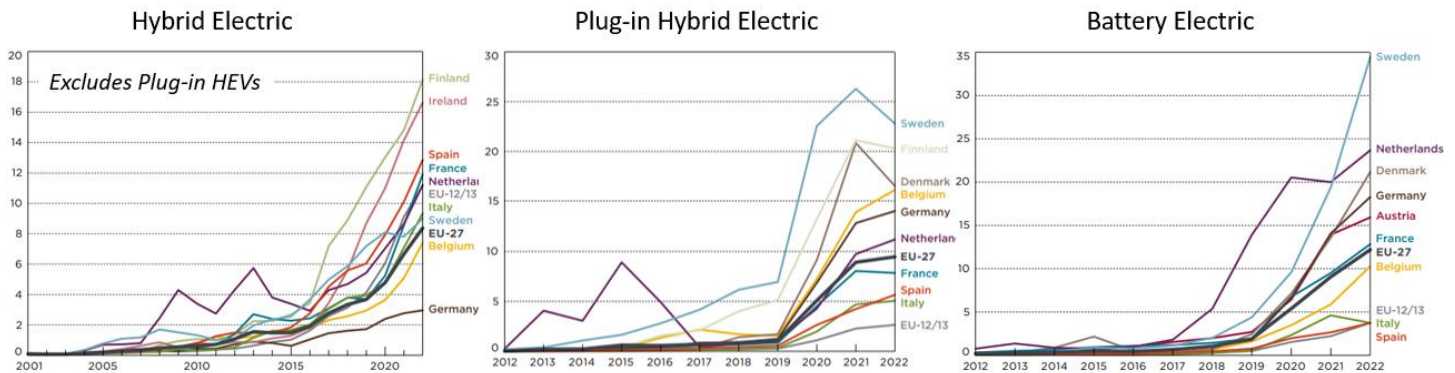


Sign-up and previous newsletters: <https://mobilitynotes.com/home/newsletters/>

Market Update

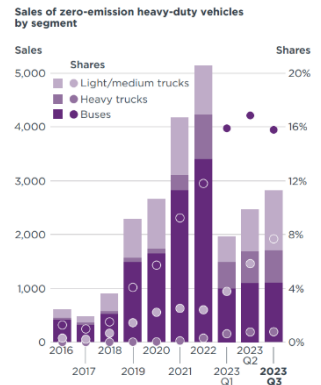
ICCT European Light-Duty Market Update – All forms of electrification on the rise

ICCT’s European Market Pocketbook has been published and has a lot of information on the changing nature of European passenger car and commercial vehicle makeup. Fleet CO₂ emissions have reduced significantly since the 2021 target (95 g/km) but almost all the reductions in 2022 are attributed to the increase in BEVs (at zero tailpipe). Notably, automakers are pursuing all forms of electrification and regular hybrids are also rapidly gaining market share as a pragmatic tool for lowering fuel consumption while offering affordable mobility.



European HD Electric Share in Q1 – Q3 2023

The International Council of Clean Transportation (ICCT) has published a [report](#) on the Q1 – Q3 2023 market assessment for zero-emission heavy-duty vehicles in Europe. In Q3 2023, ~ 2,800 new HD ZEVs were sold in EU-27 countries, with roughly a third of the sales being in Germany. Of the 76,000 heavy trucks sold in Q3, only 610 were ZEVs (< 1%). Buses, on the other hand, have a relatively high share of ZEVs (~ 16%).



STATE OF CHINA'S AUTO INDUSTRY

Weak domestic demand for new ICE cars in China represents a significant headwind – especially for foreign brands



State of China’s auto market

A [report](#) by [Automobility Ltd.](#) provides an excellent summary of the changing nature of China’s auto market.

- The total number of vehicle shipments (passenger cars + commercial vehicles) have increased to record levels, surpassing 30 million in 2023.
- The number above includes exports, which have increased almost 5-fold since 2017, to ~ 5million vehicles in 2023.
- The domestic market in China is facing headwinds, with overall sales still down compared to peak 2017 levels. ICE sales are down 7.5%, while new energy vehicles (NEVs) were a third of overall sales in 2023.

- China is exporting the highest number of vehicles in the world, surpassing Japan and Germany. Interestingly, 75% of the exports are ICE vehicles → with the rise of NEVs, China's excess ICE manufacturing capacity lends itself to cheaper vehicle production and exporting to other countries demanding ICE vehicles.

Regulations / Reports

Euro 7 nears final rulemaking

After the back and forth with the various positions from the EU Commission, Council and Parliament, Euro 7 standards for light- and heavy-duty vehicles seem to be nearing a final agreement. Here's a [summary](#) based on the Jan 8th, 2024 version.

