

NEWSLETTER

International Regulatory Developments

TABLE OF CONTENTS

Euro 7 Technical Seminar and Driving Event.....	2
EUROPE	2
Regulation on Determination of CO ₂ Emissions from Lorries and Buses.....	2
Publication of New EMROAD Release.....	2
NORTH AMERICA	3
US Healthcare and Climate Bill	3
US DOE Projection of Emissions Reduction from Inflation Reduction Act.....	3
CARB Approval for Advanced Clean Cars II Rule	3
CARB Workshop on Tier 5 Emission Standards for Off-Road Engines	4
ASIA-PACIFIC	4
Vietnam Green Energy Programme	4
UNITED NATIONS	4
World Clean Air Day.....	4
GENERAL	5
ICCT Paper on CO ₂ Emissions from New Passenger Cars in Europe.....	5
Health Effects Institute Report on Air Quality and Health in Cities.....	5
ICCT Paper on Remote Sensing of HDV Emissions in Europe	6
RESEARCH SUMMARY	6
FORTHCOMING CONFERENCES	8

Euro 7 Technical Seminar and Driving Event EUROPE

On 27 September 2022, the Association for Emissions Control by Catalyst, and IPA, the International Platinum Group Metals Association, will hold an in-person technical seminar on Euro 7 and an ultra-low emission test driving event at the Autoworld in Brussels.

AECC and IPA have run technical programmes demonstrating how internal combustion engine vehicles achieve zero-impact pollutant emissions in real-world driving.



At the event, it will be possible to discuss the latest test data over a wide range of driving conditions, question exhaust emission control experts on the technology, and understand the implications for the proposed Euro 7 emissions standards.

The three demonstrator vehicles, including a truck, showcase a smart combination of close-coupled and underfloor catalyst- and filter-based technologies which can be experienced personally in real-world driving during the event.



Please note participation is by direct invitation only. If interested, please contact AECC at info@aecc.eu.

Regulation on Determination of CO₂ Emissions from Lorries and Buses

On 12 August 2022, Regulation (EU) 2022/1379 was published in the Official Journal of the European Union. This amends Regulation (EU) 2017/2400 as regards the determination of the CO₂ emissions and fuel consumption of medium and heavy lorries and heavy buses and to introduce electric vehicles and other new technologies.

This Regulation complements the legal framework for the type-approval of motor vehicles and engines with regard to emissions established by Regulation (EU) No 582/2011 by laying down the rules for issuing licences to operate a simulation tool with a view to determining CO₂ emissions and fuel consumption of new vehicles to be sold, registered or put into service in the Union and for operating that simulation tool and declaring the CO₂ emissions and fuel consumption values thus determined.

It applies to medium lorries, heavy lorries and heavy buses and, in the case of multi-stage type-approvals or individual approvals of medium and heavy lorries, it applies to base lorries. In the case of heavy buses, the Regulation applies to primary vehicles, interim vehicles and to complete vehicles or completed vehicles.

The Regulation states that Regulation (EU) 2017/2400 determines CO₂ emissions and fuel consumption of heavy lorries. However, in order to provide a better view on the overall CO₂ emissions of the sector, CO₂ emissions of more vehicle categories need to be calculated. It is therefore necessary to determine CO₂ emissions and fuel consumption of other heavy-duty vehicles, namely medium lorries and heavy buses. It adds that to appropriately cover future technologies, it is necessary to specify additional requirements for new technologies such as hybrid and pure electric vehicles, dual-fuel vehicles, waste heat recovery and advanced driver assistance systems.

The Regulation can be found in the Official Journal at eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2022.212.01.0001.01.

Publication of New EMROAD Release

On 11 August 2022, a new release of EMROAD was published. EMROAD is a Microsoft Excel add-in for analysing vehicle emissions data recorded with Portable Emissions Measurement Systems (PEMS). In the frame of the European legislative PEMS programmes for heavy-duty vehicles (HDV), non-road mobile machinery (NRMM), and light-duty vehicles (LDV), EMROAD was developed as a research tool, primarily used to support the development of PEMS data evaluation methods for emissions legislation.

