices in Energy Efficiency in Aluminium Sector: A Path for Decarbonisation	https://www.ideeksha.in/pages/Sectoral Workshop on Best Practices in Energy Efficiency in Aluminium Sector
2		Study Tour/ Visit of Aditya Aluminium Plant, Lapanga, Odisha	https://www.ideeksha.in/pages/A Study Tour Visit of Aditya Aluminium Plant
3	Textile	Sectoral Workshop on Best Practices in Energy Efficiency in Textile Sector: A Path for Decarbonization	https://www.ideeksha.in/pages/Sectoral Workshop on Best Practices in Energy Efficiency in Textile Sector
4		Study Tour/ Visit of Raymond Textile Plant, Chhindwara, Madhya Pradesh	https://www.ideeksha.in/pages/A Study Tour Visit of Raymond Textile Plant
5	Cement	Sectoral Workshop on Best Practices in Energy Efficiency in Cement Sector: A Path for Decarbonisation	https://www.ideeksha.in/pages/Sectoral Workshop on Best Practices in Energy Efficiency in Cement Sector: A Path for Decarbonisation
6		Study Tour/ Visit of Udaipur Cement Works Limited (UCWL)	https://www.ideeksha.in/pages/A Domestic Study Tour-Visit of Cement Plant
7	Iron & Steel	Sectoral Workshop on Best Practices in Energy Efficiency in Iron & Steel Sector: A Path for Decarbonisation	https://www.ideeksha.in/pages/Sectoral Workshop on Best Practices in Energy Efficiency in Iron & Steel Sector: A Path for Decarbonisation
8		Study Tour/ Visit of Godawari Power & Ispat Limited (GPIL)	https://www.ideeksha.in/pages/A Domestic Study Tour-Visit of Iron & Steel Plant

Now, it is proposed to extend the technical assistance support through IDEEKSHA platform to four (4) new industrial sectors namely, **Pulp & Paper**, **Chlor-Alkali**, **Tyre manufacturing** and **Sugar**.

As part of the support, ASPIRE Programme team will organise workshops and plant study trips for the above 4 new focus sectors to enhance energy efficiency measures and enable decarbonisation in the industrial sectors. Further, the IDEEKSHA Platform would also host a technology compendium and newsletters showcasing leading industrial energy efficiency and decarbonisation (IEED) practices, along with innovative technologies/ solutions and their suppliers tailored for the above sectors.

3. Overview of Pulp & Paper Sector in India

Indian Paper Industry accounts for ~**5%** of the world's paper production. The industry has as an annual revenue of ~**£7.9 billion**[1] (INR 80,000 crores), from which ~**£0.49 billion**[2] (INR 5,000 crore) is expected to be contributed to government revenue in 2023. The sector employs over half a million people directly and ~**1.5 million** indirectly[2]. The equipment used in this sector ranges from the oldest to the most modern. The paper industry is broadly classified into three segments namely Writing & Printing (W&P), Newsprint and Paperboard & Industrial Packaging (Paperboard). Paperboard leads the domestic paper demand, accounting for **45%** of demand, followed by Writing & Printing (W&P), at **35%**, and Newsprint, at **20%**[3]. Paper Mills utilise various raw materials, including wood, bamboo, recycled fibre, bagasse, wheat straw, rice husk, etc. Presently, within the overall production, wastepaper-based mills account for ~**72%**[3] of the overall production followed by wood-based mills accounting for ~**20%**, and agro-based mills account at ~**8%**.

The Indian Paper Sector is guided by five primary nationwide associations: the Indian Paper Manufacturers Association (IPMA) situated in New Delhi, the Indian Agro & Recycled Paper Manufacturers Association (IARPMA) headquartered in New Delhi, the Indian Recycled Paper Manufacturers Association (IRPMA) also located in New Delhi, the Indian Newsprint Manufacturers Association (INMA) based in New Delhi and Indian Pulp & Paper Technical Association (IPPTA) based in Uttar Pradesh. Moreover, numerous local associations, especially in manufacturing hubs like the Gujarat Paper Association, Muzaffarnagar Paper Mill Association, Kashipur Local Unit Association, and NCR Recycled Fibre Association, actively engage in representing their local concerns to the authorities, making their presence crucial for the industry.

Energy consumption per tonne of paper production in India is nearly double the North American and Scandinavian standards, averaging around **34.3 GJ/ton** paper. Key factors affecting consumption include capacity utilisation, paper quality, machinery efficiency, downtime, and cogeneration levels. Estimated energy consumption and greenhouse gas emissions are expected to rise significantly by 2030, reaching ~**1702 PJ** per annum and contributing ~**164** million tonnes of Carbon dioxide (tCO_2) per annum, respectively[4].