Euro 7: Light-Duty M1, N1 vehicles			Euro 7: Heavy-Duty M2, M3, N2, N3 vehicles		
Timing: 30 months after final regulation for new types and 42 months for all vehicles			Timing: 48 months after final regulation for new types and 60 months for all vehicles		
M1, N1 Class / mg/km, #/km	Positive Ignition	Compression Ignition	M2, M3, N2, N3 mg/kWh, #/kWh	WHSC (CI) WHTG (CI & PI)	RDE
NOx	60	80	NOx	200	260
PM (mg/km)	4.5	4.5	PM	8	-
PN ₁₀ (#/km)	6x10 ¹¹	6x10 ¹¹	PN ₁₀ (#/km)	6x10 ¹¹	9x10 ¹¹
CO	1000	500	CO	1500	1950
THC	100	-	NMOC	80	105
NMHC	68	-	NH ₃	60	85
THC + NOx	-	170	CH ₄	500	650
Evaporative (petrol fueled only) g/test	1.5		N ₂ O	200	260
Brake PM (mg/km)	3 for PEV, 7 for ICE, HEV, FCV till end of 2029 3 for all powertrains starting 2035		Lifetime / Durability	M2: 160,000 km / 8 yrs. Est: 200,000 km / 10 yrs. N2, N3+16 L, M3+7.5 L: 300,000 km / 8 yrs. Est: 375,000 km / 10 yrs. N3+16 L, M3+7.5 L: 700,000 km / 12 yrs. Est: 875,000 km / 15 yrs.	
Lifetime / Durability	160,000 km / 8 yrs. Ext.: 200,000 km / 10 yrs. Exhaust limits x 1.2 for gas emissions				



SAE Government Industry Meeting, January 2024

The annual government industry meeting was held in Washington D.C. The event highlighted the challenges faced by policymakers and industry alike as we navigate the reduced pace of EV car sales in recent months, and the significant infrastructure challenges for heavy-duty trucks. If you missed it, here is a downloadable [summary](#).

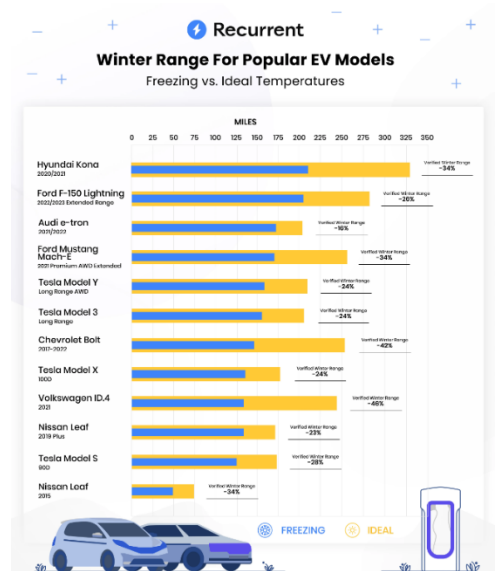
Electrification

Driving range reduction in winter

The recent spell of freezing conditions in many parts of the U.S. have prompted various articles on the reduced range of EVs and the anxiety (or lack thereof) amongst consumers. The actual range reduction depends on various factors – vehicle design and battery thermal management, driving conditions, and perhaps more importantly steps taken by the end user to manage the thermal losses.

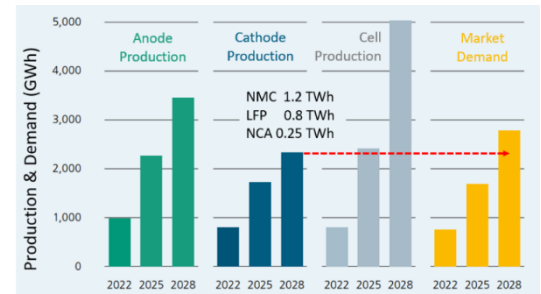
[Recurrent](#) has published real-world data collected from on-board devices on over 10,000 vehicles. The loss in range is in the 20% - 45% range when temperatures drop from the ideal for peak range to freezing temperature. The article provides a list of measures that can be taken to improve on this from the easy e.g. use preconditioning of the battery during charging, to the complex e.g. use of heat pumps.

Note: ICEs also lose range in cold temperatures (use of cabin heating etc.) but clearly the anxiety is lower given the infrastructure and quick refueling.

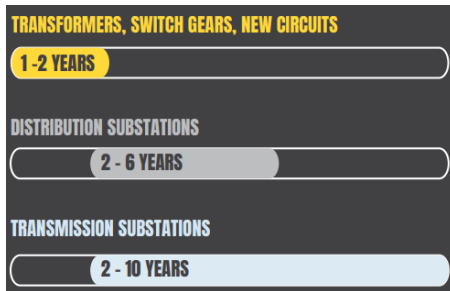


Li-ion battery roadmap to 2030

A [report](#) by the Fraunhofer Institute provides perspectives on the expected trends in Li-ion batteries out to 2030. The report predicts continued improvements to be imminent, with battery energy densities increasing from 750 Wh/l today to ~ 1,000 Wh/l, and pack prices falling from €150/kWh today to €80/kWh by end of the decade. Cell production capacity is estimated to be sufficient to meet the increased demand, although there are signs that cathode production could fall short of market demand. LFP batteries are increasing share, expected to account for a third of the overall cathode production.



