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Euro 7 standard in a nut shell

Webinar EACN 21.6.2023

BRONZE Cluster Management Excellence
STRIVING FOR CLUSTER EXCELLENCE

Member of EACN European Automotive Cluster Network

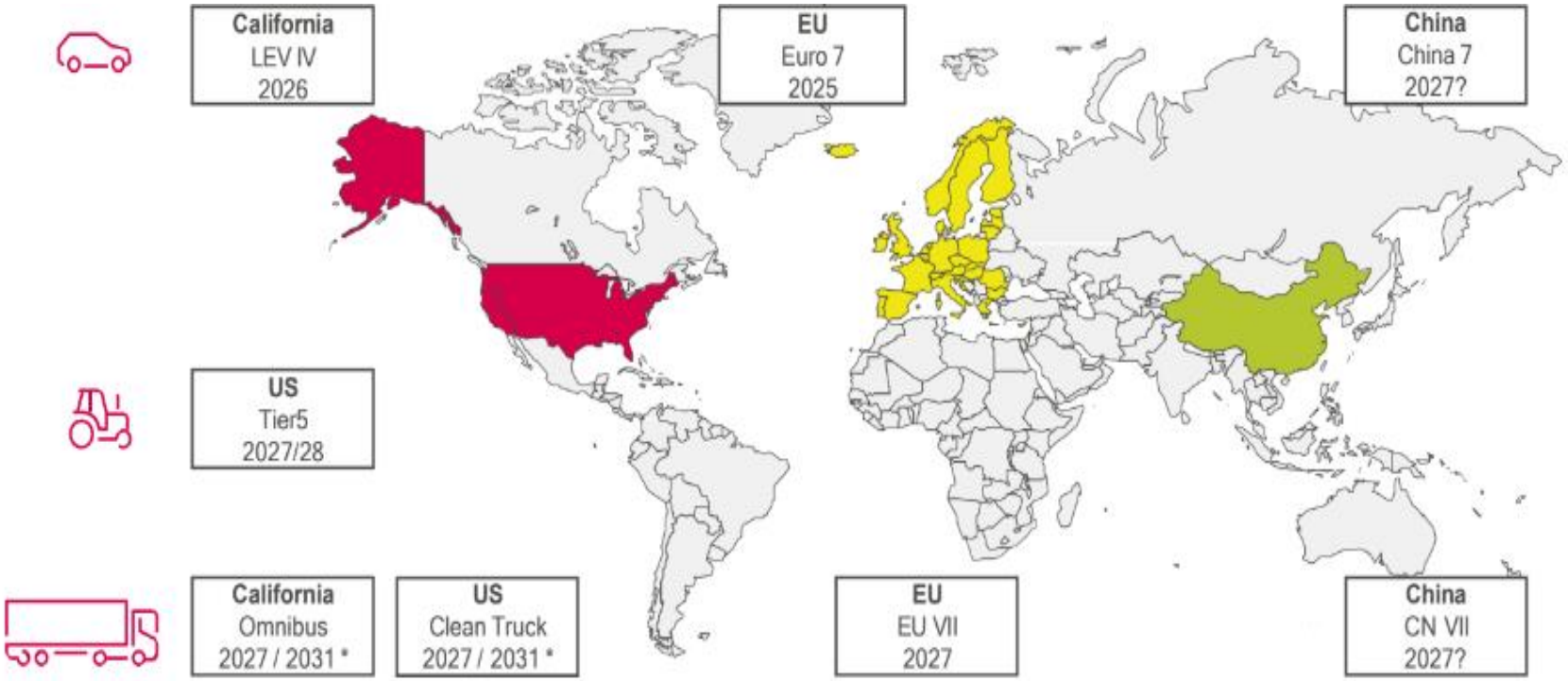
EURO CLUSTERS

Euro 7 standard and worldwide context

společně v automotive

Stonger emission limits
Cold start emission
On Board Monitoring
RDE – Real Driving emission

On Board Monitoring?
RDE – Real Driving emission?



Stonger
emission limits

Stonger emission limits
Cold start emission
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RDE – Real Driving emission

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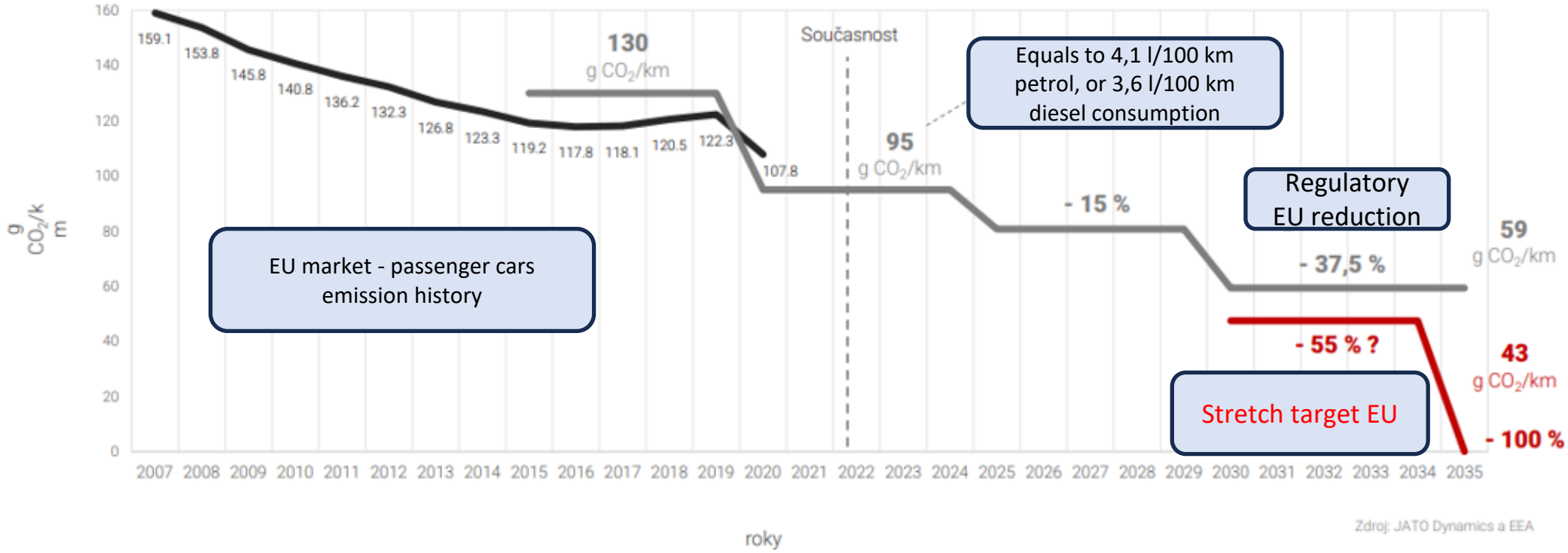
EU Regulatory requirements – CO2 emission targets history

společně v automotive



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Euro 7 standard - proposal

společně v automotive

Euro 7 = cca 7000 pages complex document without some working level details on all testing procedures

- 1-st comprehensive proposal in November 2022

- **Suggested validity from**:
- passenger cars - July 2025
- trucks - July 2027

- Realistic approval process time frame by mid.2024

- Continue negotiation process – 8 EU countries modification proposal

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Euro 7 - why so often commented ?

společně v automotive

- The same start date for all cars and newly homologated cars
- So far it was at least 1 more year time for homologation

- ➢ Not enough time to adapt all the technical solutions
- ➢ Not capable to homologate all car models (impact to the annual sales)
- ➢ Most likely a major issue to the small vehicles (A and B size)

