

## The Significance of Green Taxes in Transport Electrification in Norway

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### Abstract

**Aim:** Norway's rapid road transport electrification offers a valuable case for understanding how green taxation can accelerate decarbonisation. This article's objective was to examine how the electrification of transport can be accelerated via green taxation, analysing Norwegian policies implemented between 1991 and 2025, and to understand the socio-economic significance of the policies.

**Methodology:** The paper is largely based on the review of government reports, scientific literature and institutional websites on climate change policy, energy policy and transport policy in Norway.

**Results:** The study revealed that high carbon prices, combined with targeted fiscal incentives and infrastructure expansion, have transformed new car markets and reduced transport emissions, however this approach also entailed significant fiscal costs. Despite progress, challenges such as oil and gas revenue dependence, domestic political dynamics, and distributional and regional equity issues persist.

**Implications and recommendations:** The article advocates an adaptive policy framework to address strategic policy gaps and to ensure an environmentally, socially, and financially sustainable transition, featuring transparent revenue recycling, investment in grid and charging capacity, and complementary measures to protect vulnerable households.

**Originality/value:** To contribute to the existing literature on green taxation for transport electrification and to support future policy development, this paper assesses the role of green taxation in accelerating EV adoption. It outlines the Norwegian approach to transport electrification, evaluates the significance of green taxes for EV adoption, and concludes with recommendations for an adaptive and balanced policy framework to ensure an environmentally, socially, and financially sustainable transition.

**Keywords:** green taxation, electric vehicles, transport sector electrification, Norway, energy transition, climate mitigation policy, economic development

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## 1. Introduction

The advancing crisis of anthropogenic climate change demands urgent and comprehensive responses across all sectors of the global economy to mitigate its consequences. Transport is a major contributor to global GHG emissions, making its decarbonisation critical for meeting climate targets (IPCC, 2021). Electrification, particularly through the adoption of electric vehicles (EVs) in light-duty road transport, is a central strategy for this transition (IEA, 2021). Nonetheless, it poses a variety of challenges, including high implementation costs, the need for sufficient renewable electricity production, the establishment of suitable infrastructure, as well as a socially equitable transition. Despite these difficulties, many countries are advancing transport electrification to counteract climate change, prompting ongoing debates over the most effective strategies for rapid implementation. Norway holds an important position as global leader in EV adoption, and its extensive natural and financial resources have supported early progress, making it a valuable policy reference for ‘follower’ countries aiming to tailor electrification strategies to their specific conditions.

Since 1991, Norway has pursued private transport electrification, primarily through green taxation. The National Transport Plan 2018-2029 set a goal of 100% zero-emission new car sales by 2025 (Norwegian Ministry of Transport, 2017), with 91.19% achieved by 2024 (EAFO, 2025b). This development is supported by the country’s well-developed renewable energy infrastructure, reducing fossil fuel dependence, yet academic debate continues over the broader impact of the measures. This article examines Norway’s EV policy from 1991 to 2025, its successes and the challenges encountered. The objective was to assess the significance of green taxes in accelerating transport electrification, as well as their socio-economic consequences. Learning from the Norwegian example, it draws lessons for other countries aiming at the decarbonisation of their transport sector.

Norway is widely recognised as a prime example of both human development and environmental responsibility. Nearly all the electricity used in the country is generated from renewables, with hydropower accounting for 89.1% and wind 9% in 2023 (Climate Action Tracker, 2022; IEA, 2023b), which has supported the establishment of a renewable electricity system (Norwegian Ministry of Energy, 2016). However, fossil fuels dominate overall energy production, with oil and gas making up 93.1% in 2023 (IEA, 2023b). They also remain central to the economy, accounting for 21% of the GDP, 30% of the state’s revenue and 45% of exports (Norskpetroleum, 2024).

Norway strives to sustain its economic prosperity while simultaneously advancing its energy transition, relying on a range of policy instruments, such as the national carbon tax implemented in 1991. In order to contribute to the existing literature on green taxation for transport electrification and to support future policy development, the authors assessed the role of green taxation in accelerating EV adoption. The article outlines the Norwegian approach to transport electrification, evaluates the significance of green taxes for EV adoption as well as their socio-economic impact, and concludes with recommendations for an adaptive policy framework to ensure an environmentally, socially, and financially sustainable transition.

## 2. Literature Review

The literature presents diverging views on Norway's climate priorities. Some scholars call for fossil fuel phase-outs in offshore petroleum and the transport sector, while others argue that such domestic emissions reductions are less effective and suggest Norway should finance emission reductions abroad while leveraging its renewable resources for economic growth (Boasson & Jevnaker, 2019).

Norway's 1991 carbon tax positioned it as a pioneer in energy transition, although the effectiveness of green taxes is still being debated. Bruvoll and Larsen (2002) evaluated the relatively high Norwegian carbon tax in the first eight years of implementation, finding only a modest 2.3% reduction in CO<sub>2</sub> emissions could be directly attributed to it, in part because a broad range of fossil fuel intensive industries was exempted from the carbon tax due to competitiveness concerns. They concluded that a more uniform taxation would be more effective (Bruvoll & Larsen, 2002).

