

EvTEC2023

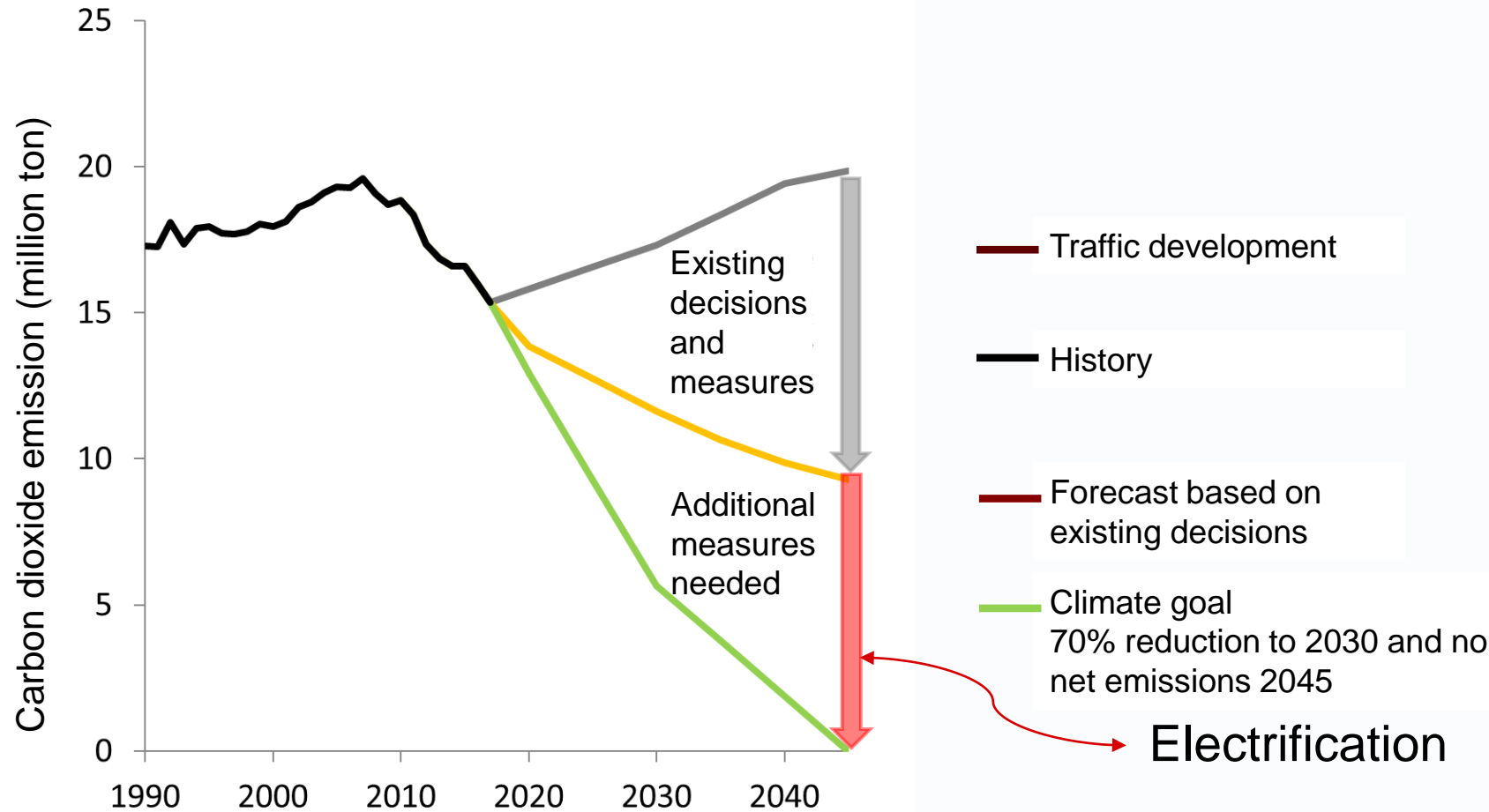
Sweden plans for electric Road Systems, ERS

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Reduction of greenhouse gases

Additional benefits

- Air Quality
- Energy Efficiency
- Enable new technologies

Electrification is the solution for tomorrow's fossil-free transport system

Electrification of the road sector

We need to free the transport sector from the use of fossile fuels and electrification is the solution for tomorrows fossile-free transportsystem.

