FFFFFF

7th

ECMA Brainstorming Meeting

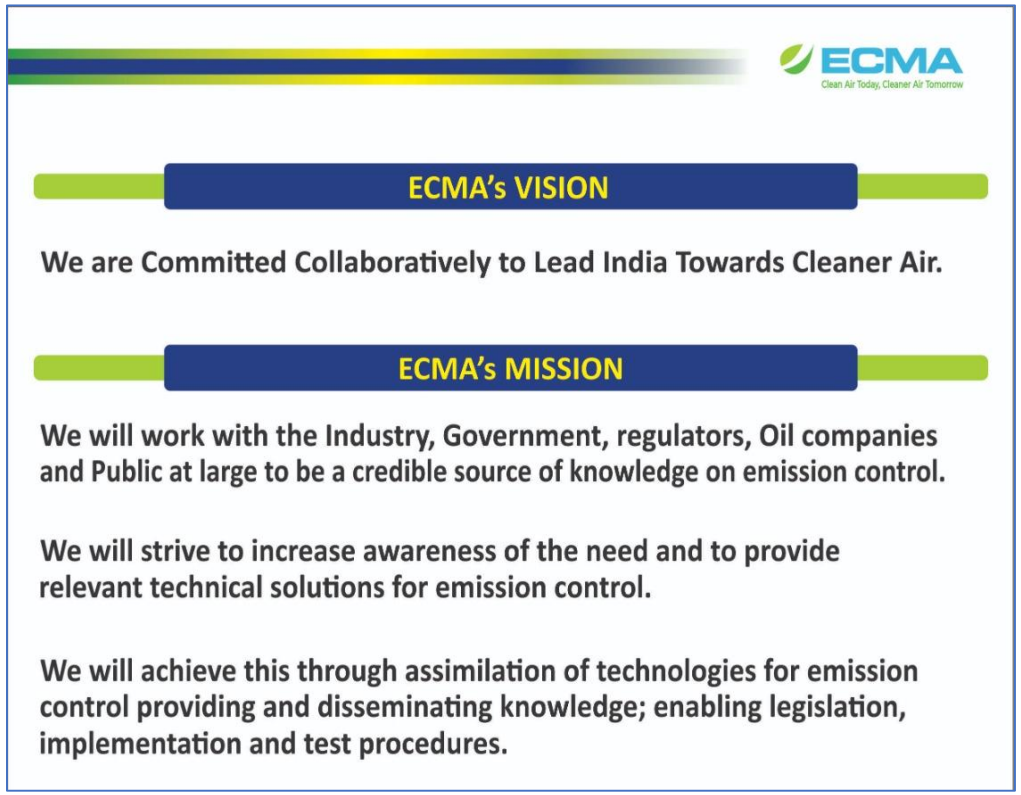
Oxford Golf & Resorts, Pune

22nd January 2024

introduction

Agenda

- Welcome to new member/s
- Follow-up of actions of previous Brainstorming Meeting (July 2022)
- Learning from weakness, threats and opportunities for different energy sources for mobility
- Weakness, threats and opportunities ahead of ECMA
- ECMA branding and utility efforts
- ECMA project initiatives and publicity
- Next ECT Conference
- ECMA collaboration with Government ministries, agencies, NGOs, Industry and other Associations
- ECMA interactions with AECC and MECA
- Expectations of members from ECMA
- Group discussion on key points and Path forward



Welcome to new Associate Member of ECMA

ECMA welcome

NPL BlueSky Automotive Pvt Limited, Mumbai

as its 18th member

represented by Mr Varun Agrawal


ECMA Members
Albonair
BASF
Corning
Cummins
Dinex
Emitec
Ibiden
Ingevity
Johnson Matthey
Mitsui Kinzoku
NGK Tech India
Pi-Green
Sharda Motors
Sud Chemie
Tenneco
Umicore
Unifrax
NPL Blue Sky Automotive
NPL BlueSky Automotive

- ECMA is a Non-profit Association representing Manufacturers of Mobile & Stationary Sources. We are now a team of 18 member companies.

- ECMA is comitted Collaboratively to Lead India towards Cleaner Air.

- ECMA Work with the Industry, Government Regulators, Oil Companies, test agencies and Public at large with an aim to be a credible source of knowledge on emission control and strive to increase awareness of the need to provide relevant technical solutions for emission control.

- ECMA achieves these objectives through assimilation of technologies, providing and disseminating knowledge in the field of emission control.

- ECMA holds Seminars and Conferences, pertaining to reducing pollution from automotive and other exhaust sources.

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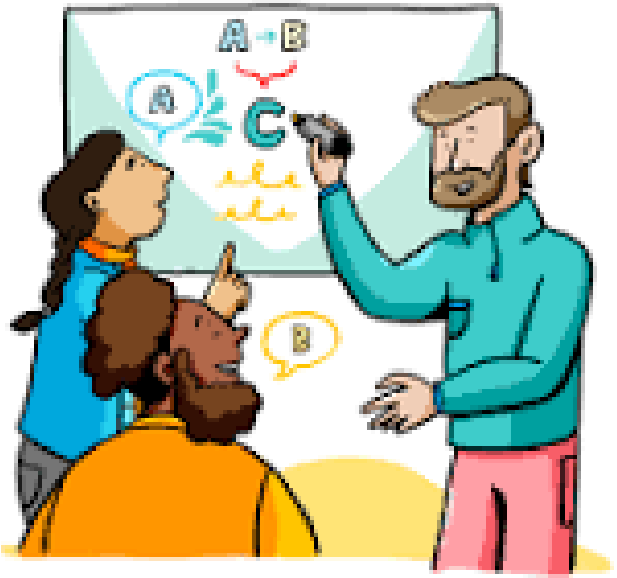
- Brainstorming is a great way to generate creative new ideas, clarify your thoughts, think outside the box, build on the ideas of others, and overcome obstacles.
- Brainstorming sessions operate best in open, supportive, encouraging environments in which participants feel free to express any idea.
- Criticism is counterproductive to the creative process, discouraging potentially thought-provoking ideas and preventing participants from opening their mouths for fear of judgment.
- Brainstorming should be collaborative and fun.



