Climate-friendly vehicles in heavy road transport in Germany

GREEN HEAVY TRANSPORT THROUGH THE JUTLAND CORRIDOR

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Team Lead Europe

13/11/2024

NOW GmbH

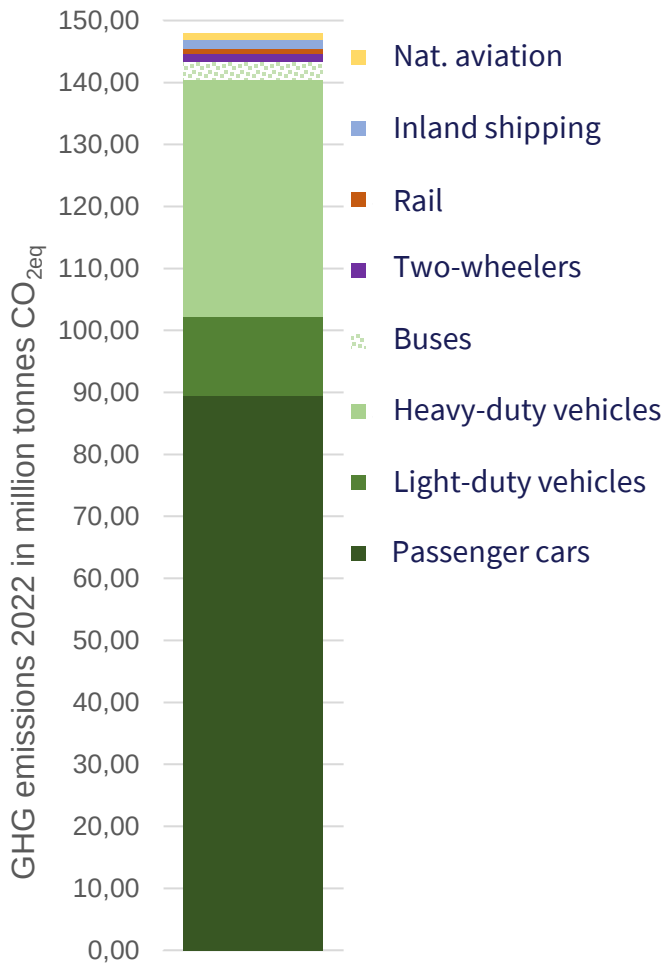
Who we are

- **NOW GmbH…**
  - …founded in 2008, is a federally-owned company and is commissioned by the German Federal Ministries.
  - …partner of the German Federal Government regarding the topics of mobility & technology.
- **Our vision:** A climate-neutral society.
- **Our mission:** We support the German Federal Government in its climate & industrial policy goals.

Topics we cover:	
Charging infrastructure	Hydrogen mobility
Battery-electric mobility	Renewable fuels
Hydrogen technology	Stationary fuel cell technology

