
15th International Conference - ECT 2024
Organised by ECMA

“Clean Air Today. Every Day.”

22nd and 23rd October 2024,
The Lalit Hotel, Connaught Place, New Delhi

CONFERENCE REPORT

ECMA (Emission Controls Manufacturers Association) organised 15th International Conference - ECT 2024, was held on 22nd October (Tuesday) and 23rd October 2024 (Wednesday) at The Lalit Hotel, Connaught Place, New Delhi based on the theme **“Clean Air Today, Every Day”**.

The Conference Theme was specially chosen to reflect the importance of clean air as an essential need for the life. Air Quality is threatened by pollutants coming from various sources and, therefore, a collective effort is required towards reducing emissions and ensuring clean air not for today but every day for a cleaner tomorrow for generations. This is achievable by a shared commitment across society, government and policy bodies, business and industry community and as well as significantly individuals. A combination of innovations, policies and right actions at the right time will surely take us to the destination.

With these view points in the mind, The ECT 2024 conference brought together industry leaders, experts, government officials, OEMs, Emission system suppliers, test agencies, NGOs and enthusiasts for engaging and insightful presentations and deliberations covering the topics on EURO7/BS7 and Global Development advancements in Emission Control technologies for Light Duty, Heavy Duty and Off-road/Non-road segments; Hydrogen as potential fuel for ICE, New Fuels and Fuel Blends, and hybrid as a promising powertrain, etc.

Dr. Prashant Gargava - Director, NCAP (MoEFCC), inaugurated the ECT 2024 Conference as the Chief Guest.

“Clean Air Today. Every Day.”

Clean air is essential for life. It is fundamental to our well-being, the health of our communities, and the sustainability of our planet. Yet, in today’s world, air quality is threatened by pollutants from various sources. Addressing this issue requires a collective efforts toward reducing emissions and ensuring clean air not just for today, but every day.

Clean Air is more than just a basic human right; it is crucial for our health. Beyond human health, clean air is also critical for the environment. It also plays a significant role in climate change. Achieving clean air means a healthier planet that can support life for future generations.

The vision of “Clean Air Today. Every day.” Is achievable, but it requires a shared commitment across society, from governments and businesses to communities and individuals. By prioritizing clean air, we invest in a healthier, more sustainable future for all. This effort will not only protect human health but also preserve the environment, reduce the impacts of climate change, and ensure that future generations inherit a world where clean air is the norm, not the exception.

Clean air is a journey, not a destination. With the right actions, policies and innovations; we can breathe easier, knowing that clean air is possible not just for today, but every day.

EXECUTIVE SUMMARY – ECT 2024 CONFERENCE: Highlights, Take-aways and Recommendations (Conference presentations and Panel Discussions)

General

- *Future emission legislation worldwide, and also in India, will chiefly focus on NO_x and CO₂ (GHG) emissions. Gaseous and PM emissions are mainly sourced from the initial cold-start operation.*
- *Combustion engine is one of the main sources for NO_x as far as urban emission quality is concerned. Control of emissions to near zero levels from all powertrains will be needed as we move on with transportation to achieve air quality goals.*
- *It is quite evident that the heavier the load and the longer the range, there is less suitability for electrification & the more reliance on combustible fuels.*
- *E-gasoline and E-diesel fuels have great potential to nearly eliminate Well-to-Wheel CO₂ emissions.*
- *There is a growing focused approach in Europe on Zero-Impact-Vehicle emission regulations. This concept is being developed jointly by University of Graz and University of Aachen. The new definitions are being formulated as under -*
 - ✓ *Zero Impact Emissions (ZIE) – Zero impact emissions are achieved when impact of vehicle fleet does not worsen the air quality by more than 3%*
 - ✓ *Zero Impact Vehicles (ZIV) – Zero impact vehicle is a vehicle whose emission are so low that they do not have a measurable negative impact on the environment or human health.*
- *ZIE can be achieved using innovative EATs with external heating, which can be realized by using burners, electrically heated catalysts, Cat VAP, etc.*
- *Zero or close-to-zero CO₂ emission is possible by promoting bio-fuels and e-fuels.*
- *Exhaust temperature control is the key to achieve ZIE. Exhaust temperature should be kept above 230 deg C to achieve ZIE and ZIV, as SCR catalyst efficiency drops below 230 deg C causing NO_x peaks.*
- *WLTP test cycle exhibit higher raw emission than MIDC test cycle. High porosity substrate shows advantages for initial emissions for THC in terms of light-off performance.*
- *Heavy-duty emissions do face challenges as regards CO₂ target, cold start and low load cycle during city driving. Additionally, it has to meet stringent Conformity Factor (CF) in RDE/in-use/off-cycle emissions.*