The word brainstorming was originally introduced by Alex F. Osborn in 1953 through his book Applied Imagination: Principles and Procedures of Creative Thinking.

Last Brainstorming Meeting - highlights

22nd July 2022 : The Oxford Golf Resorts, Pune (Future Vision for the Role of ECMA)

(earlier sessions were held in Goa, Delhi, Lavasa-Pune, Lonavala, Chennai)

- A general guideline of conducting a Brainstorming Session was presented and discussed.
- Guest lecture by Mr Yogesh Umbarkar (VP – Eatron Technologies)
  (Key Trends Driving Indian Automotive Industry)
- Challenges, threats and opportunities for ECMA were summarized
- Inputs were collected from four Brainstorming Groups
- Based on the Ideas generated during the meeting, an ACTION PLAN was prepared
- Follow-up of the Action Plan .....

Action Points and Targets – reference Brainstorming session dt 22nd July 2022

Actions	Responsibility	Time
New "catchy" Tag Line … (Clean Transition … ?)	SB, RK,	31-July-2022
Regular interactions with sister organisations AECC-Eu and MECA-US	SB, PS	quarterly
More inclusion , broaden scope, expand to other areas - expand membership (… also to other domain member companies ?) - ECMA charter	KVRB, RK, SB	31 august 2022
Promote knowledge on sustainable and synthetic fuels powering the future Ecosystem of fuels current and future, fuel roadmap - Prepare a plan on the above	SB, SK,DK, AG, SP	1-Oct-2022
More intensive participation in rule making & legislative bodies …to influence decision makers (WLTP, 90kmph, BS-7…) .. As well as parallel associations (SIAM, ACMA…) Strengthen ECMAs position in the industry. Showcase value added by ECMA so far and future - Prepare a plan on the above	PS, NP, RK, SB, ToC	31-august 2022
Invite SMEs (subject matter experts) for various ECMA meets	SB,	ongoing
Sponsor studies on air quality (impact of BS-6 and potential of BS-7) **- prepare scope document**	RM, SKS	31-august 2022
Enhance visibility on social media, seminars, conferences, journals.. (prepare plan)	SB, PPS, PL, SK	31-august-2022

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S | W | O | T


BRAINSTORM
IDEA
LEADERSHIP
DESIGN
MEDIA
TASK
ONLINE
PROMOTION
STRATEGY
ADVERTISING
SEO
SOLUTION
DIGITAL
COMMUNITY
TIME
BRAND
JOB
SUCCESS
COLLABORATION
VISION
SALE
CREATIVE
EMAIL
TEAMWORK
TRENDS
SOCIAL
PROJECT

- DNV forecasts oil demand in transport sector to halve by 2050
- Despite oil demand in the transport sector forecast to half by 2050, the present pace of the transition still falls severely short of the goals of the Paris Agreement.
- Electricity is continuing to gain traction in previously thought to be hard-to-electrify sectors including heavy trucking and aviation. Electricity's share in transport will grow from 1% today to 23% in 2050.
- Today, transport of passengers and goods accounts for about a quarter of global energy-related CO_2 emissions, a share that will grow to 30% by 2050.

- India has the third largest road network in the world. Total no of vehicles in 2022 (Jul 2023 report) accounted around 34 cr, out of which about 27 lakhs are EVs (~ 0.8%). It is expected to reach a figure of about 43 cr vehicles by 2030, with over 1% EVs. **<u>It shows that large number of vehicle would still operate on conventional ICE based power unit. This trend creates a different picture for future demand of technologies.</u>**
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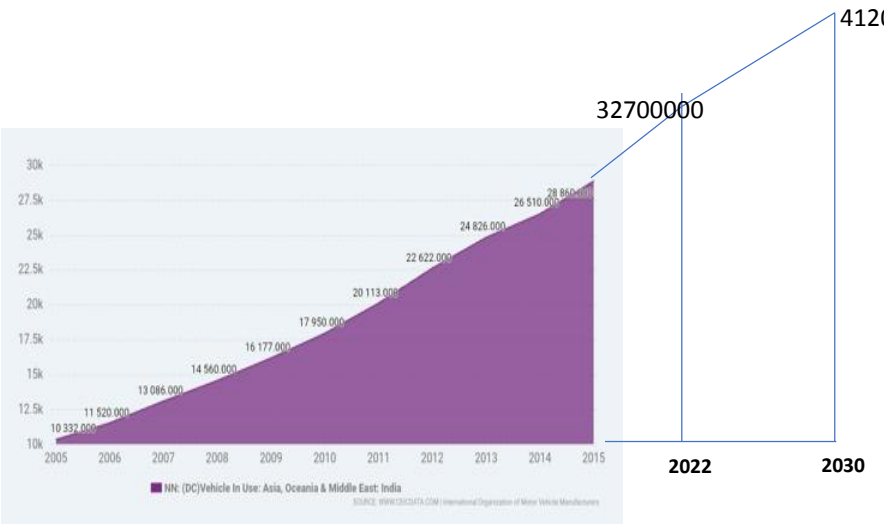

