



# A Review of Policies for Decarbonising Heavy Goods Vehicles in Ireland

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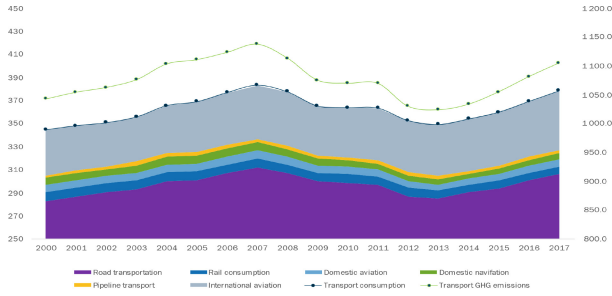
**Abstract.** The transport sector in Ireland is in need of decarbonisation if the country is to meet its climate targets. Transport is an integral aspect of the nation's economy, with the importation of goods from neighbouring countries of France and the United Kingdom occurring using heavy goods vehicles (HGVs). With the current development in transport decarbonisation and evolution of the energy sector in the country, the adoption of electric vehicles (EV), both battery & hydrogen in the transport sector, may be an attainable pathway to mitigating carbon emissions, especially from the country's heavy-duty vehicles. This review investigates the existing policies as they relate to the Irish transport sector and its decarbonisation targets. It investigates the challenges and the quick points that must be addressed for the decarbonisation targets to be met. It focuses on hydrogen-based transport and the necessary policies that could be explored as pathways to decarbonise the sector, especially the HGVs sector. The study will give policymakers an understanding of immediate actions to take and how these would impact the long-term decarbonisation strategy of the country.

**Keywords:** Transport Decarbonisation · Irish Transport Sector · Heavy Goods Vehicles (HGVs)

## 1 Introduction

The decarbonisation of HGVs has become a critical agenda worldwide due to the urgent need to address climate change and achieve sustainability goals [1], as they are a significant source of greenhouse gas emissions. In Ireland, HGVs are defined as vehicles weighing over 3.5 tonnes [2], and their reliance on diesel fuel resulted in 16% of total emissions in 2019, with the transportation sector being a major contributor to the EU's energy consumption and greenhouse gas emissions in 2018 [3]. Figure 1 illustrates that over the 19-year span from 2000 to 2018, the final energy consumption in the transportation sector in the EU grew by 10.8%, while transportation-related emissions increased by 7.0%.

Ireland, like many other countries, has recognised the urgency of decarbonising HGVs and has taken steps to address this issue [4]. In recent years, Ireland has implemented several policies and including providing financial incentives, such as grants and tax relief, to encourage the adoption of low-emission vehicles.



**Fig. 1.** FEC and GHG emissions in the transport sector in the EU, 2000–2018, Source: S. Tsemekidi Tzeiranaki et al., 2023 [3]

## 2 Overview of Ireland’s HGV Fleet and Its Contribution to Emissions

In Ireland HGVs play a significant role in the transportation sector and contribute to emissions of greenhouse gases [5]. To understand the current state of HGVs in Ireland, it is important to review various sources and studies that provide insights into the haulage industry, adoption of zero-emission vehicles, and relevant strategies.

**10-Year Haulage Strategy:** The Government’s Road Haulage Strategy 2022–2031, launched in December 2022, aims to cut transport emissions by 50% by 2030 in the challenging road haulage industry through measures like route optimisation and alternative fuel adoption. Given the heavy reliance on diesel in the sector, the strategy addresses the dual challenge of expanding operations while curbing emissions effectively [6].

**Ireland’s Hydrogen Strategy:** The National Hydrogen Strategy is an important policy document for Ireland, signalling progress in establishing a sustainable hydrogen sector in line with the nation’s net-zero emissions goal by 2050. It emphasises renewable hydrogen as a feasible alternative to fossil fuels in sectors where electrification may not be practical, aiding in emissions reduction. The strategy lays out a roadmap for developing essential hydrogen infrastructure, such as pipelines and storage facilities, highlighting Ireland’s commitment to advancing its green hydrogen sector and cutting carbon emissions [7-9].

