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BUREAU OF ENERGY EFFICIENCY
Government of India, Ministry of Power

GOVERNMENT OF INDIA
MINISTRY OF POWER

ASPIRE Programme
Accelerating Smart Power & Renewable Energy in India

SUMMARY REPORT

SECTORAL WORKSHOP ON

BEST PRACTICES IN ENERGY EFFICIENCY IN TYRE SECTOR

A PATH FOR DECARBONISATION

AUGUST 7, 2024

HOSTED BY:
Energy Management Centre (EMC), Thiruvananthapuram, Kerala

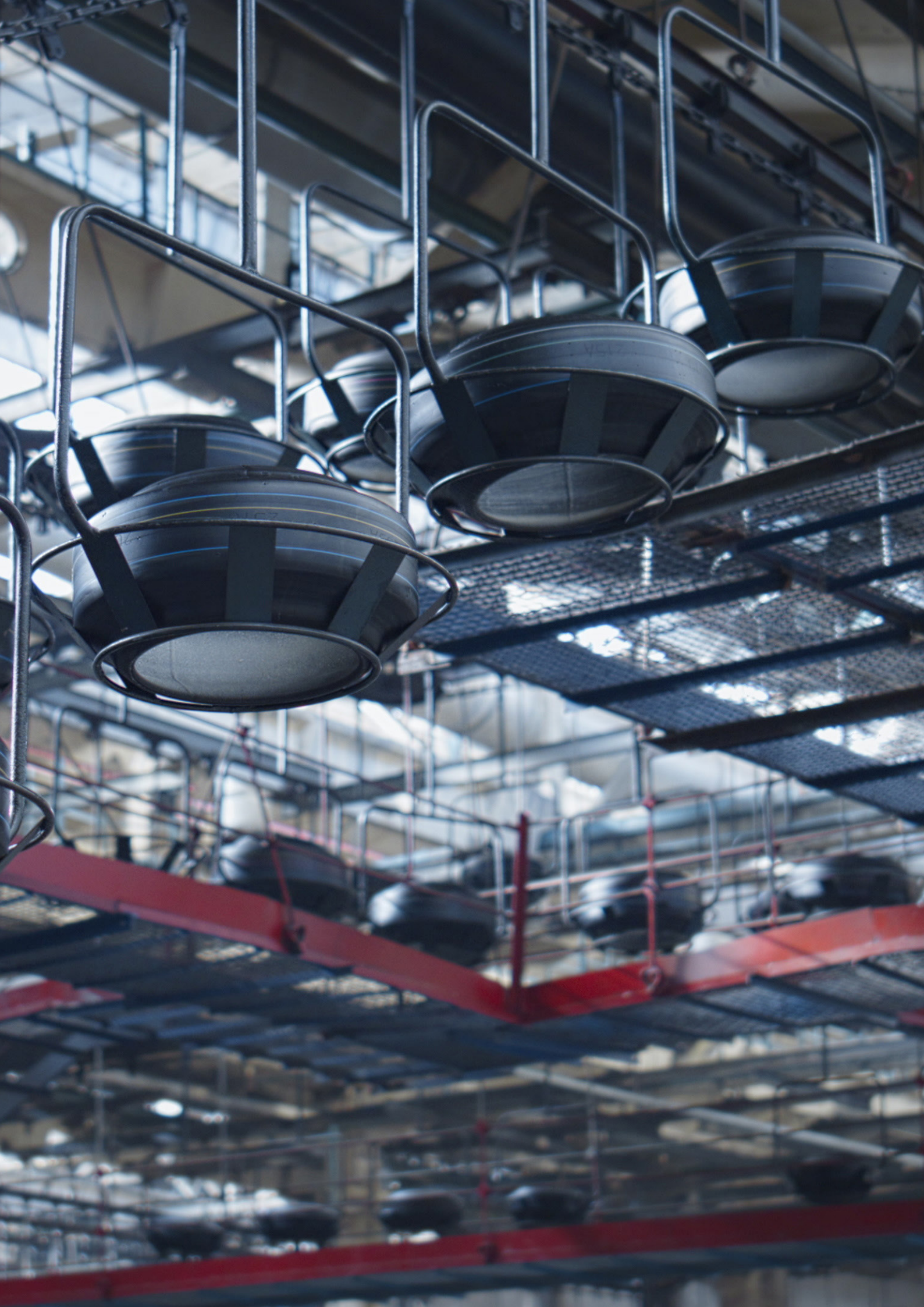
iDeeksha

Industrial Decarbonisation and Energy Efficiency
Knowledge Sharing Platform

Contents

Abbreviations

ASPIRE	Accelerating Smart Power and Renewable Energy in India
BAT	Best Available Technique
BEE	Bureau of Energy Efficiency
CAPEX	Capital Expenditure
CCTS	Carbon Credit Trading Scheme
CO	Carbon Monoxide
CO_2	Carbon dioxide
CDM	Clean Development Mechanism
DCs	Designated Consumers
DCH	Direct Contact Heater
EnCon	Energy Conservation
ESG	Environmental, Social and Governance
FCDO	Foreign Commonwealth and Development Office
GBP	Great British Pound
GDP	Gross Domestic Product
GESI	Gender Equality and Social Inclusion
GHG	Greenhouse gases
IDEEKSHA	Industrial Decarbonisation and Energy Efficiency Knowledge Sharing Platform
IEED	Industrial Energy Efficiency and Decarbonisation
KEP	Knowledge Exchange Platform
MTOE	Metric Tonnes of Oil Equivalent
$MtCO_2$	Million Tonnes of Carbon dioxide
MoP	Ministry of Power
MW	Mega Watt
MWh	Mega Watt Hour
NMEEE	National Mission on Enhanced Energy Efficiency
NSCICM	National Steering Committee on Climate Change Mitigation
PAT	Perform Achieve and Trade
PLC	Programmable Logic Controller
PRVs	Pressure Reducing Valves
rCB	Recovered Carbon Black
SCADA	Supervisory Control and Data Acquisition
SEC	Specific Energy Consumption
SGE	Specific GHG emission
TPO	Tyre Pyrolysis Oil
VFD	Variable Frequency Drive



BACKGROUND

India is the 7th largest tyre manufacturer in the world, with ~30 companies and 60+ manufacturing units. The tyre industry contributed to **2.2%** of India's manufacturing GDP in FY2022 and is expected to reach **3.4%** by FY2032. The tyre sector is categorized into two key segments i.e., end market and product segment. The end market is driven by original equipment manufacturing (OEM) for different vehicle categories and replacement sectors. The product segment consists of tyres for truck & bus, passenger vehicle, two/ three-wheeler, off-highway tyres (OHT), among others. The revenue of the Indian tyre industry has doubled over the last decade and is further expected to increase from ~INR 744 billion (~GBP 7.5 billion) in FY2022 to **~INR 1,800 billion** (~**GBP 17 billion**) by FY 2032. At present, ~90% of the tyre industry's revenue is from the domestic market, of which, 70% is on account of the replacement segment. The three leading tyre companies in India i.e., MRF Tyres, Apollo Tyres and JK Tyre together account for ~60% of the market share in terms of revenue.

