Effective Member State policies – a roadmap to TCO parity for hydrogen trucking

29th September 2026

This paper is part of a three-part H2Accelerate policy series:

- **Paper 1 sets out the Member State policy packages currently effective to unlock hydrogen trucking in Europe.**
- Paper 2 presents a proposal for adapting existing European funding calls (such as CEF AFIF) to better support coordinated truck-and-station deployments as seen in Member States.
- Paper 3 presents a TCO Parity Certainty Mechanism to unlock long-term TCO certainty and scaled investments into zero-emission H_2 trucking.

Executive Summary

Hydrogen-powered trucking is approaching a new phase of deployment in Europe. Planned deployments are accelerating in a small number of early markets, notably Germany and the Netherlands, where targeted policy measures are improving the commercial case for hydrogen-powered HDVs and their supporting refuelling infrastructure. These markets demonstrate that, with a supportive policy framework in place to reduce costs, coordinate investment, and mitigate early-market risk, deployments of hydrogen trucking can be scaled. In this paper, three mechanisms proving particularly impactful are discussed: RED III credit trading mechanisms for renewable hydrogen, road toll exemptions and reductions for zero-emission heavy-duty vehicles, and combined capital funding for hydrogen trucks and refuelling stations.

Implemented together, these measures can create a credible pathway towards total cost of ownership parity between hydrogen-powered trucks and diesel vehicles. Technology improvements, including advances in fuel cell efficiency, are strengthening this pathway, but policy support remains essential while the sector moves from early project-based deployments towards full market penetration.

The examples of Germany and the Netherlands provide a practical template for wider European deployment. However, implementation of these policies remains inconsistent across Europe and deployment of hydrogen-powered trucks is lagging behind planned targets, with a risk of a fragmented market across the continent. As such, the H2Accelerate collaboration highlights four key policy initiatives to accelerate the scale-up of the hydrogen mobility sector:

- Implement RED III credit mechanisms across Member States for RFNBO hydrogen.
- Implement road toll exemptions in line with the Eurovignette Directive, to provide a predictable operating cost advantage for zero-emission trucks.

- Adapt future CEF AFIF funding rounds to provide joint funding for hydrogen trucks and stations.
- Introduce a TCO Parity Certainty Mechanism to close the residual TCO gap, derisk policy and market volatility, and create bankable business cases for hydrogen truck investments.

Hydrogen trucking is approaching a new phase of deployment

Hydrogen-powered trucks and refuelling infrastructure are moving from project-based technology validation towards early commercial deployment. To scale beyond early demonstration projects, hydrogen trucks must compete with diesel equivalents on a Total Cost of Ownership (TCO) basis. This is particularly important in heavy-duty trucking, where fleet operators work on narrow margins and purchasing decisions are shaped by lifetime TCO.

Technology improvements are reducing the cost gap, but early hydrogen trucks and refuelling infrastructure still face higher costs. Policy support is required to accelerate the transition to zero-emission vehicles. To this end, the European Commission and Member States have implemented policies to both embed the cost of emissions for diesel-fuelled trucks and incentivise deployments of zero-emission trucks including hydrogen-powered vehicles.

A limited number of Member States are taking the lead in implementing incentivising policies, notably Germany and the Netherlands. Policy initiatives in these states are stimulating the commercial case for early deployments and provide important case studies for the rest of Europe. The transition from demonstration projects to commercial deployment depends not only on vehicle availability and infrastructure build-out, but also on the creation of a supportive policy environment that can reduce costs and mitigate early-market risk.

In this context, three policy mechanisms are proving particularly impactful:

- RED III credit trading mechanisms, which subsidise the supply of renewable hydrogen to the transport sector;
- Road toll exemptions and reductions for zero-emission heavy-duty vehicles, which significantly reduce operating costs for high-mileage trucks; and
- Combined capital funding for vehicles and refuelling infrastructure, which can reduce upfront costs and support coordinated deployment.

