



CO2 emissions from road transport & Impact on battery development and manufacturing

**Ir. Stefaan Vergote
Advisor DG CLIMA
European Commission**

**EUROBAT General Forum
Brussels, 15 June 2018**



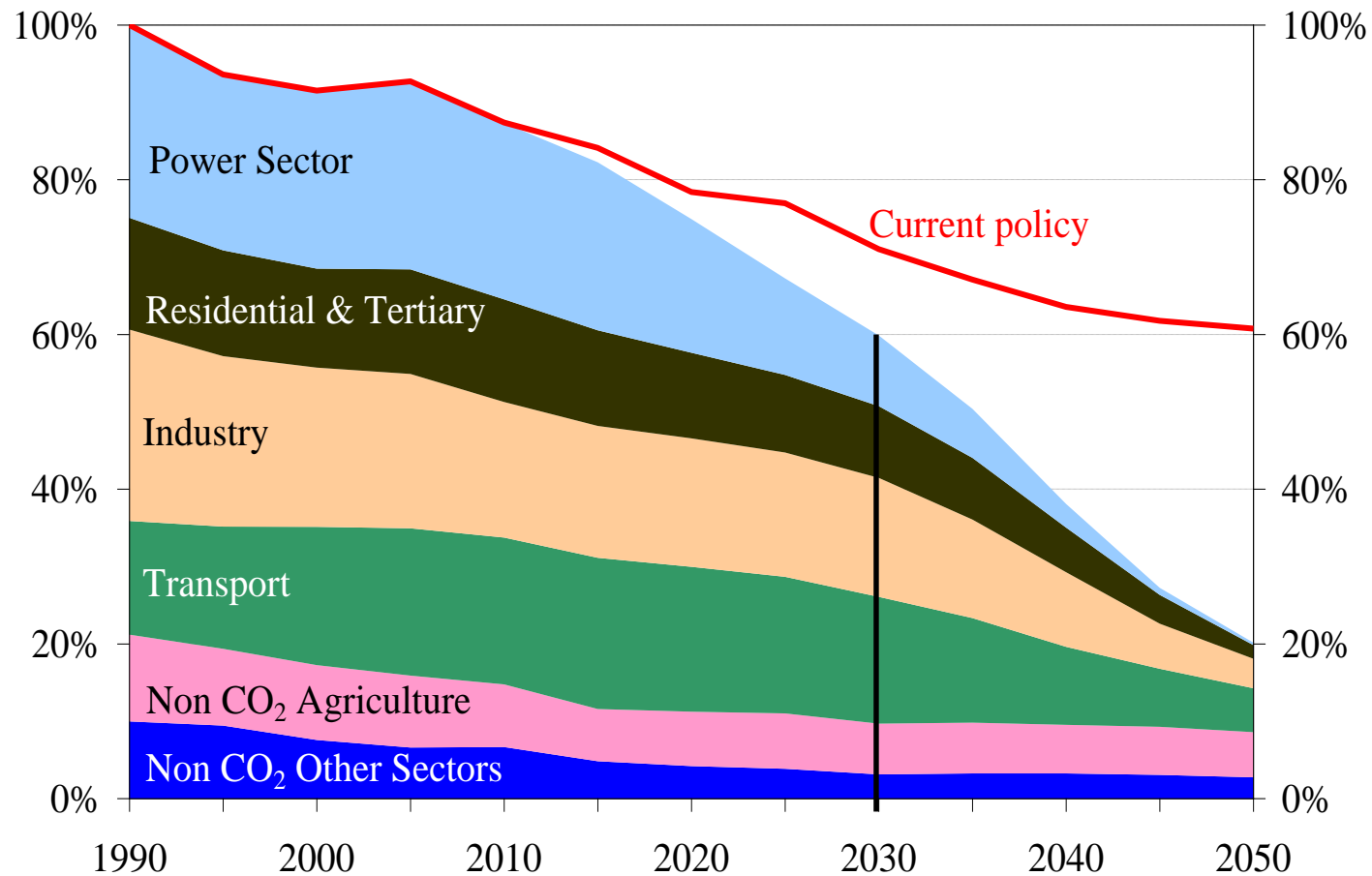