We need a number of different solutions:

- Increased efficiency in the transportsystem
- Biofuels
- Static charging – Battery Electric Vehicles
- Dynamic charging - Electric roads
- Hydrogen/Fuelcells
- Battery swapping etc



Challenges for electric vehicles, EVs

- Cruising range
- Charging (waiting time, charging congestion, infrastructure installation incl grid demands, land use)
 - Increased use of batteries (securing resources, disposal, deterioration of roads due to greater vehicle weight, vehicle agility)
- EVs load (battery weight and volume, reduction of load)
- Safety issues during fast charging (fire)
- Energy- & Costefficiency
- Grid issues



Electric Road System, ERS

“Road supplemented with an electrical installation intended for the transmission of electrical energy to vehicles during travel”

- Carbon neutral: Zero CO₂ while driving
- Cruising range becomes unlimited
- No charging congestion
- Reduce on-board batteries
- Reduce vehicles weight - increased load factor
- Reduce vehicle cost



Saves time and space while managing



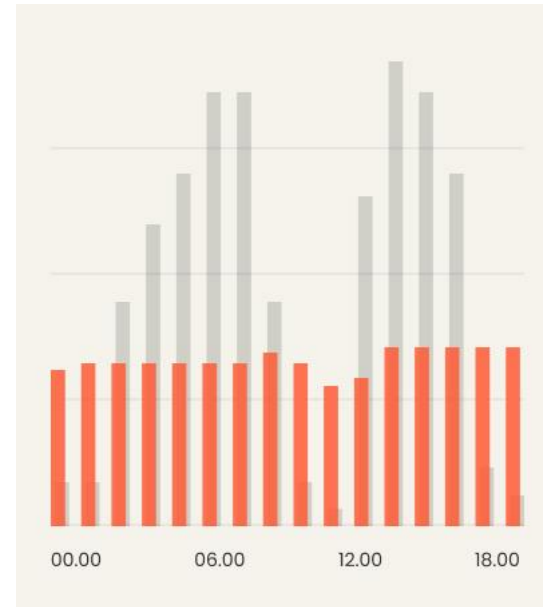
Time saving for fleets

Continuous charging enables a 30% uptime increase for the entire EV fleet



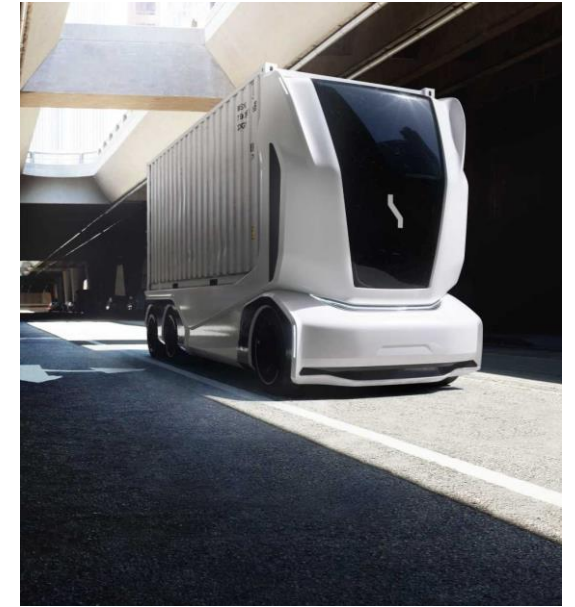
Less space wasted

Charging via ERS removes the need for most stationary charging spots



Power management

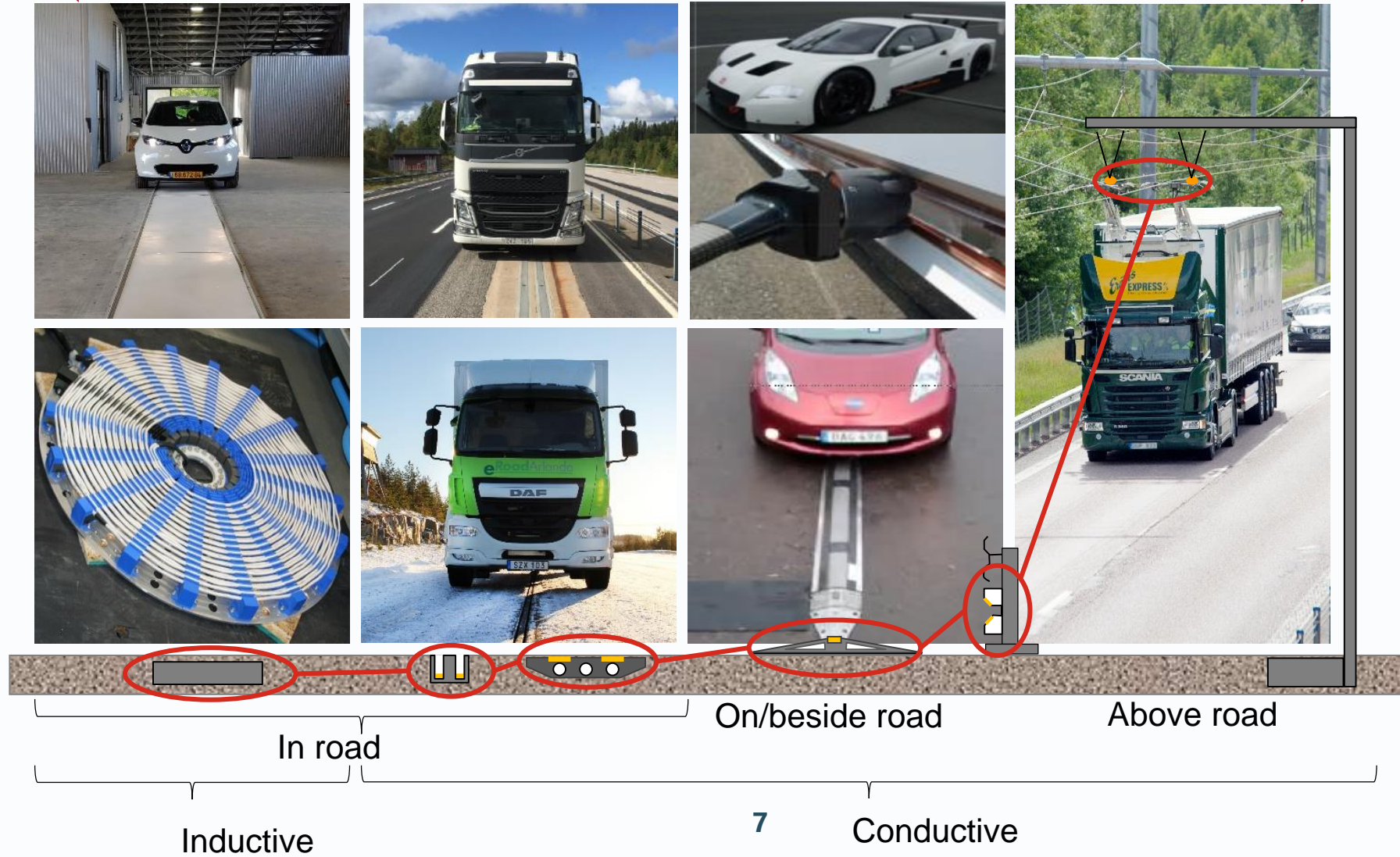
Continuous charging keeps the grid balanced at all times and smartness to use power when available and needed



Autonomous ready

Who will charge all those autonomous vehicles driving around all day?

