5-Min Monthly Read

April 2021

+ Upcoming events listed at the end

Regulations

Euro 7/VII

On April 8th, the European Commission held another discussion on Euro 7/VII. The latest proposal includes the following:

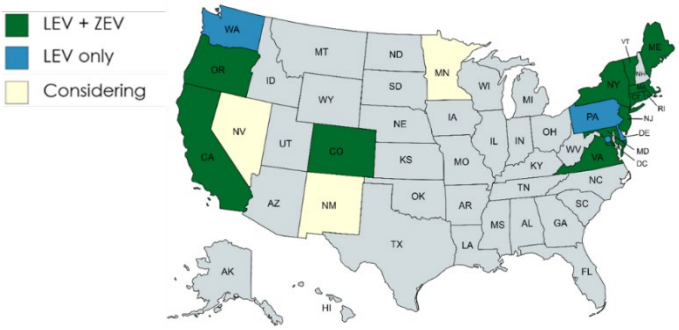
- Provision for a total "budget" for cold start emissions for any test < 16 km.
- Reduced limits e.g. NOx down to 20-30 mg/km from 80mg/km (diesel) today.
- Elimination of conformity factors.
- Testing down to – 10 °C, inclusion of sub-23 nm particles towards limits, inclusion of regeneration emissions.
- Limits on new species (e.g. NH_3, N_2O for light-duty), inclusion of CH_4 & N_2O as greenhouse gases
- Certification and compliance testing to be done mostly through on-road measurements.
- Increased durability

China Fuel Economy Standards for 2025

China has officially issued new passenger car fuel economy standards (GB 19578-2021), requiring a reduction from the 5 L/100km in 2020 to 4 L/100 km by 2025. Fuel consumption will be measured on the WLTC, but might be changed to a new "China cycle" after 2025. While CO2 is measured and used as reference, there is no direct limit.

Virginia joins "California states"

Virginia is the latest state to adopt California's LEV and ZEV program for light-duty vehicles, starting 2025. Minnesota, New Mexico and Nevada are also considering joining the so-called "California section-177 states", which currently consists of 15 states, representing > 35% of the US light-duty vehicle market.



Technology

Google to add air quality information to maps

Google is adding new functionalities to its maps, which will show the air quality in the area of interest as well as allow the user to select eco-friendly routes to minimize CO_2 emissions. Road congestion and topology will be used to calculate the expected CO_2 emissions. Maps will also show low emission zones (LEZs) and areas where driving is restricted (such as urban centers).
https://blog.google/products/maps/redefining-what-map-can-be-new-information-and-ai

Dynamic Cylinder Deactivation – Cummins/Tula demonstration for HD Low NOx

Cummins and Tula Technology have demonstrated a 74% reduction in NOx along with a 5% reduction in CO_2 emissions due to the application of dynamic cylinder deactivation on a Class 8 truck powered by the Cummins X15 (15L) engine. The technology allows for individual cylinders to be dynamically fired or "skipped" based on the load / torque demand.

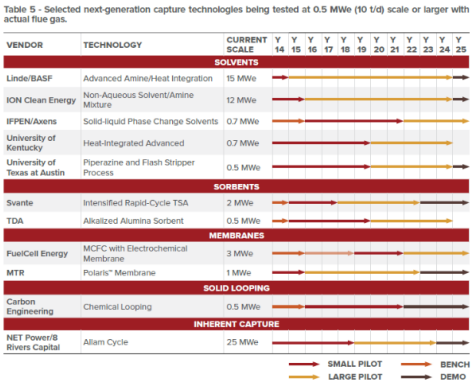
https://www.businesswire.com/news/home/20210413005025/en/Cummins-and-Tula-Study-of-Diesel-Dynamic-Skip-Fire-dDSF%E2%84%A2-Shows-74-Reduction-in-NOx-Emissions

Carbon Capture

The Global CCS institute has published a summary on the technology readiness of carbon capture and sequestration. A must read to get a primer on technologies and economics involved.
https://www.globalccsinstitute.com/resources/publications-reports-research/technology-readiness-and-costs-of-ccs/

Table 5 - Selected next-generation capture technologies being tested at 0.5 MWe (10 t/d) scale or larger with actual flue gas.