Climate protection in transport in Germany

Greenhouse gas emissions and the role of heavy-duty road transport

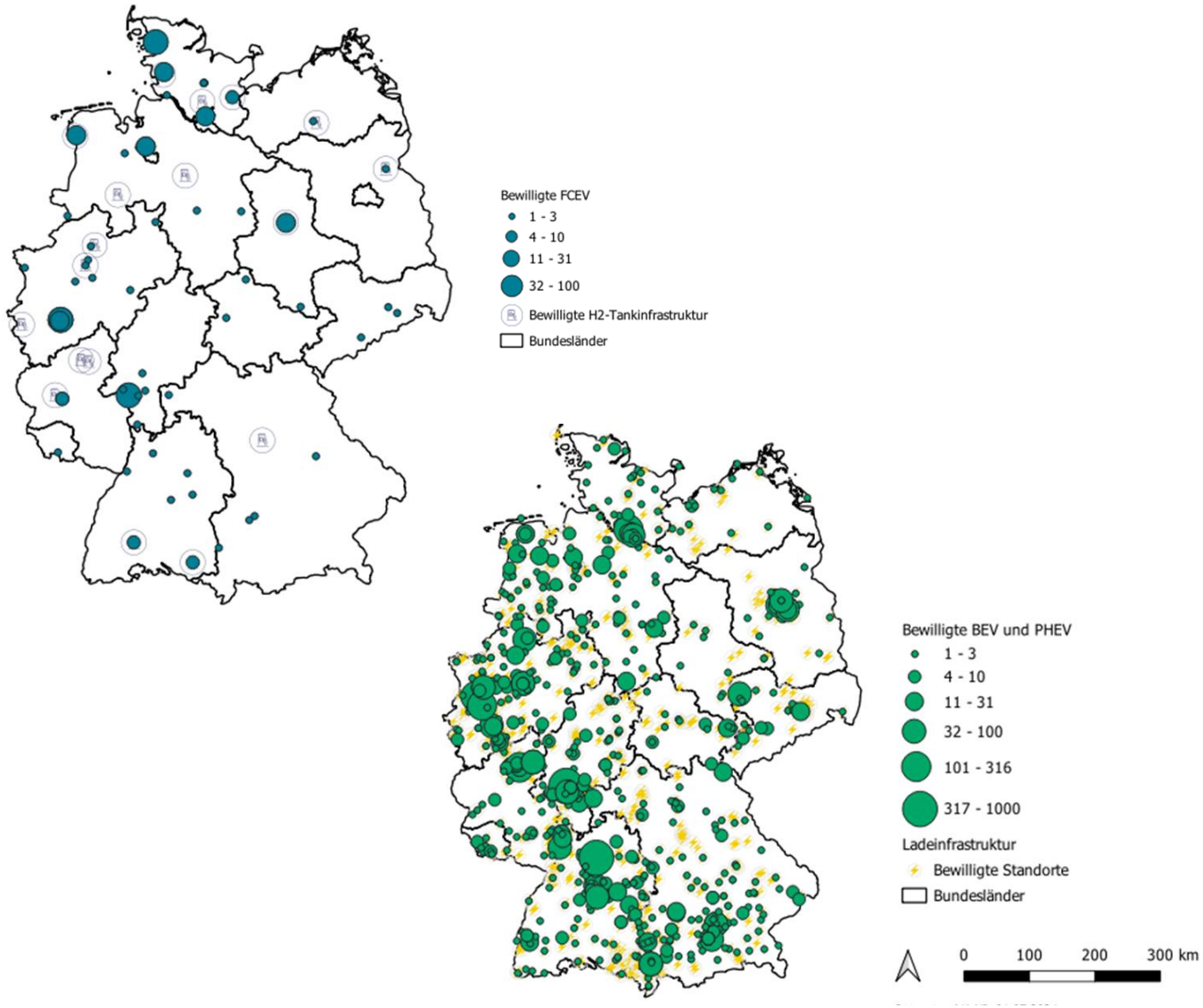


- More than 95 % of GHG emissions stem from road transport (2/3 passenger cars and **1/3 heavy-duty vehicles**)
- Modal shift to rail/shipping as essential goal
- **Electrification** as crucial lever
- HDV sector marked by high GHG emissions per vehicle and fast fleet renewal

- Expectation: **Growth** of goods transported on roads by 2040
  - Postal consignments (86 %)
  - Consolidated cargo (56 %)
  - Food and beverages (30 %)

The KsNI funding programme

Results after three funding calls



- Currently, around **€940 m** for roundabout 6,600 vehicles, more than 1,200 charging infrastructure sites and 17 hydrogen refuelling stations
- More than 6,100 (**93 %**) of funded vehicles were **battery electric** and around 400 were **fuel cell vehicles**
- More than **2,600** approved vehicles in the **N3 vehicle category** and more than 4,000 vehicles over all categories already on the road

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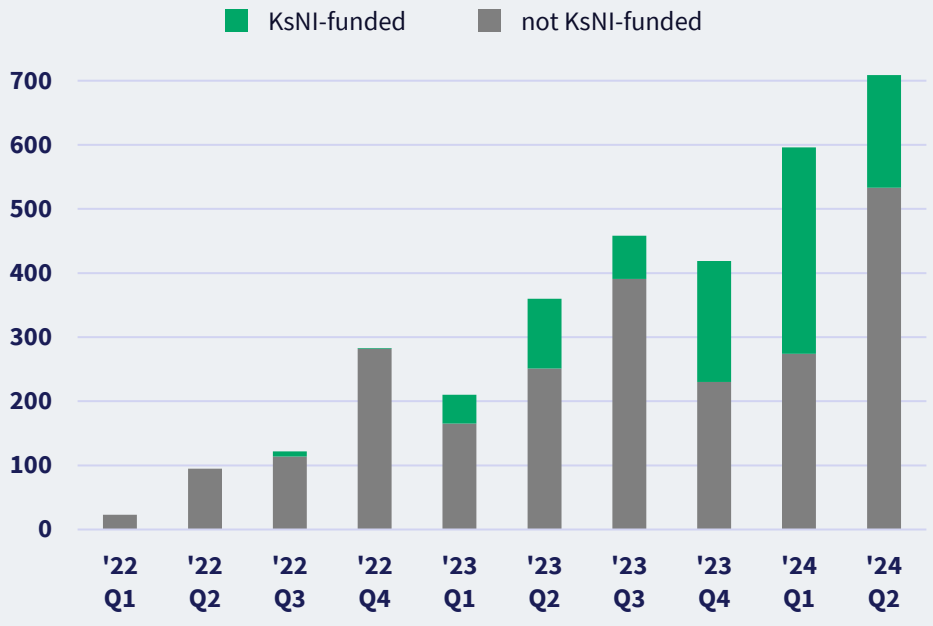
Registrations of heavy-duty vehicles (N2, N3) in Germany

