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2 Fast 2 Fiscal: Turbocharging Electric Vehicle Adoption in Emerging Markets and Developing Economies through Tax and Fiscal Policies

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This article distils key policy lessons for emerging markets by evaluating how China, Norway and France use targeted tax incentives to accelerate electric vehicle adoption. Through analysis, it highlights how fiscal design shapes clean transport transitions and offers strategic insights for aligning tax policy with local developmental and environmental goals.

1. Introduction

The *Fast and Furious* film franchise, which began in 2001 and continued with its sequel *2 Fast 2 Furious* in 2003,[1] introduces audiences to a world defined by high-speed street racing, innovation and collaborative resilience. Central to the narrative are the protagonists Dominic (Dom) Toretto and Brian O'Conner, whose contrasting origins, one rooted in underground racing, the other in formal law enforcement, gradually converge into a complex and mutually beneficial partnership. The evolving dynamic in the franchise provides a metaphorical framework for the analysis in this article, which examines how developing countries can learn from the policy pathways of frontrunner nations in incentivizing the adoption of electric vehicles (EVs), particularly through the strategic use of tax measures.

Within this metaphor of the franchise, emerging markets and developing economies are portrayed as late entrants into the global EV transition, comparable to new members of Dom's crew who, despite initial disadvantages, gain momentum by observing and adapting the tested strategies of seasoned drivers.[2] Dom embodies the characteristics of emerging markets and developing economies: he operates informally, is deeply embedded within local systems and frequently innovates under constraints.[3] Though often underestimated, Dom's resourcefulness and adaptability enable him to rise as a leader. Similarly, emerging markets and developing economies may lack the institutional capacity and infrastructure of more advanced countries, but they possess the potential to leapfrog traditional development pathways when supported by targeted policy instruments and international collaboration.

In contrast, Brian O'Conner represents frontrunner countries, which benefit from established institutional frameworks, capital, and access to cutting-edge EV technologies. As a trained and methodical agent of a rule-based system, Brian exemplifies the structured and well-resourced approach that has allowed certain countries to lead the EV transition. Brian's capacity to adapt and extend support to others mirrors the role that frontrunner countries can play in guiding and partnering with developing economies through knowledge transfer, technology sharing and fiscal cooperation.

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1. *See 2 Fast 2 Furious* (2003), film Directed by John Singleton. Distributed by Universal Pictures, United States of America.
2. In the franchise, newcomers like Roman Pearce (in *2 Fast 2 Furious* (2003)) or Ramsey (introduced in *Furious 7* (2015)) initially lack the technical skills or combat experience of veterans like Dom or Letty. But by being immersed in the crew's operations, they quickly pick up on tactics, teamwork and the unspoken rules of the road.
3. *See* D. Escandon-Barbosa, D. Urbano-Pulido & A. Hurtado-Ayala, *Exploring the relationship between formal and informal institutions, social capital, and entrepreneurial activity in developing and developed countries*, 11 Sustainability 2, p. 550 (2019). In emerging markets, businesses often operate informally, outside of formal regulatory and financial systems, allowing for flexibility but limiting access to institutional support. Entrepreneurs are deeply embedded in local communities, leveraging cultural knowledge and social networks to build trust and tailor solutions. Innovation thrives under constraints, as limited resources drive creative, frugal and adaptive problem-solving approaches.

The article pauses here briefly and acknowledges that while the *Fast and Furious* franchise is best known for its adrenaline-fuelled action, street racing culture and recurring themes of loyalty, family and redemption, the franchise offers little direct engagement with environmental sustainability or climate change. Although later instalments introduce elements of advanced technology, including EV and hybrid vehicles,[4] these appear primarily as markers of innovation and spectacle rather than as deliberate nods to green alternatives. The franchise's depiction of car culture continues to valorize high-performance, fuel-intensive vehicles, rarely reflecting on the environmental consequences of such choices.

Nevertheless, the evolution of the franchise, from illegal street races to sophisticated missions involving global threats,[5] mirrors the kind of strategic transformation required in real-world efforts to decarbonize transport systems. Just as characters in the franchise rely on speed, agility and adaptation to overcome challenges, countries transitioning to cleaner mobility solutions must demonstrate similar policy responsiveness and technological readiness. In this regard, fiscal instruments, particularly tax incentives, play a critical role. Tax incentives serve not only as catalysts for behavioural change among consumers and producers[6] but also as signals of state commitment to green industrial transformation.

The urgency of the shift to cleaner and greener transportation is increasingly evident. Decarbonizing the transport sector is no longer a matter of long-term aspiration but a pressing necessity, driven by environmental degradation, economic competitiveness and geopolitical developments.[7] As the transport sector contributes nearly one-quarter of global greenhouse gas (GHG) emissions, with road transport alone responsible for close to 10%, the electrification of vehicle fleets represents a pivotal opportunity.[8] However, much like the characters in *Fast and Furious* who must continually adapt to survive, national governments, particularly in emerging markets and developing economies, must recalibrate their fiscal and regulatory frameworks to remain viable and competitive within an increasingly decarbonized global economy.

While the global transition to EVs is gaining momentum, its pace and intensity remain uneven across jurisdictions, shaped by varying political economies, institutional capacities and industrial interests.[9] Much like the divergent trajectories of characters in *Fast and Furious*, where some adapt quickly to new technologies while others require time and guidance, countries differ in their ability to integrate and scale EV adoption.

Norway represents an example of one of the clear frontrunners, analogous to Brian O'Conner's early advantage in the franchise i.e. well-resourced, disciplined and institutionally aligned. By 2024, 88.9% of new car sales in Norway were electric, up from 82% in 2023, placing Norway close to achieving its 2025 target of full electrification for new vehicle sales.[10] Norway's structural advantage lies in the absence of a powerful domestic automotive manufacturing lobby, which has allowed successive governments to pursue consistent and ambitious EV policies.[11] Norway's policies have included exemptions from value added tax (VAT) and import duties, relief from road tolls, free municipal parking and access to bus lanes. Such sustained (fiscal) measures demonstrate how coherent, long-term interventions can shift market behaviour and embed EVs into the mainstream.

The United Kingdom, by contrast, exhibits a more moderate and politically sensitive pathway, not unlike characters in the franchise who must balance competing allegiances. Despite launching the Plug-in Car Grant (PiCG) in 2011,[12] the United Kingdom had reached only 19.6% EV penetration among new car registrations by 2024.[13] The United Kingdom's slower

4. In *Fast X* (2023), there are appearances of the Dodge Charger Daytona SRT EV and the DeLorean Alpha5 (Electric Supercar Prototype).
5. The original film, *The Fast and the Furious* (2001), focused on illegal street racing and small-scale heists in Los Angeles. By *Fast Five* (2011), the crew moved from street races to elaborate heists, like stealing a vault in Rio de Janeiro. From *Fast & Furious 6* (2013) onward, the team works with government agencies to stop rogue agents, cyberterrorists and global criminals.
6. Tax can be used to influence behaviour. *See* E. Kirchler & E. Hoelzl, *Tax behaviour*, Economic psychology, pp. 255-271 (2017).
7. *See* A. Gonçalves, *Planes Or Cars – Which Pollutes The Most? Which Is More Sustainable?* (2020), available at https://youmatter.world/en/category-environment/plane-or-cars-which-means-of-transport-pollutes-the-most/ (accessed 30 July 2025).
8. *See* K. Rukikaire, *New UN report details environmental impacts of export of used vehicles to developing world*, UN Environment Programme (UNEP) (26 Oct. 2020), available at https://www.unep.org/news-and-stories/press-release/new-un-report-details-environmental-impacts-export-used-vehicles (accessed 30 July 2025).
9. In state-led economies (e.g. China), governments can direct large-scale investments in EV infrastructure, offer generous subsidies, and enforce strict emissions regulations. In market-driven economies (e.g. the United States), EV adoption depends more on consumer demand, private sector innovation and lobbying by interest groups. In resource-dependent economies (e.g. oil-rich nations), these countries may resist EV adoption due to vested interests in fossil fuel industries. In high-capacity states (e.g. Norway, Germany), these countries can efficiently roll out charging infrastructure, enforce emissions standards and manage subsidies. In low-capacity states (e.g. some developing countries), these countries may struggle with grid reliability, corruption or lack of technical expertise, slowing EV adoption. Countries with strong traditional auto sectors (e.g. Japan, Germany) may face resistance from legacy manufacturers unless they pivot to EVs. Utilities and renewable energy companies may support EVs, while fossil fuel companies may lobby against them. In places like California or China, tech companies play a major role in EV innovation (e.g. Tesla, BYD).
10. *See* N. Adomaitis, *In Norway, nearly all new cars sold in 2024 were fully electric*, Reuters (2025), available at https://www.reuters.com/business/autos-transportation/norway-nearly-all-new-cars-sold-2024-were-fully-electric-2025-01-02/ (accessed 30 July 2025).
11. *See* J. Finnerty, *Why Norway leads the world in EV adoption*, Grioserve (2025), available at https://www.gridserve.com/why-norway-leads-the-world-in-ev-adoption? (accessed 30 July 2025).
12. *See* B. Vere in UK Parliament, UIN HL16949, tabled on 4 July 2019, *Electric Vehicles: Sales-Question for Department for Transport*.
13. *See* ZapMap, EV market stats 2025 (2025), available at https://www.zap-map.com/ev-stats/ev-market/ (accessed 30 July 2025).

progress reflects the difficulty of aligning industrial policy with climate objectives amidst political volatility and budgetary pressures.

