



ENERGY TRANSITION STRATEGY OF THE LOGISTIC SECTOR

Claude Turmes - Minister for Energy



LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Énergie et de
l'Aménagement du territoire

Département de l'énergie



National objectives 2020 - 2030

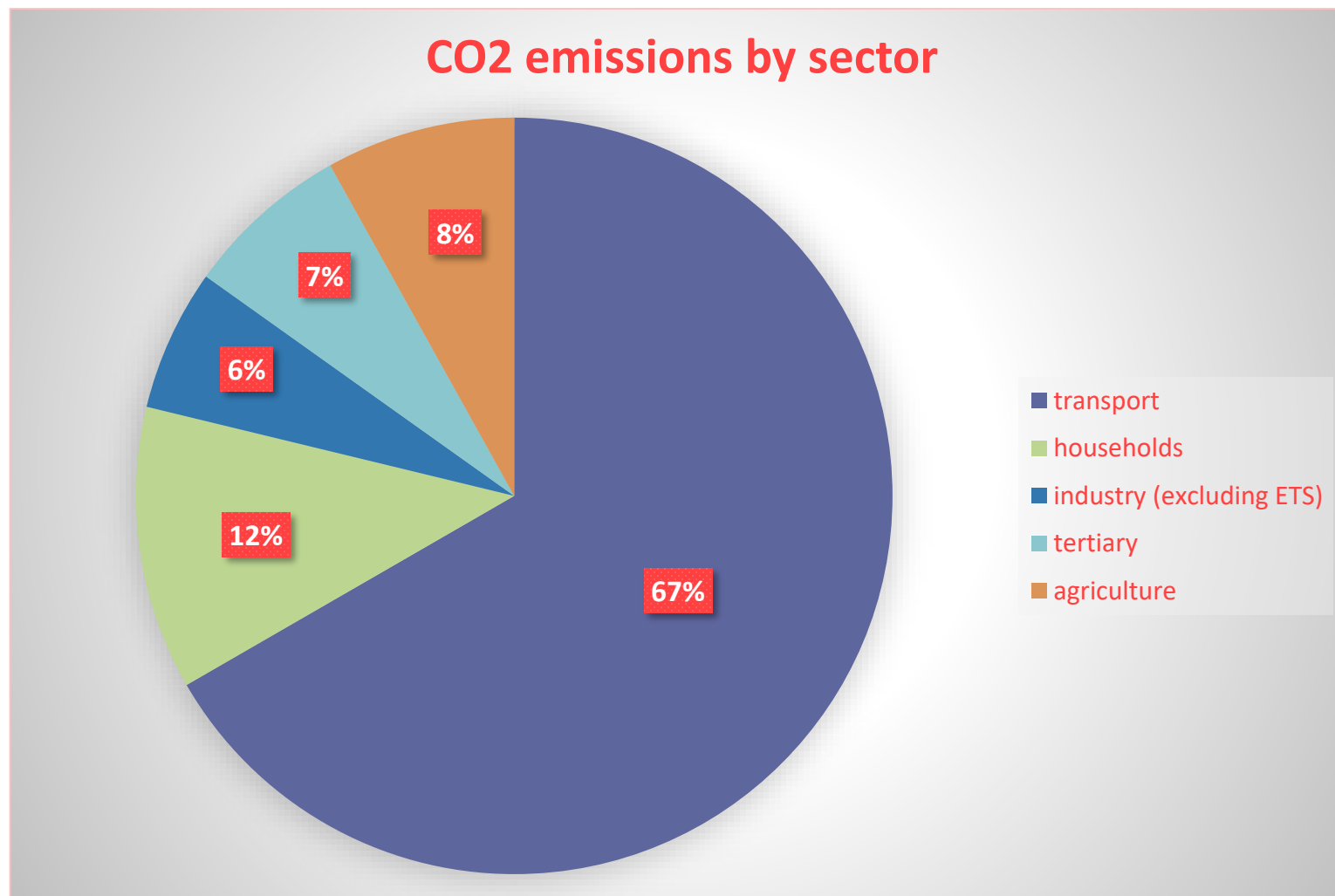
	2020 (for comparison)	2030 (PNEC)
Greenhouse gas emissions ¹	-20%	at least -55%
Renewable energies	11%	at least 25%
Energy efficiency ²	+20%	+40% - +44%

1: objectives compared to 2005 (excluding ETS)