Funding as driver for market uptake

N2

Registrations of zero-emission HDV per quarter



N3

Registrations of zero-emission HDV per quarter

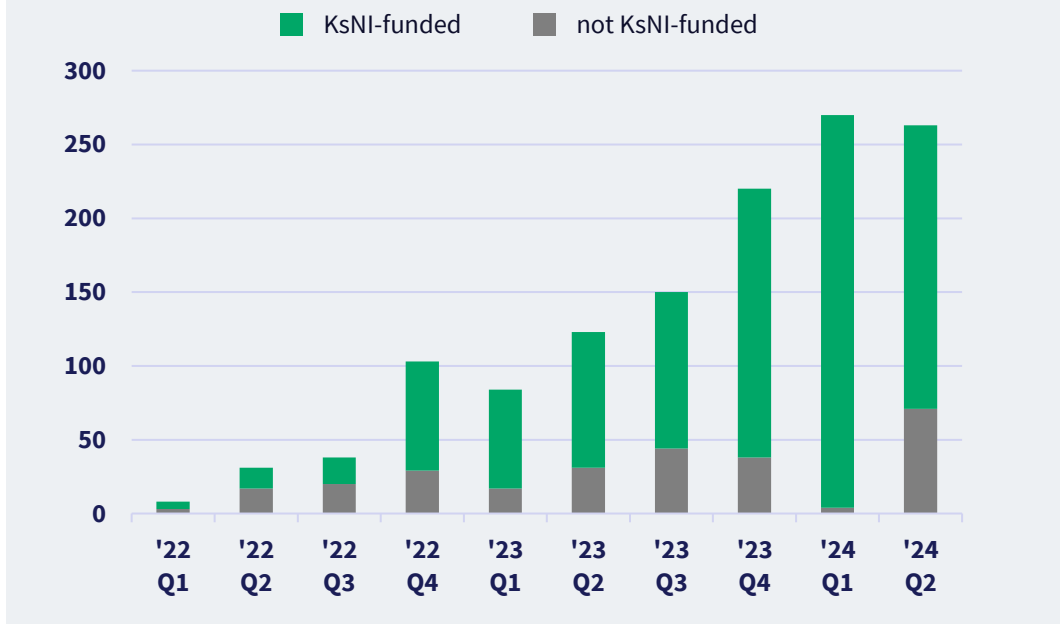


Illustration shows lorries and articulated vehicles with battery-electric, plug-in hybrid electric and hydrogen fuel cell drivetrain
Source: own calculations, KBA