Medium- and Heavy-Duty Vehicles : Spotlight on Charging Infrastructure



A new [report](#) by the Environmental Defense Fund (EDF) highlights the shortcomings of the current mechanisms that trigger a utility to add grid capacity following a request by a fleet. As example, a request for a new substation in Brooklyn in 2022 is slated to be met in 2028. The energy usage of a highway truck charging station serving 100 vehicles can be of the order of 20MW, similar to the loads of a small town. The report recommends that regulators will have to enable utilities to proactively add capacity for meeting such high demand and not require them to wait for fleet requests.

Powering America's Commercial Transportation (PACT)

Daimler Truck, Navistar and Volvo NA have formed a new coalition to highlight the need and challenges of accelerating medium- and heavy-duty charging infrastructure across the US. Other founding members include ABB E-mobility, Burns & McDonnell, Greenlane™, J.B. Hunt Transport, Inc., Prologis Inc., and Voltera.



Hertz sell-off of 20,000 Tesla EVs

Hertz has [decided](#) to sell 20,000 electric vehicles, a third of its global EV fleet, in favor of conventional ICE vehicles. The decision is tied to higher cost of collision repairs especially with ridesharing applications, and the lower resale value of these EVs in a sliding price market. The reduced EV fleet stands in contrast to the [statement](#) made by the White House last year - "Hertz is committing to substantially increase its electric vehicle rentals this year forecasting nearly two million EV rentals in 2023".

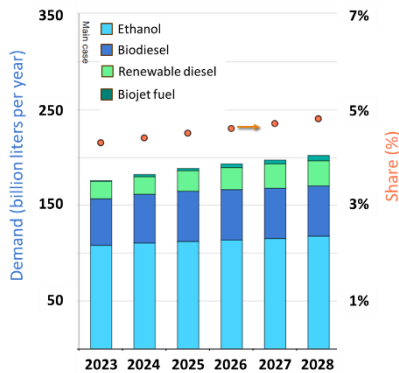
Low Carbon / Renewable Fuels

First pure-ethanol-powered truck commercialized

ClearFlame Engine Technologies [announced](#) the deployment of its first truck powered by near-pure ethanol (E98) to Vander Haag's, a truck dealer which provides parts and services for commercial trucks. Fleet testing has shown 40% lower cost than diesel, and reduced carbon emissions by 45% from a well-to-wheel perspective.



The carbon intensity of US corn-derived ethanol has [reduced](#) by ~ 23% from 2005 – 2019 and the latest GREET model has further reduced the intensity of corn farming by 5% due to improved fertilizer use. The carbon intensity of ethanol can be further reduced, such as by the recent [announcement](#) for CO₂ capture from ethanol production.



Outlook on biofuels

The International Energy Agency (IEA) predicts that in the next 5 years, biofuel demand will increase by 23% to reach ~ 200 billion liters per year. Ethanol and renewable diesel will account for 2/3rd of this demand, while biodiesel and biojet fuel will account for the rest. Brazil, Indonesia and India are expected to drive much of the increase in demand given their biofuel policies. Growth in other major economies is expected to be countered by a reduction in use due to electrification.

Conferences

Here are some upcoming conferences to consider attending –

TMC's 2024 Annual Meeting & Transportation Technology Exhibition, March 4-7, 2024, New Orleans

[TMC Annual 2024 | TMC Annual 2024 \(trucking.org\)](https://www.trucking.org/tmc-annual-2024)

The 34th Real World Emissions Workshop, March 10-13, 2024, San Diego, CA

[34th CRC Real World Emissions Workshop - Coordinating Research Council \(crao.org\)](https://www.crao.org/34th-crc-real-world-emissions-workshop)

14th VERT FORUM - EMPA, March 22nd, 2024 - Dübendorf, Switzerland

[About us \(vert-dpf.eu\)](https://www.vert-dpf.eu) Topics include particle pollution control - GPF retrofits, indoor air quality, etc.

Email: lauretta.rubino@vert-dpf.eu for registration

SAE WCX World Congress, April 16 – 18, 2024, Detroit

[WCX 2024 - April 16-18, 2024 - Detroit \(sae.org\)](https://www.sae.org/wcx-2024)

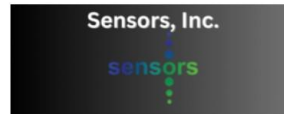
The International Vienna Motor Symposium, April 24 – 26, 2024, Vienna

[International Vienna Motor Symposium \(wiener-motorensymposium.at\)](https://www.wiener-motorensymposium.at)

Emissions Analytics Off-Highway Powertrain and Fuels USA 2024, May 8-9, Irvine, California

<https://conferences.emissionsanalytics.com/offhighway-us/index.html>

Thank you to our sponsors!



"Thank you"
to our sponsors who make it possible to offer this content free !