In the context of the EU emission trading system, Ptak (2014) showed a more optimistic view, along with some similar criticism. The study estimated that without environmental taxes and complementary policies, 2010 GHG emissions would have been 10.8 million tonnes higher, with taxes on Norwegian continental shelf companies contributing most significantly. The design and implementation must ensure adequate coverage across economic sectors and setting tax rates high enough to influence behaviour while minimising economic distortions. Ptak argued for uniform emission pricing across firms and sectors, noting that differentiated tax rates on fuels and sectors reduce environmental policy effectiveness. Taxes also work best when paired with other policies, such as renewable energy subsidies and technological innovation. To address industry resistance and potential regressive tax effects on lower-income groups, the study recommended revenue recycling and transparent policy communication (Ptak, 2014).

Through surveys of the population and companies, Dugstad et al. (2024) demonstrated that public support for green taxes increases when the revenues fund climate change mitigation and reduce social inequalities. A hybrid revenue recycling model – earmarking 20% of the carbon tax revenues to reduce urban-rural income inequalities and allocating 80% to mitigation efforts – generated the highest acceptance, even though this reflects a trade-off between efficient carbon tax levels and equity (Dugstad et al., 2024). Overall, the literature advocates refining green taxation by targeting previously exempt sectors, minimising competitiveness concerns, and addressing equity through revenue use.

Regarding the electrification of transport, Barkenbus (2020) examined the implications of EV transition for societies and consumers, highlighting both benefits (e.g. lower emissions, air pollution and maintenance costs) and challenges (e.g. battery performance compared to conventional vehicles and industry resistance).

Norway's global leadership in EV adoption has inspired extensive analysis. Employing Multi-Level Perspective Transition Theory, Figenbaum (2017) analysed the evolution of the Norwegian EV, concluding that EVs initially gained traction in regional niche markets where early incentives were particularly favourable to consumers. The study traced the transition to national uptake to incremental incentives and infrastructure expansion. However, among the critics of the policy, Holtmark & Skonhoft (2014) assessed it as inadequate for most of its objectives: they argued that although the policy reduces emissions and mitigates their local consequences, the subsidies create misaligned incentives, encouraging unnecessary second car purchases. They also emphasised that the strategy is especially unsuitable for countries with fossil fuel-based electricity systems.

Many studies document regional disparities; Schulz & Rode (2022), Yang et al. (2023), and Bjerkan et al. (2021) underlined the development and state of charging infrastructure as a key factor. Considering socioeconomic, demographic, and climatic conditions of Norway's advanced EV market, Yang et al. (2023) found that a younger, wealthier population in urban and well-equipped areas drive EV adoption, whereas an older population, the less developed infrastructure in rural areas and colder temperatures reducing battery capacities, limit EV uptake. Bjerkan et al. (2021) showed that locally tailored policies, including infrastructure investments and consumer-friendly incentives, enhance EV adoption rates.

To sum up, the literature emphasises Norway's pioneering status in EV promotion that is largely attributed to the multilevel green taxation approach. However, it also identifies significant limitations, particularly considering its usefulness for reducing emissions as well as social and geographic inequalities, stressing the need for reforms of green tax approaches. This research contributes to this debate about the potential of Norway's green tax model for the accelerated electrification of its transport sector.

### **3. Methodology**

This research was based on the revision of literature via the common scientific search engines and selected using the following criteria: (1) sources dealing with the subjects relevant to the research objective, namely transport electrification in Norway and the impact of green taxes, (2) focus on data and literature published in English, (3) information derived from sources deemed credible. In the case of primary literature, this meant official governmental or institutional publications that use replicable methods to obtain data, and that generally coincide with other equally credible sources. In the case of secondary literature, only papers published by academic sources and fulfilling high academic standards were selected. Both the findings of the primary and secondary literature were addressed, bearing in mind that some of the sources come with a positionality of the issuing authors or institutions. The authors focused on the period starting with the introduction of Norwegian EV incentives in 1991 to the present in 2025. To manage this relatively broad timeframe and to incorporate the most recent developments and empirical data, they prioritised recent data where possible. The sources that were deemed relevant following these criteria were read, summarised, and categorised by topic.

### **4. Results and Discussion**

This section presents an overview of the advancement of the electrification of transport in Norway and its financing mechanisms, and analyses the consequences of green taxes for equity and the electrification of Norway's transport.

This paper adopted the definition of green taxes as taxes that increase the relative price of a product or an activity that has a negative impact on climate or the environment (Natome & Feiring, 2021).

Since the Norwegian green tax policies relevant to this paper revolve primarily around the electrification of private transport, the study focused on road transport and passenger cars. According to Lovdata (n.d.), passenger cars are vehicles designed for the transport of passengers with up to eight seats in addition to the driver's seat. They are differentiated from delivery vans, i.e. goods vehicles with a maximum permissible mass of 3.5 tonnes, and trucks, defined as goods vehicles exceeding 3.5 tonnes (Lovdata, n.d.).