H₂-ICE technology

- *H₂-ICE can serve as an alternate H₂ technology by utilizing existing powertrain technologies to keep up the front capital costs low. The SCR technology used to meet BS7/Euro 7 or Tier 5 emission standards for diesel engines can be used on the H₂-ICE without major adaptations, hence reducing development costs & efforts.*
- *Near-zero NO_x emissions are possible for H₂-ICE engine with a relatively smaller after-treatment system and optimized urea dosing.*
- *Renewable hydrogen is required to decarbonise the transportation.*

- *H₂-ICE also offers near-term advantages in TCO (Total Cost of Operation) and existing maintenance practices.*
- *H₂-ICE technology for HDVs has potential development targets of achieving 40-45% peak BTE (brake thermal efficiency), emissions <0.02 g/hp-hr and CO₂ <1 gmCO₂/hp-hr, which is about 99.9% lower compared to corresponding diesel trucks.*
- *H₂-ICE technology also provides benefits of very low N₂O levels compared to diesel.*
- *Adequate support of government policies and funds would be required to promote H₂ technology. H₂-ICE should be considered as a Zero-Carbon fuel technology.*

HYBRID technology

- *It is evident from the trends of the sales data that there is decline in sales of ICE vehicle in India, specially in SUV segment. Mild & full hybrid vehicles are picking up pace for example about 22% from Europe, 18% from China and also showing a growing contribution in India currently at about 3%. PHEV vehicle sales are also growing at about 38% CAGR globally.*
- *Hybrids are also seen as a transitional technology, offering familiarity & practicality while reducing environmental impact. Consumers are favorably considering the aspects of no long waiting time for charging and more peaceful long drives overcoming range anxiety of BEVs.*
- *Indian consumers are increasingly opting for hybrids due to their balance of fuel efficiency and lower emissions compared to traditional ICE vehicles.*
- *Hybrids are reported to be more environmentally friendly than EVs in India's current energy context, where 75% of electricity is generated from coal. Hybrids have lower fuel consumption and maintenance costs over their lifetime, making them an attractive choice for consumers.*
- *IIT-Kanpur report reveals that Life cycle GHG emissions for HEV was 27.5% lower than BEV and 28.1 % lower than ICEV. Life cycle GHG emissions for ICEV and BEV were almost similar. GHG emission during manufacturing of vehicles was the highest for BEV. For BEV, it was 35.3% higher than HEV and for the ICEV-P, it was 3% lower than HEV.*
- *In general, the future of hybrid vehicles looks promising, with continued advancements in technology and increasing consumer acceptance. HEVs operating with E-fuels would be the most sustainable way forward for India.*

Euro7 & BS7 Emission regulations

- *Original Euro 7 proposal was stricter and had more contained far-reaching RDE conditions. However, European Commission rather converged late and finally political decision was arrived with softened regulations for cars and light duty vehicles whereas regulations are challenging and ambitious for heavy duty vehicles. In general, it is said that Euro 7 regulations are going to give further opportunities to ICE sector to continue to flourish in Europe for some more decades.*
- *Euro 7 regulations come with further lower limits of pollutants which creates more challenging demands in terms of measurement systems, measurement accuracy and repeatability assurance of tiny amount of emissions.*