As well as improved functionality covering all applications, the new release has been updated to include improvements for different vehicle types.

For light-duty vehicle real driving emissions (RDE), Euro 6e has been added with new conformity factors for NO_x and PN (1.1 and 1.34 respectively). There is also alignment on terminology with the UN Regulation on RDE, amongst other changes.

For heavy-duty in-service conformity and for non-road mobile machinery in service monitoring, some bugs have been fixed, along with changes to make only drift corrections possible for regulatory calculations.

The new release is available to download from circabc.europa.eu/ui/group/f4243c55-615c-4b70-a4c8-1254b5eebf61/library/db7a07b9-9a52-4c73-b9c3 and the release notes can be downloaded from circabc.europa.eu/ui/group/f4243c55-615c-4b70-a4c8-1254b5eebf61/library/0fadfa4d-e035-482f-81f4.

NORTH AMERICA

US Healthcare and Climate Bill

On 7 August 2022, the Inflation Reduction Act of 2022 passed the US Senate, after which it passed the House of Representatives. This introduces a package of measures intended to tackle healthcare and climate issues.

The bill includes measures targeted at energy security, including investment for alternative fuels and fuel mixtures, and biodiesel and renewable diesel. It also creates new tax credits for certain 'clean' power generation technologies.

The bill creates a new credit for commercial clean vehicles and modifies the refundable tax credit for the purchase of plug-in electric vehicles and previously owned electric vehicles.

The Inflation Reduction Act will also provide funding for loans for facilities that manufacture advanced vehicles that emit either a low amount of or no amount of greenhouse gas emissions. Funding for loans for the domestic production of efficient hybrid, plug-in electric hybrid, plug-in electric drive, and hydrogen fuel cell electric vehicles will also be available.

In addition to these measures, the bill provides incentives to replace eligible medium-duty vehicles (e.g., school buses) and heavy-duty vehicles (e.g., garbage trucks) with zero-emission vehicles, identify and reduce emissions from diesel engines, and encourage states to adopt and implement greenhouse gas and zero-emission standards for mobile sources.

More information can be found at <https://www.congress.gov/bill/117th-congress/house-bill/5376?q=%7B%22search%3A%5B%22inflation+reduction%22%7D%7D>.

US DOE Projection of Emissions Reduction from Inflation Reduction Act

On 18 August 2022, the US Department of Energy (DOE) published a fact sheet highlighting what it calls the Inflation Reduction Act's "monumental support for clean energy technologies that will lower energy costs for families and businesses while helping drive 2030 economy-wide greenhouse gas (GHG) emissions to 40% below 2005 levels".

DOE's analysis of greenhouse gas pollution reductions from the clean energy provisions of the Inflation Reduction Act and Bipartisan Infrastructure Law finds that the combined impact of both laws could reduce emissions by approximately 1 000 million metric tons (MMT) in 2030, with a total of nearly 1 150 MMT when considering other provisions of each law. It says the expected emissions reduction from these measures is equivalent to the approximate combined annual emissions released from every home in the US.

Looking specifically at transportation, the fact sheet states that tax credits for clean cars, trucks, vans, SUVs, commercial vehicles, and heavy-duty vehicles will help drivers and fleets adopt advanced technologies that lower operating costs and reduce emissions. The Inflation Reduction Act's Clean Vehicle Credit will support the transition to a clean transportation future, reducing GHG emissions and local air pollution while accelerating the expansion of American supply chains for critical minerals and battery production. It is also expected to help more Americans access clean transportation through tax credits for lower income drivers who purchase previously owned, clean vehicles.

To further decarbonise all modes of transportation, the Inflation Reduction Act creates tax credits to facilitate the use of clean fuels including biodiesel, renewable diesel, advanced biofuel, and sustainable aviation fuel.

DOE says these investments build on efforts by the U.S. Department of Transportation and the Environmental Protection Agency to update fuel economy and tailpipe emissions standards for vehicles, which will work in concert with these new investments to drive toward meeting the President's goal of 50% zero emissions vehicles sold in 2030.

The DOE fact sheet is available to read at energy.gov/sites/default/files/2022-08/8.18%20InflationReductionAct_Factsheet_Final.pdf.