- 0. A long term system perspective on the low carbon transition*
- 1. Proposal for CO2 standards for cars and vans (2025/2030)*
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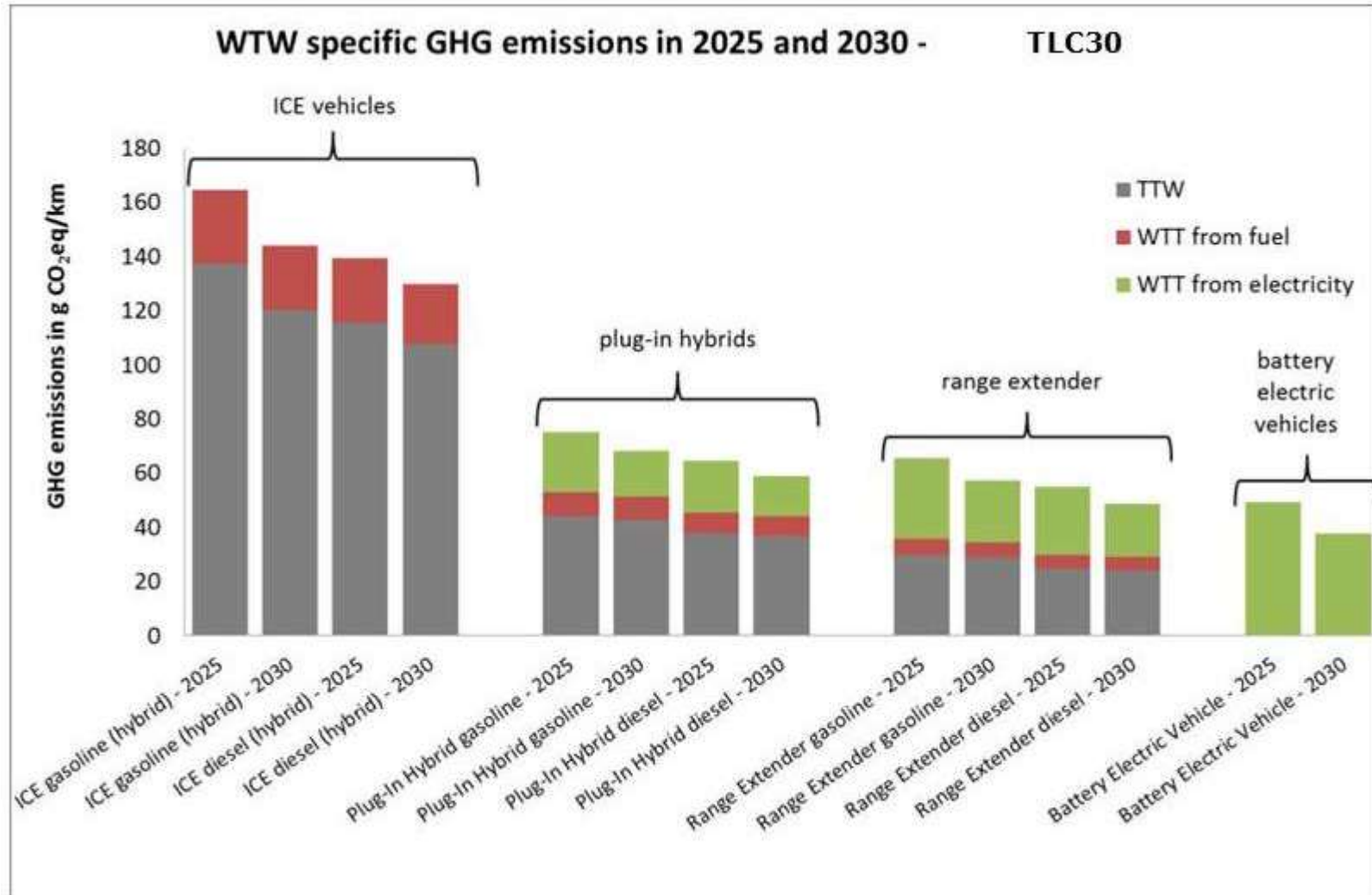


