

### Market Update

- In a new report, the International Transport Forum predicts that compared to 2015, passenger transport will increase by 2.3X and freight transport will increase 2.6X by 2050. This will be primarily driven by a growing population with increasing levels of prosperity and consumption. Even if all commitments made today to decarbonize transport are implemented, the report predicts that CO<sub>2</sub> emissions will increase by 16%. Of course, more aggressive CO<sub>2</sub> reduction strategies could be pursued and can help reduce the CO<sub>2</sub> emissions significantly.

<https://www.itf-oecd.org/itf-transport-outlook-2021>

- Daimler Trucks North America (DTNA) launched a new Detroit DD13 Gen 5 engine for vocational (Western Star 49X trucks) and on-highway (Freightliner Cascadia) applications. The 13L engine is 60lbs lighter due to a new after-treatment system and includes features such as “ThermoCoasting” which prevents after-treatment cool down, reduces the need for parking regeneration and extends DPF cleaning intervals. Regenerations are also improved through a thermal control valve on the new journal bearing turbocharger.



<https://demanddetroit.com/our-company/media/press-releases/new-detroit-dd13-gen-5-engine-2021-05-26/>

### Regulations

- Ahead of the expected European Climate Law in July, Volkswagen announced that it expects the CO<sub>2</sub> reduction target for passenger cars to be revised to 50% (from the current 37.5%). ACEA – the automakers alliance – made a statement that OEMs are ready for a further cut in the CO<sub>2</sub> target provided this is also accompanied by binding commitments on charging infrastructure and hydrogen fueling stations. Separately, ACEA has called for at least 1000 H<sub>2</sub> refueling stations and 50,000 charging points by 2030.

<https://www.reuters.com/business/sustainable-business/how-low-can-you-go-volkswagen-throws-down-emissions-gauntlet-2021-05-05/>

- CARB has adopted the “Clean Miles Standard”, which requires reduction of greenhouse gas emissions and electrification for the ridesharing company fleets. Any “transportation network company” or TNC passenger fleet will have to comply with the GHG requirements listed in the table. The targets are specified as grams of CO<sub>2</sub> per passenger miles traveled (PMT) and reduce to zero by 2030, requiring the fleets to be 100% fully electric / fuel cell by the end of this decade. All CO<sub>2</sub> emissions are accounted, included from the time the ride is booked to picking up the passenger and then ultimately making the trip. These are divided by the number of passengers to get the CO<sub>2</sub> emissions per passenger.

<https://ww2.arb.ca.gov/rulemaking/2021/cleanmilesstandard>

Calendar Year	GHG Target (grams CO <sub>2</sub> /PMT)
2023	252
2024	237
2025	207
2026	161
2027	110
2028	69
2029	30
2030+	0

- The new periodic technical inspection (NPTI) including particle number measurement has been adopted by Germany, making it the 3<sup>rd</sup> country after Belgium and Netherlands to adopt the in-use compliance measure. The test involved a hot idle measurement and to pass, the exhaust gas should have particles less than a limit of 250,000 particles/cm<sup>3</sup>. Modern diesels with filters have particles well below that limit, so the test will detect missing / compromised filters.  
<https://citainsp.org/2021/05/03/introduction-of-particle-counting-for-pti-in-germany/>

- The EU Commission has published the average specific CO<sub>2</sub> emissions for all new heavy-duty vehicles registered in the EU last year. These 2019 values are to be used as the baseline when calculating the emission reductions needed to meet the 2025 and 2030 targets. On average, new HD trucks are emitting 52.75 g-CO<sub>2</sub>/ton-km. CO<sub>2</sub> levels for each class is shown in the table, but note that only a few of these categories are subject to CO<sub>2</sub> emission standards.

Sub-group sg	rCO <sub>2g</sub> in g/tkm
4-UD	307,23
4-RD	197,16
4-LH	105,96
5-RD	84,00
5-LH	56,60
9-RD	110,98
9-LH	65,16
10-RD	83,26
10-LH	58,26

[https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L\\_.2021.167.01.0047.01.ENG&toc=OJ%3AL%3A2021%3A167%3ATOC](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2021.167.01.0047.01.ENG&toc=OJ%3AL%3A2021%3A167%3ATOC)

- Major organizations involved in the liquid fuels value chain have formed the “Renewable & Low-Carbon Liquid Fuels Platform”, aimed at promoting new and low carbon fuels as an alternative for decarbonization. A letter has been signed by 223 companies and scientists and addressed to the EU Commission, advocating a regulatory framework which recognizes and promotes the adoption of such low carbon fuels and considers the social dimension of adapting the existing infrastructure to preserve jobs.