#### **4.1. The Electrification of Transport in Norway**

##### **The Norwegian Strategy for Electromobility**

Since 2016, the Norwegian transport policy has aimed to ensure that all newly registered passenger vehicles are emission-free – electric or hydrogen-powered – from 2025 (IEA, 2023a; Norwegian Ministry of Transport, 2017). This objective serves to reduce emissions and energy consumption in the transport sector that is generally the second largest contributor to domestic GHG emissions (IEA, 2022; Norwegian Environment Agency, 2025). Since 1991, extensive incentives have been created to make EVs more economically attractive. In addition to the Norwegian carbon taxes, that have made emissions more expensive, less carbon intense and emission-free vehicles benefit from reduced costs in various areas (Government of Norway, 2025). This green taxation strategy is intended to offset the higher acquisition costs of EVs compared to vehicles powered by fossil fuels (Fraunhofer ISI, 2023) and improve their competitiveness. As a reaction to the successful EV uptake and other consequences of the measures taken, the incentives have been continuously adapted, while ensuring that zero-emission vehicles are advantaged.

Between 1990 and 2022, the EV incentives included the elimination of purchase taxes and import duties on EVs, while in 2023 this was replaced by weight-based reductions of purchase taxes. Similarly, zero-emission vehicles were exempted from annual road taxes between 1996 and 2021. After the 2022 reintroduction, EVs are currently charged the lowest rate of NOK 455. Additionally, Norwegian circulation taxes depend on the type of fuel a vehicle uses, disfavoring combustion engines. Furthermore, between 2001 and 2022, no value added tax (VAT) was charged on the purchase of zero-emission vehicles. Since 2023, VAT has only been charged on the amount exceeding NOK 500,000. A similar model applies to the road traffic insurance tax for EVs. In addition, EV owners were exempted from toll road fees from 1997 to 2017. Between 2018 and 2022, they paid a maximum of 50%, increasing to 70% in 2023. Moreover, reduced parking and ferry usage fees apply for EV users (EAFO, 2025b; IEA, 2022; Norwegian Electric Vehicle Association, 2022). The fiscal incentives also apply to company vehicles used by employees via company car tax, reduced by 25% from 2000, and subsequently amended several times to 20% from 2022.

The Norwegian EV strategy also includes non-fiscal instruments; inadequate charging infrastructure and consumer concerns about reduced convenience compared to conventional vehicles have been identified as primary barriers to EV adoption in modern markets (Schulz & Rode, 2022; Yang et al., 2023). In Norway there are regional disparities in both EV ownership and infrastructure, and to address this, since 2009 Norway has invested in expanding its charging infrastructure, in the past predominantly privately funded (Schulz & Rode, 2022). The goal of establishing a reliable charging network was set out by law via the right to charge in 2017, guaranteeing access to public charging stations for residents of apartment buildings (EAFO, 2025b; Norwegian Electric Vehicle Association, 2022). Thus, except for 2020, the number of charging stations has increased steadily in recent years (EAFO, 2025b), which resulted in a well-developed charging network of over 9,000 public fast-charging stations at the end of 2024 (Government of Norway, 2025). However, as municipalities have varying budgets for supporting infrastructure development, financial support for installing charging stations varies by region (EAFO, 2025b). Additionally, measures addressing consumer appeal, such as the 2005 introduction of bus lane access for EVs, have been implemented, although this privilege now varies by municipality (Norwegian Electric Vehicle Association, 2022).

Despite persistently high transport related emissions, these policies have brought results, as seen in Figure 1 they have been declining since their 2014 peak. The share of transport in total emissions rose from 19% (1990) to 26% (2023), with road transport accounting for 67% of transport-related emissions. Between 2015 and 2023, these emissions fell by 22%, in particular due to the increased use of biofuels and the promotion of EVs (Norwegian Environment Agency, 2025).