As per a study, in the entire lifecycle of a tyre, 2.1% of the GHG emissions are found to occur during manufacturing and 87% are attributed to product use, mainly due to rolling resistance. Moreover, production of tyre related raw materials such as carbon black, synthetic rubber, and natural rubber generates four times as much carbon dioxide (CO_2) emissions per tyre, than the manufacturing of tyre does.[1] This workshop focused on the best practices that the tyre manufacturing sector can adopt to reduce emissions in their value chain, excluding Scope 3 (supply chain-related emissions).

With the evolution of Industry 4.0, India is implementing new and innovative technologies like artificial intelligence and machine learning to improve efficiencies and reduce emissions in the atmosphere. India produces some of the finest radial tyres in the world and is currently exporting tyres to more than **170** countries with maximum tyres being sold to the US and Europe. Further, the Government of India has also been supporting the adoption of new-age technologies including funding support for technological advancements in the tyre sector.

As per the Ministry of Power's (MoP) notification dated 6th June 2023, tyre manufacturing plants with energy consumption of 7,000 MTOE per year or more are expected to qualify as a Designated Consumer (DC) as per the provision of EC Act 2001. These DCs will qualify for Bureau of Energy Efficiency's (BEE) flagship Perform Achieve and Trade (PAT) scheme or Carbon Credit and Trading Scheme (CCTS).

In the tyre industry, the typical ratio of electrical and thermal energy is 35:65 (in Kcal terms). While the thermal energy is mainly used in utilities and processes, electrical energy is utilised to drive the motive load of the plant and utilities.

According to research studies, it is found that the electricity required to produce one tonne of virgin tyres is 1,019 kWh[2], producing 86.9 kg of CO_2 emissions while power consumption for waste tyre treatment is 800 kWh, producing 60.5 kg CO_2 emissions which results in a 30% reduction in emissions. Recycling of waste tyres also leads to the generation of by-products such as steel wire, fibre and iron scrap which can be used for other purposes.[3]

The tyre sector in India can adopt best available techniques (BATs) and other emerging technologies to enhance energy efficiency and enable decarbonisation of its operations.

1 https://www.crisilratings.com/content/dam/crisil/our-analysis/esg-research/esg-readings/the-scope-3-series.pdf
2 https://www.sciencedirect.com/science/article/pii/S2666789421000258
3 https://www.fenderbender.com/running-a-shop/finance/article/33031150/new-study-looks-at-carbon-footprints-of-tires-retreads

In view of the above, a one-day sectoral workshop was organised at Energy Management Centre, Thiruvananthapuram, Kerala on 7th August 2024 under the Accelerating Smart Power and Renewable Energy in India (ASPIRE) programme.[4] 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 with the support of EMC Kerala. The theme of the sectoral workshop was "***BEST Practices in Energy Efficiency in Tyre sector: A Path for Decarbonisation***". During the workshop, **60+** stakeholders deliberated on best practices, technologies and policy interventions required to accelerate the decarbonisation of the Tyre sector. In the workshop, some key organisations from the UK Tyre sector presented the various leading best practices and technologies adopted in the UK.

Objective of the Workshop

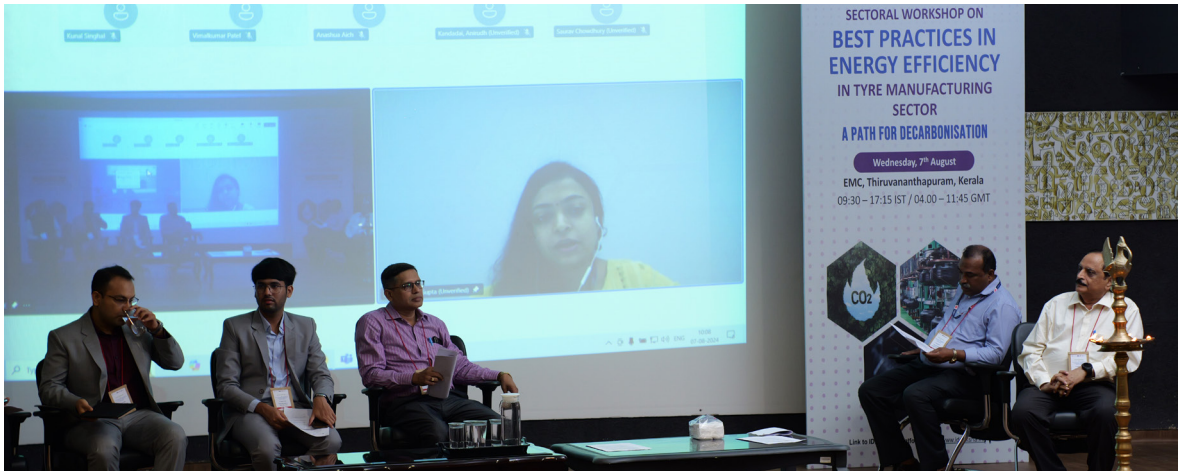
- Intimate stakeholders about Industrial Decarbonisation and Energy Efficiency Knowledge Sharing Platform (IDEEKSHA) platform and key functionalities implemented on the same
- Apprise stakeholders on the impact of the PAT scheme and the upcoming CCTS along with industrial energy efficiency and decarbonisation (IEED) measures in the tyre sector
- Share best practices/ technologies for enhancing IEED and identify learnings from the UK experience
- Identification of new emerging IEED technologies available globally including from the UK

Highlights

- **60+** participants from India and the UK
- **~17%** women participants
- **5** (sessions including GESI)
- Active participation from government agencies, leading tyre manufacturers and technology providers from India and the UK
- Dedicated session on "importance of Gender Equality and Social Inclusion (GESI) within Indian industries"

4 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. Idam Infrastructure Advisory Private Limited (India) is a key consortium member.