**Zero Emission Vehicles, SEAI, EPA, and SIMI Data:** By analysing data from SEAI, EPA, and SIMI, valuable insights can be obtained regarding zero-emission vehicles in Ireland’s HGV sector, including registered numbers, infrastructure development, emission targets, and policy initiative [5, 10, 11]. These data sources provide a comprehensive overview of the current status of HGVs in Ireland, their emissions impact, and progress towards zero-emission vehicle adoption, aiding in identifying areas for decarbonisation efforts within the sector [5]. Reviewing this information helps pinpoint opportunities and areas for improvement in advancing sustainable practices within Ireland’s HGV industry [10].

**Hydrogen Bus Trial 2020:** Hydrogen Mobility Ireland (HMI) and DCU conducted research on the performance of hydrogen fuel cell electric buses, showcasing promising

results with an impressive 3086 km distance covered over 8 weeks, minimal hydrogen consumption, and zero tailpipe emissions. The trial, backed by various stakeholders, revealed high public satisfaction, showcasing the bus’s adaptability across urban, sub-urban, and rural routes, including challenging winter conditions [12]. The study underscored the efficiency of hydrogen buses with fast refuelling times and highlighted their potential as low-emission options in Ireland’s public transport network, aligning with sustainable transport solutions [13].

### 3 Challenges and Barriers Specific to Decarbonising HGVs in Ireland

Several challenges and barriers specific to decarbonising HGVs exist in Ireland including limited availability of zero-emission HGV models suitable for long-haul transportation [14]. Inadequate charging infrastructure and concerns about the range and charging time of electric HGVs also pose barriers to adoption [15]. In a recent study by Tölke and McKinnon, 811 road freight carriers across 32 European countries were surveyed. The findings indicated that while approximately two-thirds of these carriers prioritise freight decarbonisation, a significant portion, 70%, lack the knowledge needed to implement carbon-reduction measures, and 43% face difficulties in calculating and reporting emissions from their road freight operations [16]. Table 1 below gives a snapshot of the various categories of challenges in HGV decarbonisation.

**Table 1.** Decarbonisation barriers identified among European transport operators.

Barrier Category	Barriers
Political	Politicians and policymakers are pinning their hopes on zero emissions truck technology to deliver this decarbonisation
Economic	Cost pressures among the majority of small operators
Social	Involvement and buy-in from SME carriers
Technological	Supply of new vehicle technology
Legal	The majority of the transport mobility strategy is focused on passenger transport and most of the references to freight relate to modal shift
Environmental	Transport relies on road mode

Source: Tölke and McKinnon, 2021 [16]

## 4 Policy Review and Analysis for HGV Decarbonisation in Ireland

### 4.1 Overview of National Policies and Initiatives

- **Climate Action Plan:** Ireland’s Climate Action Plan sets targets to reduce greenhouse gas emissions across various sectors, including transport. It aims to transition to a low-carbon economy, promote electric vehicle adoption, and establish support for the decarbonisation of HGVs [17].

- **EU Directives:** Ireland is obligated to follow various European Union directives related to transport emissions reduction. The Alternative Fuels Infrastructure Directive and the RePowerEU initiative encourage the deployment of alternative fuels infrastructure, including electric vehicle charging stations, hydrogen refuelling stations, and natural gas filling stations [18].
- **The TEN-T policy** of the European Union plays a pivotal role in establishing a comprehensive and efficient transport infrastructure network across the EU. The policy's objectives encompass facilitating the smooth movement of people and goods, enhancing accessibility to employment and services, promoting trade and economic development, and reinforcing social and territorial cohesion within the EU. Additionally, the TEN-T policy places a strong emphasis on reducing the environmental impact of transportation, while simultaneously enhancing safety and the overall resilience of the transport network [19].
- **RED II:** Ireland is committed to meeting the requirements of the Renewable Energy Directive II (RED II). This directive aims to increase the share of renewable energy in transport, promoting the usage of sustainable biofuels, renewable hydrogen, and renewable electricity for transport purposes [20].

## 5 Policy Recommendations

Accelerating the decarbonisation of HGVs in Ireland requires well-designed and comprehensive policy interventions that can drive the adoption of zero-emission HGVs.