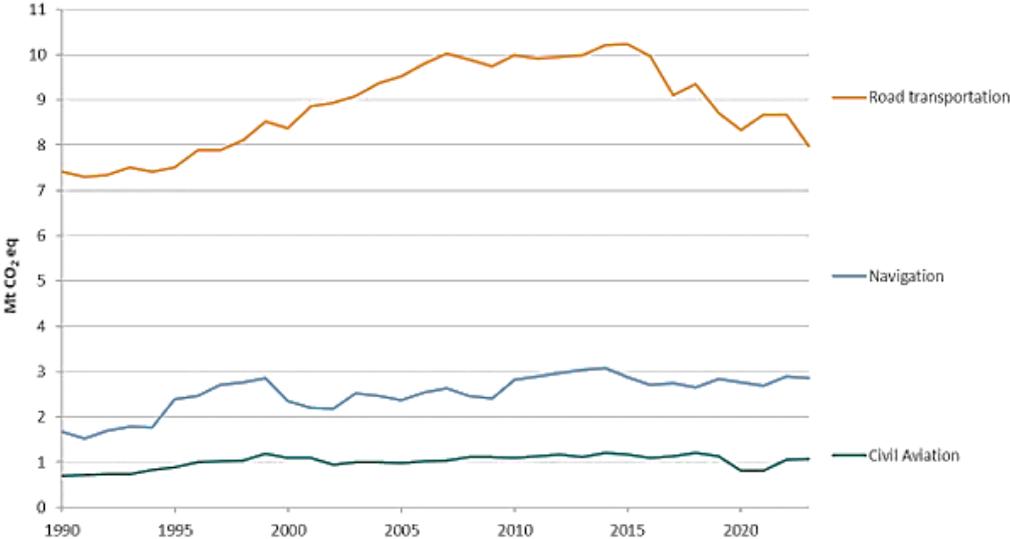


Fig. 1. Emissions in million tonnes CO<sub>2</sub> equivalents, by modes of transport 1990-2023

Source: (Norwegian Environment Agency, 2025, pp. 2-9).

## Financing Mechanisms

The scope of the measures is reflected in Norwegian transport budgets, which have increased from 3.1% to 5% (NOK 90 billion in 2024) of the total budget between 2009 and 2024 (Norwegian Ministry of Transport, 2024). In addition, the Norwegian budget allocates resources to different funds, including the Climate and Energy fund managed by the state-owned Enova SF, which supports Norway's transition towards a low-emission society (Enova, 2024) and the financing of fast-charging infrastructure (IEA, 2022). Even though revenues from CO<sub>2</sub> and NO<sub>x</sub> taxes flow into the Norwegian budget without being earmarked for a specific purpose, the implementation of green taxes has enabled Norwegian governments to redirect revenue derived from environmentally harmful activities toward the country's climate-friendly transition, notably transport electrification.

At the same time, Norway's prosperity, which facilitates the implementation of its comprehensive EV support strategy, is substantially derived from petroleum and natural gas export revenues that accounted for 61% of goods exports in 2024 at NOK 1,100 billion (Norskpetroleum, 2025). The state budget planned NOK 624 billion in 2025 from the petroleum sector (Norskpetroleum, 2024). Although these revenues are not classifiable as green tax revenues in the strict sense, they enable a strategic reallocation in favour of climate goals.

Despite all of this, the fiscal impact of the EV incentives is considerable: projections indicated they would result in a tax revenue loss of NOK 50 billion in 2025 compared to 2007 and a cumulative loss of NOK 640 billion between 2007 and 2025 (Government of Norway, 2025). This shortfall is partially funded through green taxes, however in view of declining revenues from emission-based taxes, Norway is pursuing a dynamic policy approach. As EV adoption rates increase, green tax revenues have become insufficient to compensate for the tax reductions, which consequently have gradually been scaled back while maintaining core environmental objectives (Government of Norway, 2025; IEA, 2022; Norwegian Electric Vehicle Association, 2022; Norwegian Ministry of Transport, 2024; OECD, 2022a). Paradoxically, the fiscal losses demonstrate the policy's effectiveness, revealing a substantial market shift towards lower-emission vehicles and demonstrating the potent influence of financial incentives in mitigating GHG emissions.

## 4.2. Green Taxes and Equity Concerns

This section analyses Norway's legal set up and its results. Norway has one of the highest carbon prices globally, and approximately 85% of domestic GHG emissions are either covered by the EU ETS or subject to a GHG tax, or both. At the same time, the government provides substantial incentives for the adoption of renewable energy and emerging green technologies, particularly EVs. The taxes are designed to reflect the social costs of energy use. Revenues from CO<sub>2</sub> taxes and ETS allowances are funnelled into the state budget without any earmarking, whereas those from taxes on offshore petroleum are funnelled directly into the Government Pension Fund Global (IEA, 2022).

Norway's climate framework targets a 50-55% reduction in GHG emissions by 2030 and a 90-95% reduction by 2050, as legally anchored in the 2017 Climate Change Act (IEA, 2022). Furthermore, the Climate Action Plan 2021-2030 aims at a 45% emission reduction from 2005 levels from sectors not covered by the EU ETS. This includes transport, buildings, waste and agriculture which account for around half of Norway's total emissions (IEA, 2022). A central instrument is the gradual increase of the national carbon tax toward NOK 2,000 per tonne of CO<sub>2</sub> by 2030, placing Norway among the countries with the highest effective carbon prices globally (Eriksson et al., 2023; IEA, 2022).

Cincotta & Thomassen (2025) noted that the success of the Norwegian model is due to a combination of the choice of the set improvements in the quality of EV technology and policy incentives. Specifically, the purchase tax exemption explains the bulk of the EV increase, without which the EV market share would have been reduced to 25% in 2021 compared to its observed share of 65%. Without the combined effect of all the implemented policies, the EV share would have grown slowly, as in other countries that do not use strong EV incentives, and it would have reached 10% in 2021. Similarly, the

EV tax exemption on purchase contributed the most to the CO<sub>2</sub> reduction between 2012 and 2021 (Cincotta & Thomassen, 2025).