When implemented together, these measures can create a path to TCO parity between hydrogen-powered trucks and diesel vehicles in specific use-cases.

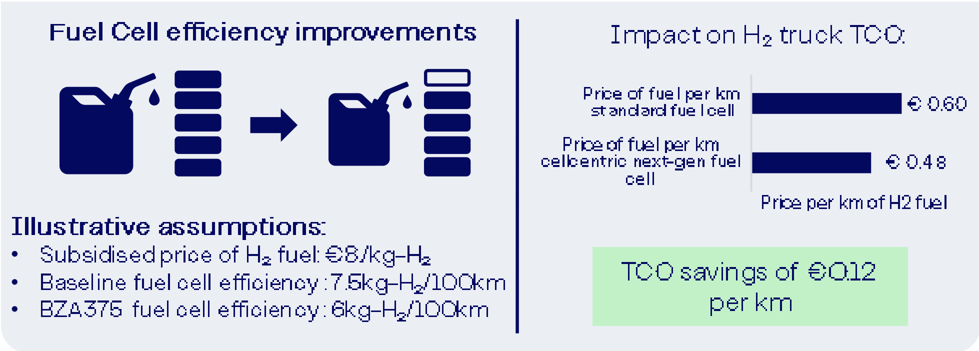
Truck technology improvements are bridging the TCO gap

The economics of hydrogen trucking are being improved by continuing advances in fuel cell technology, vehicle design, and system integration. While underlying technologies have now been validated with 100s of vehicles on Europe's roads today, early generations of hydrogen-powered trucks are expected to improve significantly as technologies and components mature, production volumes increase, and manufacturers optimise vehicles for heavy-duty applications.

In April 2026, cellcentric announced its BZA375 fuel cell system for heavy-duty applications.[1] The system is expected to enable fuel consumption of less than 6 kg of hydrogen per 100 km for a fully loaded 40-tonne truck under real-world driving conditions, compared with an estimated baseline of around 7.5 kg of hydrogen per 100 km for current vehicle generations. This improvement has a material impact on truck TCO. Using an illustrative subsidised hydrogen price of €8/kg at the pump, reducing fuel consumption from 7.5 kg to 6 kg per 100 km would reduce fuel costs by approximately 20% (€0.12 per kilometre). For high-

[1] Cellcentric, April 2026

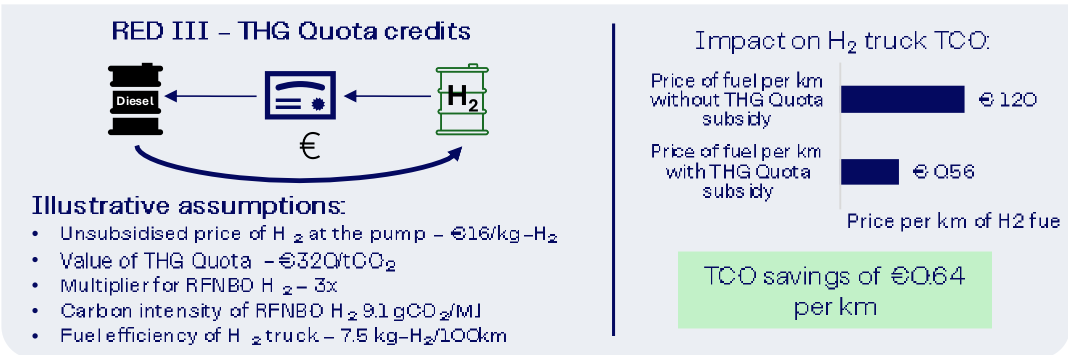
utilisation long-haul vehicles, this is a meaningful improvement in the business case for hydrogen-powered trucks.



RED III credit mechanisms reduce the cost of renewable hydrogen

The Renewable Energy Directive III requires Member States to establish mechanisms that allow fuel suppliers to exchange credits for the supply of renewable energy to the transport sector.[2] These mechanisms are intended to support the use of renewable energy or fuels and can provide an important operating cost incentive for zero-emission vehicle deployment.