**Establishing Regulatory Frameworks and Setting Targets:** The European Commission's proposed amendments aim to enforce stricter CO<sub>2</sub> emission standards for heavy-duty vehicles from 2030 onwards, extending coverage to smaller trucks and buses, thereby promoting cleaner technologies and low-emission vehicle development. By establishing specific emission caps like CO<sub>2</sub> limits, manufacturers are incentivised to create and market low-emission vehicles [21]. This will promote the gradual phase-out of internal combustion engine HGVs and promote the transition to zero-emission alternatives.

**Financial Mechanisms and Incentives to Support HGV Decarbonisation:** Transport & Environment UK, via Element Energy (an ERM Group company), studied accelerating battery electric truck adoption in Great Britain, optimising charging methods. Taking a cue from this study, Ireland government should provide grants and subsidies for the purchase of zero-emission HGVs and charging/infrastructure installation, reducing the upfront costs for operators and encouraging faster adoption. Also, tax Incentives like exemptions or reductions on road tax, toll fees, and parking charges for zero-emission HGVs making zero-emission options more financially attractive to fleet operators [22].

**Integration into Broader Sustainable Transportation Strategies:** Promoting multi-modal transport integration involves combining HGVs with rail, inland waterways, and alternative modes to reduce road dependency and enhance last-mile delivery using zero-emission vehicles. Intermodal solutions, as outlined by UNCTAD, optimise infrastructure use, boost logistics performance, cut inventory costs, and facilitate market connectivity [23]. Collaboration, according to IEA [23], is essential as international cooperation

is vital for expediting the decarbonisation process, ensuring timely progression towards a zero-emission HGV sector, and aiding in achieving sustainable transport goals [12].

## References

1. European Environment Agency. Trends and projections in Europe 2019 — Tracking progress towards Europe's climate and energy targets (2019)
2. Vehicle standards for heavy commercial vehicles (HCVs). Parliament.uk. <https://www.rsa.ie/road-safety/road-users/professional-drivers/vehicle-safety-legislation/heavy-commercial-vehicles/introduction>
3. Tsemekidi Tzeiranaki, S., et al.: The impact of energy efficiency and decarbonisation policies on the European road transport sector. *Transp. Res. Part A: Pol. Pract.* **170**, 103623 (2023). <https://doi.org/10.1016/j.tra.2023.103623>
4. Government of Ireland. (2019). Climate Action Plan 2019
5. Transport Research Innovation Monitoring and Information System. Heavy Commercial Vehicles - Ireland Country Analysis (2020)
6. Ireland's Road Haulage Strategy 2022–2031 (n.d.). <https://assets.gov.ie/242639/3ae11fc7-5e78-4057-9721-65554521d0a8.pdf>
7. [www.gov.ie](https://www.gov.ie). (2023). National Hydrogen Strategy. <https://www.gov.ie/en/publication/624ab-national-hydrogen-strategy/>
8. Patrick\_Planit (n.d.). Publications. Hydrogen Mobility Ireland. <https://h2mi.ie/publications>
9. Patrick\_Planit (n.d.). White Paper: Policy to Enable Green Hydrogen in Ireland & the Benefits of Hydrogen in Mobility to Ireland. Hydrogen Mobility Ireland. <https://h2mi.ie/benefits-of-hydrogen/>
10. Sustainable Energy Authority of Ireland. (2021). SEAI Electric Vehicle Statistics
11. [www.gov.ie](https://www.gov.ie). (n.d.). Environmental Protection Agency (EPA). <https://www.gov.ie/en/organisation/14541907-environmental-protection-agency-epa/>
12. United Nations Conference on Trade and Development (UNCTAD). “Thematic Discussion 8: Multi-Modal Sustainable Transport and Transit Solutions: Connecting Rail, Maritime, Road & Air.” Global Sustainable & Transport Conference (2016). <https://sustainabledevelopment.un.org/content/documents/11694Thematic%20discussion%208%20concept%20note.pdf>
13. The Irish Times. (n.d.). Dublin Bus unveils tour buses run on biofuel-1.784865. <https://www.irishtimes.com/news/dublin-bus-unveils-tour-buses-run-on-biofuel-1.784865>. Accessed 9 Oct 2023
14. [www.gov.ie](https://www.gov.ie). (n.d.). Low-Emission Bus Trials Report. <https://www.gov.ie/en/publication/7251e2-low-emission-bus-trials-report/>
15. Li, K., Acha, S., Sunny, N., Shah, N.: Strategic transport fleet analysis of heavy goods vehicle technology for net-zero targets. *Energy Policy* **168**, 112988 (2022). <https://doi.org/10.1016/j.enpol.2022.112988>
16. Tolken, M., MacKinnon, A.: Decarbonizing the operations of small and medium-sized road carriers in Europe (2021). <https://d2aye3ggtndtn5.cloudfront.net/app/uploads/2021/02/REP-EN-2021-01-25-Decarbonizing-the-operations-of-small-and-medium-sized-road-carriers-in-Europe.pdf>
17. Towards a Decarbonisation Roadmap for Road Transport Companies in Ireland: A Gap Analysis of Policy Agenda and Industry Perception (2022). [https://www.cilt.ie/Portals/0/adam/FAQ%20with%20Categories/6wnyEgotTUUpUyLHBT2MHQ/DocumentLink/CILT%20paper%202\\_Towards%20a%20Decarbonisation%20Roadmap%20for%20Road%20Transport%20Companies%20in%20Ireland\\_2022.pdf](https://www.cilt.ie/Portals/0/adam/FAQ%20with%20Categories/6wnyEgotTUUpUyLHBT2MHQ/DocumentLink/CILT%20paper%202_Towards%20a%20Decarbonisation%20Roadmap%20for%20Road%20Transport%20Companies%20in%20Ireland_2022.pdf). Accessed 26 Sept 2023
18. Government of Ireland (2022). Climate Action Plan 2023. [www.gov.ie](https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/), <https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/>

