

ASPIRE Programme

Accelerating Smart Power & Renewable Energy in India

**SECTORAL
WORKSHOP ON**

BEST PRACTICES IN ENERGY EFFICIENCY IN PULP & PAPER SECTOR

**A PATH FOR
DECARBONISATION**

AMRITSAR, PUNJAB, INDIA

FEBRUARY 13, 2024



Contents

1. BACKGROUND	04
2. INAUGURAL SESSION.....	06
3. TECHNICAL SESSION I	08
Perform, Achieve and Trade Scheme for Pulp & Paper Sector	
4. TECHNICAL SESSION II	10
Sharing of Best Practices by Indian Pulp & Paper Sector	
5. TECHNICAL SESSION III	12
Case Studies and Low Carbon & Digital Technologies for Pulp & Paper Sector - by Indian Experts	
6. TECHNICAL SESSION IV.....	14
Standards & Decarbonisation Technologies for Pulp & Paper Sector - by International (Including from The UK) Technology & Solutions Providers	
7. GENDER EQUALITY AND SOCIAL INCLUSION (GESI)	16
8. CONCLUDING SESSION.....	18
9. FEEDBACK FROM THE PARTICIPANTS	20
10. WAY AHEAD	21
11. GALARY	20
12. ANNEXURE	23
Agenda	
Attendance Sheet	

Disclaimer:

Nothing in this report constitutes a valuation or legal advice. The information contained herein is of a general nature and is not intended to address the circumstances of any particular individual or entity. Although implementing partner has endeavored to provide accurate and timely information, there can be no guarantee that such information is accurate as of the date it is received or that it will continue to be accurate in the future. No one should act on such information without appropriate professional advice after a thorough examination of the particular situation. The implementing partner has not verified the reliability or accuracy of any information obtained in the course of its work and does not owe duty of care to any person or party to whom the report is circulated to. The implementing partner shall not be liable to any party who uses or relies on this report and thus disclaims all responsibility or liability for any costs, damages, losses, liabilities, expenses incurred by such third party arising out of or in connection with the report or any part thereof.

Abbreviations

AI	Artificial Intelligence
ASPIRE	Accelerating Smart Power and Renewable Energy in India
AFBC	Atmospheric Fluidised Bed Combustion
BATs	Best Available Techniques
BEE	Bureau of Energy Efficiency
CHP	Combined Heat and Power
CPPRI	Central Pulp & Paper Research Institute
DCs	Designated Consumers
EE	Energy Efficiency
FCDO	Foreign, Commonwealth and Development Office
GESI	Gender Equality & Social Inclusion
GHG	Greenhouse gases
GJ	Gigajoules
IDEEKSHA Platform	Industrial Decarbonisation and Energy Efficiency Knowledge Sharing Platform
IEE	Industrial Energy Efficiency
IEED	Industrial Energy Efficiency and Decarbonisation
IE	International Efficiency
IoT	Internet of Things
KEP	Knowledge Exchange Platform
KPM	Khanna Paper Mill
MFC	Micro-Fibrillated Cellulose
MToE	Million Tonnes of Oil Equivalent
MTCO₂	Million Tonnes of Carbon Dioxide
MW	Mega Watt
NMEEE	National Mission on Enhanced Energy Efficiency
PAT	Perform Achieve and Trade
PCC	Precipitated Calcium Carbonate
PJ	Petajoules
RCF	Recycled Fibre
SEC	Specific Energy Consumption
VFD	Variable Frequency Drive
W&P	Writing & Printing

BACKGROUND

Indian paper industry accounts for **~5%** of global production, with annual revenue of **~ INR 800 billion** (~ GBP **8 billion**) in 2023. The sector employs over half a million people directly and around one and a half million indirectly. The paper industry is broadly classified into three segments namely writing & printing (W&P), newsprint and paperboard and industrial packaging (paperboard). Paperboard segment leads the domestic paper demand, accounting for **45%** of demand, followed by writing & printing (W&P), at **35%**, and newsprint, at **20%**. 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%** of the overall production followed by wood-based mills accounting for **-20%**, and agro-based mills account at **-8%**.

Energy consumption per tonne of paper production in India is nearly double than the North American and Scandinavian standards, averaging around **34.3** gigajoules/Ton (GJ/ton) paper. Key factors affecting energy consumption include capacity utilisation, paper quality, machinery efficiency, downtime, and cogeneration levels. Energy consumption and greenhouse gas emissions are expected to rise significantly by 2030, to **~1,702** petajoules (PJ) per annum and contributing **-164** million tonnes of carbon dioxide (tCO₂) per annum, respectively.

Indian pulp & paper sector consists of about **550** facilities, 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 flagship Perform Achieve and Trade (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.