There are approximately **550**[5] pulp and paper facilities in India, producing wood-based, agro-based, and recycled fibres. These plants are spread across the country and are segmented into large, small, and medium-sized enterprises. Approximately **30%** of the sector, in terms of both capacity and production, is represented by the **48** plants or designated consumers (DC) included under the BEE's PAT scheme. However, many of these paper plants are smaller in scale, falling into the SME category or utilising biomass as fuel, and they do not exceed the threshold limit of **7,500** Metric Tonne of Oil Equivalent (MTOE) per annum for pulp and paper industries to be notified as DCs under PAT Scheme.

Industrial Energy Efficiency (IEE) and Decarbonisation achievement in Pulp & Paper Sector under PAT Cycle I & PAT Cycle II are presented below are presented in Table 1 below.

Table 1: IEE & Decarbonisation - achievement under PAT Cycle I & II in Pulp & Paper sector

Total Number of DCs Notified in PAT Cycle I to VII	Energy Savings Achievement (MTOE)	Decarbonisation Achievement ($MTCO_2$)
48	**0.605**	**1.79**

[1] https://www.infomerics.com/admin/uploads/Paper-industry-apr23.pdf
[2] https://ipmaindia.org/overview-2/
[3] https://www.ideeksha.in/pages/PulpAndPaper-Basic%20info%20on%20Sectors
[4] https://papermart.in/the-pulp-and-paper-industry-addressing-the-need-for-energy-efficiency/
[5] Pathways for Accelerated Transformation in Industry Sector, A Report on the Outcome of Cycle-II under PAT Scheme, BEE

4. Decarbonisation of Indian Pulp & Paper Industry

India's ambitious target of achieving Net Zero emissions by 2070 reflects a significant commitment to addressing the climate crisis. The industry is likely to contribute ~**164** million tCO_2 per annum by 2030. The designated consumers (DCS) within the pulp and paper sector have committed to achieving energy efficiency targets through systematic planning, and many of these entities have shown significant progress. Some of the energy efficient measures adopted by paper mills are mentioned below:

- JK Paper Limited[6]: JK Paper Mills has introduced a system to harness waste heat from pulp mill effluent, aiming to generate warm water and reduce the heat load on the Effluent Treatment Plant (ETP) cooling tower. Their focus lies on managing effluents from the acid and alkali bleach plant, which are discharged into the effluent streams from the pulp mill at temperatures of 75-80°C. Traditionally, these effluents are cooled within the ETP cooling towers for subsequent processing, resulting in significant heat energy loss to the environment. As part of their mill development plan, JK Paper Mills installed a heat recovery system to reclaim some of this waste heat for more efficient use within the mill. This innovative approach has led to a 25% reduction in the overall specific steam consumption of the pulp mill.
- Seshasayee Paper and Boards Limited (SPB[7]: SPB enhanced the generation of high-pressure (HP) steam to its rated capacity by modifying the Atmospheric Fluidised Bed Combustor (AFBC). This involved converting it into a Spouted Fluidised bed and increasing the depth of the bed coil with a double-header pin row hairpin arrangement, along with adding additional heating surface. These modifications aimed to enhance the bed's heat absorption capacity volumetrically.

In addition to the above, pulp & paper industries in India have adopted the following key operational best practices and technologies as part of their Industrial Energy Efficiency and Decarbonisation (IEED) measures:

- Modernization of Pulp Mill with State-of-the-Art Continuous Digester technology[8]**:**
  By upgrading from conventional batch digesters and a double drum recovery boiler to a modern continuous digester and recovery boiler, significant savings in specific steam and power consumption were achieved:
  - Steam in Pulping – Reduced from 1.8-ton steam/ ton pulp to 0.78-ton steam /ton pulp.
  - Power consumption - Decreased from 750 kWh/ ton pulp to 686 kWh/ ton pulp.
  - Steam Economy in Evaporator – Increased from 4.1-ton steam/ ton of black liquor solids to >5.2-ton steam/ ton of black liquor solids.
  - Overall Chemical Recovery Efficiency – Increased from 94.5% to >97%.
- Modernisation in Paper machine dryers, such as installation of the thermo compressor-based system over existing cascade system and replacing rotary siphons with high-speed stationary siphons for efficient condensate removal[12]**:**
  In a mill using the cascade system for condensate removal, installing the thermo-compressor-based system improved condensate recovery from 35-40% due to condensate evacuation problems/leakages to 85%. This led to a reduction in specific steam consumption from 3.0 ton / per ton of paper to 2.8 tons / ton of paper in the machine and a decrease in drive load from 259 kW to 204 kW.