Under a typical RED III credit mechanism, suppliers of eligible renewable fuels earn credits based on the renewable energy supplied to the transport sector. These credits are then sold to obligated fuel suppliers, who must meet renewable energy or greenhouse gas reduction obligations. Where RFNBO hydrogen supplied to road transport is eligible, the mechanism can create a significant revenue stream for hydrogen fuel suppliers which can be used to reduce the price at the pump of renewable hydrogen supplied to transport operators. As such, these mechanisms can substantially improve the total cost of ownership of hydrogen trucks and support the scale-up of hydrogen trucks. Unlike direct public subsidies, the credit mechanism is funded by the purchase of credits by obligated fossil fuel suppliers, limiting the cost to the public purse.



As a market-based solution, RED III credit mechanisms also introduce price risk, making it difficult to build bankable long-term business cases for HRS operators and truck end-users. As recently as October 2024, the German THG Quota was trading at around €80/t-CO_2,[3] well below the average value in February 2026 of €320/t-CO_2.[4] To support the scale-up of hydrogen-powered trucks, a competitive total cost of ownership throughout the functional lifetime of the hydrogen truck and a coordinated ramp-up of vehicle and refuelling infrastructure deployment (providing long-term visibility for the supply of and demand for hydrogen fuel) are essential.

[2] European Commission, RED III Article 25, October 2023
[3] Nera, October 2024
[4] emobility.energy – THG Quota trading price (August 2026)

Reliance on RED III credit mechanisms alone can result in a challenging business case which may delay vehicle procurement and create uncertainty for investment in hydrogen supply and refuelling infrastructure.

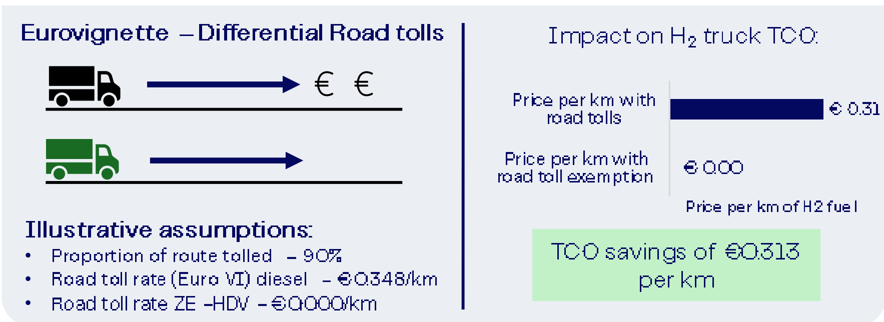
RED III credit mechanisms are a powerful tool. They can materially improve the TCO of hydrogen trucks, but additional measures may be required to improve their impact (e.g. by stabilising their value or protecting early projects from additional downside risk).

Members of the H2Accelerate collaboration recommend a "TCO Parity Certainty Mechanism" to close the residual TCO gap, derisk policy and market volatility, and create bankable business cases for hydrogen truck investments. A TCO Parity Certainty Mechanism designed to work alongside existing policy incentives and close a residual TCO gap relative to diesel trucks could provide greater certainty to early projects, support bankable business cases and accelerate the transition from demonstration to commercial deployment. The concept for a suitable TCO Parity Certainty Mechanism will be explored in the third paper in this H2Accelerate policy series.

Road toll exemptions can provide ZEVs with a predictable operating cost advantage

Under the Eurovignette Directive, Member States that apply road charges to heavy-duty vehicles are required to differentiate tolls based on vehicle emissions performance and convert to distance-based tolling. This creates a legal framework through which zero-emission trucks can receive a cost advantage relative to fossil-fuelled vehicles. The directive also allows a temporary exemption from all road tolls for zero-emission HDVs to be applied by Member States - as of October 2025, this exemption period can run until 30th June 2031.[5]

In Member States where sufficient road tolls are applied, a significant operating cost advantage can be achieved for zero-emission trucks, including hydrogen-powered vehicles.