<https://www.fuelseurope.eu/publication/the-renewable-low-carbon-liquid-fuels-platform-towards-transport-fuels-transformation/>

- The US EPA’s Integrated Risk Information System (IRIS) program has published a draft assessment of the risks of inhalation exposure to vanadium (V) and related compounds. V is used as a component of catalysts in SCR applications, especially for off-road applications.

<https://www.federalregister.gov/documents/2021/05/28/2021-11383/availability-of-the-iris-assessment-plan-for-inhalation-exposure-to-vanadium-and-compounds>

Special thanks to [Beth Hincee](#) for this alert.

## Electrification / Non-conventional fuels / Other

- The most popular light-duty vehicle in the US is now available as an all-electric. Ford unveiled the F-150 Lightning all electric pick-up truck, which will be available starting next spring. The entry model starts at < \$40,000 before any federal or state tax credits. Higher end variants will cost ~ \$53K and \$90K. A 100-kWh battery will provide up to 230 miles of driving range, while there is also a 300-mile extended range option with a 150-kWh battery. Towing capacity is 2,000 lbs in the standard-range model, increasing up to 10,000 lbs for other variants. Built-in electrical outlets offer 2.4 or 9.6 kW to power electronics and tools at the worksite. Using a Level 2 80-amp charger, the battery can be charged completely in about 8 hours. Using DC fast-charging, the battery can be charged to 80% in 44 mins.

<https://www.sae.org/news/2021/05/ford-f-150-lightning-detailed>

By 2030, Ford will invest >\$30 billion and aim to have 40% of its global sales to be all electric. The plan includes 9 all-electric cars and SUVs and 3 electric trucks (including the Lightning) by 2025. The battery demand to support these ambitions will be at least 240 GWh. Ford has formed a joint venture with SK Innovation to produce 60 GWh annually at two US plants and has invested in Solid Power for solid-state batteries.

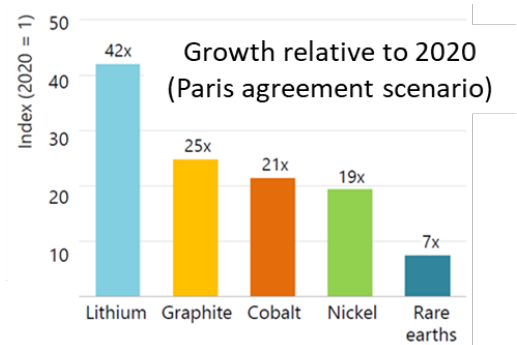
<https://www.reuters.com/business/sustainable-business/ford-boosts-ev-spending-aims-have-40-volume-all-electric-by-2030-2021-05-26/>

- The International Energy Agency (IEA) outlined a comprehensive and global strategy to reach net-zero CO<sub>2</sub> emissions by 2050. It calls for an end to sales of ICEs by 2035 globally, while estimating that ~ 20 gigafactories would be needed each year for the next 10 years to support the battery needs.

<https://mobilitynotes.com/iea-roadmap-to-net-zero-by-2050/>

In another report, the IEA has assessed the mineral demands from clean energy technologies (EVs, batteries, clean electricity generation and distribution) to meet the climate goals. Compared to 2020, the demand for minerals is expected to be 4X – 6X by 2040 to meet the Paris Agreement (T rise < 2 °C) or net zero emissions by 2050. The demand for nickel and lithium increases by 19X and 42X, respectively by 2040 for the Paris targets (even higher for net zero by 2050).

<https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions>



- Daimler and Volvo have officially launched their joint venture “cellcentric”, to develop and commercialize hydrogen fuel-cell trucks for long-haul applications. Plan is for serial production of long-haul trucks to begin in 2025.