A comparison with the EU contextualises the Norwegian results. In the EU the ETS, the system for emission reduction does not cover road and transportation emission. The incentives supporting goals e.g. Fit for 55 include mostly national level taxes and tax exemptions, therefore varying within the EU. The results so far are not sufficient to reach the objectives, whilst Norway's more rigorous and adaptive policies have yielded stronger results. In 2023 the EU emitted 794 million tonnes of the CO<sub>2</sub> equivalent from the transport sector – a slight decrease of 1.24% from 2022, but still higher than the 771 MtCO<sub>2</sub> in 2013. Emissions increased after this year, except during the pandemic. Instead, in 2023 Norway emitted a total of 11.98 million tonnes of transport sector GHG emissions, compared to 12.67 MtCO<sub>2</sub> in 2022. There has been a downward trend since the peak in 2014 (14.55 MtCO<sub>2</sub>), with emissions having fallen by 17.66% since then (European Environment Agency, 2025; Statista, 2025).

### 4.3. Equity Concerns

Norway has faced many challenges in implementing and reforming green taxes. Depending on the tax design, climate taxation can have negative effects on poverty, consumption patterns and how the generated revenue is used, hence it can encounter social opposition, especially when there is low trust in the government (Natome & Feiring, 2021). Policy makers should keep in mind the latest research that shows the best allocation of revenue for best public support (Dugstad et al., 2024). This section shows the holistic consequences of the policy instruments.

From 2013 to 2022, effective carbon prices in Norway increased significantly, and households were consistently paying the highest rates due to high taxes on petrol and diesel, of which they consume more than other sectors. Carbon pricing also varied significantly across industries, with sectors like education, health, and construction facing relatively high costs in 2022, while oil products, coal, and heavy oil remained taxed at lower rates. These discrepancies arose from differing tax rates on various energy products and were further affected by tax exemptions for certain industries (Langdal, 2023).

Hence discussions have emerged regarding the necessity of policy reforms to alleviate the economic pressure on households without compromising the effectiveness of emission reduction strategies. The data gathered in this paper demonstrated that transparent political communication and revenue use are critical, and must favour vulnerable groups (Ptak, 2014). Policymakers should also use revenues to reduce urban-rural income inequalities and make mitigation efforts to generate the highest acceptability, yet this is a complicated process. Climate change mitigation policies can have pronounced distributional effects, and the willingness to pay for a carbon sequestration program differs across both age and income distribution. Understanding these distributional patterns in more detail can allow the design of more targeted and efficient environmental policies (Campbell et al., 2023).

Importantly, Johansen et al. (2018) concluded that the implementation of climate and energy tax reforms (CETR) in Norway showed, in all four scenarios considered, conflict with sub-national policy objectives regarding equality, e.g. the increased consumption tax on oil fuel and petrol products and how it would affect household income dispersion, regional income distribution and regional industry composition. As Norwegian regional policy seeks to reduce social disparities between regions and prevent the depopulation of rural areas, a non-differentiated CETR could go against this objective. To maintain the goal of working towards an egalitarian society, they suggest differentiated taxes or supplements by other instruments, remembering the complex framework that a green tax would need to not have indirect negative impacts, and that at the same time, a policy instrument should be easily understandable as well as broadly applicable to be efficient in a rapidly changing economy. The political discussion should emphasise industry structure changes towards less pollution, particularly in technological innovation and restructuring to support trade and business also in more rural regions (Johansen et al., 2018).

Another challenge is that oil and gas production remains central to Norway's economy, accounting for a significant portion of GDP and government revenues (93.1% in 2023 (IEA, 2023b)). This dependency creates tensions in the country's energy transition, as the sector contributes over a quarter to Norway's total emissions (OECD, 2024a). This paper argues that Norway's goal to become a low emission society requires a phase out of fossil fuel. The modest effect of the carbon tax on reducing CO<sub>2</sub> emission could be extended, especially with a broader, more cost-efficient tax, uniform for all firms, sectors and different fuels and GHGs. It is crucial to carefully balance this with the goals of an egalitarian society.

In recent years Norway increased its carbon tax by 28% for most fossil fuels in 2022 and 21% in 2023. Furthermore, a tax of NOK 77 (USD 7.34) per tCO<sub>2</sub> on natural gas and liquid petroleum gas used in previously exempt greenhouses was introduced in 2022. A new tax on waste incineration was increased and differentiated in 2023 (World Bank, 2022).

There is a general hesitance due to recession concerns. However, with a sufficient supporting scheme, companies could make environmental improvements while maintaining their competitive position. Additionally, as explained by the environmental Kuznets curve, at a certain threshold level of per capita GDP, further economic development is not associated with a deteriorating environment (Johansen et al., 2018).