INAUGURAL SESSION



(L – R) Mr. Anurag Singh Sirola, Mr. Dipak Khandare, Mr. Yash Khandelwal, Mr. Sunil K. Khandare, Mr. Johnson Daniel, and Mr. K. K. Chakarvarti

Speakers

Mr. Sunil K. Khandare
Director, Bureau of Energy Efficiency (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. Anurag Singh Sirola
Associate Director, KPMG, ASPIRE Programme Team

Dipak Khandare
Associate Director, Idam Infra ASPIRE Programme Team

Key Takeaways

- The global tyre market, valued at ~**INR 28 trillion (GBP 280 billion)** in 2023, is expected to nearly double by 2032, reaching ~**INR 50 trillion (GBP 500 billion)**.
- Tyre sector in India is a crucial component of the manufacturing sector, contributing around ~2.2% to the nation's manufacturing GDP, and further expected to rise to 3.5% by FY 2032.
- The tyre sector in India is recognized as an energy-intensive industry. Decarbonisation of this sector is crucial for India's goal of becoming a net-zero economy by 2070, with leading tyre companies aiming for achieving carbon neutrality by 2050 and net-zero emissions by 2070.
- Leading tyre companies in India, such as JK Tyre and Apollo Tyres, are adopting advanced energy efficiency (EE) and decarbonisation technologies to meet their sustainability targets. This includes measures like recycling, waste management, and the installation of EE equipment.
- The transition from energy targets to emission targets will be a gradual process, with future workshops and technical sessions planned to guide the sector through this transition.
- The IDEEKSHA platform would be a one-stop shop for all IEED needs of Indian energy intensive industries including database of proven and emerging technologies and their providers available in India and globally. The IDEEKSHA platform was developed under the ASPIRE Programme and launched by the 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.
- The tyre sector's journey towards decarbonisation involves addressing emissions across the entire value chain, from raw material sourcing to product use. Embracing energy-efficient technologies, smart tyres with real-time sensors, and sustainable sourcing of materials are key strategies for reducing the sector's carbon footprint.
- Tyre sector can make significant strides towards sustainability, contributing to a more EE and environmentally friendly industrial sector, through focused efforts in adoption of EE measures and low-carbon technologies such as:
    - **Switching to energy efficient equipment**: Upgrading to more energy-efficient machinery and technologies to reduce overall energy consumption.
    - **Transitioning to greener fuel supplies**: Shifting to greener, more sustainable fuel options to reduce carbon emissions.
    - **Use of synthetic rubber instead of natural rubber** – Natural rubber from rubber trees (Hevea trees) can be replaced by synthetic rubber to manufacture tyres. Synthetic rubber is more resistant to abrasion and has good temperature properties compared to natural rubbers.
    - **Sustainable sourcing of tyre oil** – Wheels can be made from a combination of algae-oil with bio-polyurethane and silica made from agricultural waste. This would provide functional advantages to that of petroleum oil along with being eco-friendly in nature.
    - **Integrating AI and IoT-based energy management**: Utilising advanced energy management platforms powered by Artificial Intelligence (AI) and the Internet of Things (IoT) for better monitoring and optimisation of energy use.
    - **Utilising low-carbon effluent treatment technologies**: Adopting low-carbon technologies for effluent treatment to minimise environmental impact.

TECHNICAL SESSION I

PERFORM ACHIEVE AND TRADE SCHEME

Speakers

Mr. Sunil K. Khandare
Director, BEE

Mr. Naveen Kumar
Senior Sector Expert, BEE

Key Takeaways

- India is the 7th largest tyre manufacturer in the world, with **~30** companies and **60+** manufacturing units.
- The tyre sector in India, being recognised as an energy intensive sector is expected to be brought under the ambit of BEE's PAT/ CCTS scheme by 2025.
- 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.
- The CCTS provides an overall framework for the functioning of the Indian Carbon Market and includes detailed roles and responsibilities of stakeholders towards operationalization of the scheme. The objective of CCTS is to reduce or avoid greenhouse gas emissions from various sectors of Indian economy by pricing the emissions through a carbon credit certificate trading mechanism. CCTS is expected to be implemented in October 2024.w

- A feasibility study of tyre sector conducted in April 2022 across key clusters such as Chennai, Pune, and Baruch revealed the following:
    - Indian tyre sector accounts for **~9%** of global market share
    - Average specific energy consumption of tyre sector is **9.5** GJ/ton of output
    - Thermal energy accounts for **~60%** of the total energy input
- The tyre sector's energy benchmarking indicates a significant opportunity for energy savings. A baseline energy and emission audit for the sector was conducted during FY 2021-2024, with steps including stakeholder consultation, finalization of scope, and conducting the audit. This will culminate in setting baseline figures and target emissions, with the compliance cycle starting from April 2025.
- With the implementation of CCTS, the tyre sector will transition from focusing on specific energy consumption (SEC) to specific GHG emissions (SGE). This transition includes direct and indirect GHG emissions from fuel combustion and industrial processes. The sector's GHG emission intensity targets will be aligned with India's national commitments and the potential for fuel switching and decarbonisation.
- Under the CCTS, a Sectoral Technical Committee will be established to set and recommend emission reduction targets, which will be finalized by the National Steering Committee on Climate Change Mitigation (NSCICM) and notified by the Central Government. The target-setting approach will include estimating baseline emissions, setting targets on energy-related emissions, and deriving yearly targets for GHG emissions reduction.

TECHNICAL SESSION II

SHARING OF BEST PRACTICES BY INDIAN TYRE SECTOR INDUSTRIES

Speakers

Mr. M Bharathidasan

DGM, EEI

Mr. T. Jayakanthan

Chief Manager, EEI (EM)

Mr. D. Prabhu

Chief Manager, Utility (EM)
JK Tyre & Industries Ltd.,
Sriperumbudur, Tamil Nadu

Mr. Aneesh R.

Group Manager
Apollo Tyres, Perambra, Kerala

Mr. Renjit

Group Manager

Mr. Alagarsamy

Manager Apollo Tyres,
Kalamassery, Kerala

Mr. Gaurav Bohra

Dy. General Manager (EE&I),
JK Tyre & Industries Ltd.,
Kankroli, Rajasthan.

Key Takeaways

- **JK tyre and Industries - Chennai Tyre Plant:**
  - **Renewable Energy Integration:**
    - The unit sources **60.2%** of its power from renewable energy, including 7.5 MWp of rooftop solar installations and 24 MW of wind power. Additionally, the company has adopted biomass for thermal energy, with current usage at **35%** and plans for full substitution in the future.
  - **Energy Conservation (EnCon) Projects:**
    - Significant projects include the replacement of high-power centrifugal fans with high-efficiency axial fans, resulting in a **48%** energy saving.
    - Introduction of electric boilers has reduced coal and power consumption during plant startups.
    - Furthermore, optimizing hydraulic power consumption in PCR operations has yielded considerable energy savings.

- **Employee Engagement:**
    - JK Tyre emphasizes the importance of employee engagement in energy-saving initiatives, offering comprehensive training programs, visual aids, and awareness campaigns. The company also recognizes and rewards employees for their contributions to energy efficiency.