Different perspectives and needs of technology



Demonstrators for ERS

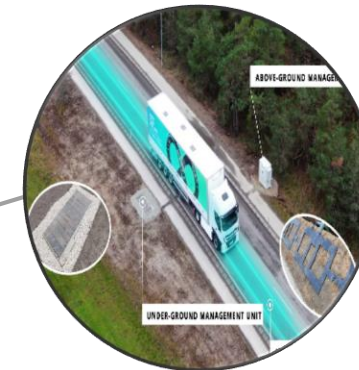
Create knowledge
regarding ERS!

Siemens
Sandviken
2016-2020



Evias
Arlanda/Stockholm
2017-2021

Elonroad
Lund
2020-2024



Electreon
Visby
2020-2024

Permanent ERS in Sweden, 2025

- A first permanent ERS will be built on E20 Hallsberg – Örebro. 21 km long taken into use in 2025/26.
- By the end of 2024, the Swedish Transport Administration will present a more detailed plan for the first phase construction of ERS on a larger scale.
- The government has obtained documentation for regulation.



**E20
Hallsberg – Örebro**



**2400km ERS
Could be possible!**

Growing global interest



Source: Piaro

Piarc Taskforce (TF) - Electric Road Systems

Piarc Task Force will grasp the field of Electrical Road systems

The TF will share knowledge and experiences from these national Research and development projects as well as from demonstrators. Findings from these activities will be presented and spread.

To promote knowledge within the field of ERS, the TF will apart from technologies also review potential stakeholders, businessmodels, interoperability, national strategies and policies.

Finally the TF will try to present possible recommendations for how to accelerate implementation of ERS and also future international cooperations och ERS and role of Piarc.