Norway is not free of controversies regarding institutionalised links between government bodies and mainland energy intensive industries, who were historically able to avoid the increasing tax burden imposed on the transport sector and offshore petroleum companies since the 1980s (Kasa, 2000), therefore the quality of institutions must be considered for efficient policy measures.

Finally, even with Norway's robust carbon pricing levels, achieving the deep emissions cuts required to meet its 2030 targets will likely necessitate additional measures. There is an ongoing debate about phasing out of fossil fuel subsidies and providing targeted support for green industries to accelerate the transition. However, this will be a significant challenge, as those opposed to the changes argue that reducing domestic emissions is of little relevance, and that Norway should finance carbon emission reductions elsewhere while ensuring that its plentiful domestic energy resources continue to drive national economic growth (Boasson & Jevnaker, 2019).

Norway's high carbon tax is a key driver in its climate policy. It has contributed significantly to emissions reductions estimated to be 10.8 million tonnes lower in 2010 than they would have been without environmental measures (Ptak, 2014). Despite progress, major challenges persist. This paper highlights five interconnected domains: equity and justice, reforming taxation without undermining competitiveness or public support, phasing out fossil fuels, addressing entrenched industry networks (especially petroleum), and ensuring sustained political will. The authors agreed with the relevant literature that the carbon tax alone is insufficient to meet Norway's 2030 emissions target of 41 MtCO<sub>2</sub>/year (Climate Action Tracker, 2022). Therefore, the country needs complementary policies, such as differentiated taxes and sector-specific instruments that are both equitable and easy to implement. Norway has recently expanded coverage to previously exempt sectors, yet its policies still fall short of aligning with the 1.5°C Paris Agreement goal. If adopted universally, its current trajectory would limit global warming to 2°C—underlining the need for deeper sectoral reforms and a strategic phase-out of oil and gas (Climate Action Tracker, 2022).

#### 4.4. Assessment of the Significance

The combined policy efforts have shown significant results: by the end of 2023, 24.5% of all registered vehicles in Norway were battery EVs (BEVs) (EAFO, 2025b), compared to just 6.17% alternative fuelled light-duty vehicles in the EU (EAFO, 2025a). The transformation was even more evident in new registrations of lightweight vehicles, with emission-free cars rising from 0.11% of new registrations in 2009 to 90.88% in 2024 (88.15% BEVs, 2.72% PHEVs, 0.01% hydrogen-powered vehicles), as shown in Figures 2 and 3 (EAFO, 2025b) – far exceeding the EU's 23.82% for alternative-fuelled vehicles (13.62% BEVs, 7.19% PHEVs, 2.9% LPG, 0.1% CNG, 0.01% hydrogen-powered vehicles in 2024) (EAFO, 2025a).

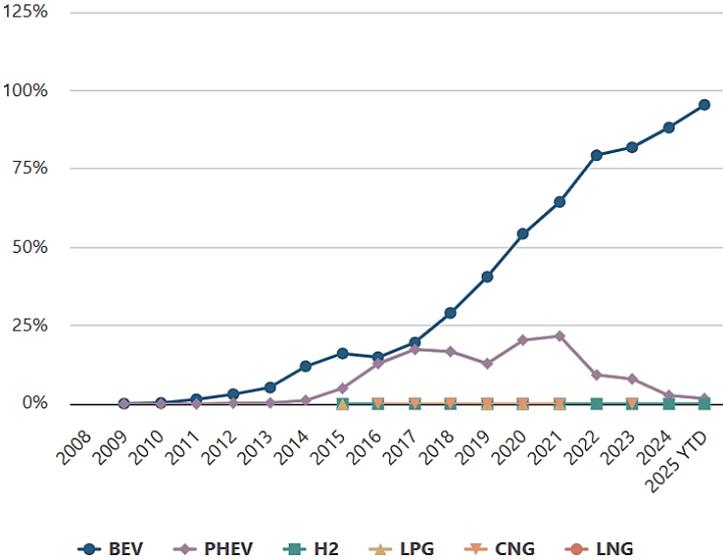


Fig. 2. Market share of new alternative-fuelled passenger cars in Norway as a percentage of the total number of registrations, by type of fuel

Source: (EAFO, 2025b).

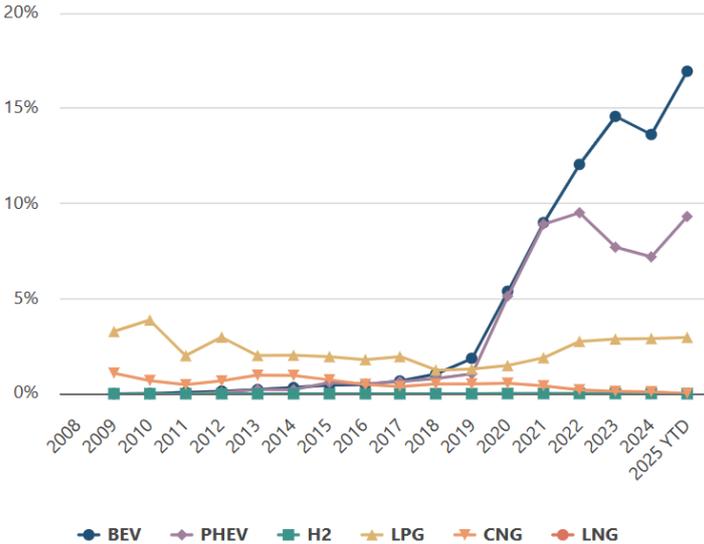


Fig. 3. Market share of new alternative-fuelled passenger cars in the EU as a percentage of the total number of registrations, by type of fuel

Source: (EAFO, 2025a).