	Newly homologated	All the vehicles produced and sold
Euro 1	1/1992	1/1993
Euro 2	1/1996	1/1997
Euro 3	1/2000	1/2001
Euro 4	1/2005	1/2006
Euro 5a	9/2009	1/2011
Euro 5b	9/2011	1/2013
Euro 6b	9/2014	9/2015
Euro 6c	–	9/2018
Euro 6d-Temp	9/2017	9/2019
Euro 6d	1/2020	1/2021

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Euro 7 – voice of OEMs

společně v automotive

The voice of OEMS:

- it makes the transition to the electric mobility more difficult
- it makes the vehicles much more expensive
- it will slow down the „refreshing“ of the car pools
- it will not support the environmental targets in a short term

The opposite arguments:

- youngest cars have the longer annual span of driving in kms
- ICE vehicles will have long time to disappear from the operation
- technically it is easy to implement

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Euro 7 – car price impact

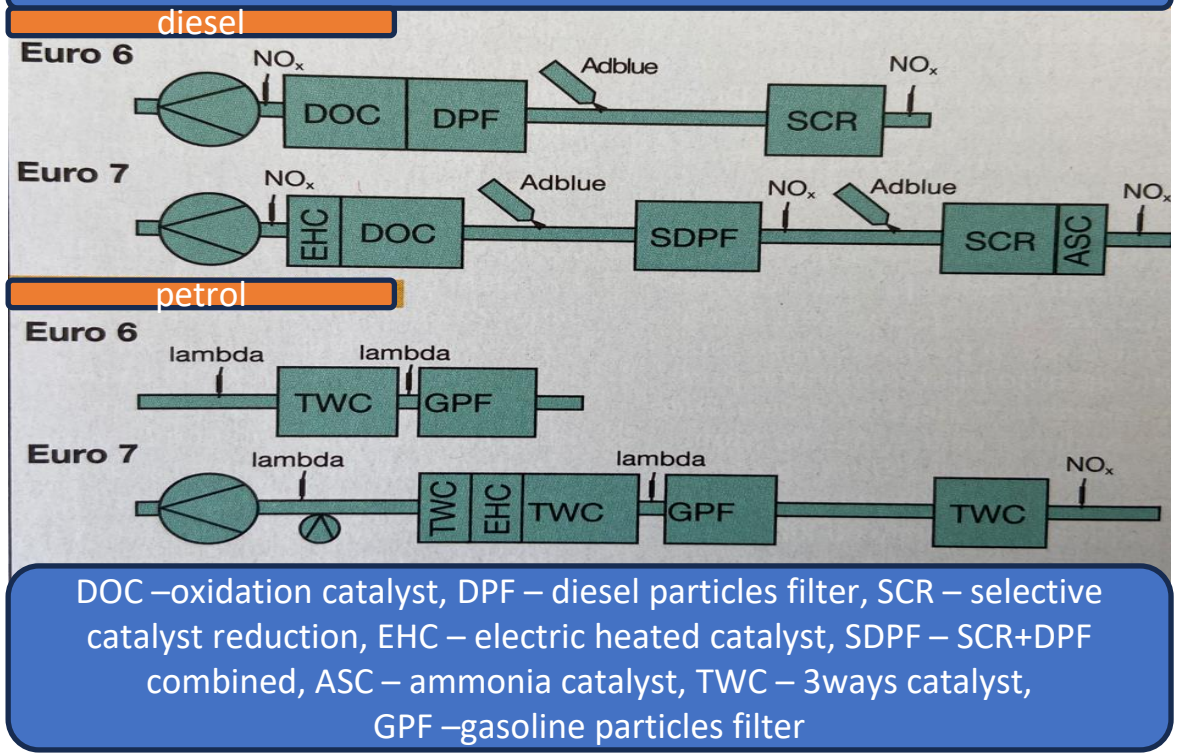
společně v automotive

EU – price increase expected on average 90 to 150 EUR per vehicle

X

OEMs – price increase expected at EUR 2- 4K, some models 6K

Possible emission solutions Euro 7 vs. Euro 6



DOC –oxidation catalyst, DPF – diesel particles filter, SCR – selective catalyst reduction, EHC – electric heated catalyst, SDPF – SCR+DPF combined, ASC – ammonia catalyst, TWC – 3ways catalyst, GPF –gasoline particles filter

Table 10-1: Costs of brake wear control options

Technology	Incremental cost factors	Incremental Cost (€/vehicle)
Regenerative braking	Controller system, coupling with mechanical brakes (assuming at least MHEV is deployed on all vehicles)	200-300
Coated discs	Material and manufacturing (e.g., carbon/tungsten discs), assuming four discs per vehicle	200-650
NAO Pads	Material and processing costs to achieve low steel equivalent performance	7 - 10
PM Collection Devices	Design and new components required	150-300
Application of drum brakes in the rear axle	Nothing in particular – Technology already available and in use	-
Resizing of brake corner	Nothing in particular – Technology already available needs to be adapted to reduce energy dissipation and improve emissions behaviour	-

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Euro 7 – new limits of poluting agents

společně v automotive

- relatively small adjustments in parametres values
- major change of the way the parametres are measured (RDE with no tolerance)
- change of marginal conditions and evaluation methods

	Euro 6d		Euro 6e		Euro 7
	benzin	diesel	benzin	diesel	both
NO_x	60 mg/km	80 mg/km	60 mg/km	80 mg/km	60 mg/km
PM	4,5 mg/km	4,5 mg/km	4,5 mg/km	4,5 mg/km	4,5 mg/km
PN	$6*10^{11}$ > 23 nm	$6*10^{11}$ > 23 nm	$6*10^{11}$ > 23 nm	$6*10^{11}$ > 23 nm	$6*10^{11}$ > 10 nm
CO	1000 mg/km	500 mg/km	1000 mg/km	500 mg/km	500 mg/km
THC	100 mg/km	170 mg/km (NO_x + HC)	100 mg/km	170 mg/km (NO_x + HC)	68 mg/km
NMHC	68 mg/km		68 mg/km		20 mg/km
NH_3	-	-	-	-	20 mg/km
Conformity ratio/index	1,43 (NO_x)/ 1,43 PN	1,43 (NO_x)/ 1,43 PN	1,43 (NO_x)/ 1,34 PN	1,43 (NO_x)/ 1,34 PN	1,00

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Euro 7 – testing conditions

společně v automotive

Emission measured in **real driving mode** only

- At least Nox a solid particles in RDE with the conformity ratio 1,00
- Newly measured ammonia emission

Current marginal conditions:
Temperature 0 – 35 Celsius, altitude up to 700 m, speed up to 145 km/h

New marginal conditions:
Temperature -10 to +45 Celsius, altitude up to 1800 m, speed up to 160 km/h
Towing the trailer

- evaluated specifically for the cold start
- not clear testing procedure

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Euro 7 - monitoring and reporting

společně v automotive

On Board Monitoring (OBM)

- Tracking of the emission in the real time frame
- Online data reporting and defect monitoring to the OEMs / car repair centres
- Linked to of all the ECU in the vehicle with the emission impact (up to couple dosens ECUs in a vehicle)
- More demanding on the car electric/ wire harness systems
- Can block the continuation of the trip when defect reported online

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Euro 7 – fuel evaporation

společně v automotive

Fuel evaporation emission limits:

- more strick SHED test
- now 2 gr per 48 hours
- newly 0,5 gr per 24 hours , tracking 48 hours
- new test – evaporation during the tank filling - up to 0,05 g/lt

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Euro 7 – senzors lifetime

společně v automotive

Senzors life time :