2: objectives relative to EU-PRIMES for LU

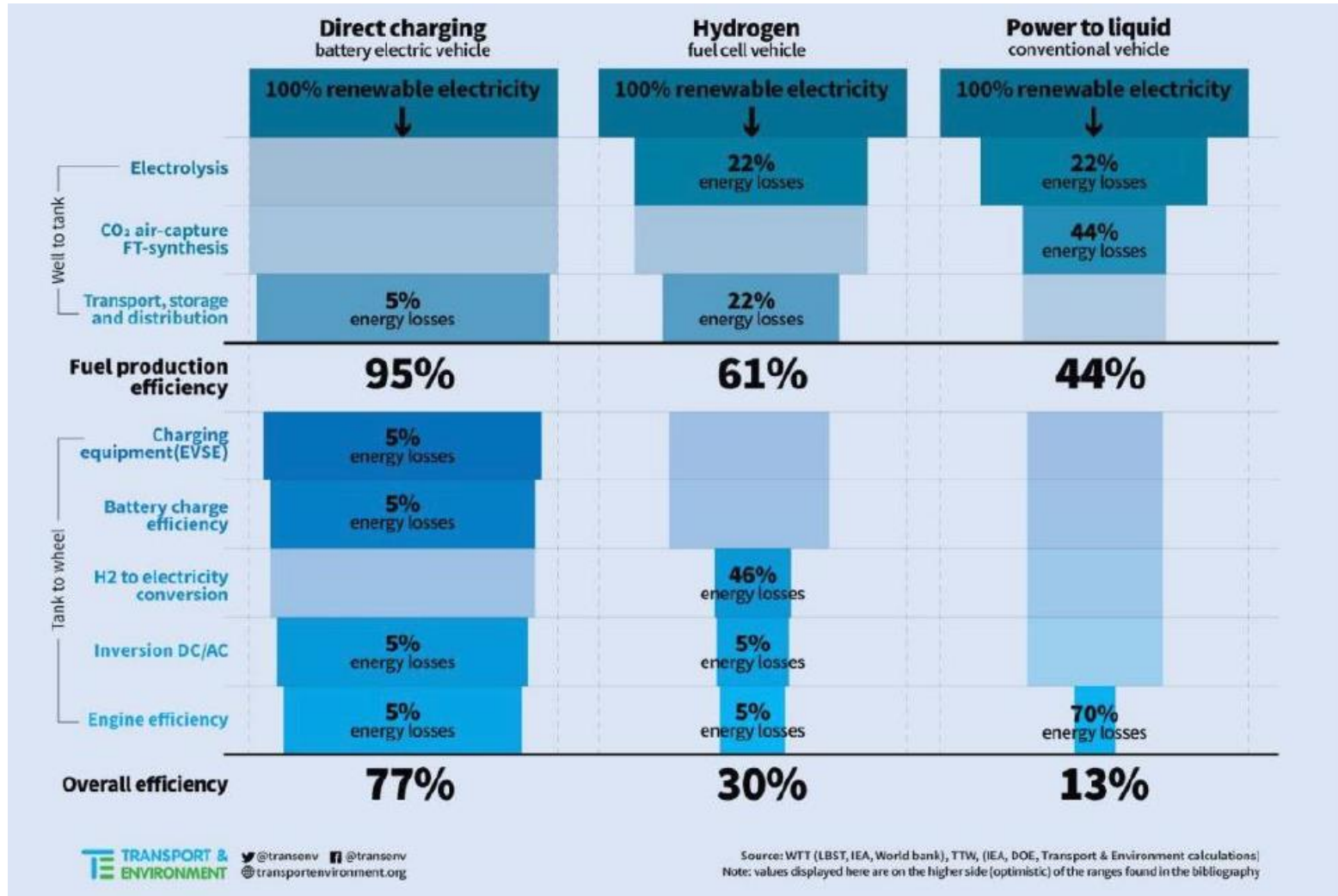


Luxembourg: from a high carbon to a zero carbon economy





Alternatives to fossil fuel





The different sources of hydrogen

Unlike fossil fuels such as oil, hydrogen has to be made. There are several techniques to produce hydrogen, but not all of them are clean.



BLACK HYDROGEN

Hydrogen is produced using coal or lignite through a process called gasification. This method creates the most pollution.