19. [www.npws.ie](https://www.npws.ie/legislation/eu-directives). (n.d.). EU Directives | National Parks & Wildlife Service. <https://www.npws.ie/legislation/eu-directives>
20. European Commission (2013). Trans-European Transport Network (TEN-T). [transport.ec.europa.eu](https://transport.ec.europa.eu/transport-themes/infrastructure-and-investment/trans-european-transport-network-ten-t_en). [https://transport.ec.europa.eu/transport-themes/infrastructure-and-investment/trans-european-transport-network-ten-t\\_en](https://transport.ec.europa.eu/transport-themes/infrastructure-and-investment/trans-european-transport-network-ten-t_en)
21. Carton, J.: Ireland's 1st Hydrogen Fuel Cell Bus Trial 2020 -Rev 0 Exploring Low Emissions Public Transport; Analysis of Ireland's 1st Hydrogen Bus Trial -2020 (2020). <https://hydrogenireland.org/wp-content/uploads/2021/11/Irelands-1st-Hydrogen-Bus-Trial-2020-Rev-0.pdf>
22. "Reducing CO<sub>2</sub> Emissions from Heavy-Duty Vehicles." [Climate.ec.europa.eu](https://climate.ec.europa.eu/eu-action/transport/road-transport-reducing-co2-emissions-vehicles/reducing-co2-emissions-heavy-duty-vehicles_en), [climate.ec.europa.eu/eu-action/transport/road-transport-reducing-co2-emissions-vehicles/reducing-co2-emissions-heavy-duty-vehicles\\_en](https://climate.ec.europa.eu/eu-action/transport/road-transport-reducing-co2-emissions-vehicles/reducing-co2-emissions-heavy-duty-vehicles_en)
23. HGVs on the Road to Net Zero How Battery Electric Trucks Can Decarbonise GB Road Freight (2023). [https://www.transportenvironment.org/wpcontent/uploads/2023/05/2023\\_05\\_TE\\_study\\_summary\\_HGVs\\_road\\_net\\_zero.pdf](https://www.transportenvironment.org/wpcontent/uploads/2023/05/2023_05_TE_study_summary_HGVs_road_net_zero.pdf)

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