VENDOR	TECHNOLOGY	CURRENT SCALE
SOLVENTS		
Linde/BASF	Advanced Amine/Heat Integration	15 MWe
ION Clean Energy	Non-Aqueous Solvent/Amine Mixture	12 MWe
IFPEN/Axens	Solid-liquid Phase Change Solvents	0.7 MWe
University of Kentucky	Heat-Integrated Advanced	0.7 MWe
University of Texas at Austin	Piperazine and Flash Stripper Process	0.5 MWe
SORBENTS		
Svante	Intensified Rapid-Cycle TSA	2 MWe
TDA	Alkalized Alumina Sorbent	0.5 MWe
MEMBRANES		
FuelCell Energy	MCFC with Electrochemical Membrane	3 MWe
MTR	Polaris™ Membrane	1 MWe
SOLID LOOPING		
Carbon Engineering	Chemical Looping	0.5 MWe
INHERENT CAPTURE		
NET Power/8 Rivers Capital	Allam Cycle	25 MWe



Electrification / Non-conventional fuels

US targets 50% reduction of greenhouse gases by 2030, compared to 2005

During a Leaders Summit on Climate, President Biden has announced a target for the US to achieve a 50% reduction in GHG emissions by 2030 relative to 2005 levels. In 2019, the emissions were already 13% below the 2005 level. This will accelerate any GHG reduction plans for the transportation sector and lead to tougher fuel economy and electrification targets. Earlier, President Biden announced a $2 trillion infrastructure package, of which $174 billion will be spent for electric vehicles and establishing a national charging infrastructure by 2030.
https://www.reuters.com/article/usa-biden-infrastructure/biden-kicks-off-effort-to-reshape-u-s-economy-with-infrastructure-package-idUSL1N2LS2M5

VW Power Day

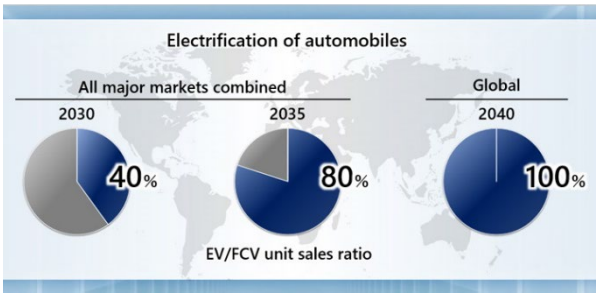
VW aims to sell 1 million electric cars in 2021, of which half will be plug-in and the other half fully electric. In 2020, VW sold 134,000 battery electric cars and 78,000 plug-ins.
https://www.ft.com/content/f8806bbb-1f4b-4cc0-8145-30d33a0d7829
VW presented its electric strategy at its "Power Day" on March 15th:

- By 2030, 80% of vehicles will use the same battery cells.
- Cost reduction targets: 30% for mainstream cathode chemistry (high Mn and LiCoMn) and 50% for inexpensive chemistry LFP (iron phosphate). High Si anode for faster charging.
- Long term solution: solid state batteries with Li metal at anode and ceramic separator. This is expected to give both reduced charging time by ~ 50% and up to 30% increased range.
- Ultra-fast charging expected to reduce charging time from 25 min to 12 min for a 280 mi trip, by 2025.
- Recycling to account for 95% of material utilization. First recycling plant already operational starting Jan 2021.
- Six battery factories to be opened by 2030, with a combined capacity of 240 GWh per year, enough for 5 million cars per year.

https://www.volkswagenag.com/en/events/2021/Volkswagen_Power_Day.html

Honda to go all-electric by 2040

Honda has announced its target to go all electric (battery or fuel cell vehicles) globally by 2040. The regional plans target 40% electric share by 2030 in the US and China.
https://global.honda/newsroom/news/2021/c210423eng.html



Volvo on the future of commercial trucking: All options open even beyond 2040

The CTO of Volvo has written an article on why he believes there is a place for all 3 technologies – battery electrics, fuel cell vehicles and ICEs paired with renewable fuel, even beyond 2040.
https://www.weforum.org/agenda/2021/04/sustainable-transport-hydrogen-fuel-technology-batteries-volvo/

Don't miss these upcoming events …

42nd International Vienna Motor Symposium, April 28th – 30th, 2021, online
https://wiener-motorensymposium.at/en/

Emissions 2021, May 12th – 13th, 2021, online
https://gamcinc.com/conferences/emissions/

33rd International AVL Conference "Engine & Environment", May 20-21, 2021, Graz, Austria or online
https://www.avl.com/-/engine-environment

DOE Annual Merit Review
Washington Hilton in Washington, D.C., on June 21-24, 2021
https://www.energy.gov/eere/vehicles/vehicle-technologies-annual-merit-review

24th ETH-Conference on Combustion Generated Nanoparticles at ETH, Zürich, Switzerland, June 22nd – 24th, 2021, online
https://www.nanoparticles.ch/