GREY HYDROGEN

Hydrogen gas is produced from natural gas via a chemical reaction called steam methane reformation. This method is the most used today because it is the least expensive, but it produces a lot of CO₂.

BLUE HYDROGEN

Hydrogen is produced via natural gas reformation in a similar way to grey hydrogen, but the CO₂ produced is captured by filters and then buried underground.

GREEN HYDROGEN

Hydrogen is produced by water electrolysis: splitting water molecules into hydrogen gas and oxygen using an electric current supplied by renewable energy. This method has the advantage of not releasing any greenhouse gases.



Costs matter !

1. Energy efficiency and cost

Pathway	Range (km/100 kWh)	Cost (EUR cents/km)	Efficiency (well-to-wheel)
E-truck charged by electric road system	60	19	77%
Battery e-truck	48	20	62%
Hydrogen fuel cell truck	24	55	29%
Power-to-gas CNG-truck	17	70	20%

Source: Siemens (2018) eHighway SoCal

2. Drive range

- In Europe between 60% to 70% of road freight journeys are within distances of **under 500 km/journey**
- Truck manufactures like Daimler, Volvo, Xos, BYD and Cummins offer e-trucks within that range
- Tesla announced e-trucks with higher ranges than that

Source: Transport & Environment and Atlas Policy

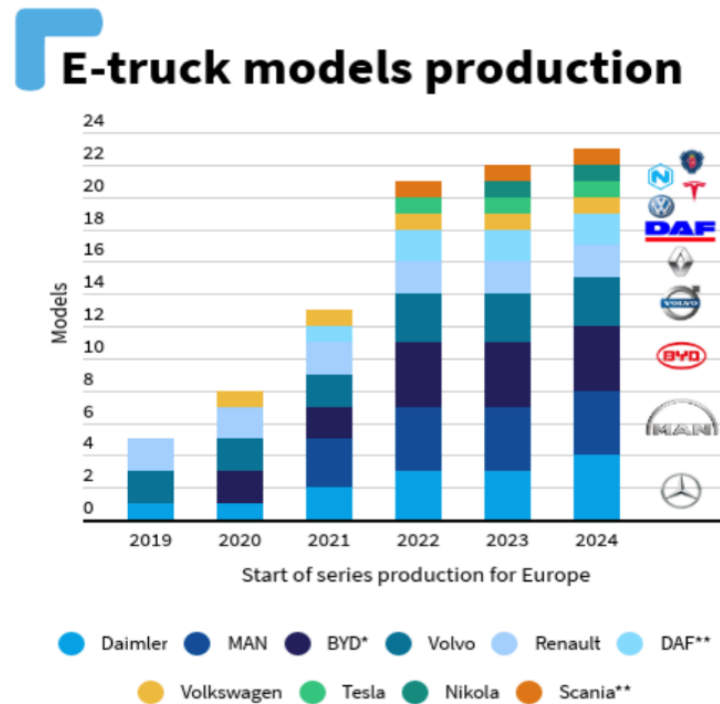


EU regulations favorable to long-distance electric trucks

- **Recharging without time loss**
 - drive and rest times regulation means driver needs to stop after 4.5h (i.e. typically after 350km) for 45m. Perfect for a recharge without losing time
- **More space for batteries**
 - as of 1 Sept 2020, the weights & dimensions directive allows longer cabins, enabling the large battery packs needed for long-range electric trucks
- **2 tons extra weight allowed for batteries**
 - as of 1 Sept 2020, the weights & dimensions directive allows zero-emissions trucks to be 2 tons heavier. Two tons of batteries represent approx. 350 km of *additional* range compared with no exemption, without loss of payload. Enables long-range electric transport
- **EU trucks' top speed is limited to 90 km/h, greatly increasing energy efficiency and range**
 - The old speed limiter directive limits the top speed of trucks in Europe to 90 km/h. Compared with >100 km/h speeds allowed in other parts of the world, this saves >20% of energy and hence increases range of an electric truck
- **Road toll discounts for Etrucks in ~10 Member States from 2024**
 - The new 'Eurovignette' directive, likely to be adopted 2021, introduces mandatory toll discounts