Indian paper industry 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.

The pulp & paper sector in the UK has a rich history, 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 bn** (1260 billion), and contributing over **£3.5 bn** (~INR 370 billion) in gross value added as per a report published in 2023. Some of the key industrial energy efficiency and decarbonisation (IEED) technologies and best practices in the UK include:

- Advanced heat recovery systems
- Carbon capture storage and utilisation (CCUS)
- Innovative effluent treatment solutions
- Use of renewable sources like agro-fibres as raw material instead of wood and single use plastic
- Use of fully recyclable packaging solution provider made from paperboard
- Use of circular design principles, recycling and waste management services
- IoT - enabled Industry 4.0 energy management solutions etc.

The strengths and capabilities of UK pulp & paper sector can be leveraged to facilitate rapid transition of Indian pulp & paper sectors' journey to net-zero.

In view of the above, a one-day sectoral workshop was organised in Amritsar, Punjab on 13th February 2024 under the Accelerating Smart Power and Renewable Energy in India (ASPIRE) programme¹. The workshop was jointly organised by the Foreign, Commonwealth and Development Office (FCDO), Government of UK and the Bureau of Energy Efficiency (BEE), Government of India. The theme of the sectoral workshop was- "**Best Practices in Energy Efficiency & Decarbonisation in Pulp & Paper Sector – A Path for Decarbonisation**". During the workshop, stakeholders deliberated on current and potential market landscape, ongoing and upcoming government interventions and best practices, technologies, etc., to enhance energy efficiency (EE) and enable decarbonisation of the pulp & paper sector. In the workshop, some key organisations from the UK pulp & paper sector presented various leading IEED best practices and technologies adopted in the UK.

Objective of the Workshop

Apprise stakeholders about Industrial Decarbonisation and Energy Efficiency Knowledge Sharing Platform (IDEEKSHA) platform and its key functionalities

Provide an overview of impact of the PAT scheme and the IEED measures implemented in the sector

Share best practices/ technologies for enhancing IEED and identify learnings from the UK experience

Disseminate knowledge and information on new and emerging IEED technologies available globally (including from the UK)

Highlights

45+ participants from India and UK

4 interactive technical sessions

Dedicated session on "significance of **Gender Equality and Social Inclusion (GESI)** within Indian industries"

Active participation from government agencies, industry associations, research institutes, leading pulp & paper manufacturers and technology providers from India and UK

¹ Accelerating Smart Power and Renewable Energy (ASPIRE) is a bilateral technical assistance 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, Government of India. KPMG is the implementation advisor to FCDO in relation to the ASPIRE programme.

INAUGURAL SESSION



(L - R) Mr. Sunil K. Khandare, Ms. Sanyukta Das Gupta, Mr. Balawant Joshi, Mr. K. K. Chakarvarti, & Mr. Ramit Malhotra

Speakers



Mr. Sunil. K. Khandare
Director,
BEE



Ms. Sanyukta Das Gupta
Senior Advisor, Smart Power,
Climate and Energy Team,
British High Commission



Mr. K. K. Chakarvarti
Senior Advisor, IDEEKSHA
Platform, ASPIRE Programme



Mr. Ramit Malhotra
Director, KPMG India,
Lead-Smart Power,
ASPIRE Programme



Mr. Balawant Joshi
Managing Director,
Idam Infra

Key Takeaways

- The global pulp and paper market is expected to grow 1.3x to ~INR 39,000 billion (GBP **372 Bn**) by 2030 with ~50% increase in total production to **306** mn metric tons by 2030.
- Indian paper industry plays a significant role in global space, with ~5% share in the global production of ~10 million metric tonnes.
- The total emissions from the sector are estimated to increase ~4x to ~164 MTCO₂ by 2030.
- Total emissions from the Indian pulp & paper sector are estimated to grow ~4x to ~164 MTCO₂ by 2030.
- The pulp and paper sector in India is one of the most energy intensive industrial sectors and has been under the ambit of BEE's Perform Achieve and Trade (PAT) scheme since inception in 2012.
- Indian pulp and paper mills comprise of 4 main categories of mills – wood based, agro-based, RCF based and imported pulp. Of these, RCF based mills offer maximum decarbonisation potential.
- Most RCF-based mills are not under the ambit of the PAT Scheme due to the current threshold level for energy intensity. These units are likely to be included under forthcoming PAT Cycles through the deepening mechanism of PAT scheme and through a separate scheme aimed at small and medium paper mills.
- Enabling decarbonisation within the pulp & paper sector can be achieved through focussed efforts in the following areas:
 - Implementation of renewable energy (RE) projects
 - Adoption of circular economy initiatives
 - Integration of AI and IoT-based platforms in decarbonisation strategies
 - Reduction of Scope 3 emissions (indirect emissions resulting from activities related to a company that are not owned or controlled by the company) through logistics optimisation, including optimising raw material and fuel sourcing, vendor selection, etc.
 - Utilisation of biomass combustion catalysts to promptly reduce energy costs by enhancing combustion efficiency and minimising losses