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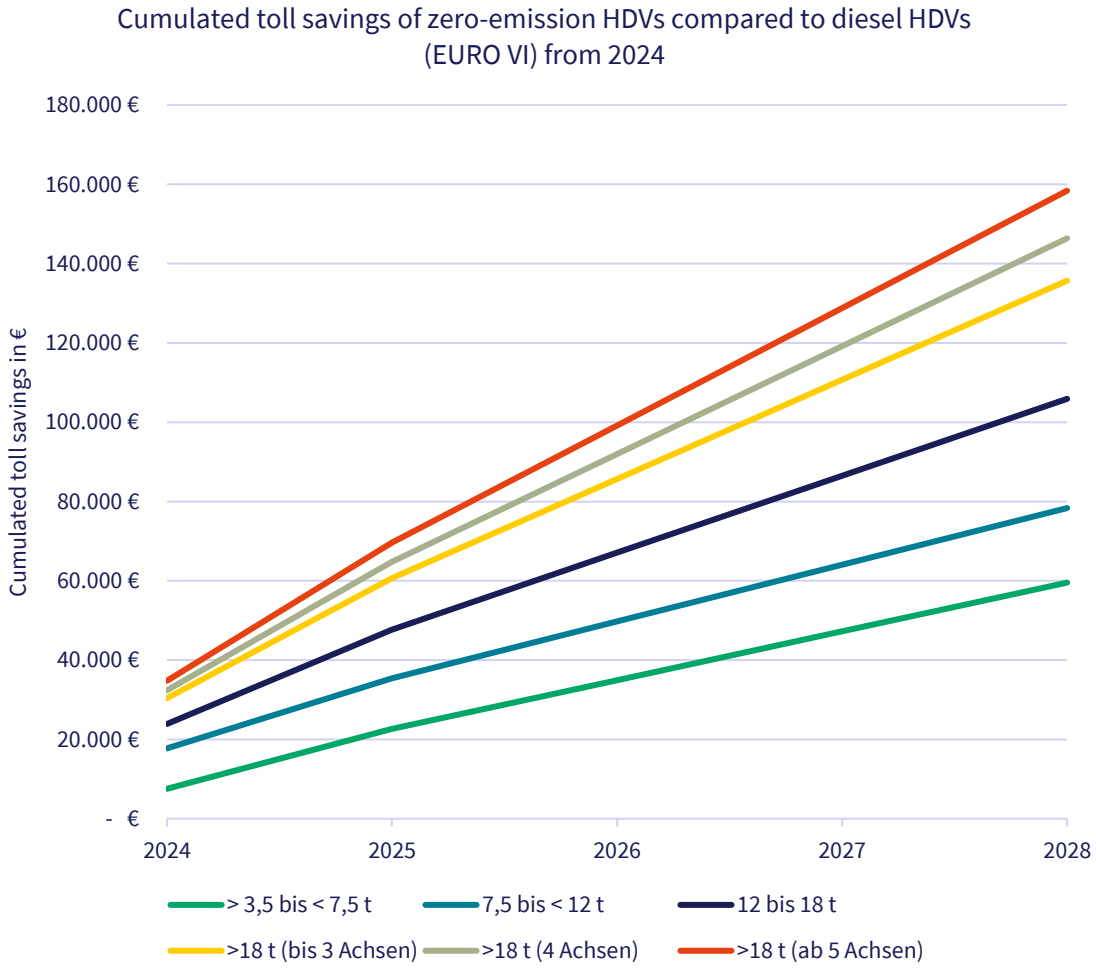
Alternatives to funding

Toll exemptions

- Toll applies to 51,000 km of German roads
- All heavy-duty vehicles with a technically permissible maximum laden mass >3.5 t are subject to the tolls
- Components: infrastructure costs, air pollution, noise emissions, CO_2 component
- Introduction of a CO_2 component of **€200 per tonne of CO_2** on December 1st, 2023
- Zero-emission heavy duty vehicles (ZEV) are exempt for 2 years
- ZEV with a technically permissible maximum laden mass >4.25 t are permanently exempt (among others)
- From 2026: CO2 component reduced by 75%
- Up to **€160,000 of cumulated toll savings over 5 years** compared to a diesel lorry (100,000 km/a)