<https://www.cellcentric.net/en/news/daimler-truck-ag-and-volvo-group-fully-committed-to-hydrogen-based-fuel-cells-launch-of-new-joint-venture-cellcentric/>

- Renewable fuels are advancing. Neste is testing a renewable gasoline which can potentially reduce wells-to-wheel greenhouse gas emissions by 65% compared to conventional gasoline fuel. While there are renewable fuel alternatives available in the market for diesel, this is the first major announcement of a possible commercial path towards renewable gasoline. Testing of the fuel is ongoing in Sweden along with Powertrain Engineering Sweden AB, a supplier to Volvo Cars.

<https://www.neste.com/releases-and-news/renewable-solutions/neste-testing-renewable-gasoline-sweden-possible-commercialization-internationally>

Bosch, Shell and Volkswagen also announced a new “Blue Gasoline” renewable fuel with up to 33% renewable content, estimated to reduce wells-to-wheel CO<sub>2</sub> emissions by up to 20%. The fuel will be available at regular stations this year, starting in Germany. The renewable content is either biomass-based naphtha (in turn from tall oil), or ethanol.

<https://www.bosch-presse.de/pressportal/de/en/bosch-shell-and-volkswagen-develop-renewable-gasoline-with-20-percent-lower-co%E2%82%82-emissions-228294.html>

Porsche and ExxonMobil are developing an e-fuel, and it is being tested in the motorsports engines at the Porsche Mobil 1 Supercup 2021.

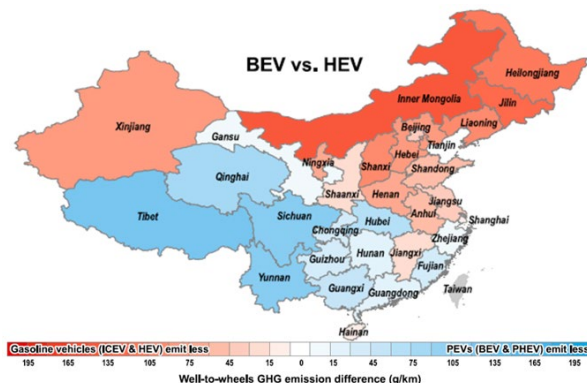
[https://corporate.exxonmobil.com/News/Newsroom/News-releases/2021/0330\\_ExxonMobil-and-Porsche-test-lower-carbon-fuel-in-race-conditions](https://corporate.exxonmobil.com/News/Newsroom/News-releases/2021/0330_ExxonMobil-and-Porsche-test-lower-carbon-fuel-in-race-conditions)

- Taking a different stand compared to its competitors, Toyota has projected that internal combustion engines will continue to dominate its vehicle sales even by the end of this decade. In 2030, ~30% of its N. America sales would be conventional gasoline engines, a little over half would be hybrids, and the remainder would be fully electric.

<https://www.wsj.com/articles/most-toyotas-will-still-use-gasoline-in-2030-company-says-11620810856>

- Researchers from Argonne National Lab, Aramco Services and the Chinese Research Academy of Environmental Sciences have published a wells-to-wheel GHG analysis of various powertrains at the province level in China. The study, based on the grid in 2017, found hybrids are emitting lower than BEVs and plug-in hybrids in over 18 provinces, due to the high carbon intensities associated with coal-derived electricity. The GHG emissions of BEVs were found to vary widely, from 22 – 293 g-CO<sub>2</sub>/km, based on the upstream emissions from electricity generation. This points for the need to the need for incentivizing hybrids while also decarbonizing the grid to enjoy the full benefits of electrification.

<https://pubs.acs.org/doi/10.1021/acs.est.0c08217>



### *Don't miss these upcoming events ...*

#### **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 22<sup>nd</sup> – 24<sup>th</sup>, 2021, online**

<https://www.nanoparticles.ch/>

#### **2021 Cambridge Particle Meeting, 25<sup>th</sup> June, online**

<https://cambridgeparticlemeeting.org/2021>

#### **FEV Diesel Powertrains 3.0, TBA, June 29<sup>th</sup> – 30<sup>th</sup>, 2021, online**

<https://fev-live.com/diesel/conference-program/>

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<https://mobilitynotes.com/home/tech-updates/summaries-conferences-technical-papers/>