TECHNICAL SESSION I

Perform, Achieve And Trade Scheme For Pulp & Paper Sector

Speakers



Mr. Sunil K. Khandare
Director, BEE



Mr. Naveen Kumar
Senior Sector Expert
Pulp & Paper, BEE

Key Takeaways

- The PAT scheme stands as a flagship initiative of the BEE under the National Mission on Enhanced Energy Efficiency (NMEEE). As a regulatory tool, PAT scheme aims to curtail specific energy consumption within energy-intensive industries through a market-based mechanism that certifies excess energy savings, allowing them to be traded, thereby enhancing cost-effectiveness in the pursuit of energy efficiency.
- In PAT cycle VIII (2023-24 to 2025-26), a total of **55** designated consumers (DCs) are included from the pulp & paper sector, including **22** DCs from wood-based category, **8** DCs from agro waste-based category, **23** DCs from RCF-based category, and 2 DCs from imported wood pulp based category.
- Ministry of Power (MoP) notified the Carbon Credit Trading Scheme (CCTS) in June 2023, under the Energy Conservation Act, 2001, to develop the country's first-ever domestic carbon market and enable tracking and trading of carbon credits.
- The domestic carbon compliance market has existed for a long time in the form of PAT scheme for tradable energy certificates (ESCerts) by DCs in industrial units from energy-

intensive sectors such as pulp and paper, cement, chlor-alkali, fertiliser, iron & steel, thermal power, textile etc.

- CCTS will encompass the existing trading mechanism by transitioning from tonnes of oil equivalent to carbon certificates expressed in tonnes of carbon dioxide (CO₂) equivalent.
- Out of **55** DCs under the BEE's PAT scheme, **11** are shortlisted for migration to the CCTS by 2024.
- Besides setting an overarching target for reducing Specific Energy Consumption (SEC), there is a need to simultaneously identify both major and minor sources of greenhouse gas (GHG) emissions within the paper plant processes. These include pulp production, utility operations, anaerobic wastewater treatment or sludge digestion, on-site vehicles and machinery, lime kilns and calciners, as well as Methane (CH₄) and Nitrous Oxide (N₂O) emissions from black liquor and pith.
- Potential strategies to improve industrial energy efficiency and reduce carbon emissions in the pulp & paper sector include:
 - Implementing comprehensive measures such as energy management systems, process integration, the adoption of new equipment, and optimisation of operational practices.
 - Augmenting on-site energy utilisation and generating energy from biomass residues, coupled with the widespread adoption of combined heat and power (CHP) technology.
 - Upgrading existing mills with energy-efficient technologies, including the incorporation of Best Available Techniques (BATs) such as steam cycle washing, black liquor gasification, waste heat recovery etc.
 - Utilising recovered paper and promoting paper recycling, potentially leading to a significant reduction of **-37%** in CO₂ emissions by substituting virgin wood with recycled fibres.
 - Integrating renewable energy sources across the sector to diminish dependence on grid electricity.

TECHNICAL SESSION II

Sharing Of Best Practices By Indian Pulp & Paper Sector

Speakers



Dr. M. K. Gupta
Director, Central Pulp & Paper
Research Institute



Dr. Bipin Thapliyal
Secretary General,
Indian Agro and Recycled
Paper Mills Association



Mr. Suneel Sehgal
General Manager,
Khanna Paper Mills

Key Takeaways

- **The Central Pulp & Paper Research Institute (CPPRI)**, Government of India, highlighted the key processes in pulp & paper production that result in significant carbon emissions. These include:
 - Transportation of raw materials
 - Delivery of chemicals for processing
 - Pulp manufacturing
 - Paper production
 - Distribution of final products
 - Effluent treatment, due to extensive water usage
 - Disposal in landfills
 - Power and steam generation
- CPPRI highlighted the significance of adopting closed paper machine hoods over open hoods due to their efficiency in moisture removal. Closed hoods utilise significantly less air compared to open hoods, requiring only a third of the air volume for the same moisture removal.
- Transition from semi-open hoods to closed hoods can reduce steam usage by **-15-20%** resulting in substantial electricity savings of **-40-50%** for air-circulation fans. Additionally,

closed hood machines minimise heat losses and facilitate the recovery of more waste heat compared to semi-open hoods.