❖ **Apollo Tyres**:

- **Strategic Energy Planning:**
    - Apollo Tyres has implemented a robust energy planning framework, including budgeting based on new projects and production plans, mapping significant energy-use equipment, and finalizing capital expenditure (Capex) budgets.
- **Daily Monitoring and Cross-Learning:**
    - The company utilizes digital tools such as SCADA and Power BI for real-time energy monitoring, ensuring efficient energy management. Additionally, cross-learning sessions across different Apollo Tyres plants foster the sharing of best practices and innovations in energy efficiency.
- **Major Energy-Saving Initiatives:**
    - Apollo Tyres has undertaken several significant projects to enhance energy efficiency:
        - (i) Steam Header Rerouting: Optimizing the steam pipeline layout has led to substantial steam savings.
        - (i) Deaerator Optimization: A focus on water balance studies and optimizing hot water recovery has reduced power consumption.
        - (i) Vacuum Pump Cascading System: The introduction of a PLC-controlled cascading system for vacuum pumps has saved **300 kWh/day.**
        - (i) Energy-Efficient Cooling and Compressor Upgrades: The company has upgraded to energy-efficient systems for Banbury Cooling and installed dedicated screw compressors, along with VFD upgrades, to optimize energy usage in factory operations, leading to savings of **700 kWh/day**.
        - (i) Enhanced Pump Efficiency: Implementation of energy-efficient pumps has improved the efficiency of the factory cooling water system.

❖ **JK tyre and Industries - Kankroli Tyre Plant:**

- **Advanced Manufacturing and Digital Operations:**
    - The unit has integrated IoT solutions to optimize energy efficiency across its manufacturing processes. Their approach includes selecting equipment that prioritizes high energy efficiency and environmentally friendly technologies.
- **Specific Energy Consumption Optimization:**
    - The company has successfully reduced energy consumption in critical systems, such as pumping, ventilation, cooling, and compressors, through continuous improvement and optimization strategies.

- **Energy Efficiency and Decarbonisation Initiatives:**
  - The company reduced CO_2 emissions by utilizing horticulture waste as fuel for a 30-ton boiler and improved fuel efficiency by enhancing condensate recovery in curing processes.
  - The plant optimized air pressure in the mixing section to lower air power consumption and implemented process improvements in cooling tower and STP pump operations, reducing overall power usage.
  - Introduction of VFD with IE-3 motors on dual extruder feed mills decreased power consumption and minimized defects by optimizing feed width and speed control.

TECHNICAL SESSION III

CASE STUDIES AND LOW CARBON & DIGITAL TECHNOLOGIES FOR TYRE SECTOR- BY INDIAN EXPERTS

Speakers

Mr. Shinoj Lal K

Chief Business Development Officer, Alphageek Enterprises Private Limited, Bengaluru

Mr. Hiday K

Managing Director, Systel Energy Solutions, India Pvt. Ltd., Coimbatore

Mr. Syed Muneeb Ellias Peeran

Marketing Engineer, TurboTech Precision Engineering Private Limited, Bengaluru

Mr. Sachin Udgirkar

Senior Vice President – Business Development, Yantra Harvest Energy Pvt Ltd.

Mr. Jain Jacob

Energy Auditor Forbes Marshall Pvt Ltd., Pune

Mr. Omkar Deshpande,

Engineer- Tyre and Rubber, Forbes Marshall Pvt Ltd., Pune

Key Takeaways

❖ **Alphageek Enterprises Private Limited, Bengaluru**

- Leveraging IoT and AI to continuously monitor energy usage, providing actionable insights and alerts to prevent energy wastage, optimize demand management, and improve overall efficiency.
- Early detection of equipment failures through AI-driven analysis, enabling timely preventive actions, reducing unplanned outages, and optimizing the performance of critical systems like chillers and motors.
- Utilizing cloud-based energy intelligence for automated ESG reporting, real-time carbon footprint monitoring, and strategic decision-making to enhance sustainability and reduce operational costs in tyre manufacturing.

❖ **Systel Energy Solutions, India Pvt. Ltd.**

- Systel highlighted the importance of digitalizing compressed air systems in tyre manufacturing to enhance energy efficiency and sustainability. Real-time monitoring, predictive maintenance, and energy optimization were emphasized as crucial components. The sector has seen the implementation of various energy-efficient technologies such as advanced steam turbines, multi-fuel gas turbines, and turbochargers. These innovations are setting new benchmarks in energy efficiency and significantly reducing carbon footprints across multiple sectors, including tyre manufacturing.

- Systel discussed the significant energy consumption, greenhouse gas emissions, and operational costs associated with compressed air systems. Their approach focuses on identifying energy wastage hotspots and leveraging smart IoT sensors and advanced data analytics for continuous improvement.

- Digitalization not only reduces energy consumption and costs but also supports broader sustainability goals by minimizing the carbon footprint and optimizing system performance in tyre manufacturing processes.

❖ **TurboTech Precision Engineering Private Limited** & **Yantra Harvest Energy Pvt Ltd.**

- TurboTech Precision Engineering showcased the application of ECTTM (Energy Conservation Technology) in the tyre industry, emphasizing significant energy and cost savings. The installation of ECTTM in tyre manufacturing resulted in an incidental power generation of **430 kW**, leading to annual savings of approximately **3.4 Mn kWh** electricity and **INR 2.14 crores (GBP 2.14 Mn)**.

- Yantra Harvest Energy highlighted their energy-saving solutions, which allow tyre manufacturers to achieve significant energy savings without any Capex. The model offers turnkey services with guaranteed performance, ensuring no interruption in existing processes while converting high-pressure steam into clean electricity, thereby contributing to energy efficiency and decarbonisation.

❖ **Forbes Marshall Pvt Ltd.**

- Enhancing the efficiency of steam and condensate recovery systems in tyre curing can significantly reduce energy consumption, lowering specific steam consumption (SSC) and cutting CO_2 emissions.

- Implementing heat recovery solutions and optimizing the use of steam and condensate can lead to substantial energy savings, contributing to the decarbonisation of the tyre manufacturing process.

TECHNICAL SESSION IV

STANDARDS & DECARBONISATION TECHNOLOGIES FOR TYRE SECTOR – BY INTERNATIONAL & UK TECHNOLOGY / SOLUTIONS PROVIDERS

Speakers

Ms. Mary Sweere
Director,
Fluid Ice, UK

Mr. Sharan Ramachandran
Global Business Development Manager,
rFpro, UK

Mr. Anand Vardhan
Director, HTFE (India & South Asia Partner of Centrica PLC, UK)

Mr. Henry Hodge
Managing Director,
Black-Ram, UK

Key Takeaways

- UK's tyre manufacturing industry is a key player in Europe, producing a wide range of tyres for various vehicles. It focuses on innovation, quality and sustainability and invests in research & development (R&D) for better performance and safety while meeting environmental standards. The sector offers diverse employment opportunities from skilled workers to engineers.