- higher life time requested
- now 5 years / 100 000 kms
- newly 8years/160 000 kms, or up to 10 years/ 200 000 kms

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Euro 7 - battery vehicles

společně v automotive

Battery capacity:

- guarantee for BEV and PHEV vehicles
- 80% capacity for 5 years/100 000 kms
- 70% capacity for 8 years / 160 000 kms
- guarantee by the producer
- perceived risk – on „paper“ capacity reduction

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Euro 7 – break systems

společně v automotive

Break system emission:

- limiting solid particles in the break wear
- measured within WLTP – in a break testing phase
- limit 0,007 gr/km
- 1 cycle at 10 independend trips , 10x192 kms and 303x breakings
- Max. decceleration 2,18m/s2
- in total 1920 kms and max. 13,44 gr of the break dust
- in 2035 the new limit at 0,003 gr/km

Solution:

- new materials for breaks (a la current sport vehicle break types)
- electrification of vehicle at least at mild hybrid level
- drum breaks
- dust collection technology

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Euro 7 - tyres

společně v automotive

Tyre emission:

- not known limits
- electric vehicles penalized (higher gross weight)
- EU tyre producers association (ETRMA) supports emission reductions
- continuous tyres development
- testing methods in development, not 100% ready

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Euro 7 - ACEA questions

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Fact sheets: 7 questions on Euro 7

3 May 2023

Under Euro 7, the European Commission seeks to expand the current Euro 6/VI pollutant emissions standards. But what is the real-world impact of Euro 7 on the environment, consumers, industrial competitiveness, and beyond? Focusing on facts and data, in this series of fact sheets, the European auto industry asks 7 questions on Euro 7.

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7. Euro 7: Good or bad for industry competitiveness?

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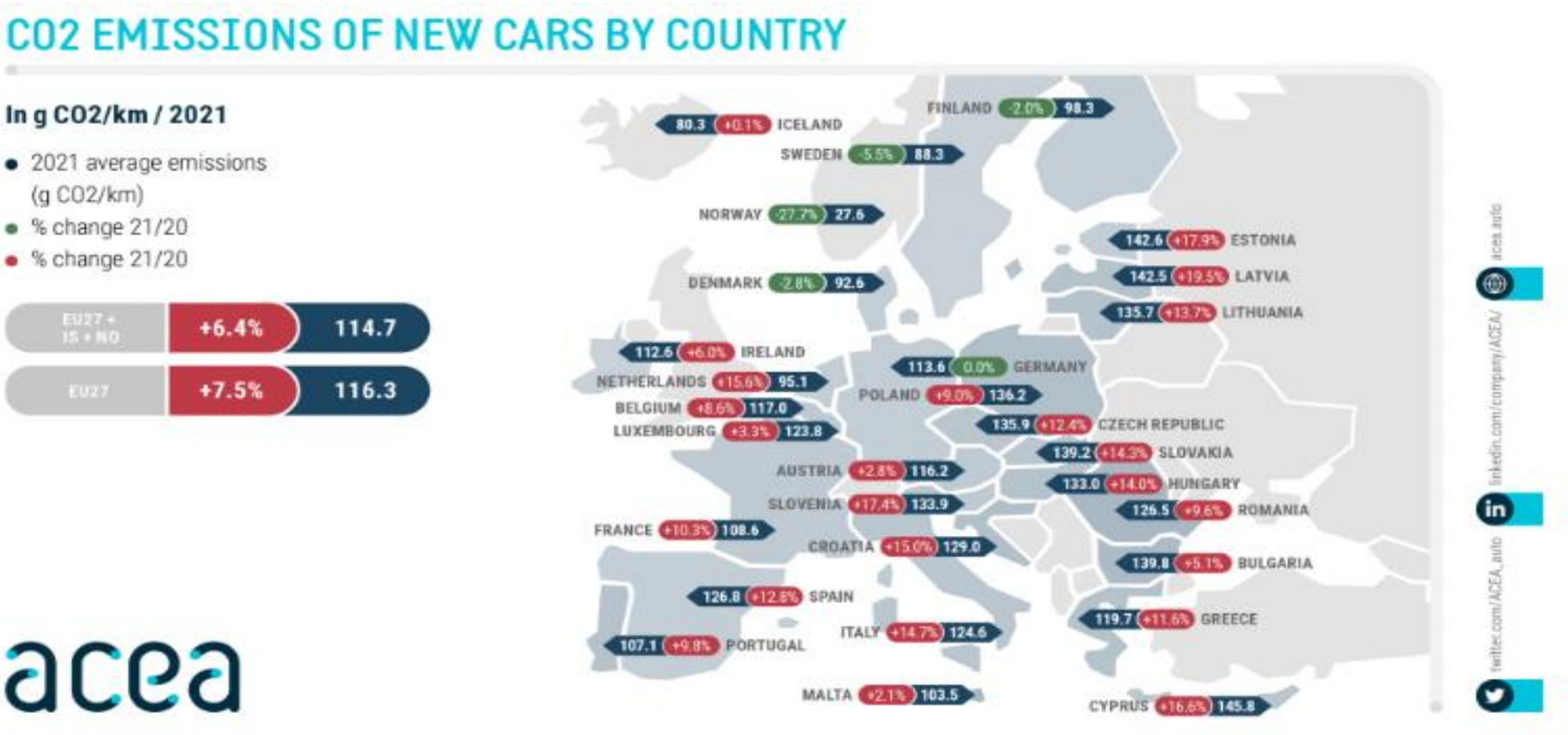

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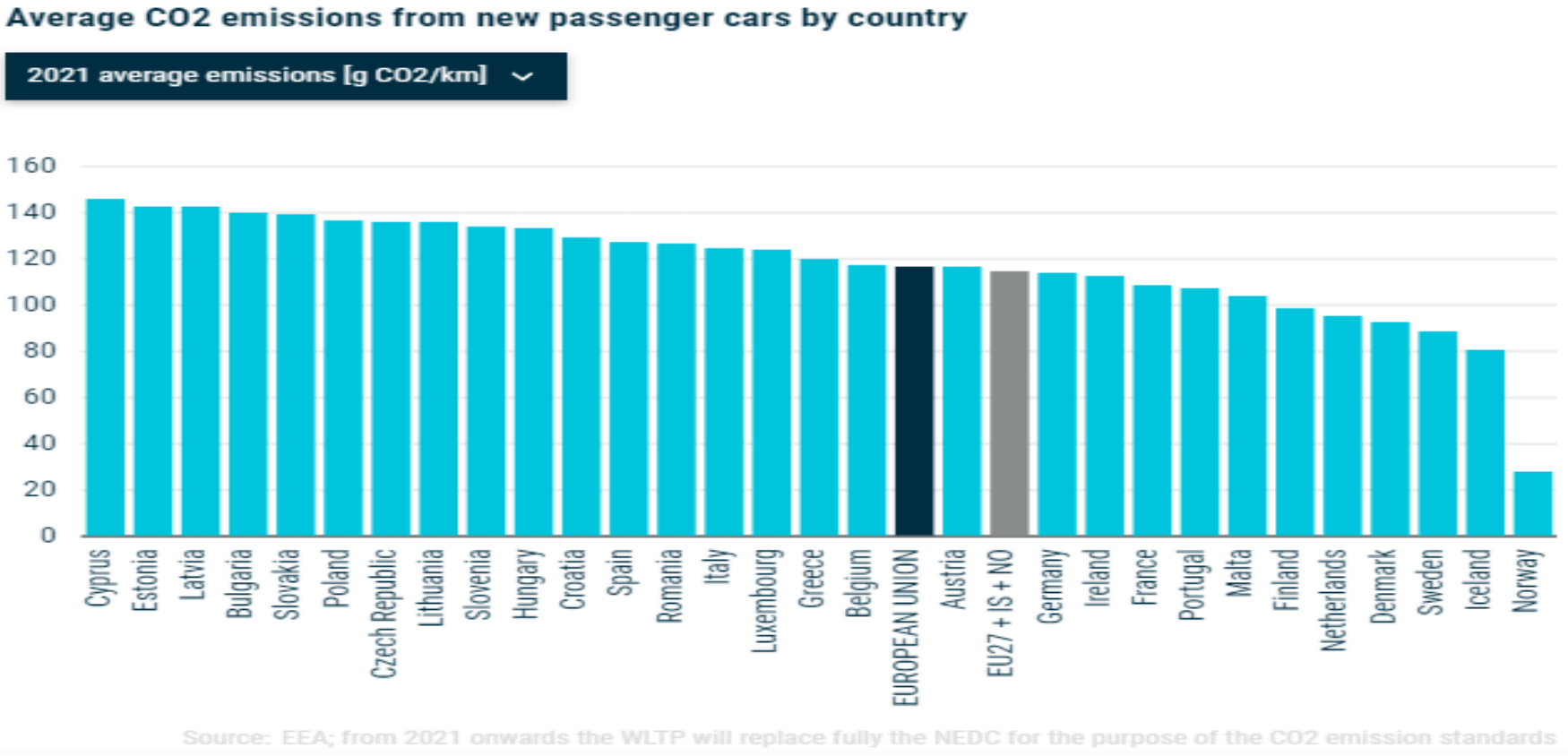
Euro 7