- CPPRI also emphasised on the importance of installing a control system to coordinate multiple air compressors efficiently. It recommended studying part-load characteristics and cycling costs to determine the most efficient mode for operating these compressors. Additionally, it advised reducing air compressor discharge pressure to the lowest acceptable setting, considering a reduction of **1 kg/cm²** in air pressure could result in a **9%** savings in input power and a **10%** decrease in compressed air leakage rates. Moreover, it suggested using the highest reasonable dryer dew point settings to minimise purges, leaks, excessive pressure drops, and condensation accumulation. For example, compressed air leak from a **1 mm** hole size at **7 kg/cm²** pressure could lead to a power loss equivalent to **0.5 kW**.
- **Khanna Paper Mills (KPM)** has implemented several measures to enhance operational energy efficiency, reduce energy consumption and enable decarbonisation, including:
 - Replacement of outdated and inefficient air preheaters with efficient air preheaters, resulting in **-1.5%** increase in boiler efficiency; **-4.5%** reduction in oxygen consumption; of auxiliary equipment etc.
 - Replacement of standard efficiency international efficiency class 1 (IE 1) / re-wound motors with premium efficiency IE3 motors, resulting in monetary savings of **INR 43 Lakhs** (-GBP 41,000) per annum
 - Replacement of liquid ring vacuum pumps with energy efficient turbo blowers, resulting in monetary savings of **-INR 23.3 million** (GBP -221,000) per annum
 - Installation of variable frequency drives (VFD) in plant areas, resulting in monetary savings of **INR 6.1 million** (GBP -58,000) per annum
 - Installation of compressor and replacing inefficient effluent treatment plant (ETP) blowers, resulting in monetary savings of **INR 2.1 million** (GBP -20,000)
 - Installation of drive compressors for ash handling system
- **Indian agro and recycled paper mills** highlighted several energy management practices in pulp and papermaking processes for improving EE, including:
 - ***Kraft & RCF pulping processes:*** (i) Steam cycle washing, (ii) Black liquor gasification, (iii) Recycled paper fractionation, (iv) High consistency forming (v) Efficient Screening
 - ***Forming, pressing, and drying in paper making:*** (i) High consistency forming, (ii) Dry sheet forming, (iii) Impulse drying of paper (iv) Closed hood (v) Hot Pressing (vi) Condebelt dryers
 - ***Energy production process:*** (i) Biomass gasification (ii) Biomass Combined Heat and Power (iii) Biogas production from sludge (iv) Waste heat recovery (v) Industry 4.0 energy management solutions

TECHNICAL SESSION III

Case Studies And Low Carbon & Digital Technologies For Pulp & Paper Sector – By Indian Experts

Speakers



Dr. Sundara Raman
Vice -President (Tech.),
EnERG TEKH



Mr. S Ramasubramanian
Product Sales Manager,
Valmet



Mr. P V Krishna Kumar
Co-Founder & Chief Marketing
Officer, Supreme Energy Solutions

Key Takeaways

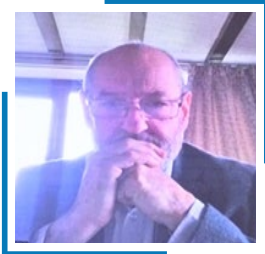
- **EnERG TEKH** discussed a case study explaining emissions reduction achieved at Orient Paper Mills (OPM) by employing a Hybrid Dryer, which integrates a biomass dryer with flue gas cleaning. Key accomplishments included:
 - Reduction in stack heat loss
 - Improvement in steam economy
 - Reduction in net carbon emissions
- The Precipitated Calcium Carbonate (PCC) facility at OPM effectively captured CO₂ from the stack flue gas emitted by the Atmospheric Fluidised Bed Combustion (AFBC) Boiler and utilised for carbonation purposes.
- **Valmet** showcased their Conical Refiner Pro technology for Micro-Fibrillated Cellulose (MFC) production for sustainable paper production, emphasizing the following advantages:
 - Decreased energy consumption
 - Accurate gap control and online calibration
 - Improved fiber reception for proper refining
 - Reduction in CO₂ emissions.