- The UK tyre industry consists of some of the biggest tyre manufacturers in the world. Two of the major players- Continental and Pirelli are the 4th and 5th largest tyre manufacturing companies, respectively, globally.[5] In the FY2023, the production intensity, which captures the Scope 1 and Scope 2 emissions (tCO_2e) per production capacity (million), of Continental and Pirelli are 0.007, 0.016, respectively.[6]

- The strengths and capabilities of UK's tyre sector can be leveraged to facilitate rapid transition of Indian tyre industries' journey to net-zero. Some of the sustainable technologies and best practises adopted by the UK tyre industry to enhance energy efficiency and enable decarbonisation are mentioned below:

    - Biomass Boilers
    - Smart Tyres

5 https://www.tyrepress.com/leading-tyre-manufacturers/
6 https://www.crisilratings.com/content/dam/crisil/our-analysis/esg-research/esg-readings/the-scope-3-series.pdf

  - Thermal Energy Management Systems technology
  - Carbon Nanotubes (CNT)
  - Eco tyres
  - Circular economy principles
  - Artificial intelligence/ machine learning based solutions to drive emission reduction
  - IoT enabled industry 4.0 energy management solutions
  - Carbon capture and utilisation
  - Process control and automation

- **Fluid Ice** showcased its innovative continuous thermal process that recovers **99.5%** of waste tyres, converting them into high-demand products such as Tyre Pyrolysis Oil (TPO), Recovered Carbon Black (rCB), and steel. These products support the circular economy by offering sustainable alternatives to fossil fuels and traditional materials, significantly reducing emissions and contributing to the UK's sustainability goals.

- **rFpro** demonstrated its cutting-edge simulation software and vast library of LiDAR-scanned digital location models, which enhance tyre development through accurate, cost-effective, and scalable virtual testing. Their high-fidelity simulations allow for precise modelling of tyre-road interactions and reduce reliance on physical prototypes, accelerating development and reducing associated costs and risks. This technological advancement supports more efficient and realistic tyre engineering processes, aligning closely with real-world conditions.

- **Centrica's** patented technology driven by wireless sensors and advanced analytics from power radar software enables machine-level energy management systems for enhancing operating margins, reducing energy consumption, predict breakdowns and driving sustainability across the organisation.

- **Black-Ram Recycling Ltd**. addressed the complexities of transitioning to true circularity in the tyre sector, emphasizing the need for improved recycling technologies and regulatory enforcement. The UK tyre recycling landscape reveals challenges such as regulatory gaps and inefficiencies in energy use and waste management. Their focus on advancing recycling technologies and enhancing market oversight is crucial for achieving higher substitution rates and supporting sustainability within the sector.

SESSION ON IMPORTANCE OF GENDER EQUALITY AND SOCIAL INCLUSION (GESI)

Mr. Anurag Singh Sirola

Associate Director, KPMG,
ASPIRE Programme Team

Key Takeaways

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.

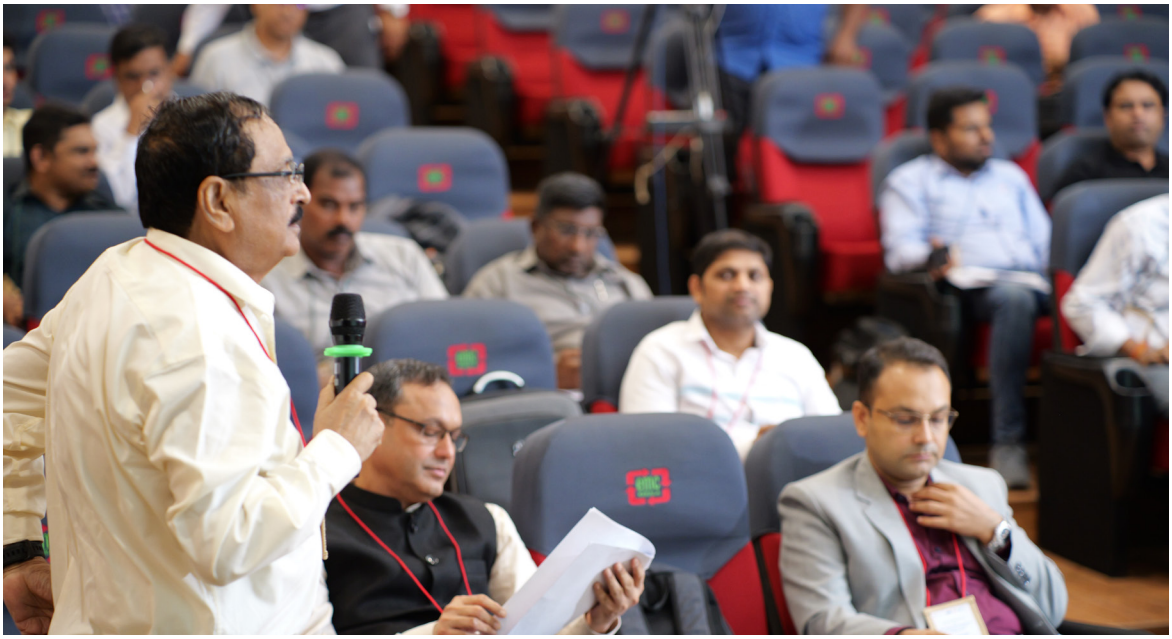
To ensure GESI, industries may consider implementation of the following measures:

- 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:

- **JK Tyre & Industries Ltd.** through their Entrepreneurship Development Programme for unemployed youths, provided necessary support to 17 unemployed women to establish successful businesses in diverse sectors, in FY 2024.
- **Apollo Tyres Ltd.** launched Navya, a program that aims to empower rural women financially by engaging them in income-generating activities and enhancing their skills and capacities. 1,122 women started income generation activities in FY 2024.
- **CEAT Tyres** launched Women Accelerator Programme to enhance behavioral skills and nurture leadership capabilities for the holistic growth of women, through workshops and mentoring programs. Further, CEAT's Nagpur facility has ~25% women associates across shop floor functions, which is not a usual norm in heavy-duty industries.
- **Balkrishna Industries Limited** provided livelihoods and vocational development to 800+ community members (mostly women) who have been trained in our pre-service teacher education center, 600 of whom are employed as teachers and teacher educators, through the CSR program.
- **Vedanta Limited** aims to achieve a 30% gender diversity ratio by 2030. In this regard, the company has implemented several measures, including a commitment to hiring 50% women through campus placements and promoting the inclusion of women in managerial decision-making bodies. Additionally, Vedanta is actively hiring LGBTQ personnel and providing sensitisation training to all employees. Initiatives like "Sakhi" are also in place to empower women by raising awareness of their socio-economic and cultural status and helping them access their rights and privileges.
- **Hindalco** is implementing the "Women at Hindalco (WAH)" initiative to ensure equal opportunities for women employees. Their commitment to gender inclusivity is evident in their workforce, with women comprising 8.37% of the total employee base and 8.62% of management positions. Furthermore, 40% of all new graduate engineer trainees are female. The company also focuses on hiring women for lateral positions. Additionally, Hindalco has established a dedicated Prevention of Sexual Harassment (POSH) committee to monitor and address issues related to crimes against women at workplace.