0. A long term system perspective on the low carbon transition

Transition to a low-carbon EU economy in 2050

(greenhouse gas emissions by sector over time as % of 1990 levels)



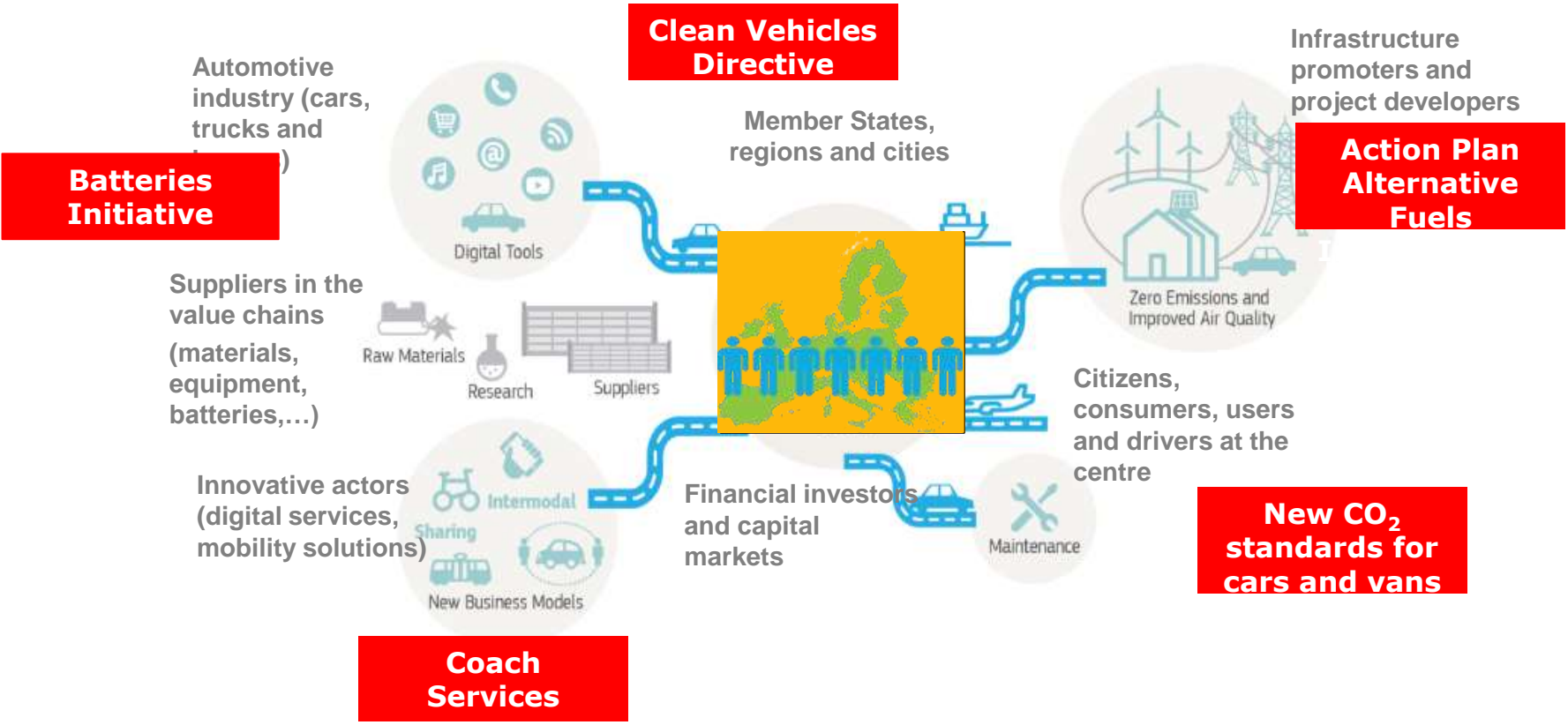




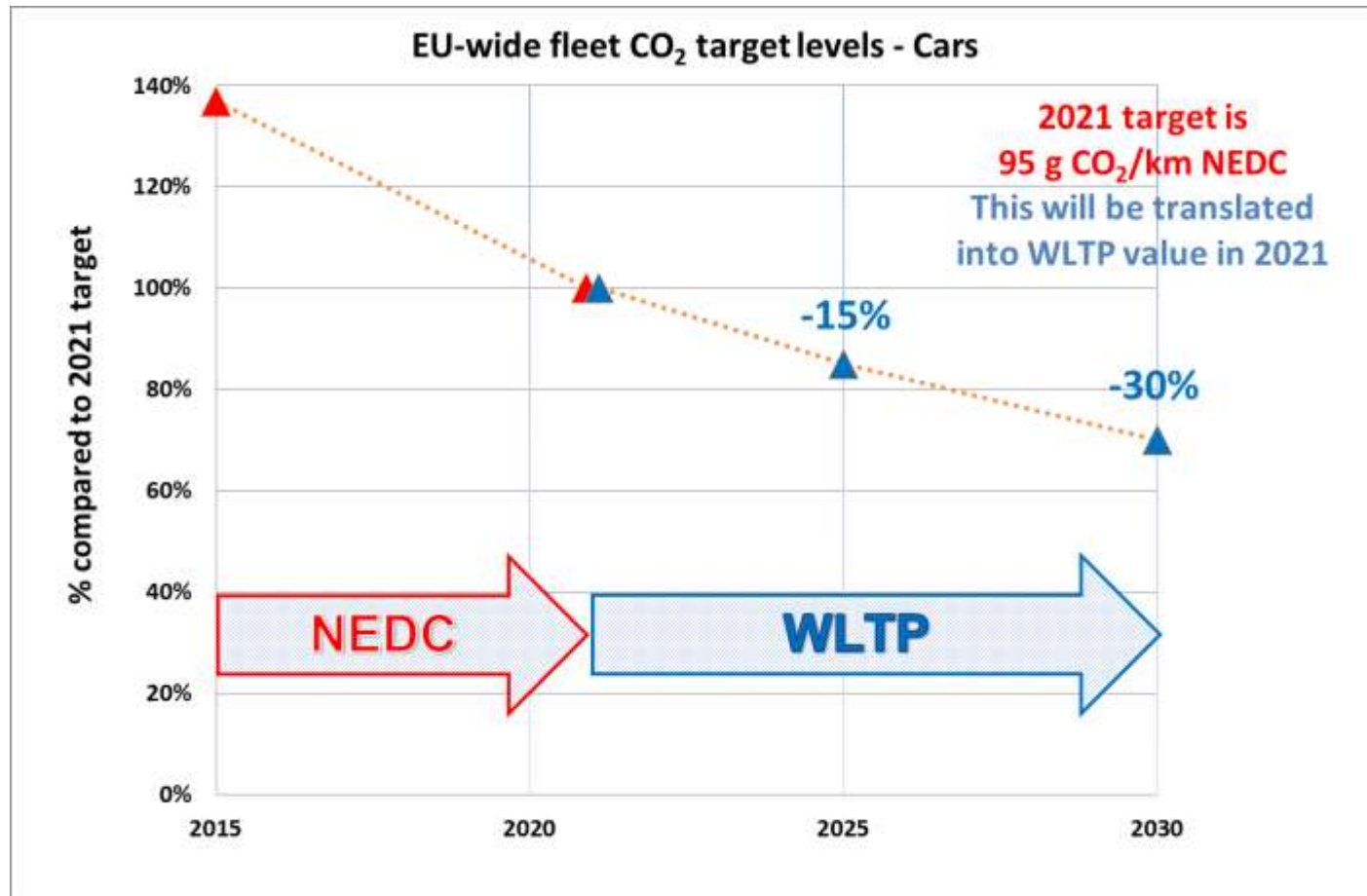
2. Proposal for CO₂ standards for cars and vans (2025/2030)