- **Supreme Energy Solutions'** Oxybooster O₂ Swift represents a bioenzyme-treated material that is entirely eco-friendly, non-toxic, non-reactive, and safe. Specifically crafted to synchronise heat input from diverse energy sources in kilns/furnaces, it strives to maintain thermal equilibrium and minimise heat losses. Comprised of a blend of waste wood chips and pyrolysis-processed bio-carbon treated with proprietary bioenzymes, Oxybooster O₂ Swift effectively curtails energy input losses by:
 - Ensuring complete combustion of fines
 - Lowering the temperature difference (Δt) within the furnace
 - Decreasing the amount of combustion air required
 - Minimising soot formation, thereby reducing radiation losses

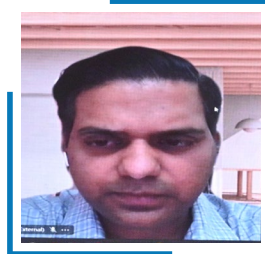
TECHNICAL SESSION IV

Standards & Decarbonisation Technologies For Pulp & Paper Sector – by International (including from the UK) Technology & Solutions Providers

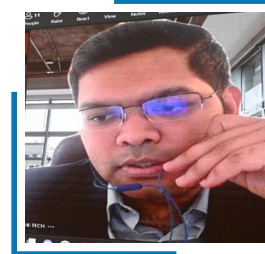
Speakers



Mr. Steve Freeman
Executive Director – Energy,
Confederation of
Paper Industries, UK



Mr. Niraj Singh
Senior Project Development
Manager, Carbon Clean, UK



Mr. Anand
Director, HTFE
(India Partner of
Centrica PLC, UK)



Mr. Colin Martin
Global Sales Director,
CoolPlanet, UK

Key Takeaways

- The **Confederation of Paper Industries, UK** highlighted some of the key initiatives undertaken by UK Paper mills to enhance EE and enable decarbonisation along with an overview of the UK pulp and paper industry, government interventions etc.
- Key policy initiatives undertaken in the UK, to promote industrial energy efficiency and enable decarbonisation include:
 - UK Emissions Trading Scheme (UK ETS)
 - Carbon Border Adjustment Mechanisms (CBAMs)

- Regulatory requirements imposing operational requirements on sites
 - Reporting requirements to highlight energy performance
 - Climate Change Agreements to drive energy efficiency
- Some of the key technologies/ best practises implemented in UK to enable decarbonisation in the sector included:
 - Combined Heat and Power (CHP)
 - Designing recyclability guidelines
 - Utilisation of bioenergy including green hydrogen, wind etc.
 - Carbon capture storage and utilisation
 - Energy Management Systems
- **Carbon Clean's** patented carbon capture technology using CDRMax™ process allows capturing more carbon at the lowest cost, all while meeting strict environmental criteria. The CDRMax™ process captures carbon dioxide from the industrial flue gases or off-gases emitted from power plants, boilers, kilns, and chemical facilities. CDRMax™ can be used with source gases that contain CO₂ concentration between **3%** to **25%** by volume. The process produces carbon dioxide with purities ranging from **95%** to **99%**, which can then be sold, reused, or sequestered.
- **Centrica's** patented technology driven by wireless sensors & advanced analytics from power radar software enables machine-level energy management systems for enhancing operating margins and driving sustainability across the organisation.
- CoolPlanet explained about it's '**CoolPlanetOS**' platform, a decarbonisation management system, designed to seamlessly integrate with various existing systems commonly found in factories, industrial facilities, and managed buildings. The platform assists companies in implementing their decarbonisation strategies.

GENDER EQUALITY AND SOCIAL INCLUSION (GESI)

Promoting Gender Equality and Social Inclusion (GESI) is crucial for Indian industries to foster an equitable and inclusive workplace culture. Despite challenges, integrating GESI initiatives offers several advantages:

- **Value creation:** Ensuring full and productive employment, decent work for all, and equal pay for equal work, including for persons with disabilities
- **Innovation:** Studies reveal a strong link between diversity in management and increased innovation, especially in an evolving industrial sector
- **Customer Service:** GESI initiatives enhance customer outcomes by fostering interactions between employees and customers who better represent the customer base.
- **Profitability:** Companies prioritising gender diversity in executive teams tend to have 25% higher profitability compared to those with less diverse teams



Mr. Anurag Singh Sirola
Manager, KPMG India

To ensure GESI, industries can implement the following measures:

- Foster an inclusive approach to hiring, developing, and retaining diverse talent, creating a culture where minority groups feel empowered to voice their opinions.
- Identify local champions across government, private sector, and civil society to collaborate on addressing inequality and exclusion.
- Implement participation quotas to increase the involvement of excluded groups.
- Fulfill the company's social mission by uniting communities and embracing diversity.
- Establish and transparently measure predetermined GESI metrics, monitoring inclusion in meetings, events, and decision-making processes.