The report will be presented at Piarc World Conference in Prague, October 2023

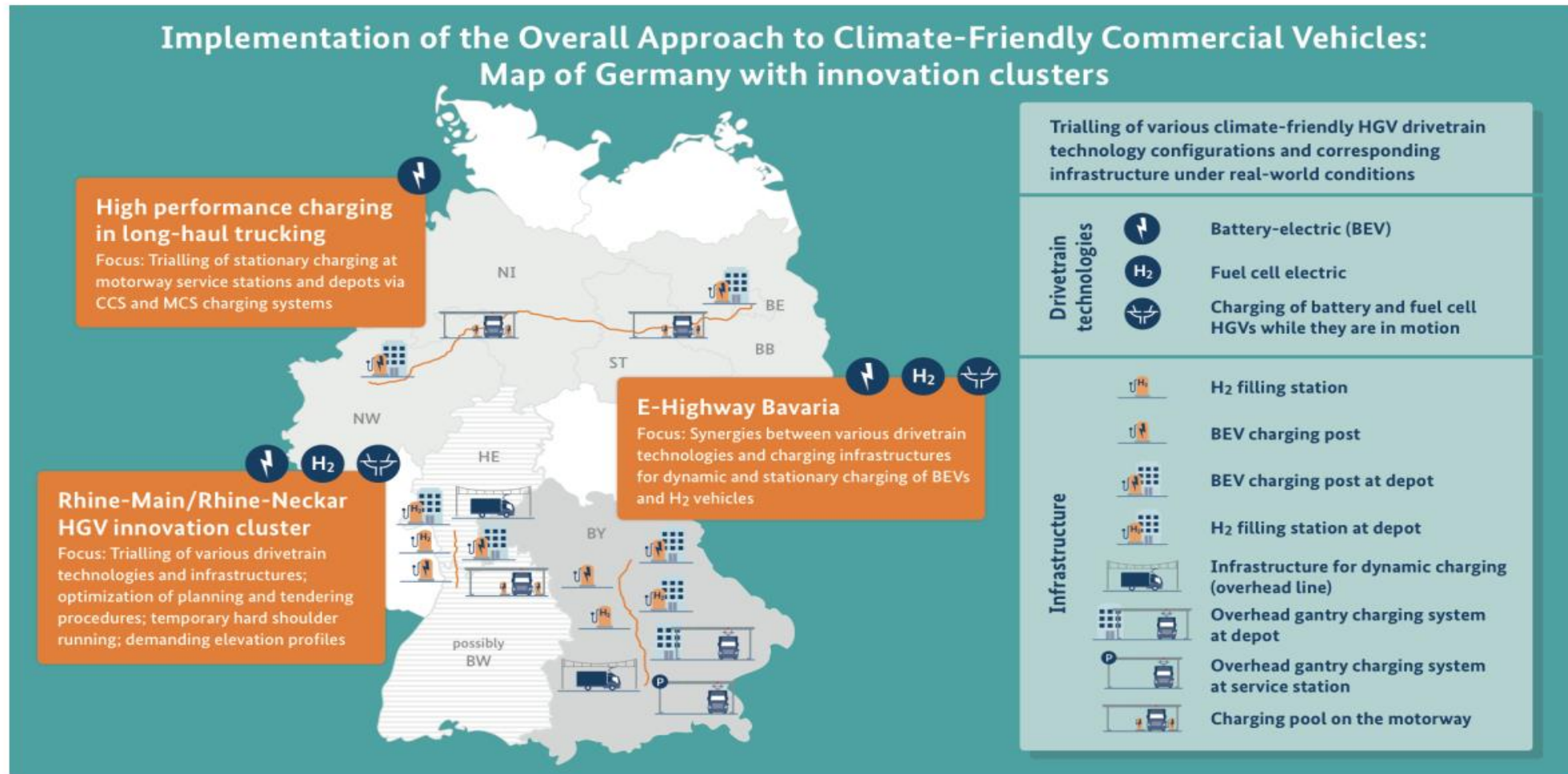
CollERS – A partnership for innovation



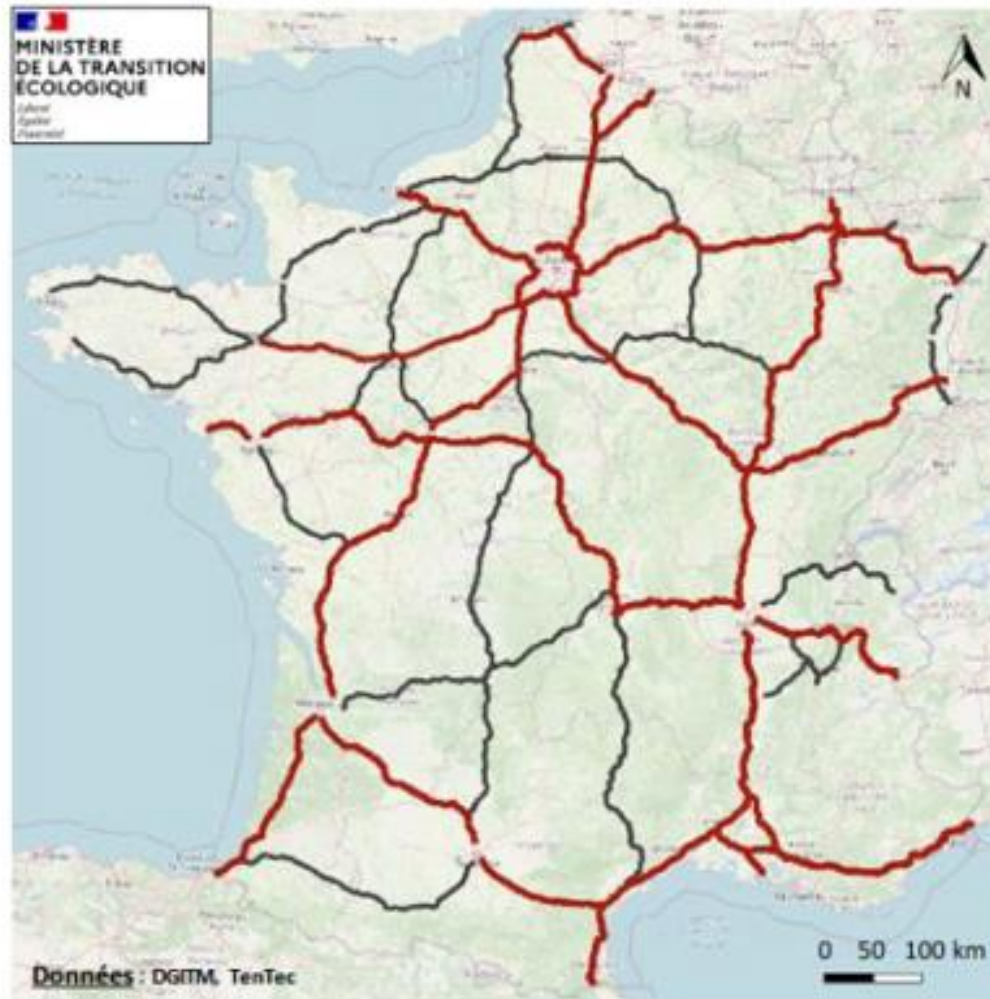
Electric Road Systems (ERS)