Sweden has the lowest average CO2 emissions from new cars in the EU (88.3g CO2/km), followed by Denmark (92.6g CO2/km) and the Netherlands (95.1g CO2/km). This page provides a detailed overview of the average CO2 emissions from new cars for each of the 27 EU member states, plus Iceland, Norway and the United Kingdom.



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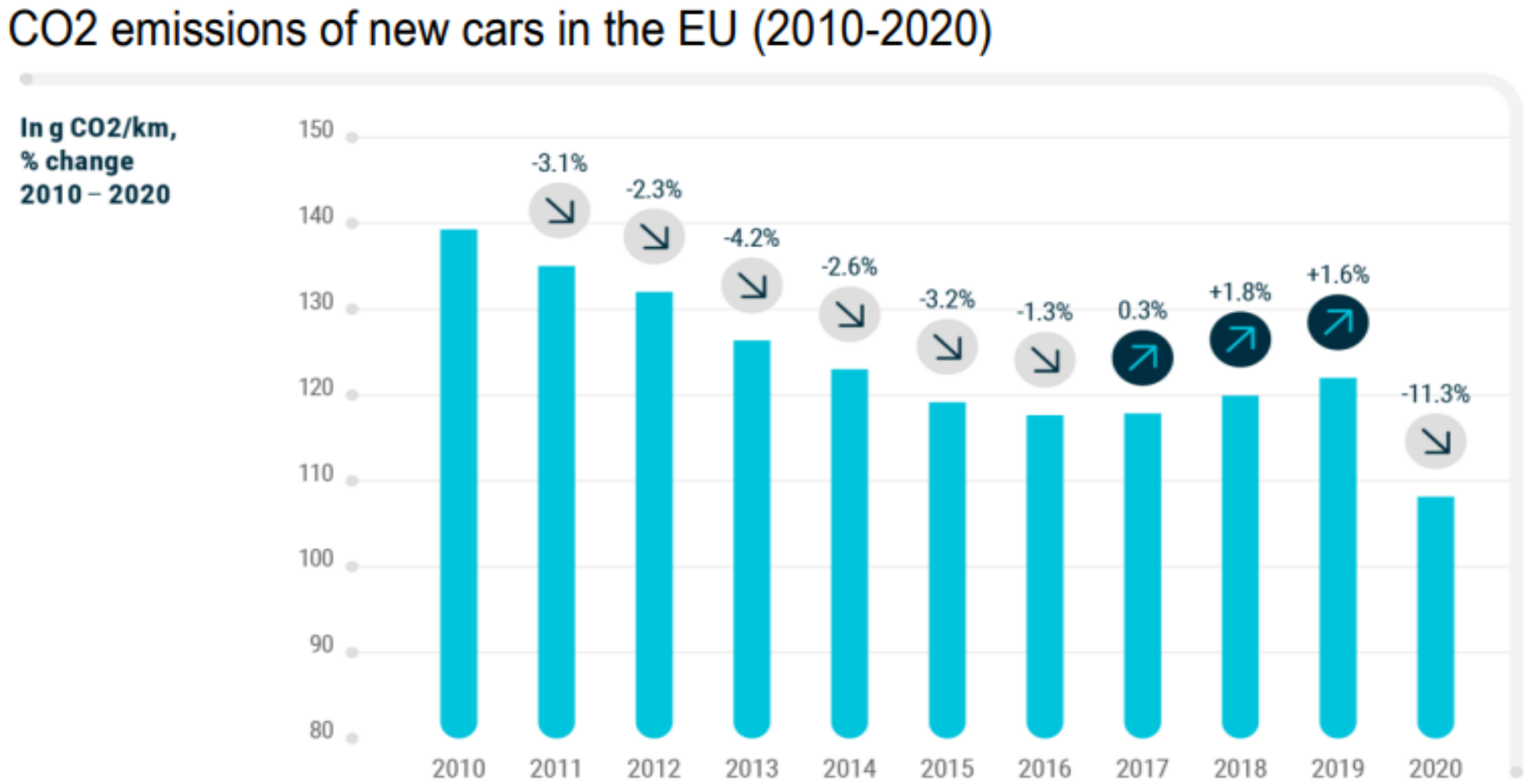