- *Euro 7 regulations carry many new suggestions, potentially controlling the emissions quite sizably from the vehicles–*
 - (a) *In general, for all types of vehicles*
 - *More effective emission tests – calls for more precise real drive emissions (RDE) measurements*
 - *Digital monitoring of compliance*
 - *Durability period is longer*
 - *Rules and Limits on emissions from brake wear and microplastic pollution from the tyre wear are newly introduced*
 - *On-board monitoring introduced*
 - (b) *For all ICE vehicles*
 - *Emission limits proposed are fuel and technology neutral*
 - *Regulation of additional pollutants introduced such as NMOG, NH₃, CH₄, N₂O*
 - *On-road tests with broader range of driving conditions*
 - *PN₁₀ is regulated instead of PN₂₃*
 - *PN limits apply to all types of Positive-Ignition (PI) vehicles*
 - (c) *for electric and hybrid vehicles*
 - *Enhanced battery durability*
- *Overall scene is that Euro 7 regulation is like a mixed bag for LDVs and quite a challenging one for HDVs*
- *Real-World In-Service Monitoring (ISM)/In-Service Compliance (ISC) is going to add complexity & cost to development and certification process.*
- *There is a challenge to EAT suppliers and OEMs as well to innovate and provide cost effective and yet robust technical solution, such as meeting varying temperature conditions in the field with reduced size of catalysts. To suffice, expectations and pressure of reduced systems cost is going to demand extensive innovation and R&D potential in Indian scenario.*
- *It is recommended that India should, as far as possible, avoid copying Euro 7 regulation and rather take the approach of adapting Euro 7 regulations suitably and incorporate hard suggestions as needed to meet specific Indian conditions. It would be fit and wise to bring BS7 regulations more stringent than Euro 7 regulation in the present form and should aim at reaching original Euro 7 proposal.*
- *It is suggested that, while framing BS7 regulation for India-*
 - ✓ *use of European experience would be vital*
 - ✓ *the limits not to be relaxed*
 - ✓ *lower emission limits to be recommended than stipulated in current Euro 7 regulation, since India has special RDE conditions like shorter distances, slower driving, harsh acceleration habits. It is expected that regulatory authorities support adequate stringency in limits and test conditions covering wide range of climatic conditions prevailing across the country*

- *Cold start emissions are going to be of great concern for India RDE condition, it would be of great interest to achieve cold start emission control without electrical heating to reduce the cost impact.*
- *Power to weight ratio for Indian vehicles is normally lower than European designs. This situation may be advantageous to Indian OEMs to use low cost solutions.*
- *ICE would still remain a primary choice for medium and heavy-duty passenger and goods applications as well as for off-road segment. Hence, lot of innovative development is expected in India for this segment till the electrification reach to an affordable and viable situation. Action on removal of old vehicles from the road is required to be accelerated so that space can be created for new/advanced technology vehicles yielding emission reduction. In this regard, it was expressed that subsidies / low-interest finance support should be considered for replacement also.*
- *In the background of hard push by the Government of India to bring BS7 as early as possible aligning with the timelines of Euro 7, it was recommended that Indian OEMs and EAT suppliers in India should follow the path and approach for BS7 technology as was done earlier while meeting the challenges of leap-frogged BS6 norms. Some of the OEMs are already exporting vehicles to Europe and are therefore ready with the technology. Exhaust After Treatment (EAT) technologies are also available and EAT suppliers are ready to support OEMs to take on implementation of BS7 just like Euro 7 scheduled to be implemented in 2027.*
- *EAT suppliers in India are ready to support the OEMs with innovative and robust technical solutions for meeting varying temperature conditions in the field, such as required in RDE conditions, with reduced size of catalysts.*
- *India being a tropical country, gasoline and blended fuel vehicles (2W, 3W, cars, etc.) are subjected to significantly large amount of evaporative emission losses as the ambient temperatures are higher (even touching 50 deg C plus in some places) and vehicles are commonly parked outside without any shelter. Therefore, EVAP control should be taken up in high priority for India BS7 regulation. This will not only reduce evaporative hydrocarbon emission but also avoid fuel losses while filling the fuel at the fuel stations.*
- *Since currently most of the power generation in India is from coal / thermal power plants; electrification may not be viable in long run. Therefore, the emerging concept of ZEV (Zero Emission Vehicle) in Europe may be quite appropriate for India to begin with striking a balance between ICEV and EV population.*