The Clean Mobility Package,

8th November 2017



New EU fleet-wide 2025 and 2030 targets - cars





Incentive mechanism for ZEV /LEV

- **Technology neutral and rewarding best performers**
- Vehicles with CO₂ tailpipe emissions between 0 - 50 g CO₂/km
- Manufacturers with ZEV/LEV fleet share above **benchmark (15% in 2025 and 30% in 2030)** will benefit from a less stringent CO₂ target - "exchange rate" of 1%/1% with maximum 5% increase of CO₂ target
- ZEV counted as one; LEV counted according to CO₂ emissions



Expected effects on new fleet composition and battery demand (LDV's)

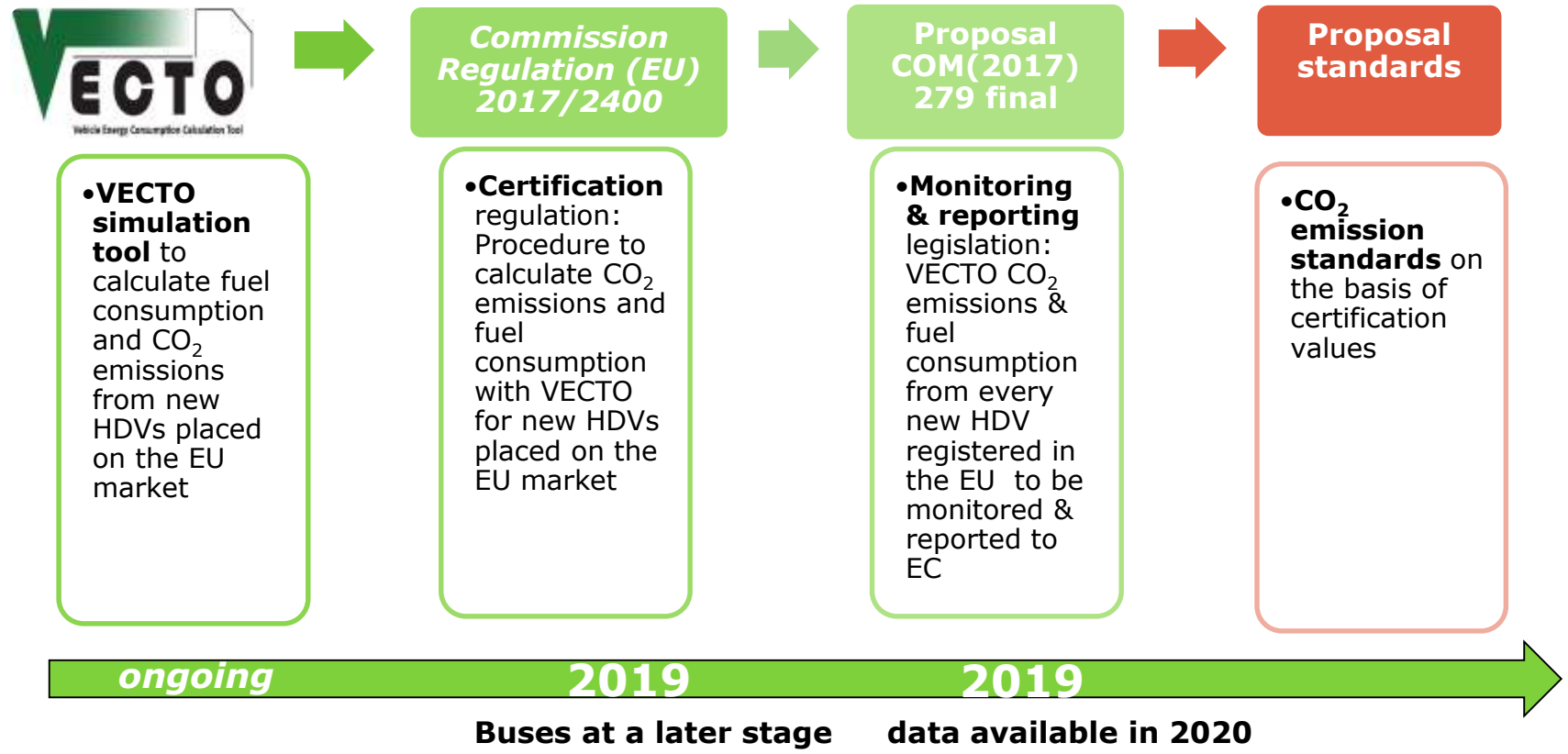
- Gradual hybridisation of ICE's
- but also need for ZLEV's (BEV, PHEV) to meet 2025/2030 target
 - 2025: 10-20% of the automotive market
 - 2030: 20-40% of the automotive market
- Estimated battery demand
 - 2025: > 66GWh
 - 2030: >140GWh