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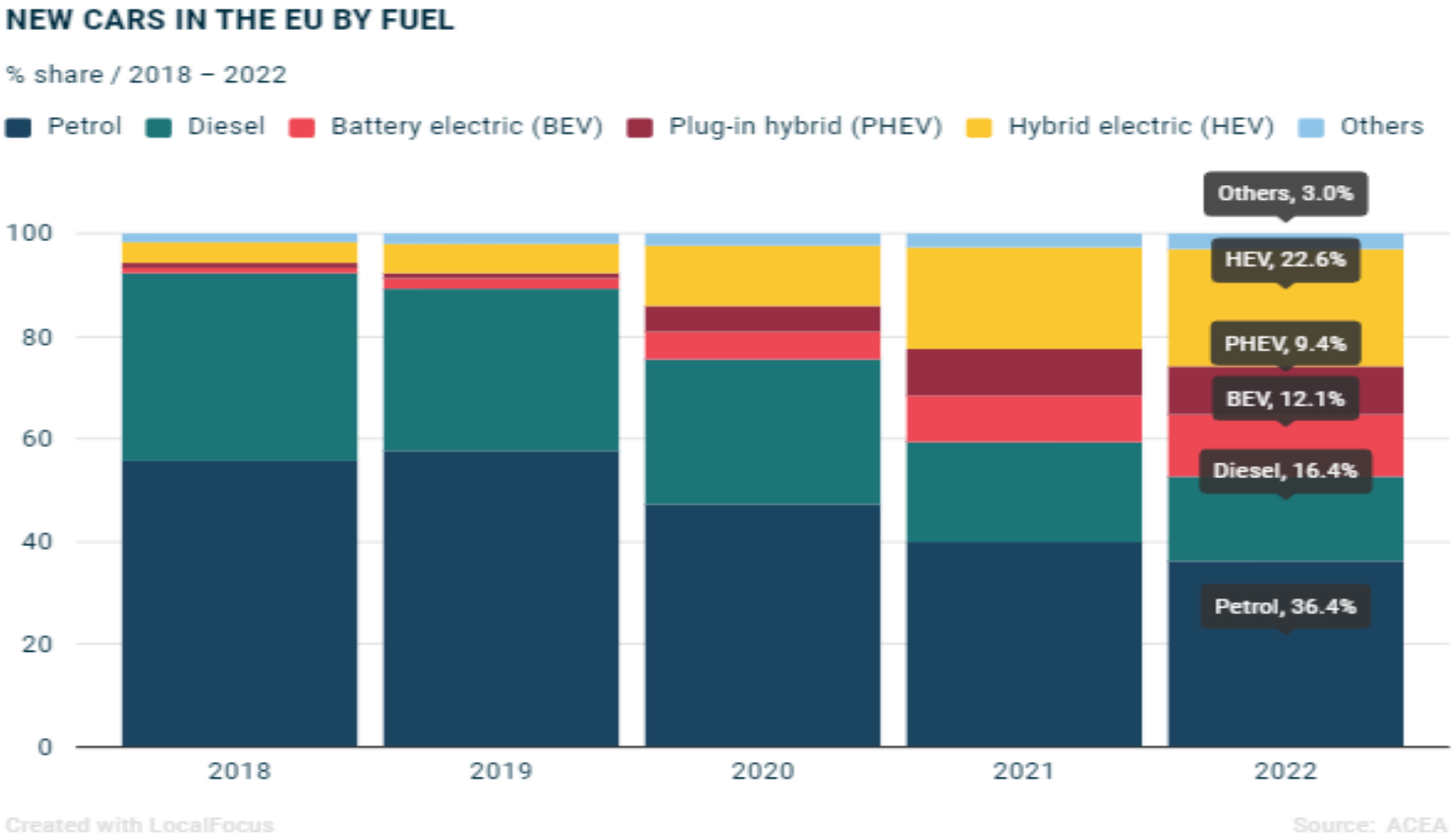
Euro 7

společně v automotive



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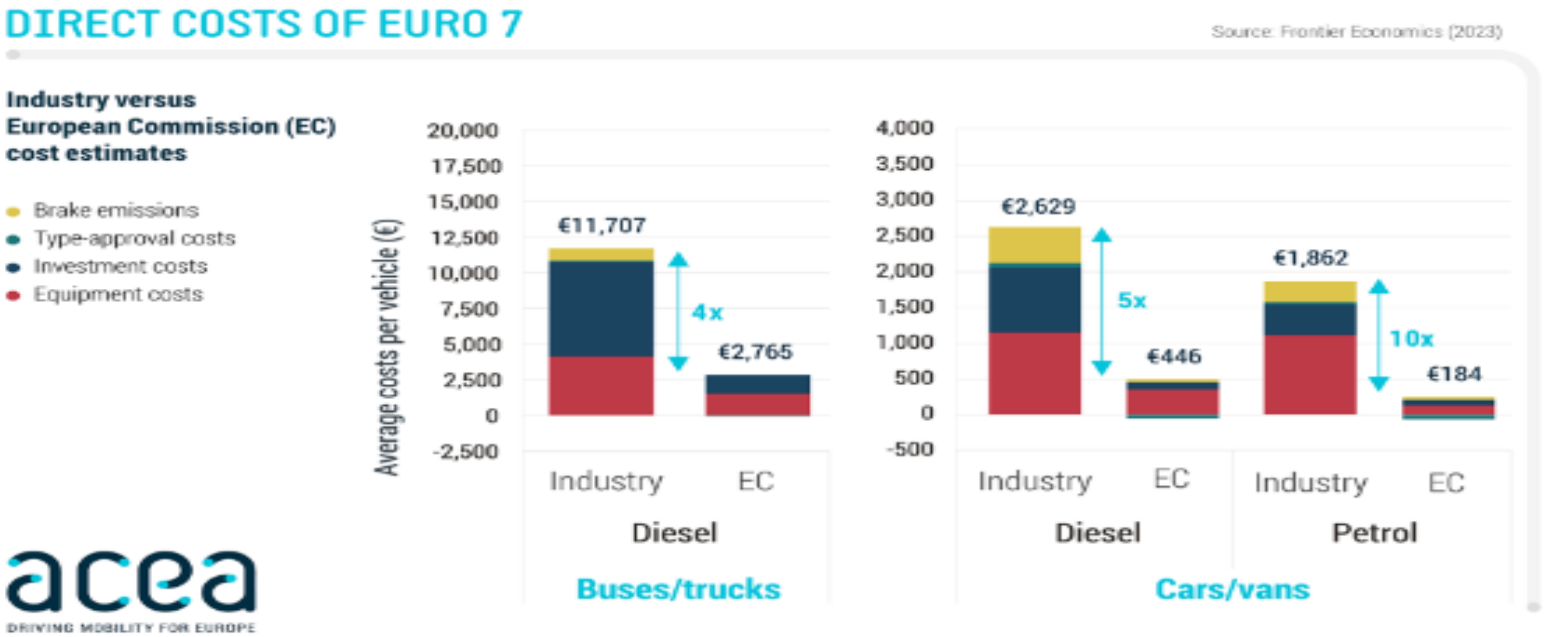
Euro 7: Direct costs 4 to 10 times higher than European Commission estimates, new study reveals



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Euro 7 - Estimated impact on small vehicles, e.g. Skoda

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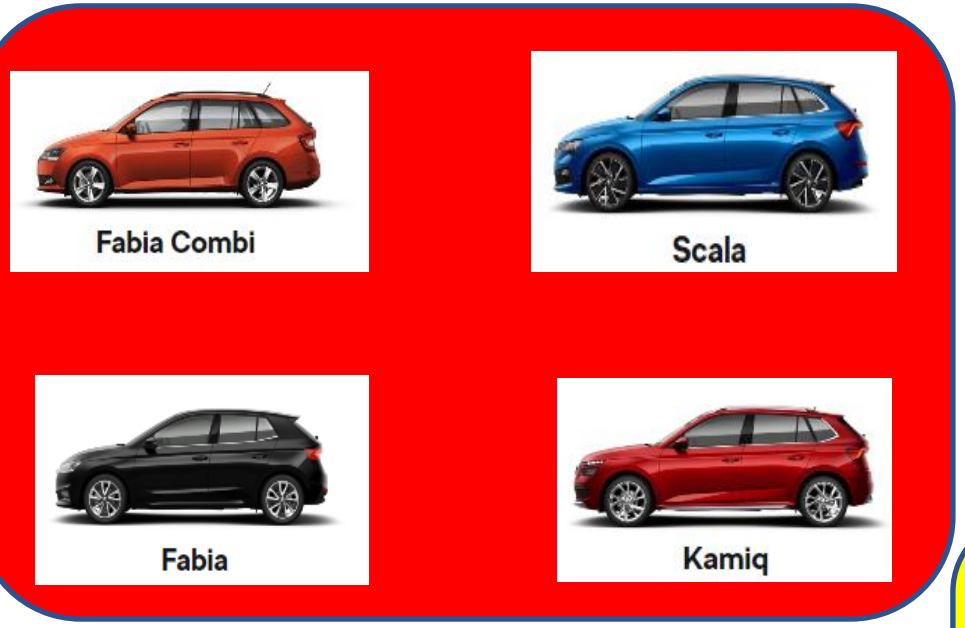