This rapid transition of the car fleet has proven vital for reducing transport sector emissions. Since their 2014 peak, road traffic emissions have declined significantly, are now approaching 1990 levels and are projected to fall below them (Norwegian Environment Agency, 2025; Norwegian Ministry of Climate and Environment, 2021). This reduction primarily reflects decreased fossil fuel and increased biofuel (171% between 2015-2020) consumption. Although policies primarily encourage EV purchases rather than fossil fuel vehicle retirement, EV mileage increased 435% between 2005-2020 while conventional vehicle mileage decreased by 6% (Norwegian Ministry of Climate and Environment, 2023).

Despite these achievements, transport contributed 12 million tonnes to Norway's total emissions in 2023 (Norwegian Environment Agency, 2025). Consequently, emission reduction and electrification efforts are expanding to public transit, ferries, trucks, and ships (Government of Norway, 2025;

Norwegian Ministry of Transport, 2017; Norwegian Ministry of Transport, 2024). The availability of affordable, green hydroelectric power for EV charging enhances transport electrification benefits in Norway (Yang et al., 2023). However, the transition also suggests an increasing electricity demand, necessitating investment in transmission and distribution systems for expanded renewable generation as well as potential energy imports, despite planned expansions in domestic electricity production (IEA, 2022; Norwegian Ministry of Finance, 2024).

As a pioneer in electric mobility (OECD, 2022b), Norway has the potential to export expertise internationally, however socioeconomic challenges persist as higher-income households have disproportionately benefited from incentives, often purchasing EVs as second vehicles, thus not replacing the use of combustion engines (Figenbaum, 2017; Holtsmark & Skonhoft, 2014). Recent support reductions could further increase the barriers for low-income groups and exacerbate existing economic inequalities (Yang et al., 2023). The latter are also manifested in regional disparities, with EV adoption concentrated in urban areas with higher incomes and better infrastructure (IEA, 2022; Yang et al., 2023). Additional barriers to EV adoption include battery performance in cold regions, and demographic variations in EV adoption (Yang et al., 2023)<sup>1</sup>. EV purchasing decisions extend beyond finances to consumer preferences, which shows that transport electrification can be accelerated via green taxes, but even more so by implementing a broader approach (Norwegian Electric Vehicle Association, 2023; Yang et al., 2023).

Norway's successful EV transition relies largely on green taxation instruments – including both emission pricing and fiscal benefits for emission-free vehicles – that enable EVs to compete with conventional vehicles, complemented by consumer-friendly incentives. The research demonstrates that addressing infrastructure needs and socio-geographic disparities requires a comprehensive, multilevel policy approach.

## 5. Conclusions

This study demonstrates that green taxes can have an accelerating impact on transport electrification, particularly when they are accompanied by subsidies for zero-emission alternatives. Despite geographical challenges, Norway's green taxation policies since 1991 have advanced transport electrification significantly, while cutting emissions, supporting energy transition and balancing the country's economic development. Starting 2025, no-emission vehicles should be newly registered. Norway's success stems from its strategic combination of carbon pricing, EV incentives, and infrastructure development. These measures are supported by abundant renewable electricity and substantial economic resources, putting Norway in a uniquely privileged position among nations confronting climate change mitigation.

Nevertheless, the Norwegian model also reveals important limitations. Social inequalities in EV access, geographic disparities in adoption rates, declining tax revenues from successful electrification and continued fossil fuel export dependence present ongoing challenges. Furthermore, in tackling the issue of limiting the remaining GHG emissions to reach the climate goals and the national target of becoming a low-emission society by 2050, the policies show a need for continued adaptations. Moreover, recent domestic political dynamics have shown that political will, more than economic and technological possibilities, will challenge greater interconnection and collaboration within Europe.

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<sup>1</sup> There are a number of factors that make the purchase of EVs less likely. The region in which potential buyers live is particularly important: fewer people buy EVs in more rural and colder areas than in cities. This is due to the actual and perceived poorer range of battery-powered vehicles in cold regions. Another factor is age. Older people are more likely to stick with the technologies they are familiar with or do not feel comfortable adapting to a new type of vehicle. These concerns cannot be addressed by tax incentives alone and play an important role in achieving the goal of 100% zero-emission cars (Yang et al., 2023).