The United States lags further behind, with battery EVs constituting just 8.9% of new vehicle sales in 2024 and combined sales of hybrid vehicles, plug-in hybrid EVs and battery EVs representing 20.1%.[14] The United States' decentralized governance and fragmented regulatory approach have produced a patchwork of state-level initiatives rather than a unified national strategy. In *Fast and Furious* terms, the United States appears as a team with high potential but limited coordination, where internal competition hinders cohesive progress.

In contrast, China has embraced a model of state-led industrial transformation, positioning itself as a strategic driver with both speed and scale. In China, it is reported that EVs accounted for 41% of global new vehicle sales in 2024,[15] supported by strong government intervention across the entire value chain. Chinese policy tools such as purchase subsidies, tax exemptions and priority licence plate allocations have been paired with industrial policies that strengthen domestic manufacturing and battery production.[16] The result is a self-reinforcing system in which state planning, consumer demand and technological innovation are tightly integrated. Much like Dom's crew evolving into a formidable force through shared purpose and strategic focus, China's coordinated approach has reshaped its domestic auto market and positioned it as a global EV leader.

France represents yet another trajectory, one characterized by legislative commitment and industrial adaptation. Through the 2019 Mobility Orientation Law (*Loi d'Orientation des Mobilités*, LOM), France formally committed to achieving carbon neutrality by 2050 and set a target to reduce transport-related GHG emissions by 37.5% by 2030.[17] Policy interventions include banning the sale of fossil fuel vehicles by 2040, establishing low-emission zones (LEZs), and expanding national charging infrastructure. The French government has leveraged its established automotive base, comprising 4,000 firms and 400,000 employees, by supporting a shift toward EV production.[18] This shift by France has been facilitated by research and development (R&D) incentives and a "bonus-malus" tax scheme, which rewards low-emission vehicles while penalizing high-emission ones.[19] France, like a seasoned but adaptable driver in the franchise, is navigating legacy systems while steering toward a low-carbon future.

These national experiences discussed above reflect the importance of context-specific strategies, shaped by industrial structures, political will and market maturity. While most developed economies have adopted proactive fiscal measures to facilitate EV transitions, emerging markets and developing economies face considerable obstacles. These include high upfront vehicle costs, limited charging infrastructure and entrenched internal combustion engine (ICE) manufacturing sectors that complicate structural reorientation. In many cases, the absence of a targeted fiscal policy further inhibits the development of local EV markets and associated industries.

Thus, in this global race to electrify transportation, frontrunners like Norway, France and China have already surged into the fast lane, leveraging policy support, infrastructure investment and technological innovation to stay ahead. In contrast, many emerging markets and developing economies remain stalled at the starting grid, constrained by limited infrastructure, fiscal space, and entrenched ICE industries. For these economies, tax policy serves as the turbo boost, an essential accelerant to overcome structural drag, ignite market demand and position themselves as serious contenders in the transition to electric mobility.

Furthermore, the digital transformation of mobility is accelerating the EV transition, providing solutions to operational challenges and enhancing the consumer value proposition. Smart charging technologies enable EVs to charge during periods of low grid demand or high renewable output, optimizing both cost and sustainability. Meanwhile, Vehicle-to-Grid (V2G) capabilities allow EVs to feed electricity back into the grid, supporting grid resilience and facilitating the broader integration of intermittent renewables.

Moreover, data-driven mobility services, ranging from predictive maintenance to dynamic routing, elevate the user experience and support long-term adoption. In this respect, EVs are increasingly conceptualized not as isolated products but as digital platforms that integrate seamlessly into connected lifestyles.

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14. *See* U.S. Energy Information Administration, *U.S. share of electric and hybrid vehicle sales reached a record in the third quarter* (2024), available at https://www.eia.gov/todayinenergy/detail.php?id=63904 (accessed 30 July 2025).
15. *See* D. Yi Chen, *China accounted for 41% of the world's automobile sales in November 2024* (2024), available at https://carnewschina.com/2024/12/31/china-accounted-for-41-of-the-worlds-automobile-sales-in-november-2024/ (accessed 30 July 2025).
16. X. Zhao et al., *Policy incentives and electric vehicle adoption in China: From a perspective of policy mixes*, Transportation Research Part A: Policy and Practice, 190, pp. 1-18 (2024), doi: 0.1016/j.tra.2024.104235.
17. *See* Climate Change Laws of the World, *Mobility orientation law 2019-1428 on transport (LOM)* (2019), available at https://climate-laws.org/document/mobility-orientation-law-on-transport-lom_6599 (accessed 30 July 2025).
18. *See* The Curious Economist, *French government to provide 8 billion euros to help revive their car industry* (2020), available at https://thecuriouseconomist.com/french-government-to-provide-8-billion-euros-to-help-revive-their-car-industry/ (accessed 30 July 2025).
19. *See* The World Bank Group, *Green Incentives for Climate Competitive Industries: A Practitioner's Handbook* (2016).

China offers a compelling case study of how digitalization and consumer culture intersect. Its tech-savvy youth — dubbed the “iPad generation” or “AI natives”, have become a driving force in EV uptake. This demographic demands not only environmental performance but also design aesthetics and digital functionality, prompting automakers to design EVs that resemble “rolling smartphones”. Companies such as BYD and NIO are responding with over-the-air updates, integrated entertainment systems and intelligent voice assistants, creating entire ecosystems around vehicle ownership.[20]

Crucially, automakers and technology giants, such as Huawei, Xiaomi, Tencent and Alibaba, are beginning to monetize user data related to commuting patterns, in-car consumption and mobility behaviours.[21] These platforms offer opportunities for bundling services, from insurance and maintenance to e-commerce and energy management. As a result, EVs are no longer just a means of transportation but nodes in a rapidly evolving data economy.

China is also leading in autonomous driving innovation, leveraging artificial intelligence (AI) and machine learning to advance autonomous mobility. Firms like XPENG are deploying cloud-based large language models alongside high-powered onboard computing systems, enabling real-time processing of complex traffic data.[22] This convergence of EVs and AI promises not only efficiency but also systemic change in how mobility is conceived and delivered.

Therefore, this article investigates how tax incentives together with supporting fiscal tools can act as catalytic instruments for emerging markets and developing countries, not only to accelerate EV adoption but also to enable broader industrial transformation. The article undertakes a comparative analysis of three frontrunners – China, France, and Norway – each of which has employed a distinctive fiscal approach to stimulate EV uptake. China’s strategy emphasizes scaled subsidies and supply chain integration; France’s model relies on targeted taxation, urban planning and industrial policy; and Norway offers a blueprint for demand-side transformation through sustained fiscal incentives and disincentives.

By examining these policy frameworks, this article aims to identify adaptable elements that can be transferred to the context of emerging markets and developing economies. The article argues that tax policy supported with other fiscal tools is not merely a financial lever but a critical component of an integrated strategy to align climate objectives with economic development and industrial upgrading. In doing so, the article addresses a gap in the current literature, which tends to focus on technological or environmental dimensions of EV transitions while often overlooking the fiscal policy architecture needed to facilitate systemic change.

The structure of this article is as follows: The article proceeds by exploring what EVs are and why governments promote them and why consumers purchase them. Thereafter the article introduces a conceptual framework linking fiscal incentives to EV adoption and industrial competitiveness. Next, the article presents a comparative analysis of tax instruments used in China, France and Norway. The article then explores how emerging markets and developing economies might adapt these instruments in light of their fiscal capacities, industrial conditions and policy environments. The article concludes with strategic recommendations for developing countries to shift gears, from policy spectators to active participants in the global transition to electric mobility.

2. From Horsepower to Battery Power: Tracing the Evolution of Clean Mobility

In the *Fast and Furious* franchise, Dom and Brian begin as rivals, one a fugitive, the other an undercover cop. Yet, over time, their bond strengthens, shifting from mistrust to mutual respect, and eventually to brotherhood. Much like their cinematic journey, the story of the automobile has evolved in ways few could have predicted. What began as gritty, ground-level transportation has now reached space-faring heights, mirroring how mobility itself has shifted from literal horsepower to electrified supercars.

Early modes of transport, from animal-drawn carts to steam-powered engines, laid the groundwork for mobility, but it was the ICE, a hallmark of twentieth-century innovation, that transformed transportation into a cornerstone of industrial modernity.[23] The ICE vehicle came to symbolize economic progress, technological prowess and individual freedom. Yet this advancement carried profound environmental externalities. As carbon emissions from road transport escalated, the cumulative climate costs

20. *See* M. Alves, *Nio Rolls Out New OTA Update to Operating System in Europe*, Electric Vehicles (22 May 2025), available at https://eletric-vehicles.com/nio/nio-rolls-out-new-ota-update-to-operating-system-in-europe/ (accessed 30 July 2025).
21. *See China’s electric vehicle revolution reshapes global auto market*, HSBC (15 Apr. 2025), available https://www.gbm.hsbc.com/en-gb/insights/sustainability/chinas-electric-vehicle-revolution-reshapes-global-auto-market (accessed 30 July 2025).
22. *See XPENG launches industry’s first AI-powered in-car OS, promoting AI-enabled smart driving experience*, XPENG (20 May 2024), available at https://xpengcars.co.uk/2024/05/xpeng-launches-industrys-first-ai-powered-in-car-os-promoting-ai-enabled-smart-driving-experience/ (accessed 30 July 2025).
23. T.C. Nguyen, *The History of Transportation* (9 Jan. 2020), available at https://www.thoughtco.com/history-of-transportation-4067885 (accessed 30 July 2025).

of ICE dependency became increasingly difficult to ignore.[24] In response, many countries have begun to promote EVs as a strategic pivot, framing them not merely as technological upgrades, but as necessary instruments in the pursuit of a more sustainable, low-carbon future.