Energy Sources -

- Gasoline is used in cars, motorcycles, light trucks, and boats.
- Heavy fuels (diesel) are used mainly by commercial vehicles, trucks, buses, tractors, CEVs, power generation equipment, trains and in boats and ships.
- Biofuels are added to gasoline and diesel fuel.
- Natural gas, as compressed natural gas and liquefied natural gas, is used in cars, buses, trucks, and ships, power generation equipment.
- Propane is used in cars, buses, and trucks in many parts of western world.
- Flex fuel is used extensively in Brazil. There is a growing interest and push in India too.
- Hybrid vehicles are used sizably in Europe, USA and japan specifically for PC and SUV segment. There is a growing demand in India too.
- Battery Electricity is used by public mass transit systems, small and light vehicles predominantly. Its being adopted in inter-city bus applications also. There are a few agri tractor prototypes running on electricity.
- Hydrogen Fuel Cells are being adopted in PC, city bus and inter-city bus applications.
- Aviation gasoline is used in many types of airplanes.
- Jet fuel is used in jet airplanes and some types of helicopters.
- Residual fuel oil is used in ships.
- Heavy oils are used in locomotives. In India, there is a fast transformation going on for electrification railway tracks.

Factors such as cost, fuel distribution, emissions, vehicle systems analysis, energy storage, power and propulsion systems, and advanced power electronics are just some of the considerations in phasing in alternative fuels and advanced vehicle design.

	Strength	Weakness	Threat	opportunity
Fuel cell	• Environmentally friendly • High efficiency • Diverse application • Long life span	• High cost • Limited infrastructure • Dependence on platinum	• Competition from other clean energy sources • Uncertainty about H2 supply • Safety concerns • Economic viability • Patent disputes	• Government support • Growing demand for clean energy • Technological advancements
Hydrogen	• High well-to-wheel Near zero emissions • Low OPEX • Energy independence • Good choice for heavy duty application	• High CAPEX • Lack of refuelling infrastructure	• Safety concerns • Market potential	• Social acceptance • Job opportunities • Hydrogen economy
Electric Vehicles	• Environment awareness • Lower taxes • Fuel efficient • New technology • Zero tailpipe emission	• Infrastructure under development • Lack of trained manpower • Energy crisis • Not suitable for heavy duty application yet	• Energy failure • **Political instability** • **Rising price of raw material** • **Low sales, low revenue, low profit**	• Digitalization progressing • Renewable energy • Market demand increasing • No direct competition

	Strength	Weakness	Threat	opportunity
Bio fuels	• Knowledge and its accessibility • Skilled manpower • High priority accorded • Sustainable energy supply • Government push • Energy independency	• Technical immaturity • Higher CAPEX and OPEX • Food vs Fuel concern • Land consuming feedstock production for biofuels • Lower energy content per volume than gasoline	• Non availability of surplus feedstock • Higher uncertainty • Lack of robustness of industrial process • Direct competition with food production	• Employment creation • Strengthening economy • Energy security • Environment improvement • Less dependency of import of convectional fuels
Natural Gas	• High efficiency • Lower emissions • Long-distance transport	• Build-up of long distance catenary systems on highways	• Widespread infrastructure not yet in place • Competition with rail freight services	• Highly efficient, lower emissions • **Lowest carbon footprint using renewable electricity**
ECMA		• Social media • Limited work area	• Evolving new technology • Growing electrification • OEMs shifting to more electrification • Regulatory landscape • Government bans on conventional fuels	• Social media

Taking some of these messages and opportunities ahead, ECMA should strive for –

- **Clean air movement to be strengthened**
- **Emission regulations in India shall align with world level for which ECMA and its member shall work closely with OEMs with best of their R&D efforts**
- **ECMA shall try to work with other agencies to redefine emission control over Full Life cycle (life cycle assessment of emission control systems on environment, well-to-wheel efficiency, etc) under real-world conditions**
- **Spread the partnership / membership to more varieties of system suppliers beyond catalysts and filters**
- **Strengthen relationship with regulators, decision-makers and other agencies**
- **Evaluate the impact of electrification growth path on ECMA family and find ways to deal with it**
- **Redefine Memorandum of Article (MoA) /by-laws wherever necessary to accommodate/allow wider areas, members from variety supplies,**

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- **ECMA is looking forward to further strengthen its association and relations with policy makers, regulatory bodies, government bodies, ministries, academia and institutions, automotive and allied industries, international forums working along the ECMA objectives, media and enhancing awareness in common public for clean air and emission controls.**

- **It is, therefore, ECMA making efforts to enhance the brand image, brand building, reach, accessibility, presence and utility of ECMA to society in general and different stake holders and specially to its members to help promote technology adoption and business avenues.**