2. Proposal for CO₂ emissions of HDV's

Regulating CO₂ emissions from heavy duty vehicles

step-wise approach



Scope of the upcoming CO₂ standards (1st phase)

AXLES	MISSION PROFILES	
	Regional delivery	Long Haul
4x2 rigid		
4x2 tractor		
6x2 rigid		
6x2 tractor		

4 Groups of vehicles covered under certification

Largest lorries accounting 65-70% of total heavy duty vehicles emissions



Targets, metric and timing

- Mandatory EU fleet-wide target for **2025: 15%** reduction of CO₂ emissions compared to 2019 levels
- Aspirational EU fleet-wide target for **2030: at least 30%** reduction of CO₂ emissions versus 2019 levels
- **Tailpipe** based approach; whole vehicle standards
- Metric: g CO₂/t km
- **Early review in 2022** to (1) determine 2030 target (2) review scope in order to include other lorries, buses, coaches, trailers (3) assess modalities, e.g. ZLEV incentives

Incentives for zero- and low- emissions vehicles (ZEV/LEV)

- **Definition of ZEV:** no internal combustion engine or engine emitting less than 1 g/kWh or 1 g/km (impurities in case of H₂ combustion); also covers buses, coaches and smaller lorries
- **Definition of LEV:** HDVs in the 4 groups emitting less than 350 g/km (i.e. about half of average fleet emissions)
- **Super-credits**
 - Each ZEV counted multiple times (x2)
 - Each LEV counted between 2 and 1 according to their emissions
 - 3 % cap on maximum decrease of emissions => *sufficient safeguards preventing a weakening of the CO₂ targets*
 - 1.5% sub-cap for buses, coaches and smaller lorries => *not to distort market*

Limited use of zero and low-emission vehicles in the HDV sector

Manufacturers	Planned release year	Announcements ZEV/LEV
Daimler	2021	Light and large lorries (>18 tons)
Volvo/Renault	2019	Municipal utility / urban delivery (>16 tons)
Iveco	n.a.	Presented a long-haul concept lorry in 2016
Man	2021	Large lorries (18 to 36 tons)
Scania	2019	Large lorries for regional delivery
Nikola Motor	2019	Lorries
Cummins	2019	Buses and delivery vehicles
BYD	2019	EU market: light lorry (7.5 tons)
		China market: broader range with larger lorries, construction and garbage vehicles
Tesla	n.a.	500 to 800 km range zero emission lorries
Siemens	On-going	Catenary infrastructures for battery electric large lorries, possibly with internal combustion engines