CARB Approval for Advanced Clean Cars II Rule

On 25 August 2022, the California Air Resources Board (CARB) approved the Advanced Clean Cars II (ACCI) rule that sets California on a path to rapidly growing the zero-emission

car, pickup truck and SUV market and deliver cleaner air and reductions in climate-warming pollution.

The rule establishes a year-by-year roadmap so that by 2035 100% of new cars and light trucks sold in California will be zero-emission vehicles. The regulation realises and codifies the light-duty vehicle goals set out in Governor Newsom's Executive Order N-79-20.

CARB says that California's is the most aggressive regulation to establish a definitive mechanism to meet required zero-emission vehicle (ZEV) sales that ramp up year over year, culminating in 100% ZEV sales in 2035. The timeline is considered ambitious but achievable. The regulation also includes provisions that enhance equity in the transition to zero-emission vehicles and provides consumers certainty about the long-term emission benefits, quality, and durability of the clean cars and trucks and the batteries they run on.

The CARB press release is at content.govdelivery.com/accounts/CARB/bulletins/329a48c, with further information on the ACCII rule at arb.ca.gov/our-work/programs/advanced-clean-cars-program/advanced-clean-cars-ii-meetings-workshops.

CARB Workshop on Tier 5 Emission Standards for Off-Road Engines

On 8 August 2022, the California Air Resources Board (CARB) held a public workshop to discuss the development of Tier 5 emission standards for new off-road diesel engines. The topics included the development of a Low Load Cycle, emission credits for hybrid vehicles, greenhouse gas (GHG) emissions standards, and small volume manufacturer provisions. CARB intends to adopt the Tier 5 standards in 2025, to become effective around 2030.

CARB (in cooperation with the SwRI and the University of California Riverside) is now developing a new off-road Low Load Cycle (LLC) to be used for Tier 5 certification and compliance testing, in addition to the existing off-road tests. The objective is to develop an LLC applicable to variable speed off-road diesel engines between 56 and 560 kW that is indicative of engine operations under low load and low exhaust temperature conditions.

According to CARB staff, most off-road hybrids are reporting fuel savings of 20-25%, while there are no reports of any NOx emission benefit. Under the considered hybrid credit, hybrid vehicles that can achieve a minimum of 20% fuel consumption reduction would be eligible for a NOx emission credit.

New GHG emission standards are envisioned that would apply to non-preempted off-road Tier 5 diesel engines above 19 kW, measured over the NRTC and the steady-state certification cycles. A range of GHG reducing or capping standards have been considered (a reducing standard requires an emission reduction from the current levels; a

capping standard is intended to prevent an emission increase in future engines).

As was the case with the Tier 4 regulation, small volume manufacturers would be granted certain compliance flexibilities during the initial two years of the Tier 5 programme. These flexibilities would include more relaxed NOx emission standards, minimal or no change in useful life periods, and no LLC certification requirements. Additionally, options are being considered in lieu of off-road in-use testing and in lieu of full OBD compliance.

Full details of the workshop can be found at arb.ca.gov/our-work/programs/tier-5/meetings-workshops.

ASIA-PACIFIC

Vietnam Green Energy Programme

On 22 July 2022, the Vietnamese Prime Minister issued new Decision No. 876/QĐ-TTg, authorising the action programme on green energy transition and reducing carbon and methane emissions from the transportation sector (referred to as the green energy transformation action programme).

The programme aims to develop a green transportation system that will reduce net greenhouse gas emissions to "zero" by 2050. It has established a roadmap for a green energy transformation within each mode of transportation.

The roadmap for period 2022 – 2030 will promote the production, assembly, import, and conversion of the use of road motor vehicles using electricity; expanding mixing, using 100% E5 gasoline for road motor vehicles; developing charging infrastructure to meet the needs of people and businesses; and encouraging new and existing bus stations and rest stops to convert according to green criteria. By 2040, it will progressively halt the manufacturing, assembly, and import of fossil-fuel automobiles, motorbikes, and motorcycles for domestic usage. The objective is for all motor vehicles and motorcycles on the roads to be powered by green electricity and energy by 2050.