By illuminating the complex balance between environmental objectives, economic sustainability, and social equity, this article offers international policymakers valuable insights condensed in the following policy recommendations:

- Given that differences in tax rates on energy for different fossil fuels and for different sectors of the economy have a negative impact on the effectiveness of environmental policy, broad-based, uniform carbon pricing across all sectors rather than sector-specific approaches should be implemented (Depren et al., 2023; Johansen et al., 2018).
- Real evolution in consumer behaviour takes time (over 20 years in the case of Norway), hence meaningful adoption requires long-term policy commitment spanning multiple legislative periods. For a faster and more efficient transition, societal elements such as awareness campaigns and an active civil society to counter the scepticism or fear associated with the need to change consumer behaviour, must be included.
- For the energy transition to be sustainable and just, social and geographical disparities must be incorporated into the policy design. This can be achieved by providing targeted support for disadvantaged regions – for instance in the expansion of charging infrastructure – and socially compatible incentives that discourage unnecessary purchases.
- As energy supply for charging EVs is a potential problem even in renewable energy-rich Norway, providing sufficient opportunities to generate electricity as climate-neutrally as possible is an important prerequisite for countries aiming to electrify their transport sector to mitigate climate change.
- To ensure that investments are made in a financially, economically, socially and ecologically sustainable manner, a continued evaluation and hence adaptation of the measures is necessary.

The appropriate policies to stimulate the electrification of transport and to tackle the challenges that come with the approach of using green taxes for it, depend largely on the individual framework setting of the country. Policy implementation must therefore ultimately be tailored to each country's unique social, economic, and geographic conditions.

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## Abbreviations

The following abbreviations were used:

BEV	Battery electric vehicle
CETR	Climate and Energy Tax Reform
CO <sub>2</sub>	Carbon dioxide
EAFO	European Alternative Fuels Observatory
ETS	Emission Trading System
EU	European Union
EV	Electric vehicle
GHG	Greenhouse gases
IEA	International Energy Agency
LPG	Liquefied petroleum gas
NOK	Norwegian krone
NO <sub>x</sub>	Nitric Oxide (NO) and Nitrogen Dioxide (NO <sub>2</sub> )
OECD	Organization for Economic Co-operation and Development
PHEV	Plug-in hybrid electric vehicle
VAT	Value added tax

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## Znaczenie podatków ekologicznych w elektryfikacji transportu w Norwegii

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### Streszczenie

**Cel:** Szybka elektryfikacja transportu drogowego w Norwegii stanowi cenny przykład pozwalający zrozumieć, w jaki sposób ekologiczne opodatkowanie może przyspieszyć dekarbonizację. Celem niniejszego artykułu jest zbadanie, w jaki sposób ekologiczne opodatkowanie może przyspieszyć elektryfikację transportu, poprzez analizę polityki Norwegii realizowanej w latach 1991-2025 oraz zrozumienie społeczno-gospodarczego znaczenia tej polityki.

**Metodyka:** Artykuł opiera się głównie na przeglądzie raportów rządowych, literatury naukowej i stron internetowych instytucji dotyczących polityki klimatycznej, energetycznej i transportowej w Norwegii.

**Wyniki:** Badanie wykazało, że wysokie ceny emisji dwutlenku węgla w połączeniu z ukierunkowanymi zachętami podatkowymi i rozbudową infrastruktury zmieniły rynek nowych samochodów i zmniejszyły emisje z transportu, jednak podejście to wiązało się również ze znacznymi kosztami fiskalnymi. Pomimo postępów nadal istnieją wyzwania, takie jak uzależnienie od dochodów z ropy i gazu, dynamika polityczna w kraju oraz kwestie związane z dystrybucją i sprawiedliwością regionalną.

**Implikacje i rekomendacje:** Autorzy opowiadają się za elastycznymi ramami politycznymi, które pozwolą wypełnić luki strategiczne i zapewnią zrównoważoną pod względem środowiskowym, społecznym i finansowym transformację, obejmującą inwestycje w sieć energetyczną i infrastrukturę ładowania pojazdów elektrycznych oraz środki uzupełniające mające na celu ochronę gospodarstw domowych znajdujących się w trudnej sytuacji.

**Oryginalność/wartość:** Aby wnieść wkład do istniejącej literatury na temat ekologicznych podatków związanych z elektryfikacją transportu oraz wesprzeć jego przyszły rozwój, w niniejszym artykule oceniono rolę ekologicznych podatków w przyspieszeniu wdrażania pojazdów elektrycznych. Przedstawiono w nim norweskie podejście do elektryfikacji transportu, oceniono znaczenie ekologicznych podatków dla wdrażania pojazdów elektrycznych i sformułowano zalecenia dotyczące ram politycznych, które zapewnią przejście na rozwiązania zrównoważone pod względem środowiskowym, społecznym i finansowym.

**Słowa kluczowe:** zielone podatki, pojazdy elektryczne, elektryfikacja transportu, Norwegia, transformacja energetyczna, polityka klimatyczna, rozwój gospodarczy

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