ECT 2024 Conference - at a Glance:

ECMA (Emission Controls Manufacturers Association) organised 15th International Conference - ECT 2024, was held on 22nd October (Tuesday) and 23rd October 2024 (Wednesday) at The Lalit Hotel, Connaught Place, New Delhi based on the theme “**Clean Air Today, Every Day.**”

More than 315 delegates attended the ECT 2024 Conference in New Delhi during 22nd and 23rd October 2024; coming from different sectors from India and abroad. In all, 13 keynotes and 26 technical papers were presented over 9 sessions. The advanced products and technologies were displayed by the Exhibiting organizations in 6 booth stalls and was a great Venue for Networking within the participants. Feedback reports revealed that the participants enjoyed the proceedings and sharing of knowledge and experiences of Technocrats shared by the subject experts from around the World in the field of Pollution Control and Air Quality Improvement.

A Technical Bulletin was also published to commemorate the conference proceedings, comprising of 9 **Technical Articles**, giving an insightful and informative content on a variety of technical subjects of general interest.

Chief Guest of the Conference, **Dr. Prashant Gargava - Director, NCAP (MoEFCC)**, specially appreciated ECMA's efforts in organizing this International Conference. His guidance as regards need of more robust development in transport-based emission control technologies and sustainable alternate solutions has been a highlight for the conference proceedings; justifying the importance of controlling urban quality control to ensure good health for the common man on the street. The Exhibitors felt appreciated by the visit of **Dr. Gargava**, devoting his precious time at the Stalls to understand the various Technologies.

The inaugural session was also honoured by the presence of Mr Dirk Bosteels (AECC, Belgium) as the Special Guest and Dr Michael Geller (MECA Clean Mobility, USA) as the Guest of Honour.

A Panel discussion was conducted on the topic of BS7 for India – Challenges, Viability, Readiness and Impact on Technology”. It had been a very interesting and thoughtful panel and created a momentum as the nation is gearing up to prepare herself for forthcoming BS7 emission regime.

Following is a glimpse of the sessions and proceedings –

Day 1 : Tuesday, 22nd October 2024

0900 – 1100 hr : Session 1 - Inaugural Session

- Keynote Presentation – Mr Dirk Bosteels (AECC, Brussels)
- Keynote Presentation – Dr Michael Geller; (MECA, USA)
- Keynote Presentation – Mr Yoshinori Otsuki (Horiba, Japan)
- Keynote Presentation – Dr Georg Huethwohl (Albonair, Germany)

1130 – 1300 hr : Session 2 - Light Duty Vehicles & Hybrids

Session Chair – Mr Saurabh Dalela - Director (ICAT, India)

- Keynote Presentation – [Mr Santosh Sonawane \(FEV, India\)](#)
- Keynote Presentation – [Dr Avinash Agrawal \(IIT-Jodhpur, India\)](#)
- Technical Paper Presentation – [Dr Andreas Gremminger \(BASF, China\)](#)
- Technical Paper Presentation – [Mr Alex Ravenscroft \(Johnson Matthey, UK\)](#)
- Technical Paper Presentation – [Mr Rajesh Maynal; \(Umicore India\)](#)

1345 – 1515 hr : Session 3 – Light Duty Vehicles

Session Chair –

- Keynote Presentation – [Mr Aditya Bhimavarapu \(Corning, India\)](#)
- Technical Paper Presentation – [Mr Shu Muraoka \(NGK Technologies, India\)](#)
- Technical Paper Presentation – [Mr Nilesh Lende \(Corning, India\)](#)
- Technical Paper Presentation – [Mr Vishal Kale \(Tata Motors India\)](#)

1515 – 1630 hr : Session 4 – Future Fuels and Fuel Blends

Session Chair – Dr Sukrut Thipse – Sr. Deputy Director (ARAI, India)