More information on the programme is available at vuphong.com/the-transportation-sector-shifts-to-re-and-reduces-ghg-emissions/.

UNITED NATIONS

World Clean Air Day

On 7 September 2022, the third International Day of Clean Air for blue skies will be observed under the theme of #TheAirWeShare.

This focuses on the transboundary nature of air pollution, stressing the need for collective accountability and action. It also highlights the need for immediate and strategic international and regional cooperation for more efficient implementation of mitigation policies and actions to tackle air pollution. The UN says pollution is a global problem that we

must act together to combat. It follows on from 2021's theme of "Healthy Air, Healthy Planet".

It goes on to say that air pollution is the greatest environmental threat to health, causing approximately 7 million premature deaths each year from diseases like stroke, heart disease, chronic obstructive pulmonary disease, lung cancer and acute respiratory infections. Many sources of air pollution also drive the climate crisis and damage nature and ecosystems. Air pollution adversely affects food security, social and gender parity, and economic development, keeping people entrenched in the cycle of poverty.

The UN calls for people to work together at home and in our workplaces, communities, governments and across borders to improve our air, ensuring that we take the necessary actions to ensure air pollution isn't a part of our collective future. It asks for people to share their thoughts on Clean Air for blue skies by sharing their actions on social media using the hashtags #TheAirWeShare and #WorldCleanAirDay.

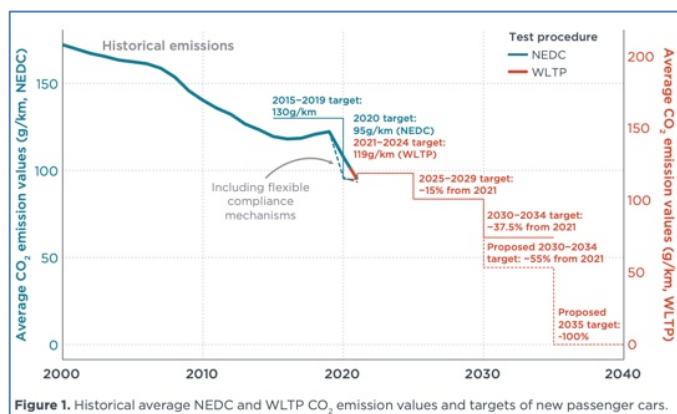
More information on the initiative can be found at cleanairblueskies.org/about/theme?utm_source=Un+Environment+Masterlist&utm_campaign.

GENERAL

ICCT Paper on CO₂ Emissions from New Passenger Cars in Europe

On 3 August 2022, the International Council on Clean Transportation (ICCT) published a briefing paper providing an overview of CO₂ emission levels of new passenger cars in the European Union in 2021 based on a preliminary dataset released by the European Environment Agency.

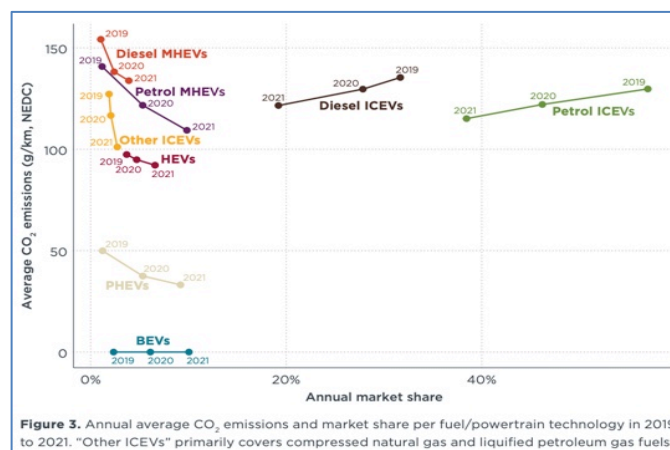
The dataset showed that new cars sold in the European Economic Area in 2021 had average CO₂ emissions of 115 g/km determined following the Worldwide Harmonized Light Vehicles Test Procedure (WLTP), which is approximately 16 g/km lower than average emissions in 2020. Including flexible compliance mechanisms, average emissions declined to 113 g/km.