Ironically, EVs are not a product of twenty-first century innovation but rather a revival of nineteenth-century experimentation. Early prototypes appeared as early as the 1890s, yet the nascent technology was swiftly eclipsed by the superior energy density of petrol and the rapid proliferation of fossil fuel infrastructure.[25] For much of the twentieth century, the electric drivetrain remained marginal, relegated to the periphery of automotive development.

By the late twentieth century, however, the escalating consequences of climate change, urban air pollution and energy insecurity catalyzed a renewed interest in electrification.[26] Governments and automakers began to revisit EV technologies not merely as engineering curiosities but as strategic responses to mounting ecological and geopolitical pressures. The launch of the Toyota Prius in 1997 marked a pivotal shift: as the first hybrid electric vehicle (HEV) to achieve commercial success, it signalled the mainstreaming of cleaner propulsion systems and laid the groundwork for a broader transition.[27]

While other alternatives, such as hydrogen-powered vehicles (HPVs), garnered intermittent interest, they were constrained by infrastructural and cost-related challenges.[28] In contrast, battery electric vehicles (BEVs), driven by declining lithium-ion battery costs and reinforced by targeted fiscal incentives and regulatory mandates, emerged as the vanguard of contemporary decarbonisation strategies. Their ascendancy reflects not only technological progress but also the deliberate policy choices that have repositioned EVs at the centre of transport and climate planning.

Modern EVs operate via electric motors fuelled by rechargeable battery packs, eliminating tailpipe emissions and significantly reducing lifecycle GHG emissions, particularly when paired with clean electricity grids. In emerging markets like South Africa, EVs are not only greener but increasingly cost-competitive: with electricity at ZAR 2.40/kWh compared to petrol at ZAR 23.11/litre, the long-term savings are compelling.[29]

However, EVs are not without trade-offs. Their production requires resource-intensive inputs, especially lithium and cobalt, raising ethical and environmental concerns.[30] Moreover, in fossil fuel-dependent countries, upstream emissions can partially offset tailpipe gains. Thus, while EVs are essential to a low-carbon future, they are not a silver bullet, they are one vital component in a complex systems transition.

Understanding the evolution from the fossil-fuelled dominance of ICE vehicles to the resurgence of electrified transport not only contextualizes the technological trajectory but also sharpens the analytical lens through which policy responses must be crafted. This transition reveals that a uniform approach is inadequate; instead, a nuanced appreciation of different EV configurations is essential. Much like how each instalment in the *Fast and Furious* franchise introduces new characters, alliances and antagonists that reshape the narrative, each EV type presents policymakers with a distinct set of regulatory, infrastructural and fiscal complexities. Effective policy design, therefore, requires more than a general commitment to electrification, it requires targeted interventions that are technologically informed and aligned with broader environmental and socio-economic imperatives. To ground the analysis of this article in technological specificity, the next section investigates the principal categories of EVs and their differentiated characteristics.

3. Understanding the Different Types of EVs

In the *Fast and Furious*, the juxtaposition between Dom's classic 1970 Dodge Charger and Brian's technologically advanced imports, such as the Nissan Skyline GT-R R34 and the Toyota Supra MK IV, serves as more than a reflection of personal identity or aesthetic preference. These vehicles diverge in engineering architecture, powertrain dynamics, and performance capabilities, distinctions that shape both their function and strategic utility within the story's high-stakes races. Similarly, the

24. J.P. Rodrigue, *Evolution of Transport Technology since the 18th Century*, in *The Geography of Transport Systems* (Routledge 2024), doi: 10.4324/9781003343196.
25. J. Demartini, *The Evolution of Transportation*, Jetset Magazine (30 June 2014).
26. S.P.M. Angeline and N.M. Rajkumar, *Evolution of electric vehicle and its future scope*, 33 Materials Today: Proceedings, pp. 3930-3936 (2020), doi: 10.1016/j.matpr.2020.06.266.
27. *History of the electric car [2023 update]*, EVBox Blog (28 Apr. 2023), available at https://blog.evbox.com/electric-cars/ (accessed 30 July 2025).
28. G. Wang, Y. Chao and Z. Chen, *Promoting developments of hydrogen powered vehicle and solar PV hydrogen production in China: A study based on evolutionary game theory method*, 237 Energy (2021), doi: 10.1016/j.energy.2021.121649.
29. A. Nanjundaswamy et al., *Electric vehicles in the business processes and sustainable development*, 20 Management Matters 1, pp. 95–113 (2023), doi: 10.1108/manm-11-2022-0111.
30. Y.S. Balcioglu, B. Sezen and A.U. İşler, *Evolving preferences in sustainable transportation: a comparative analysis of consumer segments for electric vehicles across Europe*, Social Responsibility Journal (2024), doi: 10.1108/SRJ-12-2023-0713.

electrified mobility ecosystem is far from monolithic. The EV ecosystem encompasses a range of propulsion technologies, each with specific environmental profiles, cost structures and infrastructural needs.

For policymakers, these distinctions are not technical minutiae but critical design variables. Just as motorsport strategy is calibrated to the capabilities and limitations of individual vehicles, fiscal and regulatory instruments must be tailored to the unique characteristics of each EV type. Tax incentives that fail to differentiate between battery EVs, plug-in hybrid EVs, and hybrid EVs risk inefficiency, misaligned incentives, or even unintended regressivity.

The term "electric vehicle" thus functions as an umbrella category encompassing multiple propulsion models. These include battery EVs, plug-in hybrid EVs, and, more loosely, hybrid EVs, although the latter do not typically rely on external charging.

Battery EVs (BEVs) operate solely on electricity stored in onboard lithium-ion batteries and lack any internal combustion engine.[31] Well-known models include the Tesla Model 3, Nissan Leaf and Renault Zoe. BEVs generate zero tailpipe emissions and offer lower operational and maintenance costs due to fewer mechanical components. Their environmental advantage, however, depends heavily on the emissions intensity of the electricity grid. Additionally, BEVs face infrastructural limitations such as the availability of fast-charging stations, and despite technological improvements, range anxiety remains a concern for consumers in regions with underdeveloped EV ecosystems. Yet even with improved batteries, BEVs do not arrive at the starting line unburdened. Their production, particularly the manufacturing of lithium-ion batteries, is energy-intensive, leading to higher upfront emissions compared to ICE vehicles. Linder et al.[32] report that BEVs emit up to 25% more carbon dioxide (CO#) during production. According to Argonne National Laboratory, the average BEV requires 52.25 megajoules per kilogram (MJ/kg) to manufacture, compared to 41.8 MJ/kg for a typical ICE vehicle.[33] However, this front-loaded environmental cost is quickly offset once the vehicle hits the road. Battery electric vehicles (BEVs) produce between 17% and 30% fewer emissions during operation, emitting on average 3.22 to 3.82 metric tonnes of CO# annually, compared to 4.6 tonnes for ICE vehicles.[34] Life-cycle analyses affirm the long-term benefit: EVs reduce GHG emissions by 66%-69% in Europe, 60%-68% in the United States, 37%-45% in China, and 19%-34% in India.[35] The cinematic arc is clear: while the opening scenes (i.e. production phase) may be carbon-heavy, the overall storyline reveals a decisive environmental advantage.

Plug-in Hybrid Electric Vehicles (PHEVs) blend electric and internal combustion technologies. They can be charged externally and typically offer between 30 and 60 kilometres of electric-only range before switching to fuel-based propulsion. Examples include the Toyota Prius Plug-in, Mitsubishi Outlander PHEV, and Peugeot 3008 Hybrid which provide flexibility for consumers navigating limited charging infrastructure, and their dual-power systems are especially attractive in transitional markets. However, PHEVS also present drawbacks: higher manufacturing costs, greater vehicle weight, and continued GHG emissions during non-electric operation.[36] Moreover, some studies have shown that real-world usage of PHEVs may underperform relative to their advertised environmental benefits if users rely heavily on the combustion engine.[37]

Hybrid Electric Vehicles (HEVs), by contrast, do not require external charging and operate through a self-contained hybrid system, offering improved fuel economy but without the same emissions reductions as their plug-in counterparts.

As these technological distinctions suggest, not all EVs yield the same climate or fiscal outcomes. For tax authorities and policymakers, recognizing that these variations necessitate differentiated policy frameworks if the broader goals of decarbonization and equitable energy transition are to be realized is essential to designing incentive schemes that are both equitable and effective. The next section examines the rationale behind state-led promotion of EVs, highlighting the environmental, economic and strategic imperatives that underpin these policy choices.