- EU commission says EUR 200-500 per vehicle
- OEMS assume the impact of EUR 2K - 4K per vehicle
- The results – small cars in A and B segment may disappear from the market (become too costly)

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Euro 7 – BAO plants, Engine plants, Motors plants

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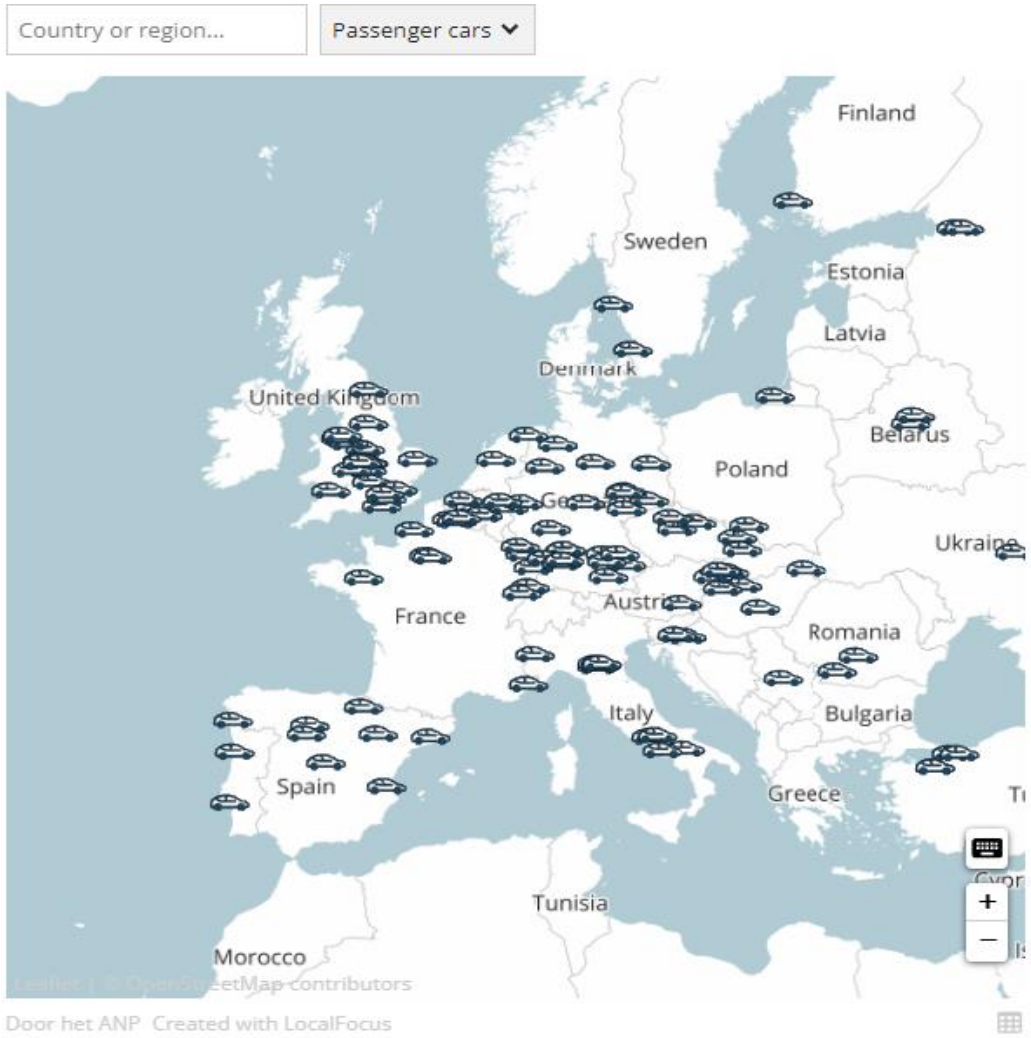

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Euro 7 – Battery plants

společně v automotive

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Euro 7 - EU autoindustry key facts

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ABOUT THE EU AUTOMOBILE INDUSTRY

- 12.6 million Europeans work in the auto industry (directly and indirectly), accounting for 6.6% of all EU jobs
- 11.6% of EU manufacturing jobs – some 3.5 million – are in the automotive sector
- Motor vehicles are responsible for €398.4 billion of tax revenue for governments across key European markets
- The automobile industry generates a trade surplus of €76.3 billion for the European Union
- The turnover generated by the auto industry represents more than 8% of the EU's GDP
- Investing €62 billion in R&D per year, automotive is Europe's largest private contributor to innovation, accounting for 33% of the EU total

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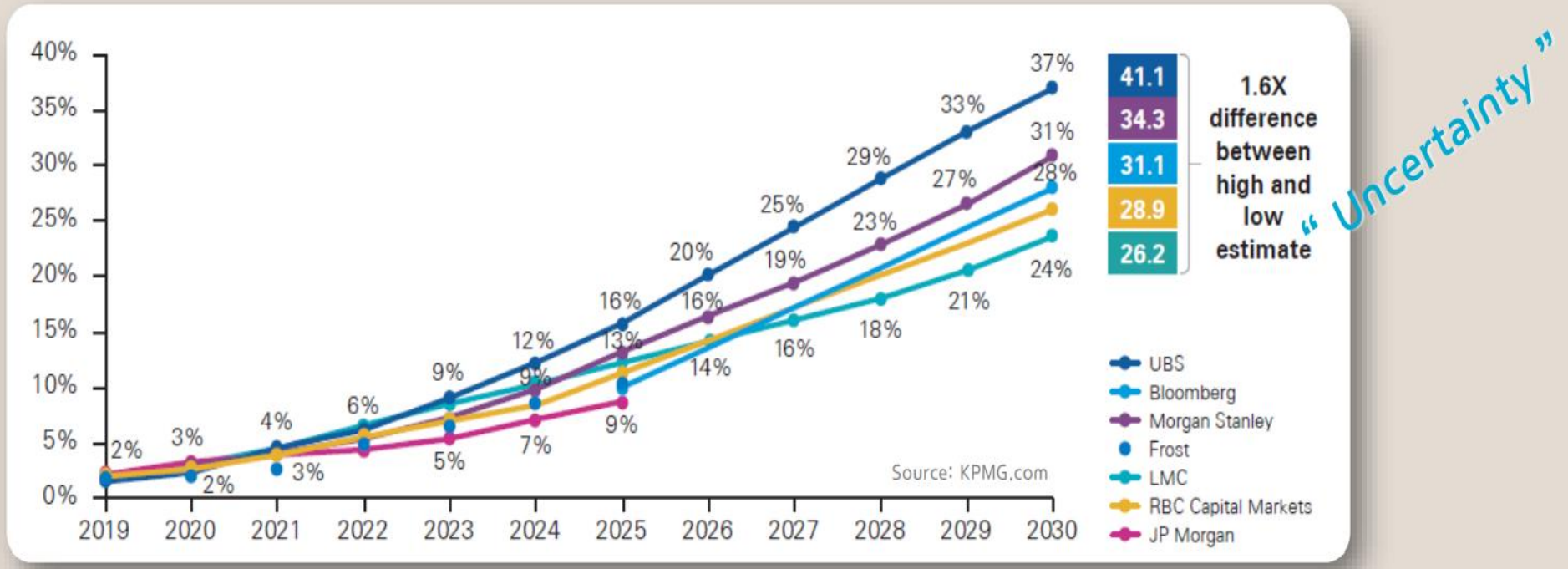
Future trends of the autoindustry vary by large extend

společně v automotive

Global EV Sales forecast – analyst's viewpoints

- Global EV Market Share for 2030 is expected to be between 24% and 37%
  → Considering the risks during the rapid EV growth, "Optimal PE sys. strategy" is needed