According to the preliminary data, all manufacturers appear to have met their 2021 CO₂ targets. Only two manufacturer

pools required flexible compliance mechanisms to do so. Eight out of ten pools had already exhausted their super-credits in 2020 for vehicles with New European Driving Cycle (NEDC) CO₂ emissions below 50 g/km, which are capped at 7.5 g/km for the period 2020–2022. Eco-innovation technologies awarded for innovative technologies, lowered CO₂ emission levels by 0.2 to 2.0 g/km.

Uptake of all forms of electrified powertrain vehicles increased from 2020 to 2021. Battery electric vehicle (BEV) market shares grew from 6.1% to 10.1% and plug-in hybrid electric vehicle (PHEV) shares grew from 5.3% to 9.2%. Hybrid electric vehicle (HEV) shares grew by roughly one third, from 4.7% to 6.6%, and mild hybrid electric vehicle (MHEV) shares using 48-volt systems almost doubled from 7.7% to 13.8%. Diesel market shares, including mild-hybrid electric vehicles, continued to fall, decreasing from 30% in 2020 to 23% in 2021.

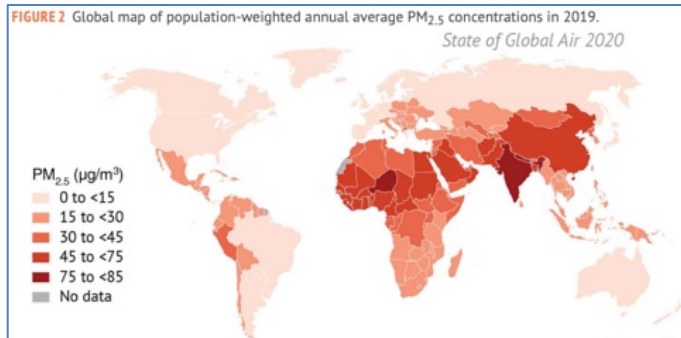


ICCT's briefing paper can be found at theicct.org/wp-content/uploads/2022/08/co2-new-passenger-cars-europe-aug22.pdf.

Health Effects Institute Report on Air Quality and Health in Cities

On 17 August 2022, the Health Effects Institute (HEI) published a report titled 'Air Quality and Health in Cities'. The report provides analysis of air pollution and global health impacts for more than 7 000 cities around the world, focusing on two of the most harmful pollutants; fine particulate matter (PM_{2.5}) and nitrogen dioxide (NO₂). In 2019, 1.7 million deaths linked to PM_{2.5} occurred in the 7 239 cities included in the analysis. Cities in Asia, Africa, and eastern and central Europe saw the greatest health impacts from PM_{2.5} exposures.

In 2019, 86% of the cities included in this report exceeded the WHO's 10 µg/m³ guideline for annual NO₂ exposure, impacting about 2.6 billion people. While PM_{2.5} pollution tends to get more attention on known hot spots around the world, less data has been available for NO₂ at this global scale.



The report, using data from 2010 to 2019, found that global patterns for exposures to these two key air pollutants are strikingly different. While exposures to PM_{2.5} pollution tend to be higher in cities located in low- and middle-income countries, exposure to NO₂ is high across cities in high-income as well as low- and middle-income countries.

The report concludes that despite the explosion in data in recent years that have brought intense focus on air pollution, little or no progress has been made towards reducing air pollution and its associated health burden in many regions of the world. Over the last decade, levels of PM_{2.5} exposure have remained high or increasing particularly in parts of Asia, Africa, and the Middle East. East Asia has seen marked regional reductions in pollution levels, driven primarily by major declines in PM_{2.5} in China.

The report is available to download from stateofglobalair.org/resources.

ICCT Paper on Remote Sensing of HDV Emissions in Europe

On 29 August 2022, the International Council on Clean Transportation (ICCT) published a working paper on remote sensing of heavy-duty vehicle emissions in Europe.

The study presents a multi-regional remote sensing analysis of 33 600 European trucks and buses to quantify the real-world level of pollutant emissions across different vehicle emission standards. It draws on data recorded from six remote sensing campaigns in Europe conducted between 2017 and 2020, covering a range of ambient temperatures and vehicle driving conditions.