Several Indian industries have already embraced GESI considerations:

- **J K Paper Limited** promotes women empowerment through inter-group savings, credit facilitation, and capacity-building programs.
- **Vardhman Fabrics** ensures equitable work and remuneration regardless of gender, offering social skill development programs for women workers.
- **Vedanta Limited** focuses on hiring LGBTQ personnel and providing sensitisation training, along with initiatives like "Sakhi" to empower women.
- **Hindalco's** "Women at Hindalco (WAH)" initiative offers equal opportunities for women employees and establishes a dedicated committee to prevent sexual harassment.
- **Trident Group's** initiatives include "Saksham" for employing differently abled individuals, "Hastkala" for crafts training, and "Sreeiana" for menstrual and reproductive health awareness among adolescent girls.

CONCLUDING SESSION



Mr. K. K. Chakarvarti

Key Takeaways

- Enhancing energy efficiency and enabling decarbonisation of industries, particularly the pulp & paper sector, is crucial for achieving sustainability & India's energy transition to net-zero.
- ASPIRE programme intends to support large energy-intensive industries in the adoption of low-carbon technologies and solutions through collaboration with global technology suppliers including from the UK.
- LAT Water, a pioneering UK-based technology provider specialising in the design, manufacture, and distribution of comprehensive treatment and recovery solutions tailored for intricate wastewater streams. Leveraging innovative approaches, LAT Water has ingeniously harnessed waste heat as an abundant energy resource, setting a new standard in water treatment efficiency. Their cutting-edge solutions are particularly well-suited for the demanding needs of the pulp & paper sector, offering unparalleled effectiveness in managing effluent treatment challenges.
- The CoolPlanetOS decarbonisation management platform, developed by CoolPlanet, aids industries in reaching their net zero goals. Alongside, Carbon Clean's CCUs technology and Centrica's wireless sensors, offer significant opportunities for enhancing energy efficiency and cutting carbon emissions in the pulp & paper industry. Stakeholders in the Indian pulp & paper sector have already shown keen interest in these technologies. However, expediting the deployment of these innovative and low-carbon technologies requires systematic interventions that support technology transfer.
- The workshop successfully deliberated on innovative measures adopted by Indian pulp & paper manufacturers and new-age technologies and solutions required to accelerate decarbonisation of the pulp & paper sector.

FEEDBACK FROM THE PARTICIPANTS

- More than **78%** of the participants responded that they were more than satisfied with the outcomes of the workshop (*provided a 7+ rating on a scale of 10*).
- About **78%** of the participants rated the quality and content of the delivery as more than satisfactory (*provided a 7+ rating on a scale of 10*).
- All the technical sessions were highly appreciated by the participants.
- Participants expressed their interest to know more about following IEED technologies from UK:
 - Waste heat recovery and utilisation output
 - Energy, data management, and reporting
 - Heat treatment technologies
 - Technologies to enable circular economy in the sector
- Women account for **~10%** of total employee strength in most of the participating organisations.

“The workshop was highly informative, especially the session focused on the UK. I would like to suggest organising the UK-based session offline in the future”

**- Mr. Arpan Gupta,
Dy. Manager
Century Pulp & Paer**

“The event provided an enlightening platform for exchanging best practices and showcasing emerging technologies”

**- Mr. Charandeep Singh, Managing Director
Sustenergy Foundation**

WAY AHEAD



Group photograph of Participants

The response to the sectoral workshop has been positive with significant participation of senior officials from BEE officials, leading Indian pulp and paper industries, and technology and solutions providers from India and UK. This workshop has served as a platform for national and international organisations to exchange knowledge on best practices and technologies aimed at enhancing industrial energy efficiency and decarbonisation measures within the Indian pulp & paper sector. This workshop is expected to have a demonstrable and long-lasting on-field impact in due course of time. The upcoming tasks to ensure the momentum include:

- Guidance and support to large energy-intensive industries, including those in the pulp & paper sector, to identify technologies, solutions, technology suppliers, and financing options for increased adoption of IEED interventions.
- Plan and organise online seminar / B2B meetings with pulp & paper industry stakeholders in close collaboration with UK technology suppliers such as CoolPlant, Carbon Clean, Centrica, LAT water, etc.
- Create more discussion forums to facilitate the exchange of knowledge and information that will aid in the formulation of policies.