4. Why Do Countries Promote EVs?

Electric vehicles (EVs) have become emblematic of a broader global realignment toward sustainability and decarbonization, functioning as strategic policy instruments across climate, public health, energy, and industrial domains. The rationale for

31. *See* A. Faraz et al., *Battery electric vehicles (BEVs)*, in *Electric Vehicles: Modern Technologies and Trends* pp.137-160 (Springer 2021), doi: 10.1007/978-981-15-9251-5_8.
32. M. Linder et al., *The race to decarbonize electric-vehicle batteries*, McKinsey & Company (23 Feb. 2023), available at https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/the-race-to-decarbonize-electric-vehicle-batteries#/ (accessed 30 July 2025).
33. J.C. Kelly et al., *Cradle to Grave Lifecycle Analysis of U.S. Light-Duty Vehicle-Fuel Pathways: A Greenhouse Gas Emissions and Economic Assessment of Current (2020) and Future (2030-2035) Technologies* (Argonne National Laboratory 2023), doi: 10.2172/1875764.
34. Id.
35. G. Bieker, *A Global Comparison of the Life-Cycle Greenhouse Gas Emissions of Combustion Engine and Electric Passenger Cars* (The International Council on Clean Transportation White Paper 2021).
36. Wang, *supra* n. 28.
37. Balcioglu, *supra* n. 30.

promoting EVs is thus neither singular nor superficial; it reflects a complex interplay of environmental imperatives, geopolitical calculations and technological advancement.

Foremost among these motivations is the urgent need to mitigate climate change. The transport sector accounts for approximately 25% of global CO# emissions, with road transport constituting a significant share.[38] Battery EVs, unlike their ICE counterparts, emit no tailpipe pollutants, offering a direct means to reduce GHG emissions. The adoption of BEVs aligns with national commitments under the Paris Agreement, which requires states to pursue efforts to limit global warming to well below 2°C, preferably 1.5°C, through deep sectoral decarbonization.[39] Electrifying transport is, in this context, not merely a technological upgrade but a political imperative, central to achieving Nationally Determined Contributions (NDCs) and signalling environmental leadership on the global stage.

The alignment between national EV policies and global environmental frameworks is both intentional and evolving. For instance, the European Union's Green Deal stipulates that all new cars sold must be zero-emission by 2035, representing a hard regulatory commitment. China's New Energy Vehicle (NEV) policy seeks to achieve a 40% EV share by 2030, reflecting not only environmental motivations but also the state's industrial ambition to dominate global EV markets. Similarly, the International Energy Agency's (IEA) Net Zero by 2050 roadmap prescribes accelerated electrification of transport as a non-negotiable pathway to deep decarbonization.

These national plans are nested within broader transnational agreements, such as the United Nations Sustainable Development Goals (SDGs), which call for clean energy (SDG 7), sustainable cities (SDG 11), and climate action (SDG 13).Electric vehicles (EVs) intersect with each of these, particularly when integrated into broader mobility systems alongside public transport and active modes of travel (walking and cycling). As such, EVs are not a standalone solution but a key component in a larger ecosystem of sustainable mobility.

Importantly, the policy case for EVs extends beyond climate considerations. Public health outcomes, particularly in densely populated urban centres, serve as an equally compelling driver. Tailpipe emissions from ICE vehicles, including nitrogen oxides (NO_x) and fine particulate matter (PM#.#), are closely associated with respiratory and cardiovascular morbidity. EVs help mitigate these harms by eliminating local emissions, thus contributing to cleaner air and healthier populations.[40] Initiatives such as low-emission zones in London, Paris and Beijing demonstrate how cities are reframing EV promotion as a matter of human well-being and urban liveability, rather than solely environmental stewardship.

Energy security constitutes a third pillar in the policy rationale. By reducing reliance on imported oil and shifting demand toward domestically generated electricity, particularly from renewable sources, EVs offer states greater control over their energy futures. This strategic repositioning is especially salient in jurisdictions vulnerable to fossil fuel price volatility or geopolitical supply disruptions. Countries such as China and Norway have framed EV adoption as part of a broader strategy to enhance energy sovereignty and macro-economic resilience.

EVs serve as catalysts for industrial and technological transformation. Government support for EVs is often embedded within broader efforts to foster innovation-led growth, stimulate advanced manufacturing, and secure a competitive position in the emerging green economy. Investments in battery production, software integration and smart grid infrastructure are viewed as levers to drive high-value job creation and long-term productivity gains.

The global transition toward EVs can also be analysed through multiple theoretical perspectives that offer insights into why countries are adopting such policies and why taxation serves as a powerful tool in this shift.

From an ethical standpoint, utilitarianism[41] provides a foundational rationale for promoting EVs. This theory posits that actions are morally right if they produce the greatest good for the greatest number of people. In the context of EV adoption, reducing GHG emissions and urban air pollution through cleaner transportation benefits public health, mitigates climate change impacts and enhances overall societal well-being. By prioritizing EVs, governments act to maximize positive outcomes, not only for current populations but also for future generations who will inherit the environmental consequences of today's policies.

Complementing this, the framework of environmental ethics, particularly deep ecology,[42] argues that nature itself has intrinsic value independent of its utility to humans. This perspective challenges anthropocentric views by emphasizing humanity's moral obligation to protect ecosystems and preserve biodiversity. Adopting EVs aligns with this ethical stance, representing a

38. K. Rukikaire, *New UN report details environmental impacts of export of used vehicles to developing world*, UNEP (26 Oct. 2020), available at https://www.unep.org/news-and-stories/press-release/new-un-report-details-environmental-impacts-export-used-vehicles (accessed 30 July 2025).
39. *See United Nations Framework Convention on Climate Change* (2022).
40. *See* A. Moseman, *Are electric vehicles definitely better for the climate than gas-powered cars?*, MIT Climate Portal (2022), available https://climate.mit.edu/ask-mit/are-electric-vehicles-definitely-better-climate-gas-powered-cars (accessed 30 July 2025).
41. *See* R.M. Hare, *Ethical theory and utilitarianism*, in *Contemporary British Philosophy*, pp. 113-131 (Routledge 2014).
42. *See* G. Sessions, *The deep ecology movement: A review*, 11 Environmental review 2, pp.105-125 (1987).

commitment to reduce environmental degradation and promote sustainable coexistence with the natural world. It broadens the justification for EV policies beyond human benefit alone to encompass a respect for the integrity of ecosystems and planetary health.

In the context of political philosophy, social contract theory[43] sheds light on the responsibilities of states in responding to environmental challenges. According to this theory, governments exist to safeguard the rights and well-being of their citizens, and in return, citizens comply with laws and regulations. Climate change poses significant risks to public welfare, including through extreme weather events and health impacts from pollution. Therefore, governments have a duty to enact policies that mitigate these risks, such as incentivizing EV adoption, as part of their commitment to protect both present and future citizens. This theory underlines the legitimacy of state intervention in the transportation sector to secure collective benefits.

From a sociological perspective, ecological modernization theory[44] offers a hopeful outlook by reconciling environmental protection with economic growth. This theory suggests that technological innovation can drive sustainability while simultaneously enhancing industrial competitiveness. EVs exemplify this “win-win” scenario: green technology reduces emissions and environmental harm, while also creating opportunities for domestic industries in battery production, electric drivetrains and software development. Policymakers motivated by ecological modernization see EV promotion not as a trade-off but as a strategic pathway to modernize economies and foster sustainable development.

Despite their promise, EV markets remain fragmented. Policy inconsistency across jurisdictions, ranging from subsidies and tax incentives to infrastructure investments, creates uneven playing fields and distorts consumer signals. The lack of harmonized charging infrastructure and plug standards further undermines confidence, especially for cross-border travel and long-distance use.

Supply chain constraints and uneven vehicle availability also hamper progress. While wealthier countries enjoy a growing selection of EV models, affordability remains a critical barrier in many emerging markets and developing economies, threatening to reinforce global inequalities in clean mobility access. For example, China’s expanding role in the global EV market reveals both an opportunity and a source of geopolitical tension. The US tariffs have prompted Chinese automakers to accelerate foreign investment, establishing manufacturing bases in countries like Hungary, Turkey, Thailand and Brazil.[45] Rather than deterring growth, trade barriers are propelling China’s globalization strategy, enabling it to circumvent restrictions while deepening economic ties with partner countries.[46]

Countries promote EVs not simply as end products but as entry points into a broader transformation of mobility, energy and economic systems. Yet this transition is uneven and fraught with both technological and political complexities. A nuanced understanding of these dynamics, ranging from climate policy to digitalization and market fragmentation, is essential for crafting effective, context-sensitive EV strategies. The next section examines why consumers themselves are choosing to adopt EVs, exploring the psychological, economic and social factors that shape demand and influence the pace of adoption.

From the consumer perspective, several key factors drive the increasing popularity of EVs. Foremost are the cost savings associated with owning an EV. Although the upfront price can be higher, lower fuel and maintenance costs over the vehicle’s lifetime make EVs financially attractive. Government tax incentives and subsidies further reduce the initial purchase price, encouraging adoption.

Environmental awareness is another growing motivator. Many consumers are increasingly concerned about their personal carbon footprints and the broader impacts of climate change. Choosing an EV is seen as a direct way to contribute to environmental stewardship.

In addition, the performance and technology of EVs appeal to many drivers. The instant torque delivery, quiet operation and advanced features such as regenerative braking and smart connectivity offer a modern and enjoyable driving experience.