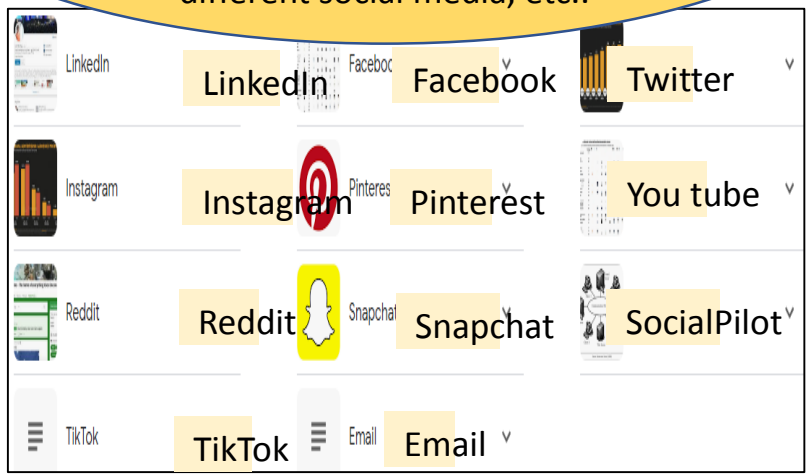
Presentation by Gutenberg

http://www.thegutenberg.com/

The Gutenberg is a marketing communication firm, having presence in USA, UK, Singapore and India. It chiefly deals with enhancing public relations, marketing & branding, creative designing, web development, engagements with different social media, etc..

ECMA Brand Elevation Strategy

(presented on 22nd Dec 2023)



Highlights of recommendations by Gutenberg

- marketing
- Branding and image enhancement
- communication strategy effective both in times of peace or crisis.
- how to formulate and implement successful brand strategies,

- Build the trust
- Understand the reason of existence
- Take specific initiatives to support the brand image
- Enhance communication platforms

ECMA branding and utility efforts

First step

- Evaluate the current webpage and development to make it dynamic and useful to the visitors
- Identify/locate KEY WORDS and establish links with them
- Evaluate the benefits and efficacy
- Continuous review and updating

Second step

- Establish communication on LinkedIn, develop data base and evaluate the results
- Reviews

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Paper presented in ECT 2023 jointly by ARAI and ECMA (Thu 2nd Nov, Session 2 – Light Duty applications)

Evaluation of Particulate Filtration and Air Quality Index by Particulate Filter on a BS6 Compliant Vehicle in Polluted Urban Environment

- Mr Sudipto Basu (ECMA) & Mr Manoj More (ARAI)

Highlights of ECMA+ARAI paper

CPCB has set NAAQS (National Ambient Air Quality Standard) for assessing the air quality through the status of following 12 pollutants -

- Particulate Matter 10 (PM10)
- Particulate Matter 2.5 (PM2.5)
- Nitrogen Dioxide (NO2)
- Sulphur Dioxide (SO2)
- Carbon Monoxide (CO)
- Ozone (O3)
- Ammonia (NH3)
- Lead (Pb)
- Benzene
- Benzopyrene
- Arsenic
- Nickel

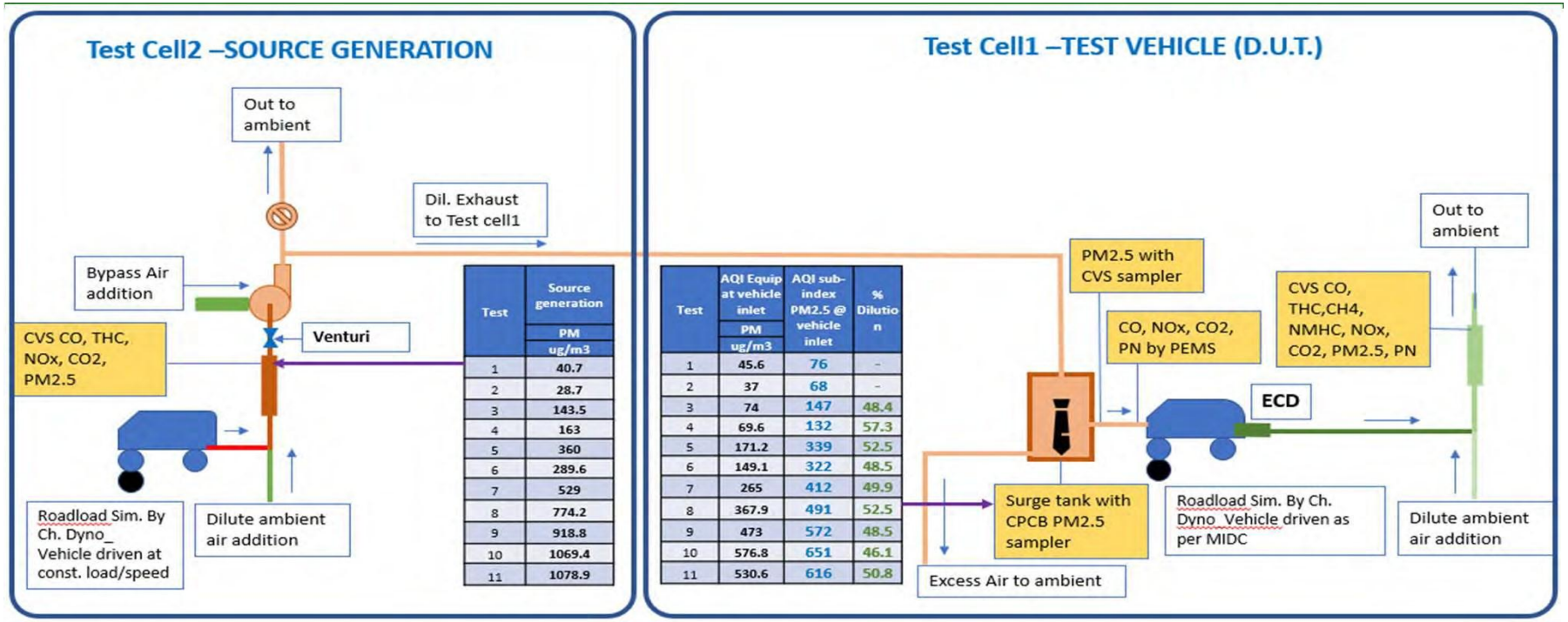
- **Out of these, particulate matter is found to be a major contributor to deteriorating air quality in India, especially PM 2.5**
- **The level of PM pollutant is reported to have exceeded the recommended national and international standards in many Indian cities, causing severe impact on public health**