Like well-designed RED III credit mechanisms, the costs of differential road tolls and exemptions are expected to have a limited impact on the public purse. The lost revenues from ZEV exemptions will remain small during the early deployment phase, when zero-emission HDVs represent only a small share of the total fleet.

Road toll exemptions are therefore one of the most effective near-term policy tools for hydrogen trucking. They are simple for operators to understand, directly linked to vehicle usage, and capable of providing predictable support over time.

Combined truck and station funding can stimulate coordinated deployments

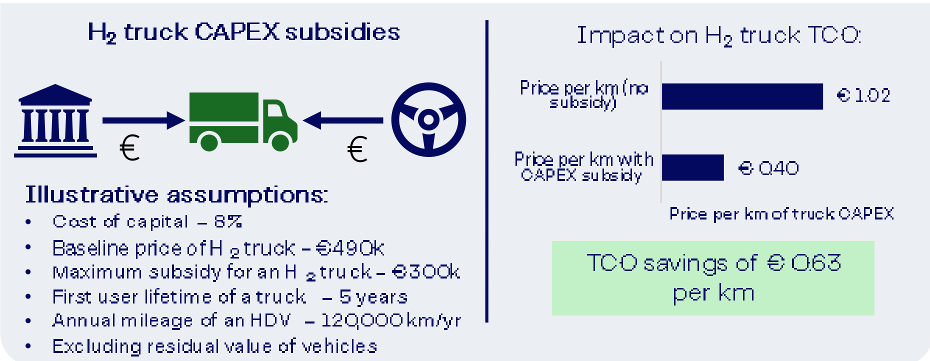
Coordinating the geography, technology, and timing of truck and refuelling station deployment supports a positive investment case and mitigates underutilisation and infrastructure availability risk.

[5] Directive (EU) 2025/2459 – November 2025

Since 2021, European funding through CEF AFIF has sought to stimulate the deployment of hydrogen refuelling infrastructure through infrastructure-only capital funding. CEF AFIF has provided access to €2.5 billion in subsidies for fuelling infrastructure including hydrogen refuelling and recharging infrastructure[6], with around €400-450 million previously awarded towards hydrogen refuelling infrastructure.[7] While partially successful, this has also highlighted that infrastructure funding alone is often insufficient where there is no co-located deployment of vehicles.

The Netherlands has sought to address this challenge through the annual SWiM programmes, which have provided joint capital support for hydrogen refuelling stations and hydrogen-powered vehicles since 2024. By linking funding for infrastructure with funding for vehicles, the programme reduces risk for both fuel suppliers and transport operators and supports coordinated deployment. Across the first two rounds of SWiM, around 600 hydrogen-powered vehicles and 13 new or expanded stations were awarded funding from a budget of around €72 million.[8] Following the success of the SWiM programmes, Germany adopted a similar €220m combined funding scheme for hydrogen trucks and stations in January 2026.[9] The German combi-funding scheme was significantly oversubscribed with bids worth over €455m received targeting over 70 high-capacity station and over 800 heavy-duty hydrogen truck deployments.[10] These programmes provide an important template for other Member States and for future EU-level funding programmes.

Combined funding has two important impacts on scaling zero-emission mobility. Subsidies address the capital cost gap for early hydrogen trucks, which will remain more expensive than diesel vehicles during pre-series and early series-production phases. Secondly, the funding increases the likelihood that refuelling infrastructure will achieve sufficient utilisation for a scalable business case.



Members of the H2Accelerate collaboration recommend rescoping future European funding (e.g. CEF AFIF) to provide joint funding for hydrogen trucks and stations. Targeted capital funding will remain necessary during the initial phase of European hydrogen mobility deployment to overcome the incumbency advantage of diesel-powered vehicles. The experience of the Netherlands' SWiM programme and Germany's combined funding scheme shows that smaller, targeted budgets can have a significant impact when they support vehicles and infrastructure together. Future European funding should build on this model. A proposal for rescoping European funding such as CEF AFIF under a joint truck and station funding scheme will be explored in the second paper in this H2Accelerate policy series.