Finally, access and convenience benefits, like preferential access to bus lanes, free parking or exemption from congestion charges in certain cities, provide tangible incentives that make EVs more attractive and practical in urban settings. Tax incentives function as fiscal nitrous, compressing time and cost to accelerate this transition. These instruments help internalize environmental externalities, nudging consumers toward cleaner technologies. By lowering the upfront price tag through credits,

43. *See* P.H. Jos, *Social contract theory: Implications for professional ethics*, 36 The American Review of Public Administration 2, pp.139-155 (2006).
44. *See* A.P.J. Mol and G. Spaargaren, *Ecological modernisation theory in debate: A review*, 9 Environmental politics 1, pp. 17-49 (2000).
45. *See* N. Sherman, *Biden hits Chinese electric cars and solar cells with higher tariffs*, BBC (2024), available at https://www.bbc.co.uk/news/business-69004520 (accessed 30 July 2025).
46. W. Zhang, X. Fang and C. Sun, *The alternative path for fossil oil: Electric vehicles or hydrogen fuel cell vehicles?*, Journal of Environmental Management (2023), doi: 10.1016/j.jenvman.2023.118019.

rebates and exemptions, tax policy recalibrates the cost-benefit equation in favour of EVs, supporting SDG 12: Responsible Consumption and Production.[47]

But fiscal policy extends beyond the dealership floor. Targeted incentives for charging infrastructure – whether through reduced electricity tariffs, home charger subsidies or waived tolls and registration fees – further reduce the total cost of ownership and improve convenience.[48] In jurisdictions where such measures have been strategically deployed, market penetration has surged, reinforcing the causal link between tax design and transport-sector decarbonization.[49]

Moreover, this fiscal architecture advances broader sustainable development objectives. By disincentivizing fossil fuel reliance and encouraging cleaner grids, EV incentives support SDG 13: Climate Action and SDG 7: Affordable and Clean Energy.[50] When powered by low-carbon electricity, EVs offer a scalable pathway to emissions reductions without sacrificing mobility.[51]

As adoption scales, so too does the charging infrastructure. The expansion of this ecosystem reduces “range anxiety”, a psychological barrier rooted in the early limitations of EVs, and broadens the feasibility of electric mobility across urban and peri-urban contexts.[52] In doing so, tax incentives also advance SDG 11: Sustainable Cities and Communities, embedding low-emission transport into the built environment.[53]

5. Theoretical Foundations for Using Taxation to Promote EVs

Taxation, as a policy instrument, is particularly well-suited to promote EV adoption, and its use can be explained through several economic and institutional theories.

The Pigouvian tax theory is a classical economic framework that justifies taxing activities that generate negative externalities, costs borne by society but not reflected in market prices. Petrol-powered vehicles contribute to air pollution and climate change, imposing health and environmental costs that are not accounted for by individual drivers. By imposing taxes on petrol vehicles, governments internalize these external costs, making polluting behaviour more expensive and less attractive. Conversely, providing tax subsidies or credits for EVs helps correct market failures where the environmental and social benefits of cleaner vehicles are undervalued by consumers and producers. This economic approach aligns financial incentives with environmental goals, guiding market behaviour toward sustainability.

Behavioural economics adds nuance to this understanding by acknowledging that consumers do not always act as perfectly rational agents.[54] Decisions about purchasing vehicles are influenced by complex factors including habits, perceptions and social norms. Tax incentives such as rebates, credits, and reduced registration fees serve as “nudges” that make EVs financially and psychologically more appealing. These incentives can lower barriers to entry and accelerate consumer adoption by addressing behavioural biases and information gaps.[55]

The political dimension of taxation policy is illuminated by public choice theory, which examines how self-interest and political incentives shape policy outcomes.[56] Governments are more likely to adopt and maintain tax incentives for EVs when these policies deliver tangible, visible benefits to voters and influential interest groups such as automotive manufacturers and clean energy advocates. EV tax incentives, therefore, become politically palatable because they combine environmental objectives with economic and social appeal, supporting politicians’ goals of voter satisfaction and industrial growth.

47. X. Liu et al., *Do policy incentives drive electric vehicle adoption? Evidence from China*, 150 Transportation Research Part A: Policy and Practice, pp. 49-62 (2021), doi: 10.1016/j.tra.2021.05.013.
48. P.Z. Lévay, Y. Drossinos and C. Thiel, *The effect of fiscal incentives on market penetration of electric vehicles: A pairwise comparison of total cost of ownership*, 105 Energy Policy, pp. 524-533 (2017), doi: 10.1016/j.enpol.2017.02.054.
49. S. Küfeoğlu and D. Khah Kok Hong, *Emissions performance of electric vehicles: A case study from the United Kingdom*, 260 Applied Energy (2020), doi: 10.1016/j.apenergy.2019.114241.
50. L. Cozzi et al., *Tracking SDG 7: The Energy Progress Report 2021* (International Bank for Reconstruction and Development / The World Bank 2021).
51. N.C. Onat et al., *How eco-efficient are electric vehicles across Europe? A regionalized life cycle assessment-based eco-efficiency analysis*, 29 Sustainable Development 5, pp. 941-956 (2021), doi: 10.1002/sd.2186.
52. S. Sommer and C. Vance, *Do more chargers mean more electric cars?*, 16 Environmental Research Letters 6 (2021), doi: 10.1088/1748-9326/ac05f0.
53. F.T. Schiavo et al., *The meaning of electric cars in the context of sustainable transition in Brazil*, 13 Sustainability (Switzerland) 19 (2021), doi: 10.3390/su131911073.
54. *See* H. Luth, *Behavioural economics in consumer policy: The economic analysis of standard terms in consumer contracts revisited* (Intersentia 2010).
55. *See* L.A. Reisch and M. Zhao, *Behavioural economics, consumer behaviour and consumer policy: state of the art*, 1 Behavioural Public Policy 2, pp.190-206 (2017).
56. *See* J.S. Shaw, *Public choice theory,* The Concise Encyclopedia of Economics pp.1-7 (2002).

Furthermore, institutional economics highlights the critical role of formal and informal institutions — such as laws, norms and regulatory frameworks — in shaping economic behaviour.[57] Tax policy is a key institutional mechanism through which governments influence markets. By embedding EV incentives within the broader institutional context, policymakers can steer market dynamics away from fossil fuel dependence and toward sustainable transport solutions. The effectiveness of tax incentives, thus, depends not only on their economic rationale but also on the strength and coherence of the surrounding institutional environment.

6. Comparative Tax Incentives and Fiscal Approaches to EV Adoption: Lessons from China, France and Norway

6.1. Introductory remarks

This section provides a critical comparative analysis of the tax incentives used by China, France, and Norway to promote EV adoption. The section focuses on the types of tax incentives and fiscal instruments employed, their alignment with national policy goals and the behavioural and structural effects they have on mobility transitions. Each country's subsection begins with an overview of its fiscal orientation, followed by a breakdown of specific tax incentives and their implementation contexts.

6.2. China's fiscal strategy: Driving industrial policy through tax relief

China's EV tax policy is intricately linked to its broader industrial, environmental and urban development agendas. China adopts a multi-pronged approach that includes purchase-based tax exemptions, annual vehicle levies and selective consumption tax exclusions. This section introduces China's core tax incentives and fiscal instruments and examines how they work in concert to reduce the cost of EV ownership, promote domestic EV manufacturing and steer consumer choices toward electric mobility.

6.2.1. Exemptions under the Vehicle Purchase Tax (VPT)

This subsection examines how exemptions from China's Vehicle Purchase Tax (VPT) significantly lower the upfront cost of new energy vehicles and create a strong demand-side pull in favour of EVs.

In China, the promotion of EVs is deeply rooted in both an urgent need to tackle severe air pollution and a strategic industrial vision. China's sprawling urban centres, particularly megacities like Beijing and Shanghai, have long grappled with hazardous air quality caused primarily by emissions from ICE vehicles and coal-based energy production.[58] As a result, EVs emerged as a critical solution to reduce harmful pollutants such as nitrogen oxides and particulate matter, directly improving public health outcomes for millions of urban residents. Beyond environmental concerns, energy security is a key motivation; by shifting transportation away from imported oil towards domestically generated electricity, especially as China expands its renewable energy capacity, the country reduces its vulnerability to volatile oil markets and geopolitical risks. Industrial policy further drives China's EV push, as the government has identified electric mobility as a cornerstone of its broader green industrial strategy.[59] By fostering dominance in the global EV supply chain, from battery production to vehicle manufacturing, China aims to capture significant economic value and technological leadership in the decades to come. These priorities are supported by robust policy tools such as generous subsidies, tax exemptions, and special privileges like easier access to licence plates, which collectively lower the barriers for consumers to adopt EVs and propel domestic production.

The Vehicle Purchase Tax (VPT), instituted in 2001, serves a dual purpose: to generate revenue for automotive sector development while concurrently incentivizing environmental stewardship through energy consumption reduction.[60] This tax framework has undergone iterative recalibrations to enhance alignment with China's evolving environmental priorities.[61] The tax rate structure is explicitly progressive relative to engine displacement, a proxy for fuel consumption and emissions intensity, with vehicles exceeding 1.6 litres subjected to a fixed rate, while rates for smaller engines fluctuate to encourage the purchase of more efficient vehicles.

57. *See* D.C. North, *The new institutional economics and development. Economic History*, pp.1-8 (1993), available https://EconPapers.repec.org/RePEc:wpa:wuwpeh:9309002 (accessed 30 July 2025).
58. *See* L.T. Molina et al., *Impacts of megacities on air quality: challenges and opportunities*, in *Oxford Research Encyclopedia of Environmental Science* (Oxford University Press 2020), doi: 10.1093/acrefore/9780199389414.013.5 .
59. *See* Y. Sharifli, *Electric Ambitions: China's Strategic Focus on Türkiye's Green Mobility Industry*, China Global South Project (29 May 2025), available at https://chinaglobalsouth.com/analysis/china-ev-strategy-turkiye/ (accessed 30 July 2025).
60. W. Liu et al., *How to promote China's green economic development? The combination effects of consumption tax and carbon tax policies*, 35 Energy and Environment 3, pp. 1374-1395 (2024), doi: 10.1177/0958305X221140581.
61. K.L. Lo et al., *Energy-saving and Emission Reduction Effects of China's Auto Tax Policy*, 214 Procedia Computer Science, pp. 79-85 (2022), doi: 10.1016/j.procs.2022.11.151.