CONCLUDING SESSION



(L-R) **Mr. K. K. Chakarvarti**, **Mr. Dipak Khandare** and **Mr. Anurag Singh Sirola**

The ASPIRE Programme team emphasized that enhancing energy efficiency and reducing carbon emissions are crucial for advancing sustainability in the tyre sector. He highlighted the importance of these measures in supporting India's efforts to achieve net-zero emissions and addressing global challenges related to climate change.

The ASPIRE programme is set to support large, energy-intensive industries, including those in the tyre sector, by promoting the adoption of low-carbon technologies and solutions through partnerships with international technology providers, including those from the UK.

The workshop successfully explored innovative strategies and technologies adopted by the tyre industry, focusing on how these can drive decarbonisation. Discussions covered advancements in tyre recovery, simulation technologies, and recycling processes, all aimed at accelerating the sector's transition to more sustainable practices.

FEEDBACK FROM THE PARTICIPANTS

- Around **85%** of the participants responded that they were more than satisfied with the outcomes of the workshop[7].
- About **90%** of the participants rated the quality and content of the delivery as more than satisfactory[7].
- The technical session II– Sharing of Best Practices by Indian Tyre Sector was highly appreciated by the participants.
- Many participants recommended similar sectoral workshops for the tyre sector.
- Participants expressed their interest to know more about following IEED technologies from UK:
  - Waste heat recovery and utilisation output
  - Low carbon technologies
  - Recycling technology and process
  - Energy data management and reporting
- Women account for ~**15%** of total employee strength in most of the participating organisations.
- Participating organisations have undertaken various initiatives to promote Gender Equality and Social Inclusion (GESI), including:
  - Encouraging the development of new women engineers.
  - Giving priority to female candidates in campus hiring programs.
  - Inclusion of females in Graduate Engineer Trainee/ Management Trainee recruitment and advancement to officer/ managerial positions.
  - Organizing social awareness events.
  - Ensuring the inclusion of women in all core committees and decision-making processes

7 *provided a 7+ rating on a scale of 10*

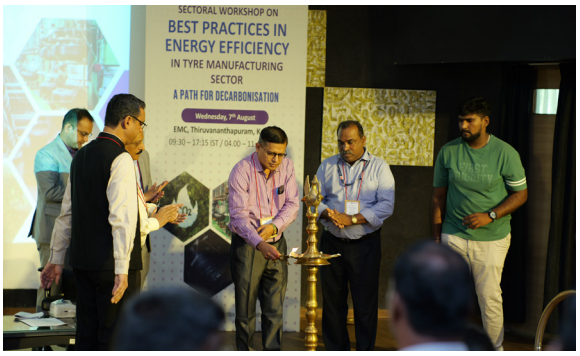
WAY AHEAD

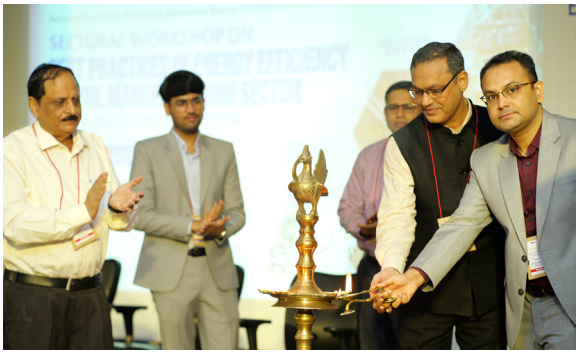
Group photograph of participants

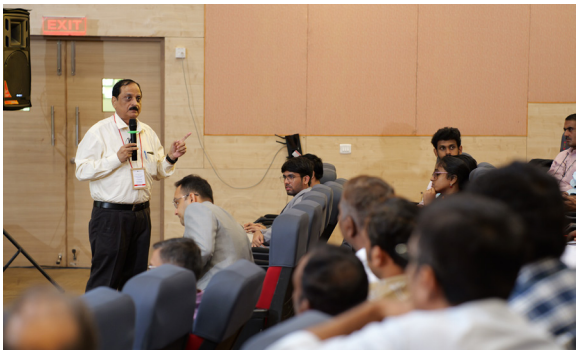
The sectoral workshop has garnered a positive response with substantial participation from esteemed officials from BEE, executive leaders from prominent Indian tyre industries, and technology and solutions providers from India and the UK. This workshop has served as a platform for national and international organisations to exchange their best practices and technologies aimed at enhancing industrial energy efficiency and decarbonisation measures within the Indian tyre 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 tyre sector, to identify technologies, solutions, technology suppliers, and financing options for increased adoption of IEED interventions.
- Plan and organise online seminar / B2B meetings with tyre industry stakeholders in close collaboration with UK technology suppliers such as Fluid Ice, rFpro, Black-Ram, Centrica, etc.
- Establish additional discussion forums to facilitate the exchange of knowledge and information, contributing to the formulation of effective policies.

GALLERY


SECTORAL WORKSHOP ON
BEST PRACTICES IN
ENERGY EFFICIENCY
IN TYRE MANUFACTURING
SECTOR
A PATH FOR DECARBONISATION

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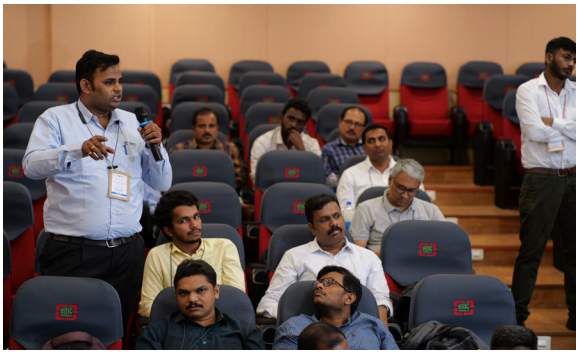