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[6] European Commission, November 2025
[7] Transport and Environment, May 2025 – N.b. While funding for HRS was awarded, not all the funding has been drawn down as funded stations have faced delays and cancellations.
[8] Mobility Plaza, April 2026
[9] NOW GmbH, January 2026
[10] BMV Press Release, July 2026

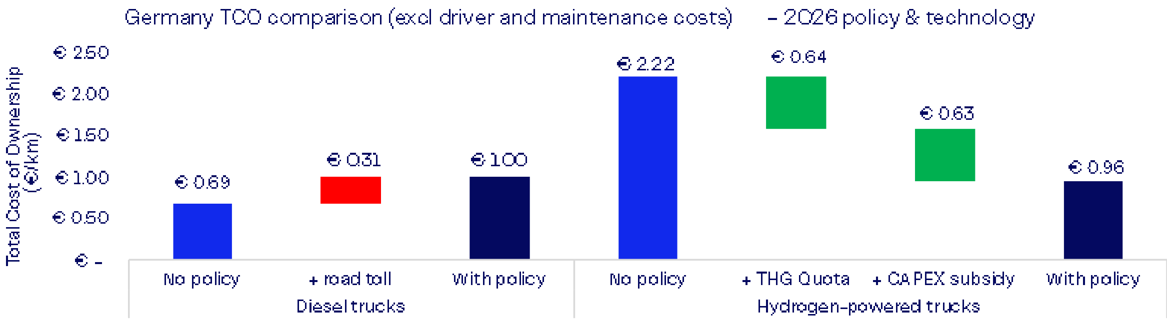
Joint policies can create a pathway to TCO parity

As explored in the Global Hydrogen Mobility Alliance's Market Activation Strategy,[11] scaling of both vehicle manufacturing and the hydrogen value chain will create a pathway to cost-competitive hydrogen trucking. To reach this scaled deployment, the early hydrogen trucking market requires a coordinated and coherent policy package to address the main cost and risk barriers facing vehicle operators, fuel suppliers, and infrastructure providers.

RED III credit mechanisms can reduce the effective cost of renewable hydrogen while road toll exemptions can provide a predictable operating cost advantage for zero-emission trucks. Combined capital funding can reduce upfront costs and support the coordinated deployment of vehicles and refuelling infrastructure.

When these measures are implemented together, they create a credible pathway towards TCO parity between hydrogen-powered trucks and diesel vehicles. This is a significant development for the European hydrogen mobility sector: TCO parity with diesel is possible **today** in leading markets, using mechanisms that already exist within the European and national policy framework.

Germany is emerging as a priority market for hydrogen trucking in Europe because these mechanisms are brought together to drive a competitive business case. The combination of toll exemptions, RFNBO credit value and combined capital funding can make hydrogen trucks commercially attractive in the short term.



Future improvements in hydrogen supply chains, truck technology, and economies of scale will allow the policy support measures for hydrogen trucks to be progressively reduced while still maintaining hydrogen price parity with diesel.