GALLERY



Annexure

Agenda

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 to the 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 Punjab Energy Development Agency (PEDA)	Mr. M.P. Singh, Director, 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 – 11:00	Tea Break and Networking	
Technical Session I: Perform Achieve and Trade Scheme for Pulp & Paper Sector		
11:00 – 11:05	Moderator	Mr. Sunil K. Khandare, Director, BEE
11:05 – 11:25	Perform Achieve and Trade (PAT) Scheme for the Pulp and Paper Sector	Mr. Naveen Kumar, Senior Sector Expert- Pulp & Paper – BEE
11:25 – 11:35	Q&A	
Technical Session II: Sharing of best practices by Indian Pulp & Paper Sector		
11:35 – 11:40	Moderator	Mr. K. K. Chakarvarti, Senior Advisor, IDEEKSHA Platform (ASPIRE Programme Team)
11:40 – 12:00	Energy Saving Initiatives Taken at Khanna Paper Mills	Mr. Suneel Sehgal, Mr. Gagandeep Mohey and Dr. Piyush Verma; Khanna Paper Mills
12:00 – 12:20	Energy Conservation in Paper Sector – a step towards decarbonisation	Dr. M. K. Gupta, Director, Central Pulp & Paper Research Institute (CPPRI)
12:20 – 12:40	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
12:40 – 12:50	Q&A	
12:50 – 13:50	Lunch Break and Networking	
Technical Session III: Case Studies and Low Carbon & Digital Technologies for Pulp & Paper Sector – by Indian Experts		
13:50 – 13:55	Moderator	ASPIRE Team/ Sector Expert (BEE)

Time (IST)	Name of Session	Presenter
13:55 – 14:15	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
14:15 – 14:35	Role of Back Pressure Turbine and IE4 & IE5 Efficiency Motors in Pulp & Paper industry	Mr. Milind Chittawar, CEO, SEE-Tech Solutions
14:35 – 14:55	Optimised Refining for Sustainable Fibre Treatment, case- Valmet Conical Refiner Pro	Mr. S Ramasubramanian, VALMET
14:55 – 15:15	Emerging Opportunities and Solutions for Efficient Steam generation and Fuel Cost Savings in Paper Industry	Mr. P V Krishna Kumar, Supreme Energy Solutions
15:15 – 15:25	Q&A	
Technical Session IV: Standards & Decarbonisation Technologies for Pulp & Paper Sector – by International & UK Technology & Solutions Providers		
15:25 – 15:30	Moderator	Mr. Anurag Singh Sirola, Manager, KPMG India
15:30 – 15:45	Presentation by Confederation of Paper Industries, UK* – <i>'Decarbonising UK Paper Mills'</i>	Mr. Steve Freeman, Executive Director – Energy, Confederation of Paper Industries, UK
15:45 – 15:50	Q&A	
15:50 – 16:05	Presentation by Manufacturing Technology Centre, UK* <i>'Pioneers in advanced manufacturing solutions and technologies for industry innovation'</i>	Representative from Manufacturing Technology Centre, UK
16:05 – 16:10	Q&A	
16:10 – 16:25	Presentation by Carbon Clean, UK* <i>'Carbon Capture, Utilisation and Storage technology to help achieve net-zero'</i>	Mr. Niraj Singh, Senior Project Development Manager, Carbon Clean, UK
16:25 – 16:30	Q&A	
16:30 – 16:45	Presentation by Centrica PLC, UK* <i>'Improve OEE, Reduce Energy, & Predict Breakdowns with Centrica's Wireless, Real-time Technology'</i>	Mr. Anand, Director, HTFE (India Partner of Centrica PLC, UK)
16:45 – 16:50	Q&A	
16:50 – 17:05	Presentation by CoolPlanet, UK* <i>'Using data to drive best practise and step change emissions reduction in pulp and paper sector'</i>	Mr. Colin Martin, Global Sales Director CoolPlanet, UK
17:05 – 17:10	Q&A	
Discussions, Feedback and Concluding Remarks		
17:10 – 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

Attendance Sheet

S. No.	Name	Designation	Organisation
1	Dr. Sanjay Tyagi	Scientist E-II	Central Pulp & Paper Research Institute (CPPRI)
2	Mr. Gagan Mohey	Sr. Mgr.	Khanna Paper Mill
3	Mr. Dinesh Kumar	Manager	Khanna Paper Mill
4	Mr. Aviral Soni	EA to ED	Khanna Paper Mill
5	Dr. Bipin Thapliyal	Secretary General	Indian Agro and Recycled Paper Mills Association
6	Dr. Sundara Raman	Vice-President (Tech.)	EnERG TEkH
7	Mr. Jayaprakash T	Joint Secretary	Indian Agro and Recycled Paper Mills Association
8	Mr. R K Aggarwal	Partner	R K Energy Solutions
9	Er. Vibhor R Aggarwal	Partner	R K Energy Solutions
10	Mr. Arpan Gupta	Dy. Manager	Century Pulp & Paper
11	Mr. Ajay Kumar	Manager	Century Pulp & Paper
12	Mr. Rajesh. P	Manager (Electrical)	Tamil Nadu Newsprint and Papers Limited
13	Mr. Senthil Arunachalam. A. K	Manager (Mechanical)	Tamil Nadu Newsprint and Papers Limited
14	Mr. Balamurugan. M.P. N	Senior Manager (Pulp)	Tamil Nadu Newsprint and Papers Limited
15	Mr. Shivkumar	Senior Manager (Paper machine)	Tamil Nadu Newsprint and Papers Limited
16	Mr. Arijit Kanti Swain	Chief Manager (Electrical)	JK Paper Mill, Rayagada, Odisha
17	Mr. Sudeep Kumar Panda	Deputy Manager (Power Block)	JK Paper Mill, Rayagada, Odisha
18	Mr. Inderjit Singh	Sr Engineer Electrical	Satia Industries Ltd
19	Mr. Sarabjit Singh	AM Utility -power plant	Satia Industries Ltd
20	Mr. P.T. Sampath	SR. GM. Utility	Bindals Papers Mills Limited
21	Mr. Khalid Khan	Senior Consultant	Innovative Energy Conservation Solutions
22	Mr. Vivek Choudhari	Senior Manager	Innovative Energy Conservation Solutions
23	Dr. M.K. Gupta	Director	CPPRI
24	Mr. Harish Bhatia	Regional System Manager	Yokogawa India Limited
25	Mr. Jay Kumar	Dy. Manager - System Sales	Yokogawa India Limited