- Technical Paper Presentation – [Ms Kavitha Moorthy \(Cummins, India\)](#)
- Technical Paper Presentation – [Mr Dirk Bosteels \(AECC, Brussels\)](#)
- Technical Paper Presentation – [Mr Harmeet Singh \(Maruti Suzuki, India\)](#)
- Technical Paper Presentation – [Dr Claus Goersmann \(Ecocat, India\)](#)

1700 – 1845 hr: Session 5 – Heavy Duty Vehicle Emissions: Challenges for Euro 7/BS7

Session Chair – Dr Rolf Brueck - Managing Director (Emitec, Germany)

- Technical Paper Presentation – [Mr Gaurav Heda \(Emitec, India\)](#)
- Technical Paper Presentation – [Ms Tulika Mazumdar \(NATRAX, India\)](#)
- Technical Paper Presentation – [Mr Ambrish Khot \(Cummins, India\)](#)
- Technical Paper Presentation – [Mr Naoki Kawamura \(Ibiden, India\)](#)
- Technical Paper Presentation – [Mr Manohar Prasad \(Johnson Matthey, India\)](#)
- Technical Paper Presentation – [Mr Varun Agrawal \(NPL BlueSky, India\)](#)

Day 2 : Wednesday, 23rd October 2024

0900 – 1100 hr : Session 6 – H2-ICE : Opportunities, Challenges and Viability

Session Chair – Dr R K Malhotra - President (Hydrogen Association of India)

- Keynote Presentation – [Mr David Bergeal \(Johnson Matthey, India\)](#)
- Technical Paper Presentation – [Mr Suresh Bagavathy \(Reliance Industries, India\)](#)
- Technical Paper Presentation – [Mr Ashraf Emran \(FEV, India\)](#)
- Technical Paper Presentation – [Mr Tushar Sahu \(Umicore India\)](#)
- Technical Paper Presentation – [Dr Sukrut Thipse \(ARAI, India\)](#)

1130 – 1300 hr: Session 7 – Off-Road Emission Control 01: Challenges & Technologies

Session Chair – Mr Manoharan Sundaram - Sr Vice President - R&D (TAFE, India)

- Keynote Presentation – Mr Dirk Bosteels (AECC, Brussels)
- Technical Paper Presentation – Dr Vishnuvarthan Muthusamy (Ecocat, India)
- Technical Paper Presentation - Mr Naoki Kawamura (Ibiden, India)
- Technical Paper Presentation – Dr Kamlesh Tayade (Johnson Matthey, India)

1345 – 1515 hr : Session 8 – Off-Road Emission Control 02: Challenges & Technologies

Session Chair – Dr Anupam Dave – Head (International Tractors, India)

- Keynote Presentation – Mr Steve Whelan (Horiba MIRA, UK)
- Technical Paper Presentation – Mr Manoj Kusumba (TMTL - Eicher Engines, India)
- Technical Paper Presentation - Mr Nilesh Lende (Corning, India)
- Technical Paper Presentation – Mr Shakti Kumar Singh (Escorts Kubota, India)

1515 – 1715 : Session 9 – BS7 for India

Moderator – Mr Prakash Sardesai (Sud-Chemie, India)

- Keynote Presentation – Dr Michael Geller; (MECA, USA)
- Keynote Presentation – Mr Evangelos Georgiadis (Dinex, Denmark)
- Keynote Presentation – Mr Steve Whelan (Horiba MIRA, UK)

Panel Discussion:

“BS7 for India – Challenges, Viability, Readiness and Impact on Technology”

Panelists:

- Dr Michael Geller; (MECA, USA)
- Mr Evangelos Georgiadis (Dinex, Denmark)
- Mr Steve Whelan (Horiba MIRA, UK)
- Mr Dirk Bosteels (AECC, Brussels)
- Ms. Anumita Roy Chowdhury (CSE, India)
- Mr Mahesh P (Ashok Leyland, India)
- Mr Prakash Sardesai (Sud-Chemie, India) - Moderator

Glimpses