The policy framework has been developed, but implementation must accelerate

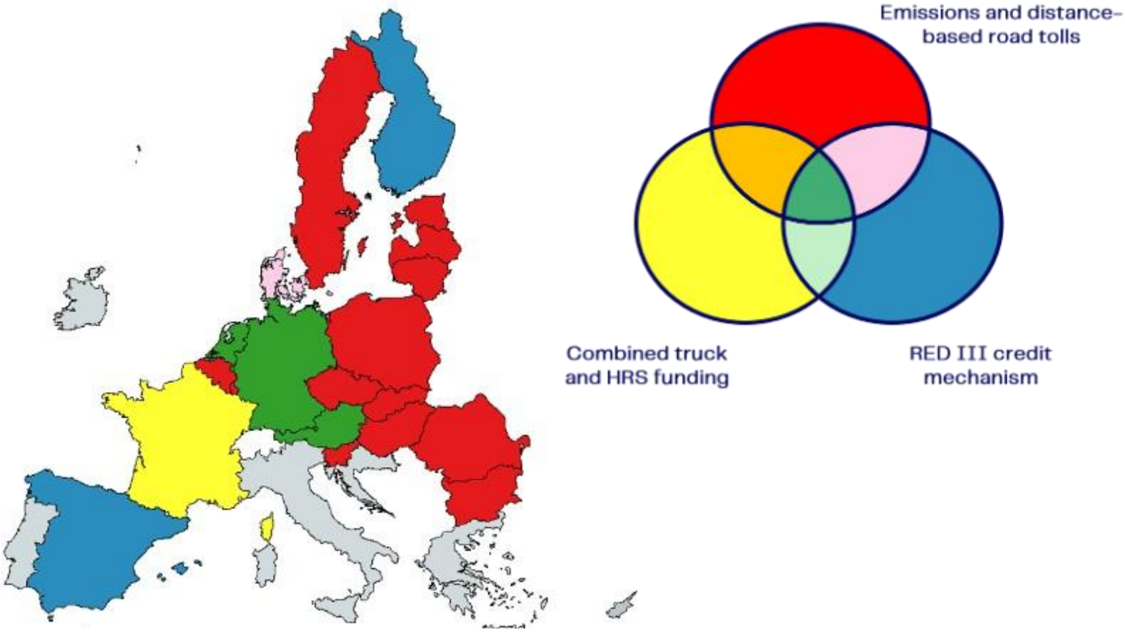
While a pathway towards policy-enabled TCO parity is developing, the pace of hydrogen truck and infrastructure deployment across Europe is lagging behind decarbonisation targets mandated in the HDV CO_2 standards. The majority of Member States have not yet implemented the policy packages needed to support early commercial deployment of hydrogen-powered trucking.

For example, the deadline for the transposition of RED III into Member States' legislation passed in May 2025. Despite this, many Member States have not yet designed RED III credit mechanisms, let alone mechanisms which provide a clear and investable route for RFNBO hydrogen in road transport. Further, road toll exemptions and reductions for zero-emission trucks are not applied consistently across Europe. Combined funding schemes for hydrogen trucks and stations remain limited to a small number of early-mover Member States.

This uneven implementation risks a slow and fragmented development of a European hydrogen trucking market: action across Europe is needed to build on the momentum of first deployments in Member States with strong policy frameworks. The second and third papers in this series explore two priority

[11] GHMA, September 2025

implementation areas: adapting European funding such as CEF AFIF to support combined truck-and-station deployment and introducing a TCO Parity Certainty Mechanism to provide long-term TCO certainty.



Status of policy implementation in EU Member States (see Annex 2)

H2Accelerate

DAIMLER TRUCK

Hyundai Hydrogen Mobility

Linde

Teal mobility

VOLVO

TotalEnergies

Annex 1 – TCO calculations

Fuel cell efficiency improvements

The price of fuel per km travelled is calculated from:

$$price\ of\ fuel\ per\ km = price\ of\ H2\ fuel\ \times fuel\ efficiency$$

The subsidised price of H_2 fuel is assumed to be 8€/kgH_2[12]. In April 2026, cellcentric announced its BZA375 fuel cell system for heavy-duty applications.[13] The system is expected to enable a fuel efficiency of less than 6 kg of hydrogen per 100 km, compared with an estimated baseline of ~7.5 kg of hydrogen per 100 km[14] for earlier fuel cell generations.

$$price\ of\ fuel\ per\ km_{next-gen\ fuel\ cell} = 8\ €/kgH_2 \times \frac{6\ kg/100km}{100} = 0.48\ €/km$$

$$price\ of\ fuel\ per\ km_{standard\ fuel\ cell} = 8\ €/kgH_2 \times \frac{7.5\ kg/100km}{100} = 0.60\ €/km$$

RED III – THG Quota credits

An illustrative **unsubsidised** price of hydrogen at the pump of **16€/kgH_2** was used, based on the total cost of renewable hydrogen production, distribution, and refuelling[15].