Crucially, the VPT is a one-time tax levied upon the acquisition of new passenger vehicles for personal use. It explicitly excludes second-hand vehicles and those acquired for commercial purposes, with the tax base calculated as the purchase price exclusive of VAT.[62]

6.2.2. Adjustments to the Vehicle and Vessel Tax (VVT)

This sub-section analyses the preferential treatment of EVs under the Vehicle and Vessel Tax (VVT), which incentivizes long-term ownership and discourages reliance on high-emission vehicles.

The VVT operates as an annual property tax applied from the month of acquisition, targeting vehicle and vessel owners.[63] The 2012 reforms introduced a tax assessment mechanism based on engine exhaust volume, effectively internalizing environmental externalities linked to engine size and emissions. The annual tax is prorated monthly, with detailed passenger vehicle rates outlined in Table 1.

Table 1. Annual tax rates for VVT in China

Vehicle type	Subcategory	Tax base	Annual tax range (¥)	Remarks
Motorized road vehicles	Passenger vehicles	Per vehicle	60–320	Includes trolleybuses; rate determined by engine size
	Cargo vehicles	Per tonne of net load capacity	16–60	Tax calculated based on declared tonnage
	Motorcycles	Per vehicle	20–60	Flat rate applied regardless of engine capacity
	Motor-tricycles	Per vehicle	32–80	Typically used for light transport in urban areas
Non-motorized road vehicles	Manually drawn vehicles	Per vehicle	1.2–24	Includes pedicabs and handcarts
	Animal-drawn vehicles	Per vehicle	4–32	Common in rural and peri-urban transport
	Bicycles	Per vehicle	2–4	Flat rate for personal or commercial use
Motorized vessels	Up to 150 tonnes	Net tonnage	1.20	Tax escalates with capacity
	151–500 tonnes	Net tonnage	1.60	
	501–1,500 tonnes	Net tonnage	2.20	
	1,501–3,000 tonnes	Net tonnage	3.20	

62. *Vehicle Tax*, China Daily (13 Dec. 2018), available at https://govt.chinadaily.com.cn/s/201812/13/WS5c122531498eefb3fe46ec41/vehicle-tax.html (accessed 30 July 2025).
63. Ministry of Industry and Information Technology, Ministry of Finance State Administration of Taxation, Announcement on Adjusting the Technical Requirements for Energy-Saving New Energy Vehicles That Enjoy Vehicle and Vessel Tax Benefits (2022).

Vehicle type	Subcategory	Tax base	Annual tax range (¥)	Remarks
	3,001–10,000 tonnes	Net tonnage	4.20	
	Over 10,000 tonnes	Net tonnage	5.00	
Non-motorized vessels	Up to 10 tonnes	Deadweight tonnage	0.60	Tax applies to barges, rafts and unpowered vessels
	11–50 tonnes	Deadweight tonnage	0.80	
	51–150 tonnes	Deadweight tonnage	1.00	
	151–300 tonnes	Deadweight tonnage	1.20	
	Over 300 tonnes	Deadweight tonnage	1.40	

The strategic exemption of new EVs from both VPT and VVT represents a deliberate fiscal signal prioritizing cleaner transportation modes. The exemption reflects a nuanced understanding that overcoming the entrenched dominance of internal combustion engines necessitates not only technological advancement but also sustained policy intervention that mitigates economic disincentives associated with EV adoption.

Much like a key plot twist in the *Fast and Furious* saga, where unexpected shifts redefine the trajectory of the narrative, China's tax policy on NEVs has undergone a dynamic evolution that reflects the country's complex journey toward electric mobility. In 2014, the Chinese government launched a pivotal incentive by exempting NEVs from the VPT, extending this relief to both domestically produced and imported vehicles.[64] Originally intended to conclude in 2020, this exemption has since been extended multiple times, now set to persist until 2027, albeit with a deliberate tapering: purchasers between 2024 and 2025 may claim up to RMB 30,000, which then reduces by half to RMB 15,000 for acquisitions from 2026 to 2027.[65] This phased rollback signals a strategic governmental shift from aggressive stimulus toward market maturity and self-sustainability.

Yet, akin to the early stages of a high-octane race where acceleration is hesitant and progress measured, the adoption of NEVs initially lagged behind expectations. The government's ambitious target of five million EVs by 2020 was unmet, with only approximately 650,000 vehicles on the road by that time.[66] This shortfall invites a critical interrogation of the exemption's immediate effectiveness. However, viewing the data through a broader lens reveals a more nuanced narrative: according to Liu,[67] a remarkable acceleration occurred in 2021, with a 161% surge in NEV sales, emphasizing the cumulative impact of sustained incentives and policy refinement.

Parallel to the VPT exemption, the VVT was also targeted to ease the financial burden on consumers of energy-saving vehicles. The Ministry of Finance halved the VVT for such vehicles to a modest range of 30-160 Yuan and granted full

64. A. Niranjan, *China makes new electric cars tax-free*, The Guardian (10 July 2014), available at https://www.theguardian.com/environment/2014/jul/10/china-exempts-electric-cars-from-tax (accessed 30 July 2025).
65. L. Fo'an, *Announcement on the Extension and Optimization of the Vehicle Purchase Tax Exemption Policy for New Energy Vehicles* (China Briefing 2023), available at https://www.china-briefing.com/news/china-extends-nev-tax-reduction-and-exemption-policy-to-2027/ (accessed 30 July 2025).
66. W. Li, M. Yang and S. Sandu, *Electric vehicles in China: A review of current policies*, 29 Energy and Environment 8, pp. 1512-1524, doi: 10.1177/0958305X18781898 (2018).
67. Z. Liu, *Impact of vehicle purchase tax exemption on electric vehicle sales: Evidence from China's automotive industry*, 49 Energy Strategy Reviews, doi: 10.1016/j.esr.2023.101148 (2023).

exemption for eligible NEVs.[68] However, as the plot thickens, the eligibility criteria for NEVs have tightened considerably through regulatory updates in 2018 and 2022,[69] reflecting an increasingly rigorous environmental standard.

Despite its symbolic significance, the VVT exemption functions as a minor subplot in the broader policy drama due to the tax's inherently low baseline value. Chen et al.[70] critically note that this exemption alone offers limited consumer relief and is insufficient to position NEVs competitively against entrenched ICE vehicles. The overarching lesson echoes through the narrative arc: only a concerted ensemble of tax incentives, subsidies and regulatory support can truly shift the market dynamics and drive NEVs into the mainstream.[71]

Thus, the VPT and VVT exemptions, while foundational, are but chapters in China's ongoing odyssey toward electrification, a complex interplay of policy incentives, market forces and technological evolution that mirrors the escalating stakes and evolving challenges of a blockbuster franchise unfolding on a global environmental stage.

6.2.3. Consumption tax exemptions for EVs

This subsection explores how the absence of consumption taxes on EVs reinforces affordability and positions EVs as the rational choice in China's evolving transport ecosystem.

In China, affordability stands out as the primary concern for most consumers, especially in lower-tier cities where income levels are comparatively modest. Many Chinese EV buyers are first-time car owners living in densely populated urban areas, where personal mobility has traditionally been limited by factors such as high vehicle ownership costs and restrictive licence plate systems. Additionally, China's rapidly growing middle class tends to be highly tech-savvy, expecting modern vehicles to feature advanced connectivity and smart functions.[72] To meet these demands, the government has implemented generous subsidies and tax exemptions that significantly reduce the upfront cost of EVs, making them more accessible to a broader segment of the population. Beyond financial incentives, special policies granting licence plate privileges in congested cities like Beijing and Shanghai help overcome bureaucratic barriers, allowing EV owners to navigate urban restrictions more easily. Furthermore, China's robust domestic production capabilities ensure a wide variety of affordable EV models tailored to different consumer segments, enhancing choice and reinforcing market competitiveness.

Introduced in 2006, China's consumption tax functions as a targeted fiscal instrument designed to regulate and generate revenue from select goods including tobacco, refined oil, alcohol and automobiles. This tax is levied in addition to the VAT and applies broadly to the production, subcontracted processing and importation of these consumer goods.[73] Within the automotive sector, consumption tax rates vary significantly, imposing a heavier burden on ICE vehicles, as detailed in Table 2., reflecting a fiscal preference intended to curb the environmental externalities associated with traditional fuel-powered cars.

Table 2. Consumption tax to be paid for automobiles

Tax item	Scope of levy	Tax rate
Small automobiles	Sedans	10%
Large automobiles	All-terrain vehicles	3%-8%

68. CN: Vehicle and Vessel Tax (2012), Vehicle and Vessel Tax, Order No. 43 of the President of the People's Republic of China, Standing Committee of the National People's Congress.
69. Ministry of Industry and Information Technology, Ministry of Finance State Administration of Taxation, Announcement on Adjusting the Technical Requirements for Energy-Saving New Energy Vehicles That Enjoy Vehicle and Vessel Tax Benefits (2022).
70. Z. Chen, Z. Yang and S. Wappelhorst, *Overview of Asian and Asia-Pacific Passenger Vehicle Taxation Policies and Their Potential to Drive Low-Emission Vehicle Purchases* (International Council on Clean Transportation 2022).
71. L. Lin and J. Xue, *Analysis of Tax Policy for Promoting the Development of China's New Energy Vehicles Industry* Proceedings of the 2019 4th International Conference on Humanities Science and Society Development (2019), doi: 10.2991/ichssd-19.2019.63; K.L. Lo et al., *Energy-saving and Emission Reduction Effects of China's Auto Tax Policy*, 214 Procedia Computer Science, pp. 79-85, doi: 10.1016/j.procs.2022.11.151 (2022).
72. *See* T. Carter, *Chinese drivers are demanding smart cars — and that's what they're getting*, Business Insider (18 May 2024), available at https://www.businessinsider.com/chinese-ev-makers-battle-for-market-dominance-with-smart-features-2024-5 (accessed 30 July 2025).
73. CN: Consumption tax, Ministry of Finance and State Administration of Taxation (20 Mar. 2006), available at https://www.china-tax.net/turnover-tax-china/consumption-tax.html (accessed 30 July 2025).