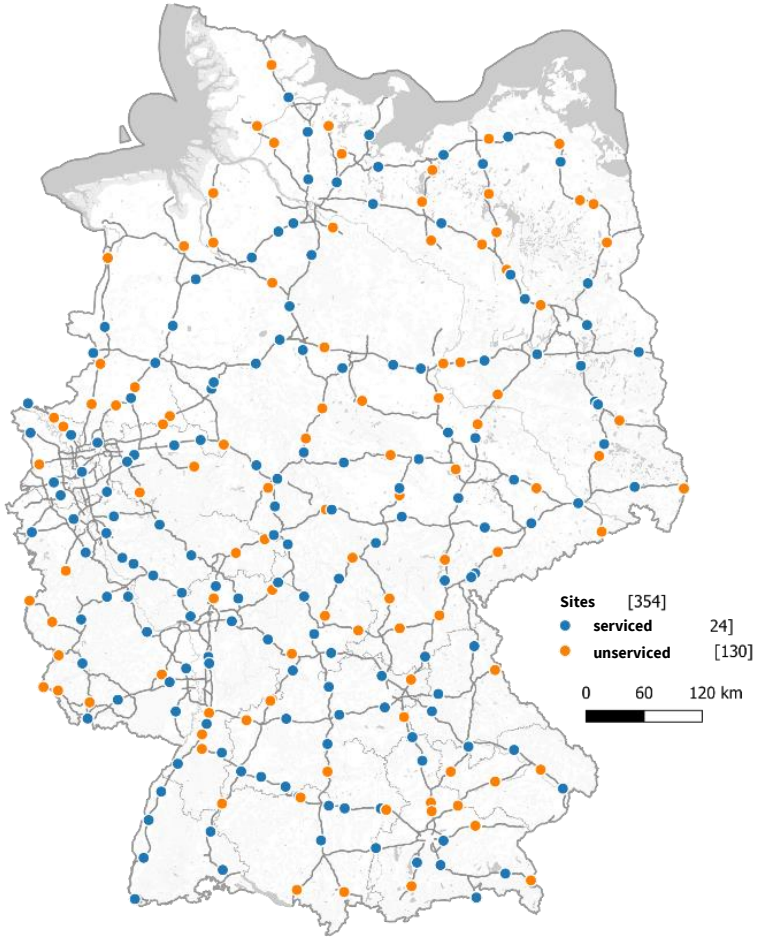
Market outlook

„Clean room“ talks

Forecast registrations in Germany (N3/<12t)

“Lkw-Schnellladenetz”

Fast charging network für lorries



- 354 locations
- 224 serviced rest areas
- 130 unserviced rest areas
- 1,800 MCS + 2,400 CCS recharging points
- €2 bn (tender at unserviced rest areas and grid connections)

Nationale LEITSTELLE Ladeinfrastruktur

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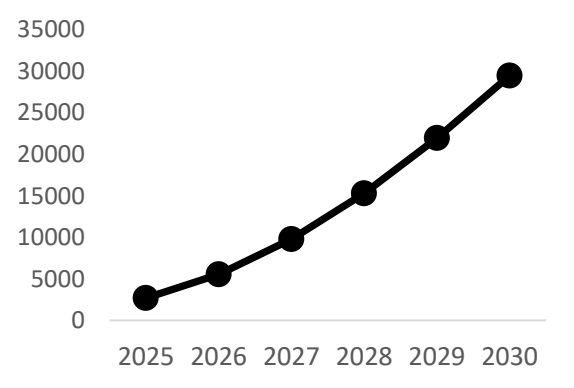
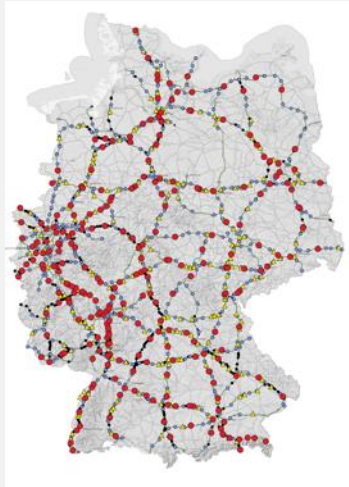
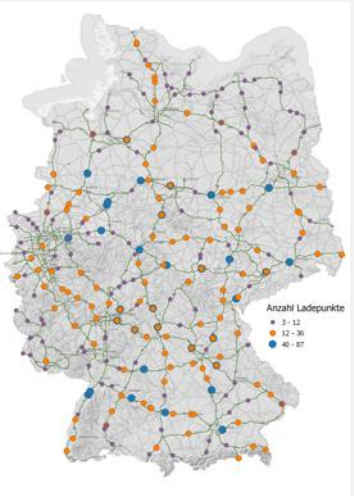
Planning recharging infrastructure for HDV

Modelling the network

Input data	Cleanroom-HDV Toll data (TC)	Toll data (TC)	e.g. Acquisition tool for rest areas(BASt)	Toll data (TC)
Analysis-step	*Determination of the charging demand in Germany (highway)*	*Allocation of charging demand to route/toll sections*	*Selection of suitable charging locations*	*Sizing of charging locations*







What to consider

Aim and challenges

Aim

Nationwide and demand-based fast-charging network for electric HDV at rest areas

Key challenges

… ensure market-driven prices and a fair competitive landscape.

… provide sufficient space for charging infrastructure.

… ensure grid connections in time.