Sweden, Germany and France agree to work together to enhance electric road systems technology, identify means for cross-border operability and campaign at European level for the wider spread of this technology.

Clusters for electrification pilots - Germany



Suggested ERS-roads in France

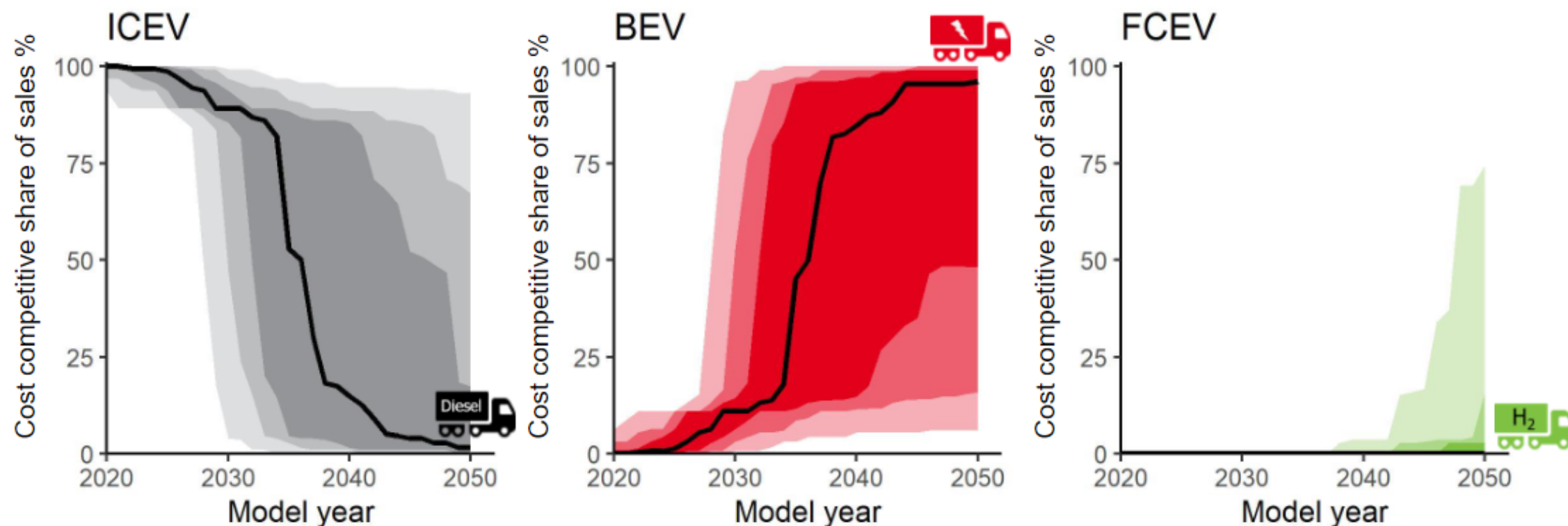


— 4900 km 2030

— 3950 km 2035

The future of road freight is electric

The share of the HDV market that each technology could theoretically attain by having the lowest TCO.