Since 2014, China has exempted producers and importers of new EVs from the consumption tax, a policy move akin to a catalytic scene in a grand narrative that seeks to rewrite the script of automotive production economics.[74] By alleviating tax-induced production costs, this exemption has aimed to serve as a critical lever to accelerate the scaling of EV manufacturing and consumption, promoting a shift away from ICE vehicles toward cleaner alternatives.[75] Unlike some time-bound incentives, this exemption currently persists with no predetermined sunset, providing sustained support to manufacturers navigating the transition to greener technologies.

A case in point is BYD Auto Co., Ltd., a prominent protagonist in China's EV saga and a subsidiary of the BYD Group. BYD's strategic pivot from ICE vehicle production to an exclusive focus on NEVs epitomizes the tangible impact of consumption tax relief on industrial realignment. The 2022 announcement by BYD to discontinue ICE vehicle manufacturing emphasizes how fiscal incentives like the consumption tax exemption can recalibrate market dynamics and corporate strategy.[76] Such developments suggest the exemption has been instrumental in lowering production costs, thereby enabling companies to align their operations with national environmental priorities.[77]

However, the storyline remains in flux. Looking toward the horizon, speculation abounds regarding a potential revision of the consumption tax regime. Analysts anticipate discussions at the forthcoming third plenum, a quinquennial congress pivotal for setting long-term policy direction, may herald a structural shift in tax incidence from producers and importers to wholesalers and retailers. This adjustment is proposed in response to observed consumption imbalances, with the intent to stimulate demand by relieving upstream pressures.[78] Yet, this reallocation risks cascading tax burdens downstream, potentially inflating retail prices and dampening consumer uptake of EVs. The full implications for dealerships, pricing strategies and ultimately consumer affordability remain shrouded in uncertainty, casting a shadow over the policy's future effectiveness.[79]

In sum, the consumption tax exemption represents a pivotal fiscal mechanism within China's broader EV policy portfolio. While it has demonstrably supported production growth and industrial transformation, its evolving contours reflect the complex balancing act between managing market supply and incentivizing demand in the unfolding EV narrative.

6.3. France's balanced approach: Incentivizing green choices within a social framework

France's EV tax system is characterized by a balance between environmental responsibility and social inclusivity. France employs a mix of national and regional tax incentives aimed at reducing vehicle emissions, supporting energy-efficient infrastructure, and promoting accessibility to lower-income households. This section outlines the principal instruments France uses to facilitate this transition, including registration tax exemptions and energy transition-linked tax credits.

6.3.1. France's vehicle registration tax reductions and exemptions

This subsection details how France's regional vehicle registration taxes are structured to favour EV adoption through partial or full exemptions, depending on regional climate policy priorities.

France presents yet another model, where EV introduction is closely tied to compliance with broader EU climate commitments and efforts to stimulate a green economic recovery. As part of the EU Green Deal, France is mandated to phase out sales of internal combustion engine vehicles by 2035, aligning national policy with continental decarbonization goals. Urban areas, facing chronic air pollution issues, have implemented low-emission zones (*Zones à Faibles Émissions*, ZFEs) that restrict the entry of high-polluting vehicles, creating local incentives for EV uptake.[80] France's COVID-19 economic recovery packages have prioritized green investments, with substantial subsidies for EV purchases to stimulate both environmental and economic

74. *New energy vehicle purchase tax exemption policy extended to the end of 2027*, Xinhua News Agency (21 June 2023), available at https://www.gov.cn/zhengce/202306/content_6887717.htm (accessed 30 July 2025).
75. B. Yu, *Life after subsidies for China's EVs*, Dialogue Earth (30 Nov. 2023), available at https://dialogue.earth/en/business/life-after-subsidies-for-chinas-evs/ (accessed 30 July 2025).
76. S.A. Smith, *Digital Transformation In Marketing: A BYD Case Study*, 6 Academic Journal of Current Practice in Business and Management (2021).
77. X. Liu et al., *Do policy incentives drive electric vehicle adoption? Evidence from China*, 150 Transportation Research Part A: Policy and Practice, pp. 49-62, doi: 10.1016/j.tra.2021.05.013 (2021).
78. K. Yao and E. Zhang, *China's key plenum aims to fix decades-old tax revenue imbalance*, Reuters (21 June 2024), available https://www.reuters.com/world/china/chinas-key-plenum-aims-fix-decades-old-tax-revenue-imbalance-2024-06-20/ (accessed 30 July 2025).
79. J. Huang and F.N. Ochoa, *China's Economy Is Flagging. A Five-Year Plan Seeks to Change That*, The Wall Street Journal (11 July 2024), available at https://www.wsj.com/world/china/china-eyes-key-tax-reform-to-fill-up-local-government-coffers-12aed397 (accessed 30 July 2025); J. Pak, *China pledges tax reform. That is a big deal for this socialist country*, Market Place (24 July 2024), available at https://www.marketplace.org/2024/07/24/china-tax-reform-socialist-country-property-tax-cigarettes-consumption/ (accessed 30 July 2025).
80. *See* H. Samuel, *France scraps mandatory low-emission zones in major cities*, The Telegraph (18 June 2025), available at https://www.telegraph.co.uk/world-news/2025/06/18/france-scraps-plans-low-emission-zones-major-cities/ (accessed 30 July 2025).

benefits.[81] The government's bonus-malus tax system provides financial bonuses to buyers of electric and low-emission vehicles, while simultaneously imposing penalties on high-emission cars, creating a market mechanism that encourages cleaner transport choices. This approach reflects a blend of regulatory compliance, economic stimulus and public health objectives, illustrating how EV policies can serve multiple national goals.

In France, the Vehicle Registration Tax (VRT) operates as a composite fiscal gatekeeper that comes into play at the pivotal moment of vehicle purchase and registration.[82] This tripartite tax framework for passenger vehicles orchestrates a financial narrative through:

(1) Fixed registration fee: A nominal base charge of EUR 11, a gateway toll for entering the vehicle ownership arena.

(2) Carbon emissions tax (carbon malus): This tiered levy pivots on the vehicle's CO# emissions, calibrated to EU regulatory standards. Vehicles adhering to EU thresholds face a sliding scale tax from EUR 50 to as steep as EUR 60,000, corresponding to emissions from 118 grams (g) CO#/km to above 193g. Vehicles failing to meet these standards encounter even harsher penalties, with rates escalating from EUR 1,000 up to EUR 60,000 for emissions starting as low as 4g, emphasizing the tax's punitive precision.[83]

(3) Weight tax (weight malus): A weighty surcharge of EUR 10 per kg is levied on vehicles tipping the scales beyond 1,800kg, penalizing the environmental cost of heft.[84]

At its core, the VRT embodies the "bonus-malus" system — a fiscal seesaw designed to reward the lightest environmental footprints while imposing heavier burdens on the more pollutive actors. This system functions as a financial incentive mechanism: vehicles with low CO# emissions enjoy a "bonus" in the form of exemption from the carbon and weight malus taxes, whereas heavier and more polluting vehicles are met with escalating penalties, crafting a sharply defined economic divide based on environmental impact.[85]

In the broader cinematic plot of climate policy, France's exemption of new EVs from the carbon and weight malus taxes emerges as a decisive plot twist aimed at curbing GHG emissions from passenger vehicles. By erasing these punitive layers, the policy lowers the upfront financial barriers for consumers contemplating the leap from conventional ICE vehicles to EVs. This reduction acts as a spotlight on the total cost of ownership, intensifying the allure of new EVs against their ICE counterparts.[86]

The bonus-malus system, first scripted in 2008 and refined through iterative legislative revisions, has gradually reshaped the market's casting call, coaxing a shift from high-emission vehicles toward models with significantly reduced carbon footprints.[87] The 2017 recalibration introduced more granular malus rates tied to per-gram CO#/km and per-kilogram weight metrics, ratcheting up the financial stakes for vehicles exceeding emission and weight thresholds, thereby sharpening the system's behavioural incentives.[88]

France chronicles the rising crescendo of EV registrations from 2011 through 2018, illustrating the efficacy of the bonus-malus system as more than just a policy: it is a decisive force altering the narrative arc of the French automotive market. These sustained upward trends reveal how the dynamic interplay of fiscal incentives and regulatory penalties has woven a compelling story that advances the adoption of EVs. The system's ongoing evolution emphasizes its adaptive capacity, recalibrating to maintain pressure on emissions while fostering technological and consumer transitions essential to France's broader environmental ambitions.