E-truck models production



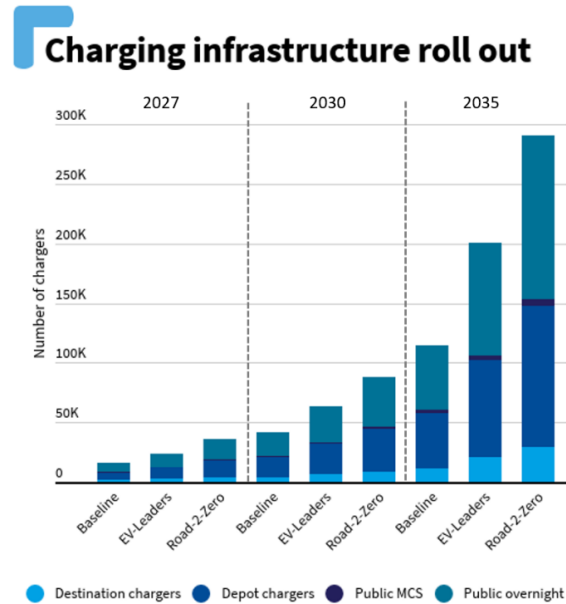
Source: T&E analysis, data from ICCT and OEMs

* BYD announced series production in Europe for two models in 2020, two other models are expected later but don't have any date of production so far. 2022 is assumed for those.

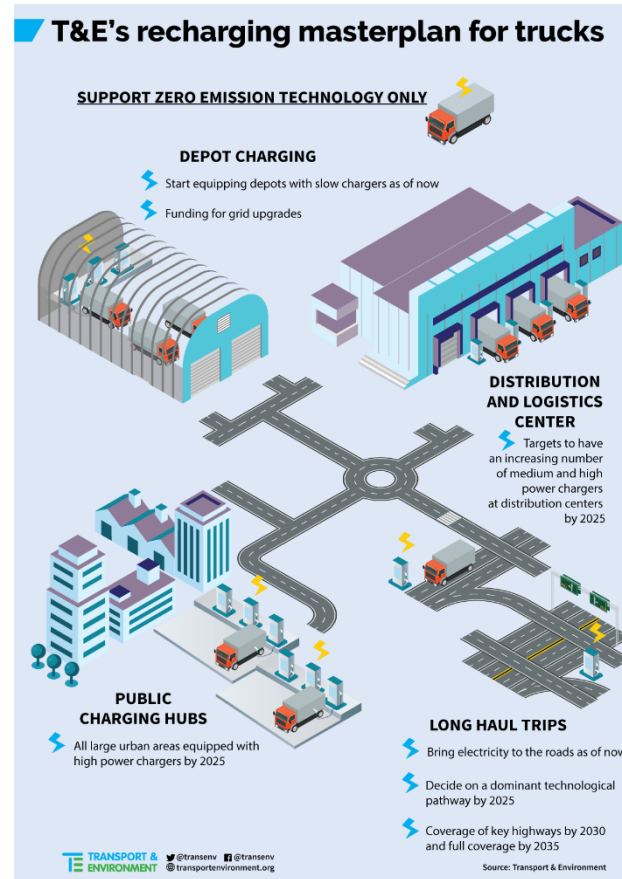
** DAF and Scania both announced e-truck series production, 2022 at the latest is assumed here



The case for e-truck charging infrastructure

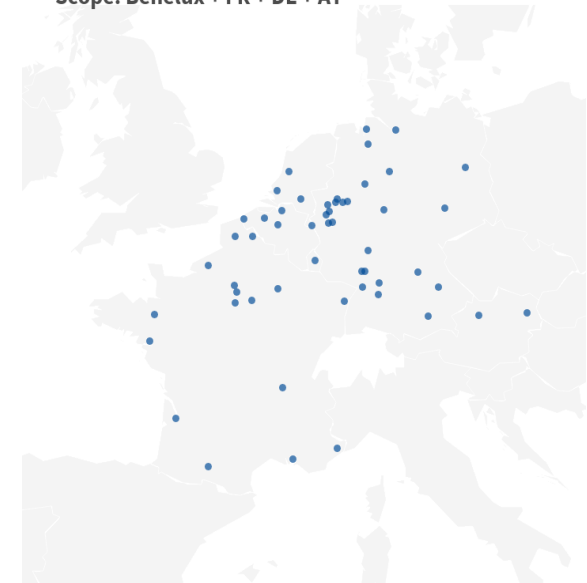


Source: T&E analysis, data from the ETIS Plus project and Eurostat



Urban nodes for freight activity

Scope: Benelux + FR + DE + AT





Thank you



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