- PM being the major concern for poor air quality and human health, ECMA recognized the utility of the Particulate Filters fitted on BS 6 vehicles, in filtering out PM and providing particulate free air at the exhaust regardless of the high particulates in polluted ambient air with excessive AQI.
- The need was felt to test and demonstrate this cleaning potential through testing with a reputed Test Agency such as ARAI.

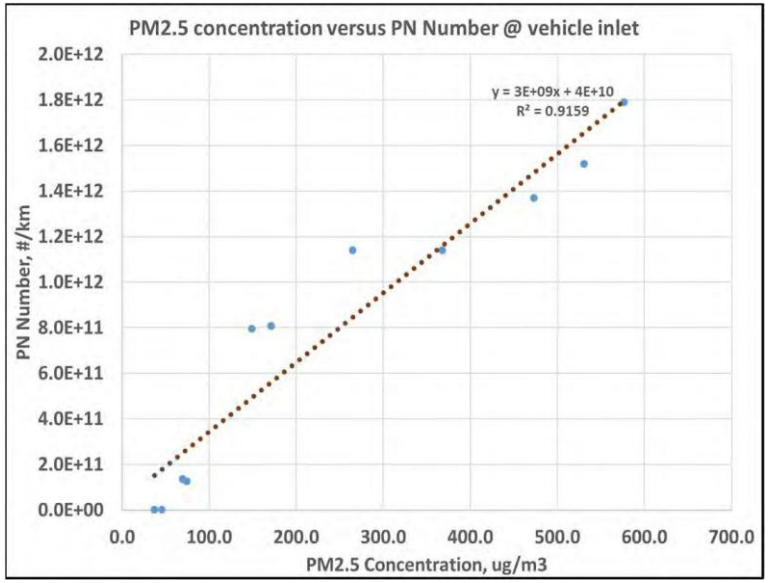
Highlights of ECMA+ARAI paper

Test On Chassis Dynamometer	On road test using 2 PEMS system
Chassis dynamometer tests (2 each) on test vehicle on MIDC cycle with following intake air PM2.5 AQI sub-index • ~50-100 (test cell ambient air) • ~200-300 • ~350-450 • >700.	1) City tests: Inside city portion of Pune during minimum ambient AQI during the day and maximum ambient AQI during the day) 2) RDE tests on certification route consisting of Urban, Rural and Motorway trip share.

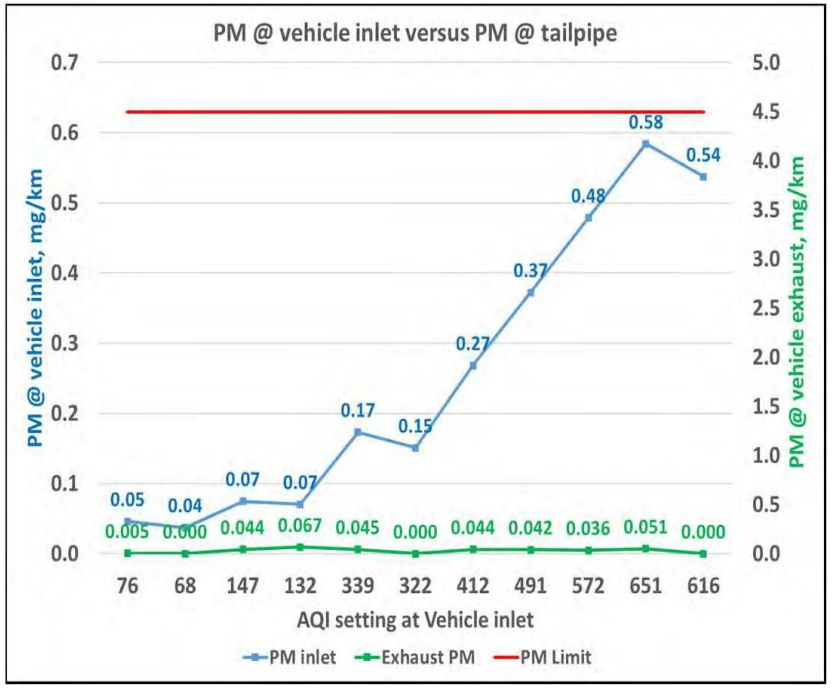
Model	XXXXX (M1 category BS-VI OBD Stage-I Compliant)
Fuel Type	Diesel
Engine Displacement (cc)	1497
No. of cylinder	4
Max Power (Bhp@rpm)	~115bhp@~3700rpm
Max Torque (Nm@rpm)	~260Nm@1500-2700rpm
Seating Capacity	5
Transmission Type	Manual
Emission Control Devices	EGR +DPF and LNT