The trading price of THG quota credits was set to **320€/tCO_2**, based on average prices for 2025-2027 credits observed in February 2026.[16]

For 2026, fuel suppliers must achieve a **12% reduction** in greenhouse gas intensity[17] relative to the fossil fuel baseline of **94 gCO_2/MJ**[18], giving a target carbon intensity of:

$$94\ gCO2/MJ \times (100\% - 12\%) = 82.72\ gCO_2/MJ$$

Assuming RFNBO hydrogen has a carbon intensity of **9.1 gCO_2/MJ**[19], each megajoule of hydrogen provides an additional emissions saving of:

$$82.72\ gCO_2/MJ - 9.1\ gCO_2/MJ = 73.62gCO_2/MJ$$

Using a lower heating value of **120 MJ/kg H_2**, this is equivalent to an additional **8,834 gCO_2** avoided per kilogram of hydrogen.

Assuming a multiplier of **3** for RFNBO hydrogen used in road transport[20], each kilogram of hydrogen earns:

$$\frac{8{,}834\ gCO_2/kgH_2}{10^6\ g/t} \times 3 = 0.0265\ THG\ Quota\ credits\ /kgH_2$$

At a THG credit price of 320 €/tCO_2, the total subsidy enabled by the THG credits is:

$$subsidy\ amount = \frac{320€}{tCO_2} \times 0.0265\ THG\ credits(tCO_2)/kgH_2 = 8.48€/kgH_2$$

This reduces the effective hydrogen cost from **16 €/kg** to **7.52 €/kg**, corresponding to a fuel cost of **0.56 €/km**, compared with **1.20 €/km** (assuming 7.5kg/100km fuel efficiency) without THG credit revenue.

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[12] H2.LIVE, November 2025
[13] Cellcentric, April 2026
[14] National Platform for Mobility H2-BZ hydrogen fuel consumption in SZM in 2022-2030
[15] €6.50 renewable hydrogen production price in Germany, European Hydrogen Observatory, assumed €1.50/kg for storage and compression and €5/kg for distribution, €3/kg HRS contribution to hydrogen price at 700 bar in 2024, Clean Hydrogen Partnership SOA
[16] Average credit prices based on eot news, February 2026. 2025: 240€/tCO_2, 2026: 445€/tCO_2 and 2027: 285€/tCO_2
[17] S&P Global, December 2025
[18] NOW-GMBH, January 2024
[19] Based on the life cycle GHG intensity of RFNBO hydrogen European Commission, 2014
[20] BfJ regulation - THG Quota multipliers

Eurovignette – Differential road tolls

Zero-emission vehicles, including hydrogen combustion vehicles and hydrogen fuel cell vehicles, are exempt from tolls until the 30th of June 2031 in Germany.[21] Without this exemption, the toll for Euro 6 category trucks is 0.348€/km.[22] Assuming a proportion of distance travelled on toll roads of 90%, this is equivalent to a **toll rate of 0.31€/km.**

H_2 truck CAPEX subsidies

The German HRS and truck funding scheme sets a maximum funding amount of €300,000 per truck and up to 80% of the additional costs compared to a diesel equivalent.[23]

The cost of a diesel equivalent truck was estimated at €115,000 based on values by the Global H_2 Mobility Alliance.[24] The maximum hydrogen vehicle price is therefore:

$$€115{,}000 + \frac{€300{,}000}{80\%} = €490{,}000\ /truck$$

With the maximum subsidy of €300,000, the CAPEX of the hydrogen vehicle is reduced to €190,000. For the purposes of this illustrative TCO comparison, residual values of both diesel and hydrogen vehicles were excluded from the calculation.

German TCO comparison

TCO calculations assume a cost of capital of 8%, a first end-user lifetime of 5 years, and annual mileage of 120,000 km/year.