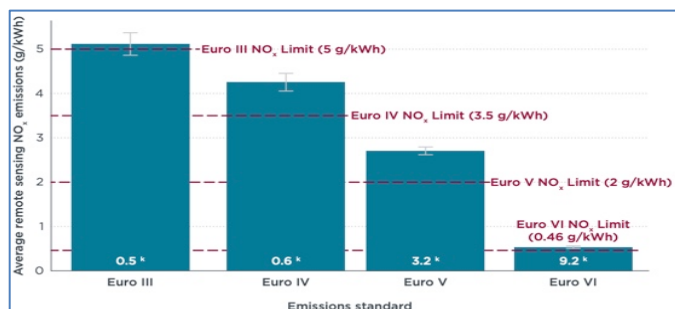
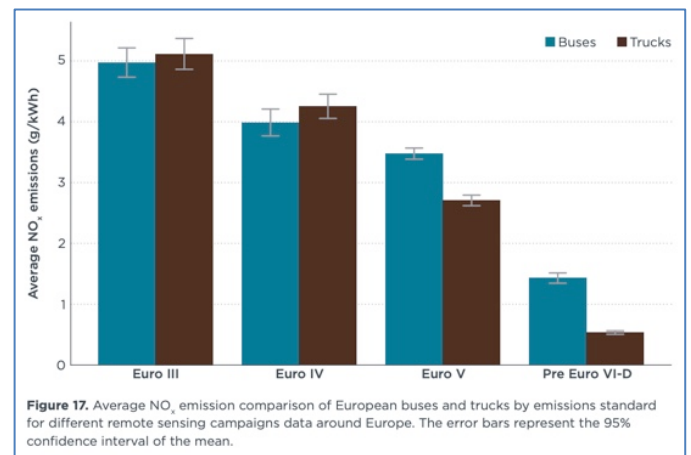


Figure 8. Average NO_x emissions of heavy-duty trucks by European emission standards for the Flanders remote sensing campaign data. The number of measurements is presented below each bar and the error bars represent the 95% confidence interval of the mean. The dashed red lines indicate the regulatory limit for each Euro standard. Only results of groups with positive VSPs are shown.

ICCT says a clear reduction in the average NO_x emissions of trucks and buses was observed over the increasing level of stringency of the Euro emission standards. The introduction of the Euro VI-D stage for new vehicles reduced the NO_x emissions of buses three-fold in comparison with other Euro VI buses predating this standard.



Despite falling average emission levels, the NGO says the real-world NO_x emissions of heavy-duty vehicles are still generally in exceedance of the regulatory limits, particularly in urban areas. This analysis found 7.6% of trucks and 9.5% of buses compliant with Euro VI to be high emitters compared to 5.8% and 2.8% of Euro V compliant trucks and buses. According to ICCT, these high emitters may result from unfavourable testing conditions, emission control failure, or vehicle tampering.

The working paper can be downloaded from theicct.org/publication/remote-sensing-of-heavy-duty-vehicle-emissions-in-europe/.

RESEARCH SUMMARY

Effects of Emissions and Pollution

Hospital admission risks and ambient fine particulate matter exposure in Beijing, China, Ziting Wu, et al.; *Atmospheric Environment* (in press), [doi: 10.1016/j.atmosenv.2022.119291](https://doi.org/10.1016/j.atmosenv.2022.119291).

Associations of long-term exposure to ambient ozone with hypertension, blood pressure, and the mediation effects of body mass index: A national cross-sectional study of middle-aged and older adults in China, Zhiping Niu, et al.; *Ecotoxicology and Environmental Safety* (September 2022), Vol. 242, 113901, [doi: 10.1016/j.ecoenv.2022.113901](https://doi.org/10.1016/j.ecoenv.2022.113901).

Association of exposure to ambient particulate matter with maternal thyroid function in early pregnancy, Xichi Zhang, et al.; *Environmental Research* (in press), [doi: 10.1016/j.envres.2022.113942](https://doi.org/10.1016/j.envres.2022.113942).