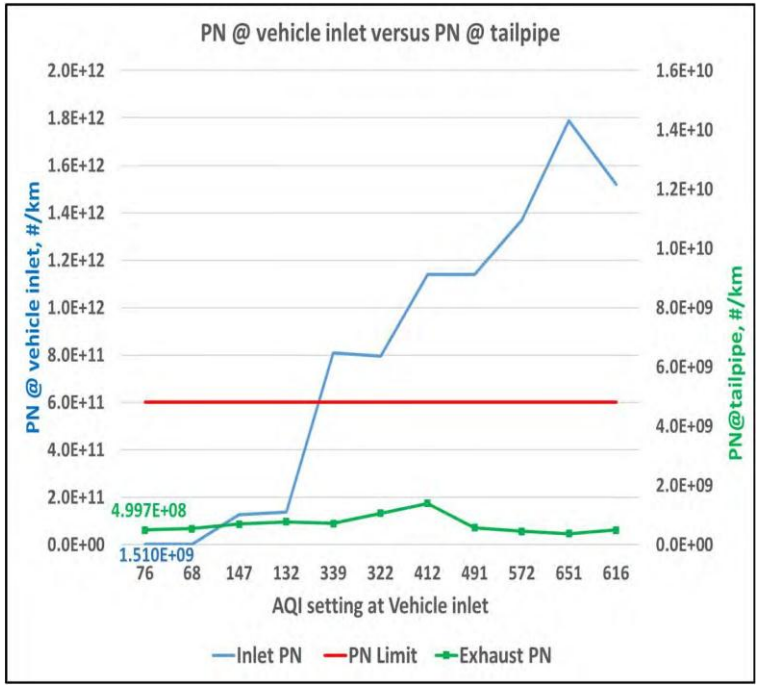


Highlights of ECMA+ARAI paper

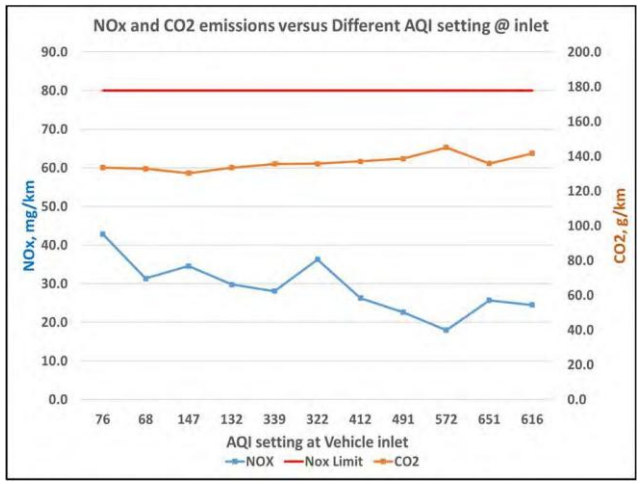


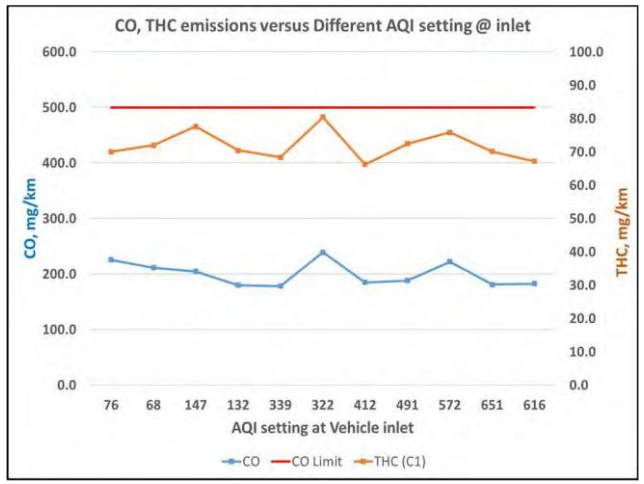
PM conc generated at Source Generation Vehicle outlet