The fuel efficiency of a diesel truck was estimated at 25 L-diesel/100km.[25] At a price of diesel in Germany of €1.795/L, this results in a fuel cost component of:

$$\frac{25\ L/100km}{100} \times 1.795\frac{€}{L} = 0.449€/km$$

[21] Toll Collect | Toll for alternative drives
[22] Toll Collect | Toll rates
[23] PtJ, January 2026, Funding for Hydrogen Refuelling Stations and Hydrogen Vehicles
[24] Global Hydrogen Mobility Alliance, September 2025
[25] Automotive World, January 2015

Annex 2 – Implementation of supportive policies across Member States

RED III credit mechanism

The following Member States have implemented CO_2 reduction requirements for fuel suppliers which can be met by supplying renewable energy and/or trading "credits" with renewable fuel suppliers:

- The Netherlands, Obligations – Renewable Energy for Transport[26]
- Germany, THG Quota Mechanism[27]
- Denmark, CO_2 requirements for fuel suppliers[28]
- Finland, Act on the Promotion of the Use of Renewable Fuels in Transport[29]
- Austria, Fuel Ordinance 2012[30]
- Spain, Royal Decree 611/2026 (starting operation in 2027)[31]

Eurovignette and distance-based road tolls

According to the ECG Association's Overview of the Eurovignette Directive's implementation in Member States, in August 2025 11 Member States had implemented CO_2 and distance-based road tolls (Austria, Czech Republic, Denmark, Estonia, Germany, Hungary, Latvia, Lithuania, Luxembourg, Slovakia, Sweden)[32].

Since August 2025, Poland[33], Romania[34], the Netherlands[35], Bulgaria[36], Belgium[37], and Slovenia[38] have also implemented the Eurovignette Directive.

The Eurovignette Directive has been transposed into national law in both France and Portugal[39], however these are countries which operate concession contracts under which private operators collect tolls. CO_2 and distance-based road tolls will therefore only be required for new or renewed contracts, which is expected to result in delayed implementation relative to other Member States.

Combined truck and HRS funding

Member States which have implemented a combined truck and HRS funding scheme include:

- The Netherlands: Subsidy for hydrogen in mobility (SWiM)[40]
- Germany: Funding of hydrogen refuelling stations in road transport in connection with commercial hydrogen-driven vehicles[41]
- Austria: Zero-emission commercial vehicles and infrastructure (ENIN)[42]
- France: "Ecosystèmes territoriaux hydrogène" run in 2021 and 2023[43]

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[26] Dutch Emissions Authority, Renewable Energy for Transport Obligations
[27] BMUKN, December 2025, THG Quota Amendment
[28] Retsinformation, 2025, Act No. 483/2025
[29] Finlex, updated 2023, Act on the Promotion of Renewable Fuels in Transport
[30] RIS, updated 2026, Fuel Ordinance 2012
[31] Official State Gazette, July 2026, BOE-A-2026-16011 Real Decreto 611/2026
[32] ECG Association, August 2025, Eurovignette Directive Implementation Update
[33] Eurowag, June 2024, Toll Rate Changes Due to Implementation of CO2 Classes
[34] Logifie, May 2026, Romania: TollRo Distance-Based Truck Toll
[35] Trucktoll Netherlands, July 2026, Truck Toll Rates
[36] AEBTRI, June 2026, New Toll Rates and CO2 Component from 1 June 2026
[37] Viapass, May 2026, Kilometre Charge Changes from 1 July 2026
[38] DarsGo, Slovenia CO2 Emission Classes
[39] Diario da Republica Portuguesa, March 2025, Decreto-Lei n.º 38/2025
[40] Business.gov.nl, 2026, Subsidy for hydrogen in mobility (SWiM)
[41] PtJ, January 2026, Funding for Hydrogen Refuelling Stations and Hydrogen Vehicles
[42] FFG, ENIN - Funding for Zero-Emission Commercial Vehicles
[43] Ministères Transition écologique, Aménagement du Territoire, Transports, Ville et Logement, February 2023 – Ecosystèmes territoriaux hydrogène