[6] Improving Energy Efficiency in Pulp & Paper Sector (Achievements and way forward), BEE

[7] Improving Energy Efficiency in Pulp & Paper Sector (Achievement and way Forward),BEE

[8] Challenges and Achievements of PAT Scheme in Indian Pulp and Paper Sector-Way ahead for Energy Efficiency Improvement in PAT Phase-2, IPPTA, Mr. Arjit Sengupta & Dr. B.P. Thapliyal

5. Potential Technology Interventions for Enhancing IEED in Indian Pulp & Paper Sector

Some of the potential areas for technology intervention in the Indian pulp & paper sector to reduce carbon intensity & facilitate a rapid transition to net-zero have been identified below[9]:

- Installation of Shoe Press in Paper Machines
- Oxyfuel Burning in Lime Kiln and Black Liquor Boilers
- Installation of Centralised Compressed Air Generation System
- Installation of Extended Delignification System for Cooking of Wood
- Optimise Dispersion Energy According to Requirement
- Firing of Black Liquor at High Concentration
- Installation of Advanced Process Control Systems
- Installation of High-Pressure Cogeneration Systems
- Installation of Back Pressure Turbine in Place of Pressure Reducing De-Superheated Steam
- Replace Vacuum Pumps with Vacuum Blowers
- Bio-Methanation from Wastewater Discharge of Agro-Based Pulp Mill
- Installation of Multiport Dryers to Reduce Steam Consumption in Paper Machines
- Use of Inorganic Fibrous Fillers in Paper Making to Increase Filler Loading Over 20%

Pulp & Paper Industry in the United Kingdom (UK)

The United Kingdom has a rich history in the paper industry, marked by the installation of the world's inaugural mechanical paper machine at Frogmore Paper Mill in 1803. This sector maintains its significance in the UK's economy, employing **~60,000** individuals, generating an annual revenue of ~**£12 billion** (INR 1,26,211 crores), and contributing over **£3.5 billion (**INR 36,814 crores) in gross value added as per a report published in 2023[10].

In 2021, paper and boards production in the UK has reached **3.64** million metric tons, with **1.52** million metric tons dedicated to corrugated case materials, also known as containerboard, essential for corrugated packaging. The heightened demand for paper-based packaging has driven a substantial **17%** increase in case materials production in the UK since 2010[11].

Indian Pulp and Paper industries can leverage strengths and capabilities of UK pulp & paper sector to accelerate their journey towards achieving net-zero emissions. This can be facilitated by adopting following best practices, technologies, and solutions offered by the UK technology providers:

- Advanced heat recovery systems
- Innovative effluent treatment solutions
- New value-added and environmentally friendly products and solutions such as creative papers packaging and labels, bookbinding & covering papers, translucent and barrier papers, smart papers, transfer papers etc.
- Industrial packaging (thermo Box-Insulated packaging), Retail packaging, etc.
- Using renewable sources like agro-fibres as raw material instead of wood and single use plastic.
- Fully recyclable packaging solution provider made from paperboard.
- Use of Circular Design Principles in the packaging design process.
- Recycling and waste management services including cardboard, paper, plastic recycling
- Industry 4.0 solution providers

[9] https://papermart.in/the-pulp-and-paper-industry-addressing-the-need-for-energy-efficiency/

[10] Statista Research Department (https://www.statista.com/topics/6371/paper-industry-uk/#topicOverview)

[11] https://papermart.in/the-pulp-and-paper-industry-addressing-the-need-for-energy-efficiency/

6. IDEEKSHA Sectoral Workshop for Pulp & Paper Sector

A one-day workshop on **"*Best Practices in Energy Efficiency in Pulp & Paper Sector: A Path for Decarbonisation*"** is being organised by ASPIRE Programme in collaboration with BEE on **13th February 2024** at **Hotel Radisson Blu.** The workshop will cover various aspects of the pulp & paper sector such as the PAT scheme, best practices, and new & emerging low-carbon technologies to enhance industrial energy efficiency and decarbonisation (IEED) measures. The workshop is designed to provide national and international organisations with a platform to present their best practices and technologies in the above areas. The workshop would provide an opportunity for stakeholders to understand the pulp & paper sector in India and connect with key stakeholders for potential partnerships. The workshop would thus enable in capacity building of pulp & paper sector stakeholders.