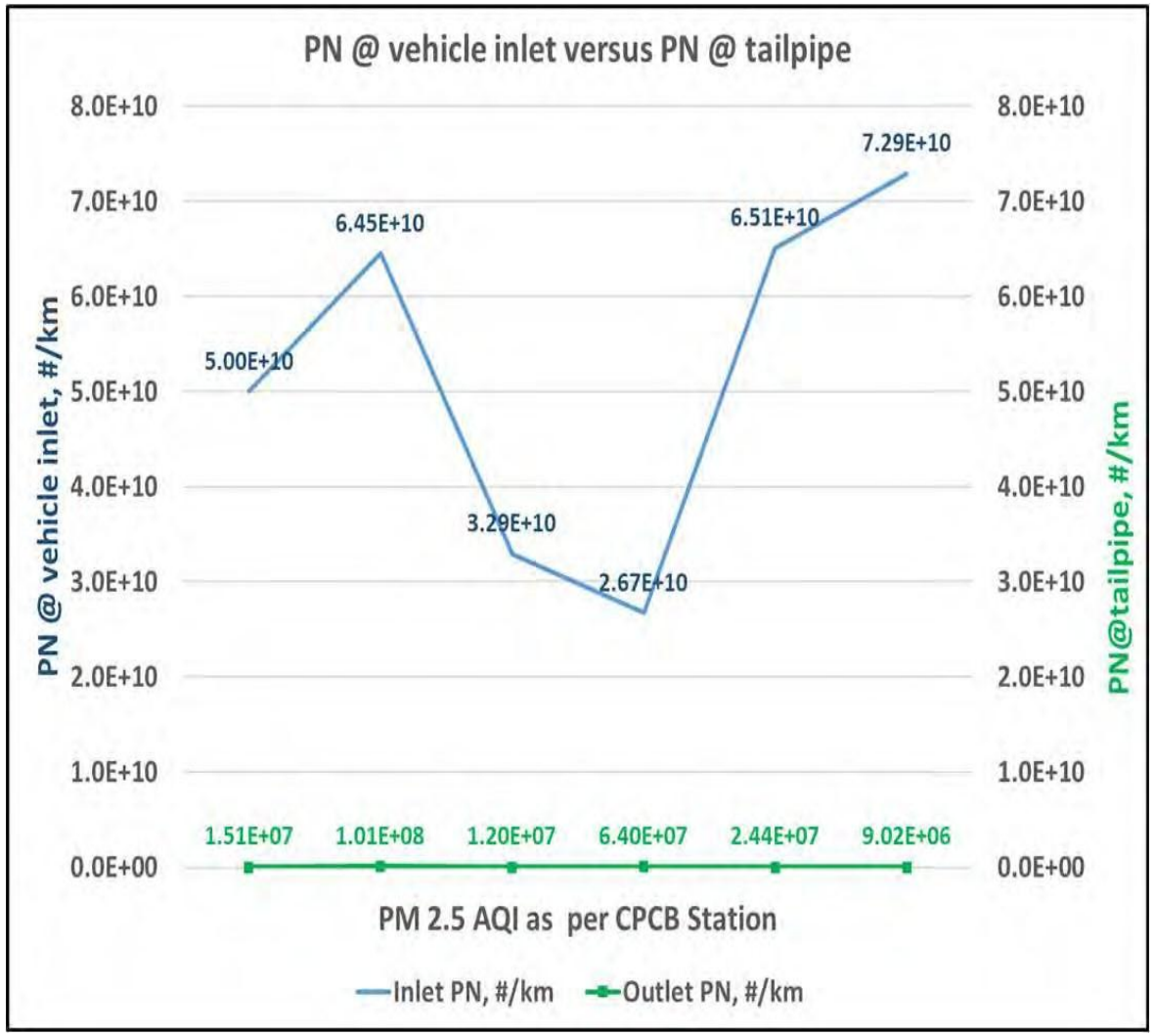
PM and PN at the project vehicle tail pipe





NOx, CO, HC well within the limits at Project vehicle tailpipe

Highlights of ECMA+ARAI paper



- It is evident from the both tests, in the laboratory and on the road, that aftertreatment devices as fitted in a production BS 6 light duty vehicle are performing as per requirement.
- Cleaning effect on PM 2.5 with the use of Particulate Filter is demonstrated in both laboratory and on- road tests cleaning the ambient air of any AQI quality.
- The results clearly demonstrate that appropriate exhaust aftertreatment devices, in particular Particulate Filters has the capability of reducing PM 2.5 and PM 10 pollutants to very low level and this, quite consistently irrespective of the Air Quality Index the vehicle is exposed to.
- Similar trends are expected to be shown with other types of fuel (gasoline, CNG Bio-fuels) in passenger car and heavy-duty vehicles too. However, this needs to be evaluated.

Observations

There has been a dull response / silence from the delegates to the ECMA-ARAI presentation. No questions, no comments, no post-session discussions, no post-conference remarks; in spite of very interesting results that too at the background of poor air-quality situation in Delhi during the conference days.

We shall know –

- *Whether impact was not effective at all*
- *Whether presentation flow was not impressive and impulsive*
- *Whether the project objectives and results could not be well-described and penetrated*
- *Whether delegates preferred to keep silence due to some pressure*
- *Even media personal did not show their attention*

ACTIONs proposed

- **Workshop / Round-table in February / March 2024 – who should be invited ?**
- **One-to-one meeting with diesel OEMs (with the support of SIAM)**
- **Technical Articles in automotive magazine/s and media**
- **Technical report to be submitted to MoRTH / CPCB**
- **Discuss the gravity of issue and encouraging results with NGOs like CSE**
- **Views from MECA & AECC and study their similar experiences, if any**

Projects by ECMA (SUGGESTIONS for discussion)

- **Continuation of project with ARAI on Petrol vehicle or other fueled vehicles ?**
- **Create platform to drive for technically correct utilization of SCR and impact on ambient air**
- **Create platform to drive for awareness of utility of particulate filter devices and impact on ambient air**
- **Calling technical papers from students from selected colleges / universities on the emission control subjects. Award the best three papers. Invite the BEST STUDENT PAPER to be presented in next ECT**
- **Doing / participating in some technical projects with MECA / AECC with an aim of international exposure and learning from the point of view of adoption in Indian context**

Projects by ECMA (SUGGESTIONS for discussion)

- **It is proposed to work on publishing White papers on different topics of opportune areas and mutual interest of stake holders**

- **Examples for discussion**
  - ✓ **Cleaning tail pipe emissions to near-zero level using different fossil fuels and fuel blends**
  - ✓ **Evaluation and technical Assessment of hybrids as a potential transit technology towards Clean Air movement**
  - ✓ **Evaluation and emission control solutions for Hydrogen-ICE for medium and heavy duty applications**