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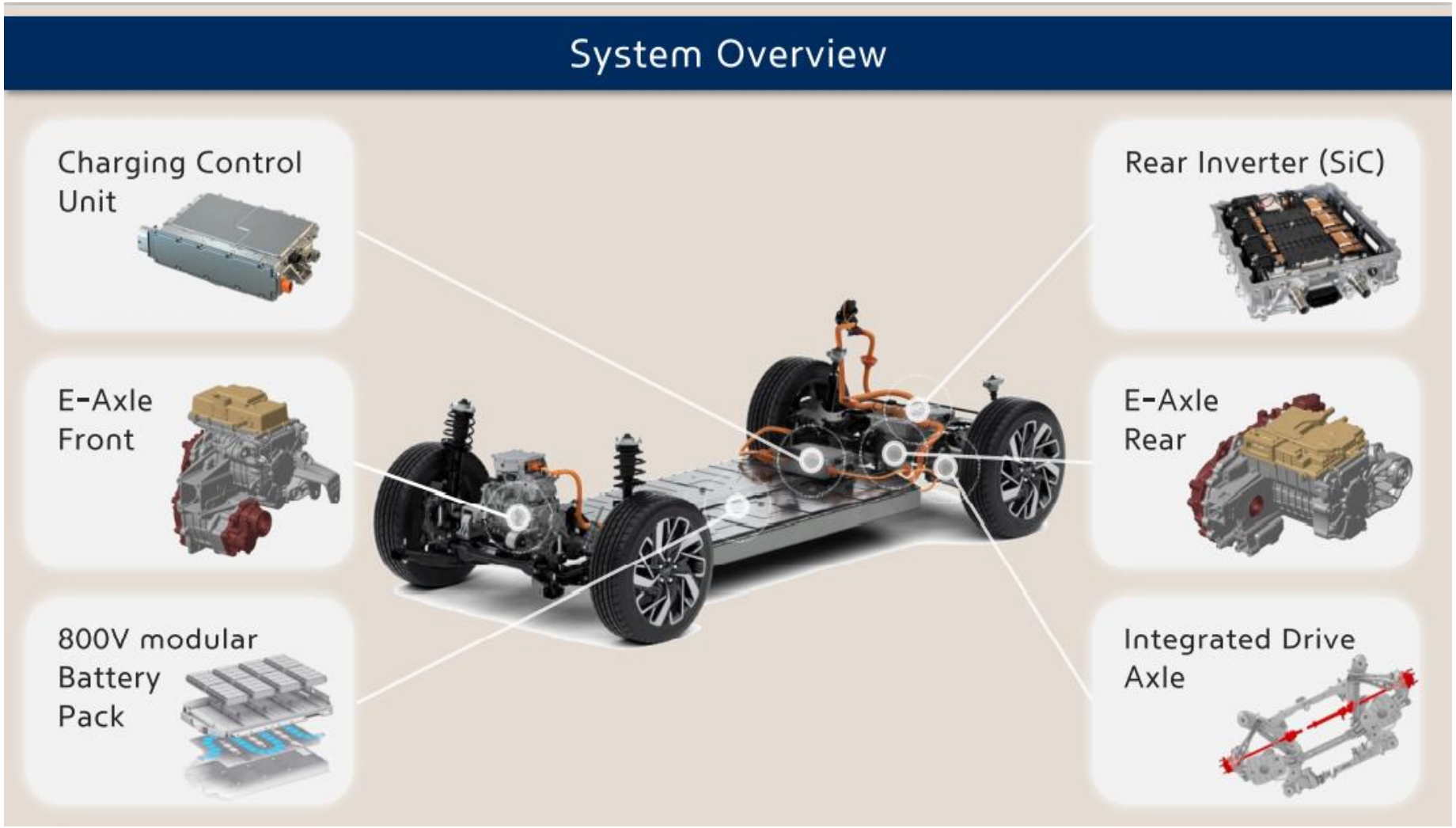
BEV platform example



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Alternative technologies – H2

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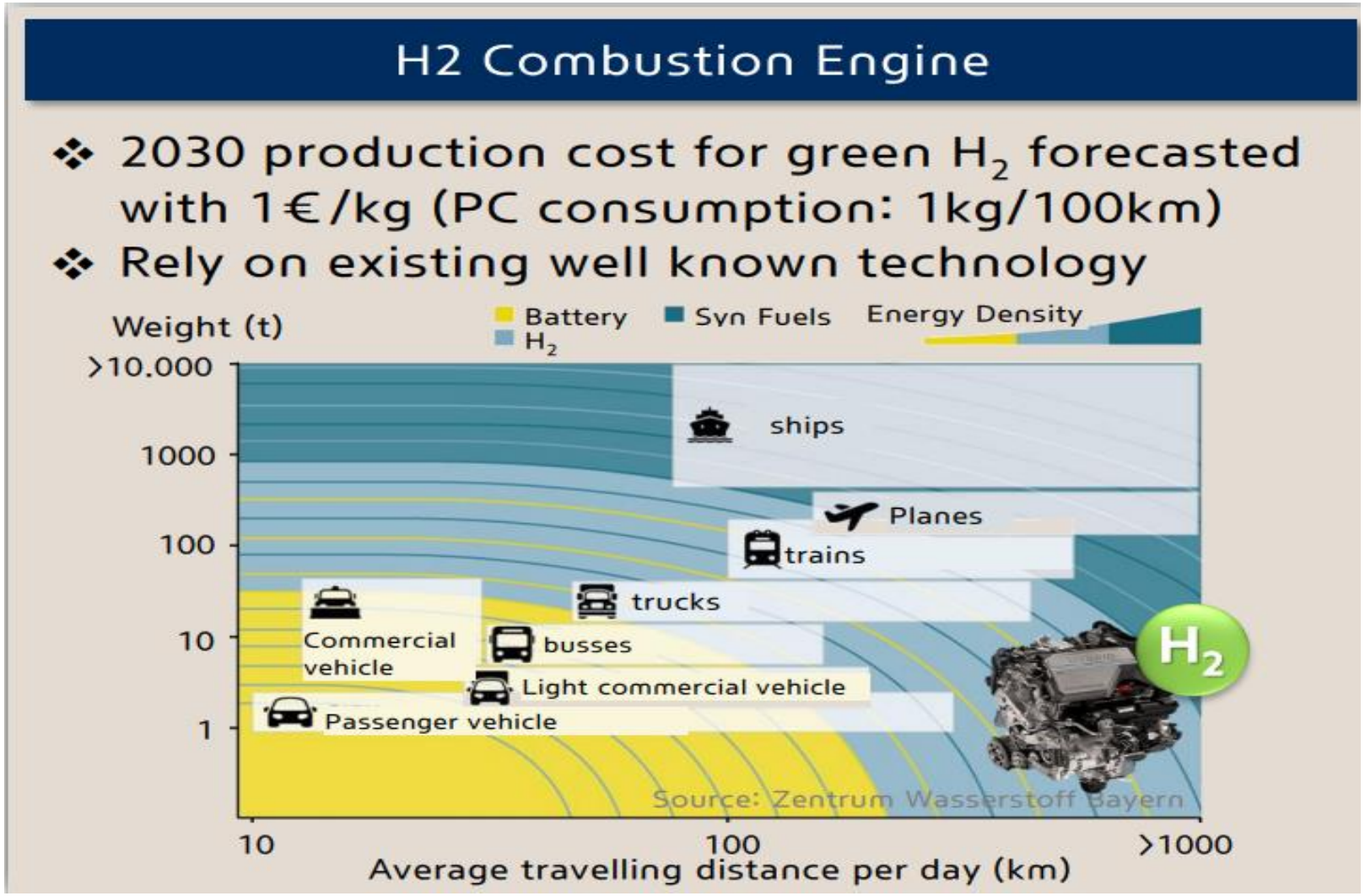

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Euro 7 - ACEA questions

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Euro 7

ACEA Euro 7 fact sheet # 1 (May 2023)

Significant progress has been made in the EU on reducing air pollution from vehicles, under the current Euro 6/VI standards. Euro 7 is unlikely to make much more of an impact, and may even be counterproductive as it risks slowing down fleet renewal.