Ensuring a competitive charging market

Challenges for competition

High risk of monopoly prices

- Temporary lack of competition (e.g. shortage of space, grid connections)
- Excessive prices would prevent e-truck market ramp-up (cost-sensitive logistics sector)

High demand risk in the market ramp-up phase

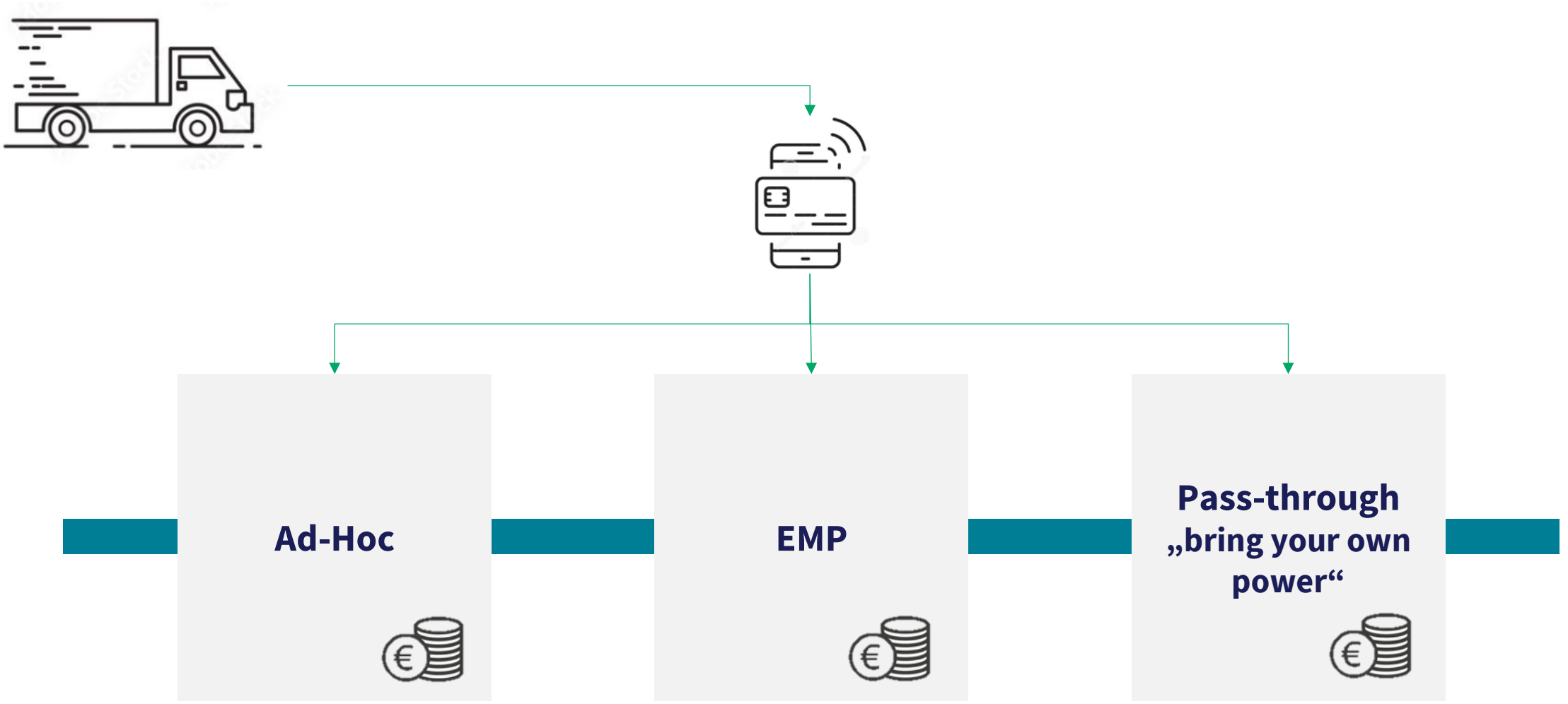
- Uncertain demand could lead to high-risk premiums
- Demand can only be influenced to a small extent by the CPO, risk assumption therefore problematic