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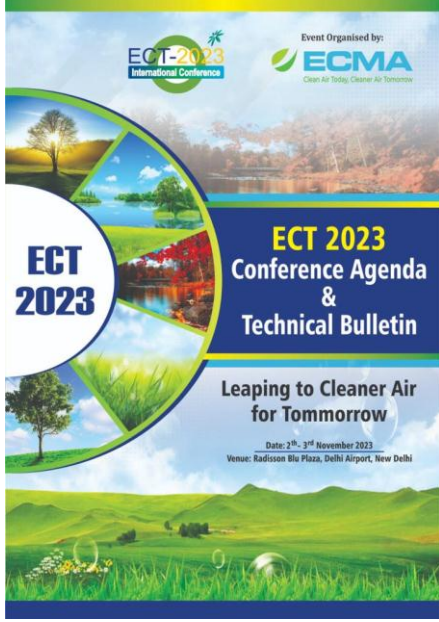

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- Next ECT -- Month and year
- Next ECT - City for the conference
- Venue – size and facility
- How many days ?
- Conference theme for next ECT

- Participation of MECA and AECC in next ECT
- Session topics for next ECT
- Session length per day
- Session length per day
- how many keynotes and technical presentations ?
- Session planning – time for presentations, specially for overseas presenters

- Entertainment programme on President's Dinner event
- Conference Support – ECMA members, others

- Exhibition participation
- OEM and industry participation
- Participation of Government authorities and officers

- Overall arrangements, visibility, stage layout, etc
- Ways and means to make ECT more global, interesting and participation-worthy amongst different segments incl academia

When do we start preparations of next ECT ?

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ECMA collaboration with Government ministries, agencies, NGOs, Industry, other Associations, media

- Ministries – MoRTH, MHI, MoE&F
- Agencies – CPCB, CSE, SCoE
- Industry, OEMs - 2W, 3W, 4W(PC & SUV), LCV/MCV/HCV, Agri Tractor, Power Generation, off-road, CEV, waterways, Locomotives
- Associations – SIAM, IDEMA, ACMA, TMA, Hydrogen Asso,.....
- Testing houses – ARAI, ICAT, IIP, RDSO
- Oil companies – IOCL, BPCL, HPCL, Reliance
- R&D houses – AVL, FEV, SwRI, ARAI, ICAT
- Conferences / Seminars – SIAT, CVF, Hydrogen Forum, FISITA, SAE
- Academia / Institutions – student projects
- Media

- Visibility
- Presence
- Weightage
- Recognition
- Utility
- Importance
- Leadership

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- **New Membership Drive**

MECA members include manufacturers of…
(Manufacturers of Emissions Control Association)

For mobile sources:

- Catalytic converters (catalysts, substrates, mounting sleeves, and converter housings) for all fuels
- Diesel particulate filters
- **Oxygen, NOx, and temperature sensors**
- **Thermal management strategies**
- **Engine/fuel management technologies**
- **Crankcase emission control technologies**
- Evaporative emission controls
- **Powertrain efficiency technologies**
- **Enhanced combustion technologies**
- **Plasma technologies**
- **Components for fuel cell technology**

For stationary sources:

- Selective catalytic reduction (SCR) systems
- Non-selective catalytic reduction (NSCR) systems
- Diesel particulate filters
- Catalytic oxidation systems

- **New Membership Drive**

AECC members include …

(the Association for Emissions Control by Catalyst)

The members of AECC are companies operating worldwide in the research, development, testing and manufacture of key technologies for emissions control.

Their products are the ceramic and metallic substrates for catalysts and filters; catalysts (substrates with catalytic materials incorporated or coated); adsorbers; filter-based technologies to control engine particulate emissions; and specialty materials incorporated into the catalyst or filter.

AECC members' technology is integrated into the exhaust emissions control systems of cars, commercial vehicles, buses, motorcycles and construction equipment in Europe.

It is increasingly being **used in railway locomotives and railcars, ships and inland waterway vessels and pleasure craft.**

Systems suitable for retrofitting to most types of existing engines are also available.

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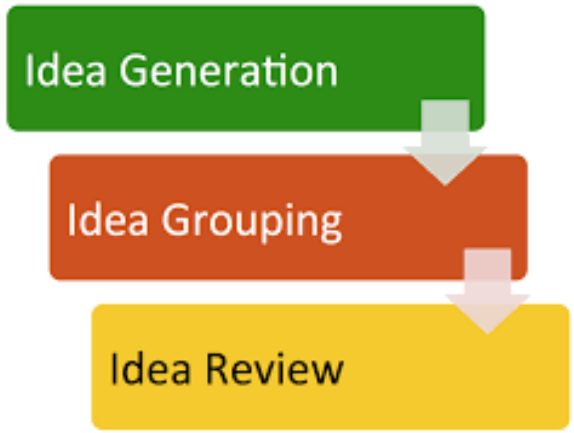
Key Points proposed for the discussions and directions

- ECMA branding enhancement
- Actions on ECMA-ARAI project publicity & New Project initiatives
- ECT Conference framework
- Collaborative work with other agencies – actions
- Membership spread and changes to MoA



KEY AREAS / SCOPE OF WORK prepared based on the collective Discussion during the meeting

Action Points / Scope of work for ECMA

- Membership enhancement
- Enhanced visibility for ECMA
- Connects with Govt agencies, SIAM, Oil co, TMA, IDEMA, CPCB, Institutions, CAQM, etc
- ECMA_ARAI paper publicity –round table at Habitat Centre – invitee list to be prepared
- Understanding MECA and AECC organisations and their work profile
- ECMA office relocation at Habitat centre
- ECMA white paper topics
- ECT in India Habitat Centre – Nov 2024 (First day : Exhibition + panel + Inauguration; Second day : Technical sessions on Off-Road Emissions)

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Thank you