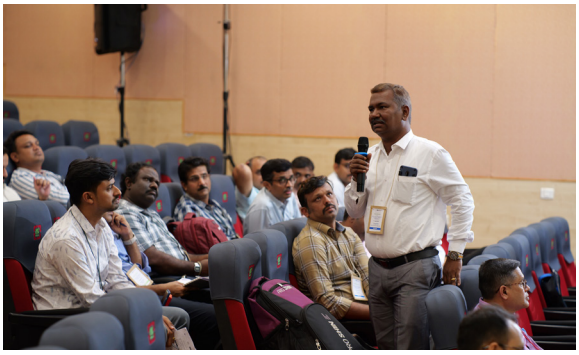

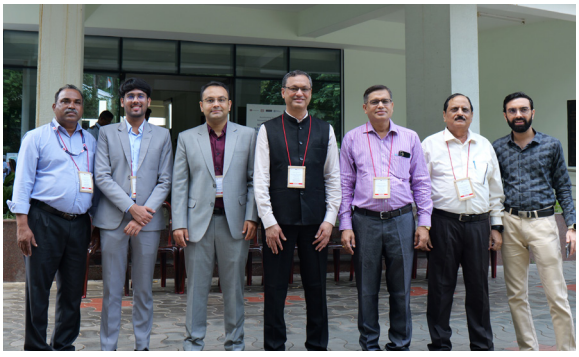

Annexures

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. Anurag Singh Sirola, Associate Director, KPMG, ASPIRE Programme Team
09:40 – 09:50	Introduction of ASPIRE Programme*	Ms. Sanyukta Das Gupta, Senior Advisor, Smart Power, Climate and Energy Team, British High Commission (BHC)
09:50 –10:05	Special Address on tyre manufacturing sector's initiatives on energy & emission reduction	Designated Representative, Automotive Tyre Manufacturers Association (ATMA)
10:05 – 10:20	Keynote Address by Bureau of Energy Efficiency (BEE)	Mr. Sunil K. Khandare, Director, BEE
10:20 – 10:30	Vote of thanks	Mr. K. K. Chakarvarti, Senior Advisor, IDEEKSHA Platform (ASPIRE Programme Team)
10:30 – 10:40	Group photograph	
10:40 – 11:00	Tea break and networking	
Technical Session I: Perform Achieve and Trade Scheme for Tyre Sector		
11:00 – 11:05	Moderator	Mr. Sunil K. Khandare, Director, BEE
11:05 – 11:35	Perform Achieve and Trade (PAT) Scheme and Carbon Credit Trading Scheme (CCTS) for the Tyre Sector	Mr. Naveen Kumar, Senior Sector Expert, BEE
11:35 – 11:45	Q&A	

Time (IST)	Name of Session	Presenter
Technical Session II: Sharing of best practices by Indian Tyre Sector		
11:45 – 11:50	Moderator	Mr. K. K. Chakarvarti, Senior Advisor, IDEEKSHA Platform (ASPIRE Programme Team)
11:50 – 12:10	Presentation by JK Tyre & Industries Ltd *'Best practices in energy efficiency to attain carbon neutrality by 2050'*	Mr. M Bharathidasan, DGM, EEI Mr. T.Jayakanthan, Chief Manager, EEI (EM) Mr. D.Prabhu, Chief Manager, Utility (EM)
12:10 – 12:30	Presentation by Apollo Tyres *'Energy saving initiatives of Apollo Tyres'*	Mr. Aneesh R., Group Manager Mr. Renjit, Group Manager Mr. Alagarsamy, Manager
12:30 – 12:50	Presentation by JK Tyre & Industries Ltd *'Best practices in energy efficiency at Kankroli plant'*	Mr. Gaurav Bohra, Dy. General Manager (EE&I)
12:50 – 13:00	Q&A	
13:00 – 14:00	Lunch break and networking	
Technical Session III: Case Studies and Low Carbon & Digital Technologies for Tyre – by Indian Experts		
14:00 – 14:05	Moderator	ASPIRE Team/ Sector Expert (BEE)
14:05 – 14:25	Presentation by Alphageek Enterprises Private Limited *'Harnessing IoT and AI for enhanced energy efficiency in Industrial and commercial facilities: embracing the net-zero transition'*	Mr. Shinoj Lal K, Chief Business Development Officer, Alphageek Enterprises Private Limited, Bengaluru
14:25 – 14:45	Presentation by Systel Energy Solutions *'Digitalizing compressed air for energy efficiency and sustainability in tyre manufacturing'*	Mr. Hiday K, Managing Director, Systel Energy Solutions, India Pvt. Ltd., Coimbatore

Time (IST)	Name of Session	Presenter
14:45 – 15:05	Case Study by TurboTech Precision Engineering Private Limited *'Micro Turbine supplied for Tyre Manufacturing'*	Mr. Syed Muneeb Ellias Peeran, Marketing Engineer, TurboTech Precision Engineering Private Limited, Bengaluru
15:05 – 15:25	Presentation by Forbes Marshall Pvt Ltd. *'Energy efficiency benchmarking and solutions for thermal utilities in tyre industry'*	Mr. Jain Jacob, Energy Auditor Mr. Omkar Deshpande, Engineer- Tyre and Rubber, Forbes Marshall Pvt Ltd., Pune
Technical Session IV: Standards & Decarbonisation Technologies for Tyre Sector – by International & UK Technology & Solutions Providers		
15:25 – 15:30 ***(10:55 – 11:00 BST)***	Moderator	Mr. Anurag Singh Sirola, Associate Director, KPMG, ASPIRE Programme Team
15:30 – 15:45 ***(11:00 – 11:15 BST)***	Presentation by Fluid Ice, UK* *'Recovery of waste materials from end-of-life and used Tyres'*	Ms. Mary Sweere, Director, Fluid Ice, UK
15:45 – 15:50 ***(11:15 – 11:20 BST)***	Q&A	
15:50 – 16:05 ***(11:20 – 11:35 BST)***	Presentation by rFpro, UK* *'High-definition tyres in high-definition worlds'*	Mr. Sharan Ramachandran, Global Business Development Manager, rFpro, UK
16:05 – 16:10 ***(11:35 – 11:40 BST)***	Q&A	
16:10 – 16:25 ***(11:40 – 11:55 BST)***	Presentation by Centrica PLC, UK* *'Improve operational energy efficiency predict breakdowns with Centrica's wireless, real-time technology'*	Mr. Anand, Director, HTFE (India Partner of Centrica PLC, UK)
16:25 – 16:30 ***(11:55 – 12:00 BST)***	Q&A	