Long-term exposure to air pollution, coronary artery calcification, and carotid artery plaques in the population-based Swedish SCAPIS Gothenburg cohort, Karl Edlund, et al.; *Environmental Research* (in press), [doi: 10.1016/j.envres.2022.113926](https://doi.org/10.1016/j.envres.2022.113926).

Good and bad get together: Inactivation of SARS-CoV-2 in particulate matter pollution from different fuels, José de la Fuente, et al.; *Science of The Total Environment* (October 2022), Vol. 844, 157241, [doi: 10.1016/j.scitotenv.2022.157241](https://doi.org/10.1016/j.scitotenv.2022.157241).

The role of NO_x emission reductions in Euro 7/VII vehicle emission standards to reduce adverse health impacts in the EU27 through 2050, Eamonn Mulholland, et al.; *Transportation Engineering* (in press), doi: [10.1016/j.treng.2022.100133](https://doi.org/10.1016/j.treng.2022.100133).

Air Quality, Sources and Exposure

Quantifying on-road vehicle emissions during traffic congestion using updated emission factors of light-duty gasoline vehicles and real-world traffic monitoring big data, Xue Chen, et al.; *Science of The Total Environment* (in press), doi: [10.1016/j.scitotenv.2022.157581](https://doi.org/10.1016/j.scitotenv.2022.157581).

Evaluation of air quality effects of the London ultra-low emission zone by state-space modelling, Hajar Hajmohammadi and Benjamin Heydecker; *Atmospheric Pollution Research* (August 2022), Vol. 13, Issue 8, 101514, doi: [10.1016/j.apr.2022.101514](https://doi.org/10.1016/j.apr.2022.101514).

Long-term trend analysis of criteria pollutants in megacity of Delhi: Failure or success of control policies, Nidhi Verma and Shiva Nagendra; *Urban Climate* (September 2022), Vol. 45, 101254, doi: [10.1016/j.uclim.2022.101254](https://doi.org/10.1016/j.uclim.2022.101254).

Emissions Measurements and Modelling

China 6 moving average window method for real driving emission evaluation: Challenges, causes, and impacts, Yachao Wang, et al.; *Journal of Environmental Management* (October 2022), Vol. 319, 115737, doi: [10.1016/j.jenvman.2022.115737](https://doi.org/10.1016/j.jenvman.2022.115737).

Exhaust emissions from gasoline vehicles after parking events evaluated by chassis dynamometer experiment and chemical kinetic model of three-way catalytic converter, Hiroo Hata, et al.; *Science of The Total Environment* (in press), doi: [10.1016/j.scitotenv.2022.157578](https://doi.org/10.1016/j.scitotenv.2022.157578).

The impacts from cold start and road grade on real-world emissions and fuel consumption of gasoline, diesel and hybrid-electric light-duty passenger vehicles, Liqiang He, et al.; *Science of The Total Environment* (in press), doi: [10.1016/j.scitotenv.2022.158045](https://doi.org/10.1016/j.scitotenv.2022.158045).

Emissions Control, Catalysis, Filtration

Impact of diffusion limitations inside the wall of catalytic filters on conversion of gaseous pollutants at increased flow rates, Rudolf Pečinka,

et al.; *Chemical Engineering Science* (October 2022), Vol. 260, 117876, doi: [10.1016/j.ces.2022.117876](https://doi.org/10.1016/j.ces.2022.117876).

Analyzing the role of copper in the soot oxidation performance of BaMnO₃-perovskite-based catalyst obtained by modified sol-gel synthesis, Verónica Torregrosa-Rivero, et al.; *Fuel* (November 2022), Vol. 328, 125258, doi: [10.1016/j.fuel.2022.125258](https://doi.org/10.1016/j.fuel.2022.125258).

Pr-rich cerium-zirconium-praseodymium mixed oxides for automotive exhaust emission control, Simon Fahed, et al.; *Applied Catalysis A: General* (August 2022), Vol. 644, 118800, doi: [10.1016/j.apcata.2022.118800](https://doi.org/10.1016/j.apcata.2022.118800).