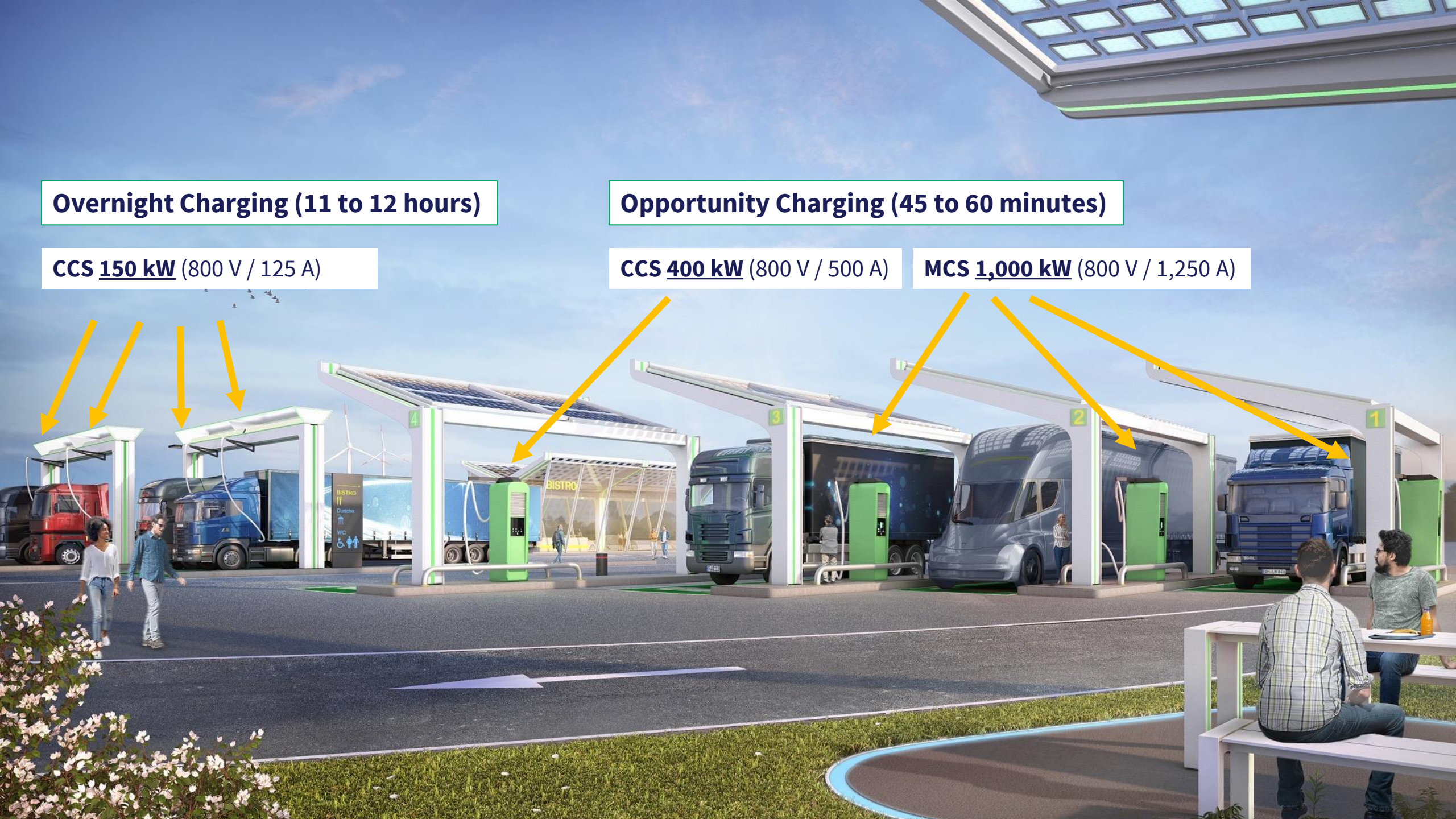
Federal authorities must be able to make adjustments after award decision

- Dynamic framework parameters, e.g.:
  - Flexible/temporary use of LIS areas for diesel trucks?
  - Option to reserve of spaces? Introduction of a central reservation system?
- Risk of lock-in effects or cost-intensive renegotiations