S. No.	Name	Designation	Organisation
26	Mr. P V Krishna Kumar	Co-Founder & Chief Marketing Officer	Supreme Energy Solutions, Tiruchirappalli, Tamil Nadu
27	Mr. Suneel Sehgal	Head Utility	Khanna Paper Mills
28	Dr. Piyush Verma	Head- Business Excellence, QC/R&D, Chemical Handling and ETP	Khanna Paper Mills
29	Mr. N Sriram	Technology Manager	Valmet Technologies Private Limited
30	Mr. S Ramasubramanian	Product Sales Manager	Valmet Technologies Private Limited
31	Mr. Akhil VP	Marketing Specialist	Valmet Technologies Private Limited
35	Mr. Sunil K. Khandare	Director	Bureau of Energy Efficiency
37	Mr. Naveen Kumar	Sr. Sector Expert - Pulp & Paper	Bureau of Energy Efficiency
32	Ms. Sanyukta Das Gupta	Sr. Advisor, Smart Power	British High Commission (ASPIRE Team)
42	Mr. Yash Khandelwal	Policy Advisor-Low Carbon Growth, Climate and Energy Team	British High Commission (ASPIRE Team)
33	Mr. Ramit Malhotra	Director, Lead-Smart Power	KPMG India (ASPIRE Team)
34	Mr. Balawant Joshi	Managing Director	Idam Infra (ASPIRE Team)
36	Mr. K. K. Chakarvarti	Sr. Advisor, IDEEKSHA	Idam Infra (ASPIRE Team)
38	Mr. Anurag Sirola	Manager	KPMG India (ASPIRE Team)
39	Mr. Dipak Khandare	Associate Director - Industrial Decarbonisation	Idam Infra (ASPIRE Team)
40	Ms. Dhaarna Rawat	Consultant	Idam Infra (ASPIRE Team)
41	Ms. Sonam Vyas	Consultant	KPMG India (ASPIRE Team)
43	Mr. Honey Arora	Functional Expert Pulp Electrical	Trident India
44	Mr. Sukhpreet Singh	Shift Manager REC Electrical	Trident India
45	Mr. Alok Sharma	Director Technology and Business Development	Zenex India Pvt. Ltd
46	Mr. Amit Sharma	Director & CEO	Venus Energy and Consultants Private Limited
47	Mr. Jatin Mishra	Sr. Engineer	Khanna Paper Mills Ltd.
48	Mr. Samridh	GET	Khanna Paper Mills Ltd.
49	Mr. Balinder Singh	Sr. Manager	Khanna Paper Mills Ltd.
50	Mr. Charandeep Singh	Sr. Manager	Khanna Paper Mills Ltd.
51	Mr. Manpreet Singh	GM	Aadtech

S. No.	Name	Designation	Organisation
52	Mr. Steve Freeman*	Executive Director - Energy	Confederation of Paper Industries
53	Mr. Niraj Singh*	Senior Project Development Manager	Carbon Clean
54	Mr. Anand*	Director	HTFE (India Partner of Centrica PLC)
55	Mr. Colin Martin*	Global Sales Director, CoolPlanet	CoolPlanet
56	Ms. Trinayani Sen*	Senior Program Associate	WRI India

*Attended virtually

FOR MORE INFORMATION PLEASE CONTACT

Archana Chauhan

Head, Energy Sector Reform
British High Commission
archana.chauhan@fcdo.gov.uk

Vikas Gaba

Partner and National Lead Power & Utilities
KPMG in India
vikasgaba@kpmg.com