Between 2014–2020, Euro 6/VI standards delivered a 25% cut in total nitrogen oxides (NOx) emissions from cars and vans on EU roads and a 36% cut from heavy-duty vehicles.

The impact of Euro 6/VI is being held back by the high proportion of older vehicles still in circulation. For instance, eight years after Euro VI, pre-Euro VI trucks still account for three-quarters of the total trucks on EU roads and 92% of NOx.

The Euro 7 proposal would only reduce road transport NOx emissions by less than 4% for cars and vans (compared to Euro 6 levels) and by about 2% for trucks. But it will entail significant human and financial resources.

Without tackling the older vehicles, Euro 7 will have a barely perceptible impact on road transport NOx emissions.

“

Between 2014–2020, Euro 6/VI standards delivered a 25% cut in total NOx emissions from cars and vans on EU roads and a 36% cut from heavy-duty vehicles.

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Euro 7

ACEA Euro 7 fact sheet # 2 (May 2023)

All the auto industry's investments are geared towards decarbonising road transport, which will enable us to reach climate neutrality and tackle air quality. The Euro 7 proposal risks making the green transition a more distant prospect.

The European auto industry is investing maximum manpower and capital to improve zero-emission technologies, investing over €250 billion in electrification.

Electrification, alongside the development of alternative fuels, is the most efficient way to reduce CO2 emissions from road transport.

It is also by far the most effective way to minimise pollutant emissions and therefore improve air quality. The European auto industry urgently needs a streamlined, holistic approach to the massive zero-emissions transition.

> The European auto industry is investing maximum manpower and capital to improve zero-emission technologies, investing over €250 billion in electrification.

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Euro 7

ACEA Euro 7 fact sheet # 3 (May 2023)

The Euro 7 proposal is a complicated and costly reform. It will lead to higher prices for consumers and operators, who risk holding on to their older, more polluting vehicles for longer. This would be detrimental to the environment and disruptive for vehicle manufacturers.

It would pose significant costs to the European automotive industry, logistics companies, and consumers, thereby damaging an already fragile European economy.

In fact, the Euro 7 proposal is likely to increase the average purchase price of a new car by €2,000.

Complying with Euro 7 will mean increased costs to:

- reflect all the additional research, development, production, and testing expenses;
- cover major new test facilities; and
- account for the much wider boundary conditions in the new Euro 7 tests, requiring additional onroad testing, complemented by new, in-lab Real Driving Emissions (RDE) test simulations.

> “
>
> The Euro 7 proposal is likely to increase the average purchase price of a new car by €2,000.

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Euro 7

ACEA Euro 7 fact sheet # 4 (May 2023) PDF

Rather than simply updating the Euro 6/VI regulations, the Euro 7 proposal is much more stringent for cars and vans, and it is a complete overhaul for trucks – entailing billions of euros of investment.

Euro 7 is not a simple 'update' of the previous euro 6/VI regulations, but significantly strengthens the rules for cars and vans. For heavy-duty vehicles, it is a complete overhaul with increased stringency on both exhaust emissions limits and tests.

Euro 7 testing proposals are unrealistic as they extend the on-road test conditions into statistically irrelevant – and not everyday – driving situations.

On the other hand, Euro 6 testing conditions are delivering for cars, vans and trucks. Euro 6/VI covers over 95% of statistically possible on-road driving events and conditions. The Euro 6/VI regulations deliver vehicles with extremely low exhaust pollutant emissions where it counts – on the road.

Going back to the effective Euro 6 testing conditions would allow manufacturers to focus on delivering more ambitious emission reductions rather than compliance with new extreme and statistically irrelevant testing conditions.

> **Euro 6/VI covers over 95% of statistically possible on-road driving events and conditions. It delivers vehicles with extremely low exhaust pollutant emissions where it counts – on the road.**

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Euro 7

ACEA Euro 7 fact sheet # 5 (May 2023)

The EU already has one of the most comprehensive and stringent approaches to pollutant emissions globally. State-of-the-art technology means that exhaust emissions are barely measurable.

The latest standards – Euro 6/VI – were introduced from 2014. Since then, extra steps have been taken as part of Euro 6 for cars and vans to further reduce nitrogen oxides (NOx) and particle pollutant emissions under real driving conditions. Emissions measured on the road using portable emission measuring systems (PEMS) are now at a barely measurable level. Euro VI strengthened particle number (PN) limits and expanded the test conformity procedures, also delivering low emissions.

China, Japan, and the United States also have regulations to reduce vehicle emissions, but they are not as strict as those in the EU.

For example, the US approach is less stringent than the EU's in a number of instances:

- Emission limit values achieved by vehicles in the US are measured under controlled lab tests, not under the variability of on-road driving.
- Limits are based on the average number of new cars sold by manufacturers, rather than applying to every single vehicle sold, as is the case in the EU.
- The US has no limits for emissions of ultra-fine particles.

> "The severity of pollutant emissions standards is about much more than numbers on paper or tests in a lab. Its effectiveness should ultimately be measured by how a vehicle performs on the road.

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Euro 7

ACEA Euro 7 fact sheet # 6 (May 2023)

The European auto industry needs proper lead time to develop and implement emission reduction technologies in new vehicles. In its current form, the Euro 7 proposal contains unrealistic timelines from an engineering point of view.

Euro 7 is unlikely to be adopted before the end of 2024. The new regulations would come into force in July 2025 for cars and vans and July 2027 for trucks. This would only leave a few months for new cars to comply with extremely stringent new regulations. At least three years lead time is required for such major changes.

The proposal does not provide sufficient lead time to develop, engineer, test, and type approve all combustion engine and electric vehicle models and variants addressed by Euro 7.

Type-approval authorities would not have the capacity to handle the expected surge in approval requests. This would effectively lead to a halt in sales for many vehicles.

The shorter the lead time, the higher the vehicle cost increase will be, because of short-term limited supplier capacity.

> “
> The new regulations would come into force in July 2025 for cars and vans and July 2027 for trucks. This would only leave a few months for new cars to comply with extremely stringent new regulations.

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Euro 7

ACEA Euro 7 fact sheet # 7 May 2023

Europe's auto industry is a leading driver of EU economic growth. The Euro 7 proposal means that certain vehicle models and segments could no longer be produced in the EU, risking progress on the industry's green transition.

The Euro 7 proposal risks slowing down the transition to zero-emission transport, which will enable the EU to reach its ambitious climate goals and at the same time improve air quality.

Significant levels of investment are needed to comply with the Euro 7 proposal's unrealistic deadlines. The negative economic impact will harm the global competitiveness of the EU auto industry.

Other major economic regions are establishing an attractive investment environment for the transport industry. Instead of regulation, they are incentivising their way to zero emissions. The Euro 7 proposal comes at a time when the US is establishing a policy framework to accelerate the transition to fossil-free alternatives.

Europe needs a streamlined and holistic EU strategy that incentivises substantial investment in zero-emission transport in Europe and made in Europe.

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EVROPSKÁ UNIE
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Thank you very much for your attention.

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