Understanding the NH₃ adsorption mechanism on a vanadium-based SCR catalyst: A data-driven modeling approach, Andres Suarez-Corredor, et al.; *Chemical Engineering Science* (November 2022), Vol. 262, 117975, doi: [10.1016/j.ces.2022.117975](https://doi.org/10.1016/j.ces.2022.117975).

Robust Temperature Control for an Electrically Heated Catalyst using First Order Sliding Mode and Supertwisting Controllers, Nadia Landarouche and Mohammed Bakhti; *IFAC-PapersOnLine* (2022), Vol. 55, Issue 12, pp. 365-370, doi: [10.1016/j.ifacol.2022.07.339](https://doi.org/10.1016/j.ifacol.2022.07.339).

Towards tailpipe sub-23 nm solid particle number measurements for heavy-duty vehicles regulations, Barouch Giechaskiel, et al.; *Transportation Engineering* (September 2022), Vol. 9, 100137, doi: [10.1016/j.treng.2022.100137](https://doi.org/10.1016/j.treng.2022.100137).

Sub-23 particle control strategies towards Euro VII HD SI natural gas engines, Chiara Guido, et al.; *Transportation Engineering* (in press), doi: [10.1016/j.treng.2022.100132](https://doi.org/10.1016/j.treng.2022.100132).

Transport, Climate Change & Emissions

Road life-cycle carbon dioxide emissions and emission reduction technologies: A review, Nieyangzi Liu, et al.; *Journal of Traffic and Transportation Engineering* (in press), doi: [10.1016/j.jtte.2022.06.001](https://doi.org/10.1016/j.jtte.2022.06.001).

Complete LCA of battery electric and conventional fuel vehicles for freight trips, Mounisai Middela, et al.; *Transportation Research Part D: Transport and Environment* (September 2022), Vol. 110, 103398, doi: [10.1016/j.trd.2022.103398](https://doi.org/10.1016/j.trd.2022.103398).

FORTHCOMING CONFERENCES

SAE Powertrains, Fuels and Lubricants

6-8 September 2022, Krakow, Poland

sae.org/attend/pfl

Cenex-LCV

7-8 September 2022, Millbrook, UK

cenex-lcv.co.uk/

International Symposium on Modelling of Exhaust Gas Aftertreatment

11-13 September 2022, Bad Herrenalb/Karlsruhe, Germany

itcp.kit.edu/modegat/

7th Rostock Large Engine Symposium

15-16 September 2022, Rostock, Germany

rgmt.de

3rd SAENA Conference on Sustainable Mobility

25-28 September 2022, Catania, Italy

universitacusano.com/csm2022

Aachen Colloquium Sustainable Mobility

10-12 October 2022, Aachen, Germany

aachener-kolloquium.de/en

AECC will make a presentation.

8th International MinNOx Conference

26-27 October 2022, Berlin, Germany

iav.com/en/events/8-internationale-minnox-conference

AECC will make a presentation.

13th ECMA International Conference & Exhibition

10-11 November 2022, New Delhi, India

ecmaindia.in/eventsdetails.aspx?mpgid=41&pgidtrail=42

Transport Research Arena 2022

14-17 November 2022, Lisbon, Portugal

traconference.eu/about-tra

FEV Zero CO₂ Mobility

15-16 November 2022, Aachen, Germany

fev-live.com/zero-co2-mobility/conference-program/

Powertrains For Renewable Fuels

22-23 November 2022, Stuttgart, Germany

fkfs-veranstaltungen.de/en/events

POLIS Annual Conference

30 November – 1 December 2022, Brussels, Belgium

polisnetwork.eu/2022-annual-polis-conference

WCX SAE World Congress Experience

18-20 April 2023, Detroit, USA

sae.org/highlights/wcx

Deadline for abstracts 13 September 2022.

44th International Vienna Motor Symposium

26-28 April 2023, Vienna, Austria

wiener-motorensymposium.at/fileadmin/Media

Deadline for abstracts 30 September 2022.

SAE Heavy-Duty Diesel Sustainable Transport Symposium

3-4 May 2023, Gothenburg, Sweden

AVL Vehicle & Environment Conference
25-26 May 2023, Graz, Austria
avl.com/-/vehicle-environment?i=3464186&sfmc_sub