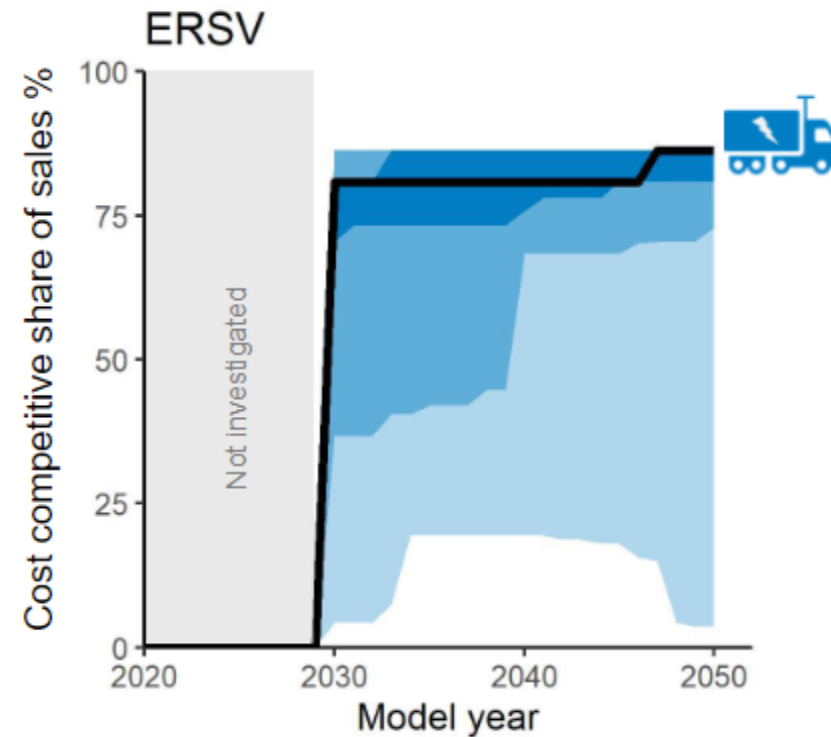


Notes: Black line denotes the median scenario, shading denotes 50th, 75th and 95th percentiles of the multiple scenarios explored.

Key point: **BEVs** have the potential to outcompete **ICEV** and **FCEV** options, even without incentives.

Electric road systems could be cost competitive

The share of the HDV market that each technology could theoretically attain by having the lowest TCO.



Notes: Black line denotes the median scenario, shading denotes 50th, 75th and 95th percentiles of the multiple scenarios explored.

Key point: **ERSVs** could be cost competitive but their utilisation and speed of deployment are uncertain.

Policy Recommendations

- Introduce policies that accelerate the deployment of zero-emission vehicles and their infrastructure.
- Ensure that policies to promote direct electrification of trucks remain technology-neutral.
- Launch targeted studies and pilot projects to assess the merits of electric road systems for road freight decarbonisation.
- Further investigate decarbonisation technologies for particularly challenging road freight applications.

Summary

- Lack of infrastructure for stationary charging is an obstacle for electrification of heavy transports and that infrastructure should be deployed now
- ERS is a promising solution for electrification
- Hydrogen for transport cluster around industries that produce H₂ or more?
- During the upcoming years get more knowledge to remove uncertainties how heavy transports can be electrified by using electric road systems, ERS.
 - Frameworks
 - Demos & pilots
 - Deployment plans



Thank you for your attention!



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