3. Clean Vehicles Directive



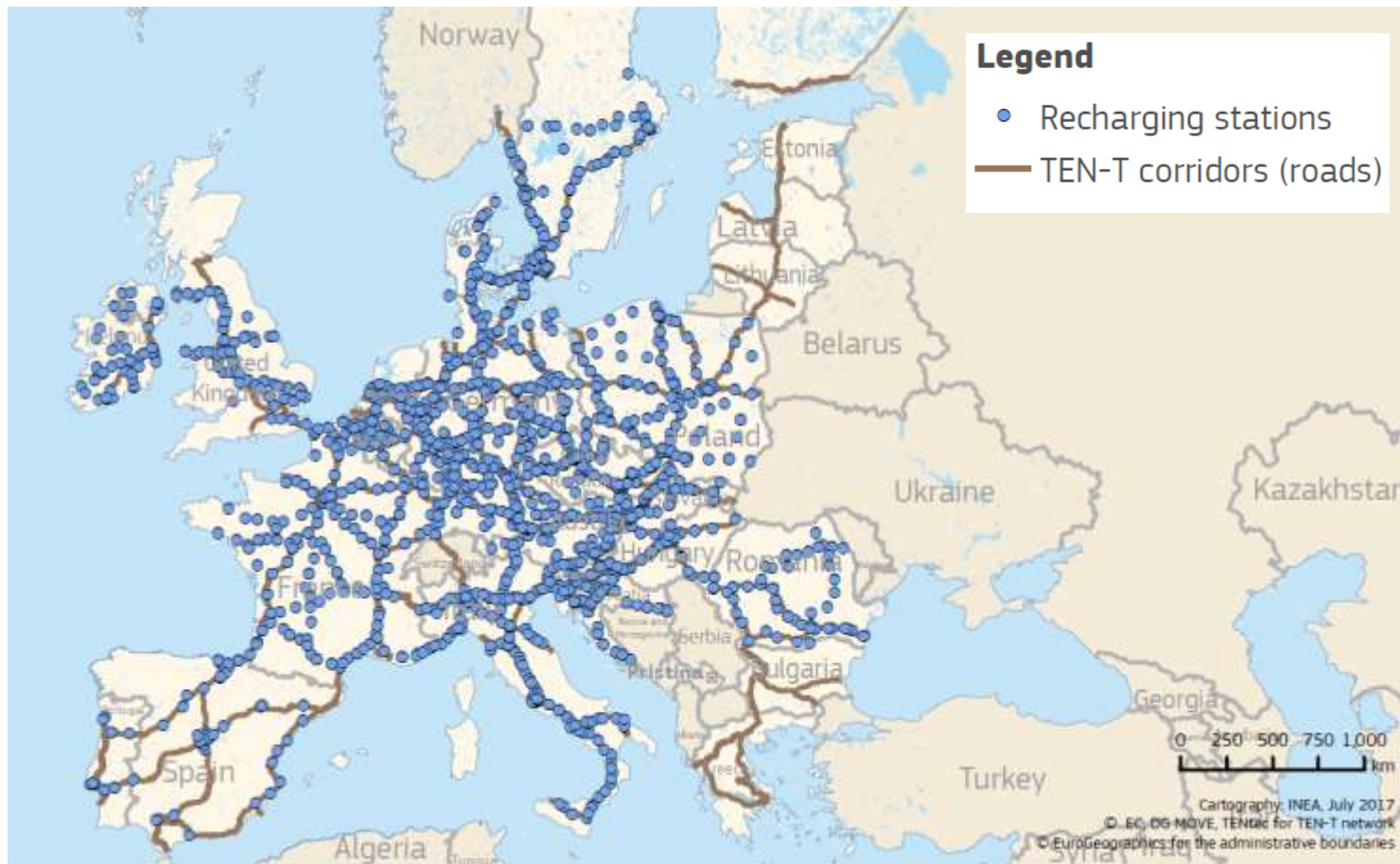
Clean Vehicles Directive

- The general objective of this initiative is to accelerate the public procurement of clean vehicles in the Union
- applies to contracts for the purchase, lease, rent or hire-purchase of road transport vehicles
- Definition of Clean Vehicle:
 - Cars 25g CO₂/km in 2025(+ air pollution RDE limit) , 0g/km in 2030
 - Busses with alternative fuels (Electricity, hydrogen, natural gas including CNG, LNG, biomethane)
- Minimum procurement targets
differentiated by GDP per capita and population density



4. Alternative Fuels Infrastructure Action Plan

Action Plan Alternative fuels – Financing EV infrastructure along EU highways





5. Strategic Battery Action Plan



Strategic Action Plan on Batteries

1. Securing the sustainable supply of raw materials
2. Supporting European projects covering different segments of the battery value chain, including cells manufacturing
3. Strengthening industrial leadership through stepped-up EU research and innovation support covering the full value chain
4. Developing and strengthening a highly skilled workforce in all parts of the value-chain
5. Supporting a sustainable battery value chain – ie requirements for safe and sustainable batteries production - as a key driver for EU competitiveness
6. Ensuring consistency with the broader enabling and regulatory framework



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