ASPIRE programme promotes gender equality, and the sectoral workshop is expected to deliver GESI (Gender Equality and Social Inclusion) through the participation of women and stakeholders from marginalised groups from large energy-intensive industries.

The detailed agenda for the pulp & paper sectoral workshop has been provided in Annexure.

7. Study Trip to Khanna Paper Mills, Amritsar

A study trip/ plant visit to Khanna Paper Mills (KPM), Amritsar, Punjab, is scheduled on **14th February 2024**. Spanning 80 acres, this facility stands as the nation's largest single-location plant utilising recyclable paper waste. Housing four paper machines, deinking plants, and a **30 MW** in-house captive power plant, the mill, managed by highly skilled production teams, meets the escalating demand for a diverse range of paper products. KPM's output, including duplex board, newsprint, and writing/printing paper, holds significant market shares: 11% in copier, 20% in writing/printing, 48% in packaging/board, and 30% in newsprint. Since its establishment in 1985, the company annually produces **10,000 million tons** of various paper products, leveraging approximately **15,000 million tons** of recycled fibre. Additionally, they've implemented a **200-kg-per-day sun dried board unit** and achieve a daily production of 100 tons each for newsprint and writing/printing paper. Additionally, KPM has obtained ISO 9001:2000 certification and adapted to market trends, where packaging now constitutes 41% of paper usage. Exporting products to South Asian Association for Regional Cooperation (SAARC) countries, Africa, and the Middle East, KPM remains a global player in the paper industry, producing around **330,000 MT** of board and writing/printing paper, and notably being the first Indian paper mill to create premium writing and printing board from 100% deinked woodfree recovered paper.

KPM campus has a unique state-of- the- art infrastructure which is well equipped with the latest technologies. 100-acre Khanna Paper Mills campus houses:

- Two plants that produce Board with a daily capacity of 400 tons.
- A plant that produces Newsprint with a daily capacity of 400 Tons.
- A plant that produces writing and printing paper with daily capacity of 400 Tons.
- Two plants that produce pulp by recycling of wastepaper with a daily production capacity of 350 Tons.

The study trip/ plant visit of the Khanna Paper Plant would foster dialogue and knowledge exchange among diverse industry players and fostering a deeper understanding of advancements in paper recycling. The study trip would offer participants an opportunity to learn about cutting-edge sustainable initiatives implemented by Khanna Paper Mills (KPM) as well as the best Industrial Energy Efficiency and Decarbonisation (IEED) technologies and procedures adopted by the plant. This study trip/ plant visit would enable sharing of best practices and technologies between industries and ensure an ambitious, mutually beneficial and outcome-focused relationship.

8. Annexure – Agenda for Pulp & Paper Sectoral Workshop

Theme: Best Practices in Energy Efficiency in Pulp & Paper Sector: A path for Decarbonisation

Date: 13th February 2024

Time: 09:00 – 17:30 IST/ 03:30 – 12:00 GMT

Venue: Hotel Radisson Blu, Amritsar, Punjab

Time (IST)	Name of Session	Presenter
Inaugural Session		
09:00 – 09:30	Registration	
09:30 – 09:35	Lighting of Lamp	
09:35 – 09:40	Welcome Address	Mr. Ramit Malhotra, Director, KPMG India Lead-Smart Power, ASPIRE programme
09:40 – 09:50	Introduction of ASPIRE Programme	Ms. Sanyukta Das Gupta, Senior Advisor, Smart Power, Climate and Energy Team, British High Commission
09:50 – 10:00	Brief overview of industrial energy efficiency (IEE) theme of ASPIRE Programme	Mr. Balawant Joshi, Managing Director, Idam Infra (ASPIRE Programme Team)
10:00 – 10:10	Special Address by PEDA	Mr. M.P. Singh, Director, Punjab Energy Development Agency (PEDA)
10:10 – 10:20	Keynote Address by Bureau of Energy Efficiency (BEE)	Mr. Sunil K. Khandare, Director, BEE
10:20 – 10:25	Vote of Thanks	Mr. K. K. Chakarvarti, Senior Advisor, IDEEKSHA Platform (ASPIRE Programme Team)
10:25 – 10:30	Group Photograph	
10:30 – 10:50	**Tea Break and Networking**	
Technical Session I: Perform Achieve and Trade Scheme for Pulp & Paper Sector		
10:50 – 10:55	Moderator	Mr. Sunil K. Khandare, Director, BEE
10:55 – 11:15	Perform Achieve and Trade (PAT) Scheme for the Pulp and Paper Sector	Mr. Naveen Kumar, Senior Sector Expert- Pulp & Paper – BEE
11:15 – 11:25	Q&A	
Technical Session II: Sharing of best practices by Indian Pulp & Paper Sector		
11:25 – 11:30	Moderator	Mr. K. K. Chakarvarti, Senior Advisor, IDEEKSHA Platform (ASPIRE Programme Team)
11:30 – 11:50	Energy Saving Initiatives Taken at Khanna Paper Mills	Mr. Suneel Sehgal, Mr. Gagandeep Mohey and Dr. Piyush Verma; Khanna Paper Mills
11:50 – 12:10	Energy Conservation in Paper Sector – a step towards decarbonisation	Dr. M. K. Gupta, Director, Central Pulp & Paper Research Institute (CPPRI)
12:10 – 12:30	Overview of Best Practices in Pulp and Paper Manufacturing Processes for Improving Energy Efficiency in the Pulp and Paper Sector	Dr. Bipin Thapliyal, Secretary General, Indian Agro and Recycled Paper Mills Association