Time (IST)	Name of Session	Presenter
16:30 – 16:45 ***(12:00 – 12:15 BST)***	Presentation by Black-Ram, UK* *'Maximizing steel, rubber, and carbon black recovery through tyre recycling'*	Mr. Henry Hodge, Managing Director, Black-Ram, UK
16:45 – 16:50 ***(12:15 – 12:20 BST)***	Q&A	
Session on importance of Gender Equality and Social Inclusion (GESI) measures in Indian Industries		
16:50 – 17:10	Importance of GESI measures in Indian Industries	Mr. Anurag Singh Sirola, Associate Director, KPMG, ASPIRE Programme Team
Discussions, Feedback and Concluding Remarks		
17:10 – 17:30		Mr. Sunil K. Khandare, Director, BEE Climate and Energy team, Foreign and Commonwealth Development Office Senior Member, Automotive Tyre Manufacturers Association (ATMA) Mr. Anurag Singh Sirola, Associate Director, KPMG, ASPIRE Programme Team Mr. Dipak Khandare, Associate Director, 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	Santhosh A	Managing Director	Athul Energy Consultants Pvt Ltd, Thrissur, Kerala
2	Shyam K.C	Head Engineer	Apollo Tyres, Kerala
3	Arun P S	Manager	Apollo Tyres, Perambra
4	Kishor Rajput	Sr. Officer	Bridgestone, Chakan
5	Pankaj Khade	Sr. Engineer	Bridgestone
6	Ajay Singh Thakur	Assistant Manager	Bridgestone, Kheda
7	Dharmesh Pandya	Dy. Manager	Bridgestone
8	Nimesh Darji	Sr.Manager Utility	CEAT, Halol
9	Brijesh Kapatel	Assistant Manager QA	CEAT
10	Subhash Babu B V	Registrar	Energy Management Centre, Kerala
11	Sindhu S Kumar	Information Officer	Energy Management Centre, Kerala
12	Shiji S A	Jr. System Analyst	Energy Management Centre, Kerala
13	Kumari Sheela S	PA to Director	Energy Management Centre, Kerala
14	Laji S	Accountant	Energy Management Centre, Kerala
15	E S Yamuna	Librarian	Energy Management Centre, Kerala
16	Kumari Neenu Mariyam Solaman	Project Engineer	Energy Management Centre, Kerala
17	Nithya B Tilakan	Project Engineer	Energy Management Centre, Kerala
18	Neethu K V	Project Engineer	Energy Management Centre, Kerala
19	Princy S	Project Engineer	Energy Management Centre, Kerala
20	Divine Angel J D	Project Engineer	Energy Management Centre, Kerala
21	Kumari Divya P G	Project Engineer	Energy Management Centre, Kerala
22	Priya E	Project Engineer	Energy Management Centre, Kerala
23	Mehaboob	-	Energy Management Centre, Kerala
24	Bindu Kumari	Documentation Assistant	Energy Management Centre, Kerala
25	Sree Kumari	WDA	Energy Management Centre, Kerala
26	Beena. T. A	PR	Energy Management Centre, Kerala

S. No	Name	Designation	Organisation
27	Sumesh .S	Accounts Officer	Energy Management Centre, Kerala
28	Shankar	Finance Intern	Energy Management Centre, Kerala
29	Johnson Daniel	Energy Technologist – E II	Energy Management Centre, Kerala
30	K. Adaikkappan	Divisional manager EEI	Emeral Tyre Manufaturers Ltd, Gummidipundi, Tamilnadu
31	P.J.Prem	Manager Electrical	Emeral Tyre Manufaturers Ltd, Gummidipundi, Tamilnadu)
32	Jilin M V	Engineer – Cochin	Forbes Marshall Pvt Ltd
33	Ajay Satpute	-	Goodyear, Aurangabad
34	Rajeev Dandotiya	Chief Manager (EEI)	JK Tyre & Industries Ltd (Banmore Tyre Plant, Gwalior)
35	G V Krishna Kumar	Sr. Manager- Engineering	JK Tyre & Industries Ltd., Vikrant Tyre Plant, Mysur
36	Ramesh Raju S	Manager-Engineering	JK Tyre & Industries Ltd., Vikrant Tyre Plant, Mysur
37	Anand J	Manager-Engineering	JK Tyre & Industries Ltd., Vikrant Tyre Plant, Mysur
38	Sarun Kumar K P	Consultant Engineer	Kerala State Productivity Council, Eranakulam, Kerala
39	Abhijith Narayanan	Consultant Engineer	Kerala State Productivity Council, Eranakulam, Kerala
40	Vishnu Prasad	-	MRF
41	Balaji. M	-	MRF
42	Srinivas. S	-	MRF
43	Suresh Babu B V	Accredited Energy Auditor	Ottotractions
44	G Krishanakumar	General Secretary	Society of Energy Engineers and Managers, Kerala
45	Paramwaran.M	Senior Manger Utility	CEAT TYRES
46	R.S. Rewapati	Chief Manager	Cavandish Tyre
47	Suraju	State Head	EESL
48	Bharathidasan Mani	DGM - EEI	JK Tyre & Industries Ltd Sriperumbudur
49	T Jayakanthan	Energy Manager – Electrical	JK Tyre & Industries Ltd Sriperumbudur
50	D. Prabhu	Energy Manager – Utility	JK Tyre & Industries Ltd Sriperumbudur
51	Gaurav Bohra	Dy. General Manager (EE&I)	JK Tyre & Industries Ltd., Kankroli, Rajasthan
52	Renjit Jacob	Group Manager	Apollo Tyres, Perambra

S. No	Name	Designation	Organisation
53	Alagarsamy	Manager	Apollo Tyres, Kalamassery
54	Hiday K	Managing Director	Systel Energy Solutions, India Pvt. Ltd.
56	Shinoj Lal K	Chief Business Development Officer	Alphageek Enterprises Private Limited Alapphuzha, Kerala.
57	Omkar Deshpande	Engineer – Tyre & Rubber	Forbes Marshall Pvt Ltd
58	Jain Jacob Varghese	Energy Auditor -Lead Engr.	Forbes Marshall Pvt. Ltd.
59	Syed Muneed Ellias Peeran	Marketing Engineer	Turbo Tech India
60	Sachin Udgirkar	-	Yantra Harvest Energy Private ltd., Pune
61	Sunil K. Khandare	Director, BEE	ASPIRE Programme Team
62	Naveen Kumar	Senior Sector Expert, BEE	ASPIRE Programme Team
63	Gautam Anand	Project Engineer, BEE	ASPIRE Programme Team
64	Sanyukta Das Gupta*	Senior Advisor, Smart Power, Climate and Energy Team, British High Commission	ASPIRE Programme Team
65	Yash Khandelwal	Policy Advisor, Climate & Energy Team, British High Commission	ASPIRE Programme Team
66	Anurag Singh Sirola	Associate Director, KPMG	ASPIRE Programme Team
67	K.K.Chakarvarti	Senior Advisor, IDEEKSHA	ASPIRE Programme Team
68	Dipak Khandare	Associate Director, Idam Infra	ASPIRE Programme Team
69	Shiva Prasath S R	Analyst, Idam Infra	ASPIRE Programme Team
70	Anirudh Kandadai*	Consultant, KPMG	ASPIRE Programme Team
71	Vimalkumar Patel*	Consultant, Idam Infra	ASPIRE Programme Team
72	Kunal Singhal*	Senior Manager, Idam Infra	ASPIRE Programme Team
73	Anashua Aich*	Analyst, Idam Infra	ASPIRE Programme Team
74	Henry Hodge*	Managing Director,	Black-Ram, UK
75	Sharan Ramachandran*	Global Business Development Manager	rFpro, UK
76	Anand*	Director	HTFE (India Partner of Centrica PLC, UK)
77	Saurav Chowdhury*	-	-

*Attended Virtually

FOR MORE INFORMATION PLEASE CONTACT

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