Competition model

„Bring your own power“ as an additional option

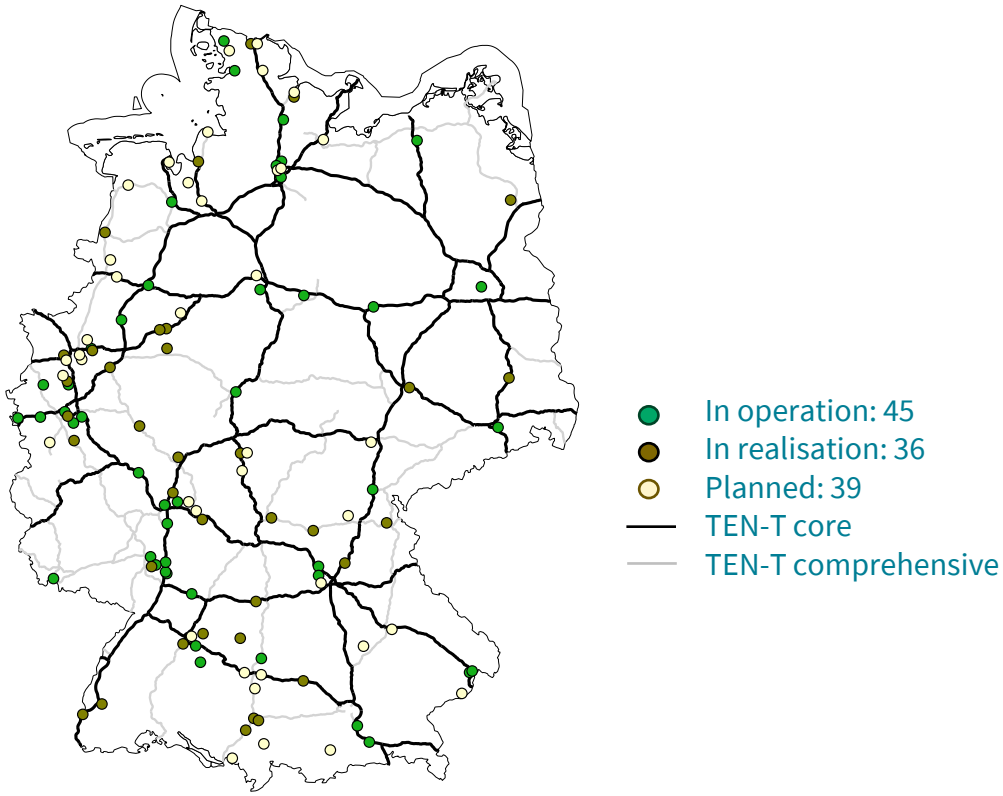



Overnight Charging (11 to 12 hours)
CCS 150 kW (800 V / 125 A)
Opportunity Charging (45 to 60 minutes)
CCS 400 kW (800 V / 500 A)
MCS 1,000 kW (800 V / 1,250 A)
BISTRO
Dusche
WC
BISTRO
4
3
2
1

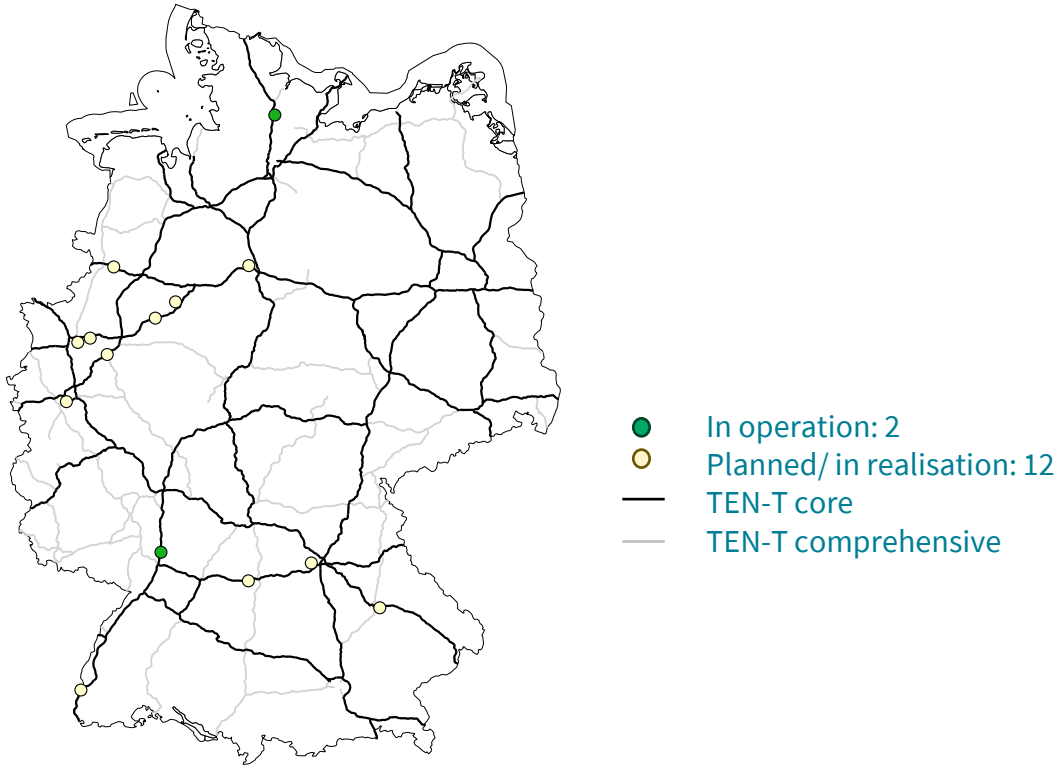
Hydrogen refuelling stations

Status quo

HRS with 350 bar (for HDV) in Germany (11/2024)



AFIR compliant HRS on the TEN-T core network in Germany (11/2024)



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