Time (IST)	Name of Session	Presenter
12:30 – 12:40	Q&A	
12:40 – 12:55	Presentation by Centrica PLC, UK Offers comprehensive energy management solutions and services to optimise business' energy usage and operational efficiency.	Mr. Anand, Director, HTFE (India Partner of Centrica PLC, UK)
12:55 – 13:00	Q&A	
13:00 – 14:00	**Lunch Break and Networking**	
Technical Session III: Case Studies and Low Carbon & Digital Technologies for Pulp & Paper Sector – by Indian Experts		
14:00 – 14:05	Moderator	ASPIRE Team/ Sector Expert (BEE)
14:05 – 14:25	Best Practices in HP Co-generation in Pulp and Paper Sector for Exceeding Energy Efficiency and Decarbonization Targets	Dr. Sundara Raman, Vice-President (Tech.), EnERG TEkH
14:25 – 14:45	Role of Back Pressure Turbine and IE4 & IE5 Efficiency Motors in Pulp & Paper industry	Mr. Milind Chittawar, CEO, SEE-Tech Solutions
14:45 – 15:05	Optimised Refining for Sustainable Fibre Treatment, case- Valmet Conical Refiner Pro	Mr. S Ramasubramanian, VALMET
15:05 – 15:25	Emerging Opportunities and Solutions for Efficient Steam generation and Fuel Cost Savings in Paper Industry	Mr. P V Krishna Kumar, Supreme Energy Solutions
15:25 – 15:35	Q&A	
Technical Session IV: Standards & Decarbonisation Technologies for Pulp & Paper Sector – by International & UK Technology & Solutions Providers		
15:35 – 15:40	Moderator	Mr. Anurag Singh Sirola, Manager, KPMG India
15:40 – 15:55	Presentation by Confederation of Paper Industries, UK* – *'Decarbonising UK Paper Mills'*	Mr. Steve Freeman, Executive Director – Energy, Confederation of Paper Industries, UK
15:55 – 16:00	Q&A	
16:00 – 16:15	Presentation by Manufacturing Technology Centre, UK* Pioneers in advanced manufacturing solutions and technologies for industry innovation	Representative from Manufacturing Technology Centre, UK
16:15 – 16:20	Q&A	
16:20 – 16:35	Presentation by CoolPlanet, UK* Offers sustainable solutions including energy management solutions to enhance energy efficiency and enable decarbonisation in manufacturing industries	Mr. Colin Martin, Global Sales Director CoolPlanet, UK
16:35 – 16:40	Q&A	
16:40 – 16:55	Presentation by Carbon Clean, UK*	Mr. Niraj Singh, Senior Project Development Manager, Carbon Clean, UK (TBC)

Time (IST)	Name of Session	Presenter
	Offers cutting-edge carbon capture technology to reduce emissions and combat climate change	
16:55 – 17:00	Q&A	
Discussions, Feedback and Concluding Remarks		
17:00 – 17:30	Mr. Sunil K. Khandare, Director, BEE Ms. Sanyukta Das Gupta, Senior Advisor, Smart Power, Climate and Energy Team, BHC Mr. Ramit Malhotra, Director, KPMG India, Lead-Smart Power, ASPIRE Programme Mr. Anurag Singh Sirola, Manager, KPMG India, ASPIRE Programme Team Mr. Balawant Joshi, MD, Idam Infra, ASPIRE Programme Team Mr. K. K. Chakarvarti, Senior Advisor, Idam Infra, ASPIRE Programme Team	
17:30 Onwards	**Tea and Networking**	

**Virtual Presentation; TBC – to be confirmed*