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81. *See* F. Geels, G. Pereira and J. Pinkse, *Public investments in COVID-19 green recovery packages: A comparative analysis of scale, scope, and implementation in France, Germany, and the United Kingdom*, Working Paper No.004 (The Productivity Institute 2021).
82. Republique Française (French Republic), *French Tax Law Brochure* pp. 1-94 (2024), available https://www.impots.gouv.fr/sites/default/files/media/3_Documentation/brochures/french_tax_law_brochure_2024.pdf (accessed 30 July 2025).
83. Republique Française, *Le barème du malus automobile est rehaussé (Automobile malus fee increases as of March 1, 2025)* (2025), available https://www.service-public.fr/particuliers/actualites/A17079 (accessed 30 July 2025).
84. Id.
85. T. Klier and J. Linn, *Using Vehicle Taxes to Reduce Carbon Dioxide Emissions Rates of New Passenger Vehicles: Evidence from France, Germany, and Sweden*, 7 American Economic Journal: Economic Policy 1, pp. 212-242, doi: 10.1257/pol.20120256 (2012); E. Ravigné, F. Ghersi and F. Nadaud, *Is a fair energy transition possible? Evidence from the French low-carbon strategy*, 196 Ecological Economics, doi: 10.1016/j.ecolecon.2022.107397 (2022).
86. S. Wappelhorst, P. Mock and Z. Yang, *Using Vehicle Taxation Policy to Lower Transport Emissions: An Overview for Passenger Cars in Europe* (International Council on Clean Transportation 2018).
87. *Supra* n. 86.
88. Z. Yang, *Practical lessons in vehicle efficiency policy: The 10-year evolution of France's CO2-based bonus-malus (feebate) system*, The International Council on Clean Transportation (12 Mar. 2018), available at https://theicct.org/practical-lessons-in-vehicle-efficiency-policy-the-10-year-evolution-of-frances-co2-based-bonus-malus-feebate-system/ (accessed 30 July 2025).

6.3.2. France's Energy Transition Tax Credit/*Crédit d'Impôt pour la Transition Énergétique* (ETTC/CITE)

This subsection investigates France's use of the Energy Transition Tax Credit/*Crédit d'Impôt pour la Transition Énergétique* (ETTC/CITE) for EV-related infrastructure investments, illustrating how these incentives support equitable participation in the low-carbon transition. The ETTC/CITE is a comprehensive framework of tax credits intended to promote investments in energy efficiency and renewable energy across various sectors. Within the scope of this study, the spotlight is on the specific tax credit allocated for the installation of EV charging stations in private residences.

Revised in April 2024, this tax credit targets individuals domiciled in France, with eligibility based on any one of the following criteria:[89]

(1) Primary residence: The individual's main home must be located in France, where they reside for over six months annually.

(2) Employment: The individual must be employed primarily in France, earning most of their income from activities based in the country.

(3) Economic interests: The individual holds primary economic interests in France, such as substantial investments or property management.

The ETTC/CITE applies to both primary and secondary residences, with limitations allowing one qualifying charging system per individual or up to two per married couple living in the same household. The credit reimburses 75% of eligible expenditures, capped at EUR 500 for controllable load charging systems and EUR 300 for non-controllable charging terminals. Eligible expenses must be incurred between 1 January 2024 and 31 December 2025, with payments made in 2024 to qualify.

The overarching aim of the ETTC/CITE is to support the broader adoption of alternative fuel vehicles by fostering the necessary charging infrastructure, thereby aligning with France's ambitious climate targets and facilitating the energy transition.[90]

A critical enabler for widespread EV adoption is the accessibility and reliability of charging infrastructure, which directly mitigates consumer concerns related to range anxiety and usability.[91] Recognizing this, the French government set aggressive goals: deploying 100,000 public charging points by 2023 and expanding to 7 million public and private charging points by 2030.[92]

The ETTC/CITE's evolution reflects this strategic priority. Initially launched in 2014 to promote residential energy-efficient renovations through a 30% refund on eligible costs up to EUR 8,000,[93] the policy was expanded in 2021 to incorporate tax credits for the purchase and installation of EV home charging systems.[94]

The results are tangible: by the end of 2023, France boasted over 1.8 million EV charging points nationwide, with private installations accounting for more than 1 million.[95] This dramatic surge in residential charging infrastructure strongly suggests that the ETTC/CITE has successfully incentivized households to invest in EV chargers, reducing barriers to EV ownership and enhancing consumer confidence in electric mobility.

In 2024, France's EV market share reached 26.2%, with a notable 291,143 BEVs registered, representing 16.9% of the total market. While EV sales have been steadily increasing, overall EV sales experienced a dip in early 2025 due to a decline in PHEV registrations. Despite this, the French government continues to support EV adoption through various incentives. France is modifying its BEV policies and incentives in 2025 to address budgetary pressures and adapt to the evolving market. The government is reducing its EV subsidy budget from EUR 1.5 billion to EUR 1 billion.[96] The European Alternative Fuels

89. Republique Française, *IR - Crédit d'impôt pour l'acquisition et la pose d'un système de charge pour véhicule électrique (CIBRE) (IR - Tax credit for the acquisition and installation of an electric vehicle charging system (CIBRE)) (*2024), available at https://bofip.impots.gouv.fr/bofip/14141-PGP.html/ACTU-2024-00033 (accessed 30 July 2025).
90. Republique Française, *supra* n. 83.
91. J.H.M. Langbroek, J.P. Franklin and Y.O. Susilo, *The effect of policy incentives on electric vehicle adoption*, 94 Energy Policy, pp. 94-103, doi: 10.1016/j.enpol.2016.03.050 (2016).
92. FR: Ministry of Ecological Transition and Territorial Cohesion, The French Energy Transition Law for Green Growth (2016).
93. A. Risch, *Are environmental fiscal incentives effective in inducing energy-saving renovations? An econometric evaluation of the French energy tax credit*, 90 Energy Economics, doi:10.1016/j.eneco.2020.104831 (2020).
94. Republique Française, *Le crédit d'impôt pour la transition énergétique (CITE) est-il encore accordé ? (Energy transition tax credit (CITE))* (2021), available at https://www.service-public.fr/particuliers/vosdroits/F1224 (accessed 30 July 2025).
95. M. Carlier, *Quarterly electric vehicle charging points in France between the first quarter of 2019 and the fourth quarter of 2023, by type*, Statista (27 May 2024).
96. *See* European Alternative Fuels Observatory, *France: over 2 million rechargable vehicles in 2024*, European Commission (9 January 2025) available https://alternative-fuels-observatory.ec.europa.eu/general-information/news/france-over-2-million-rechargable-vehicles-2024 (accessed 30 July 2025).

Observatory reports that subsidies for new BEVs will fall to between EUR 2,000 and EUR 4,000, down from the current EUR 4,000 to EUR 7,000. A new progressive scale will determine the subsidy amount based on household income. Households in the first five income groups will receive EUR 4,000, those in groups 6 to 8 will receive EUR 3,000, and those in groups 9 and 10 will receive EUR 2,000. This shift reflects the decreasing cost of BEVs and their increasing market share.

Furthermore, the government aims to promote cleaner EV production through CO# emission-based eligibility criteria for subsidies. This could potentially impact the competitiveness of European-made EVs compared to those imported from China. The funding basis for light electric commercial vehicles will also change, with support coming from energy-saving certificates rather than the state budget. The social leasing programme, offering low-income households EVs for EUR 100 per month, will continue with funding from energy-saving certificates. Finally, the *malus écologique* penalty for high-emission vehicles will likely tighten, with CO# thresholds lowered and penalties increased.

In sum, the ETTC/CITE serves as a vital policy lever that complements vehicle purchase incentives by addressing the critical "last mile" infrastructure challenge, reinforcing France's broader strategy to decarbonize transport and accelerate the transition to cleaner energy solutions.

6.4. Norway's transformative tax design: Making EVs the default option

Norway's EV policy architecture is anchored in aggressive tax exemptions that reflect the country's deep environmental commitments. Rather than offering modest rebates or temporary discounts, Norway removes virtually all major vehicle-related taxes on EVs. This section introduces the logic behind these policies and explains how they have fundamentally reshaped consumer behaviour and vehicle markets in the country.

6.4.1. Full exemption from Value-Added Tax (VAT)

This subsection explores how Norway's VAT exemption has been pivotal in bridging the affordability gap between EVs and ICE vehicles, making electric options the market norm.

VAT in Norway is a consumption tax levied on goods and services at each stage of production and distribution. The standard VAT rate is 25%, with reduced rates applied to select goods, such as a 12% rate on certain food items. Vehicles, including EVs, are generally subject to the standard VAT rate upon purchase. Imported goods, including vehicles, are also subject to VAT, although registered vendors may claim input tax credits to offset their overall VAT liability.[97]

On 1 January 2018, Norway introduced a zero VAT rate on the sale, import and leasing of EVs and EV batteries, marking a pivotal policy to stimulate EV uptake.[98] Initially scheduled to expire on 31 December 2020, the exemption was subsequently extended through 2022.[99] Starting January 2023 and continuing through 2024, the VAT exemption remains in place but is capped at NOK 500,000 per vehicle. Vehicles priced above this threshold are now subject to the standard 25% VAT on the amount exceeding NOK 500,000.[100]

The complete VAT exemption played a crucial role in Norway's comprehensive strategy to meet its climate commitments under the Paris Agreement, which targets a 55% reduction in GHG emissions by 2030.[101] Given that the transport sector is a major contributor to Norway's emissions profile,[102] promoting EVs as a cleaner alternative was essential. The VAT exemption substantially reduced the upfront cost of EVs, which is particularly impactful in Norway due to its otherwise high VAT rate.[103] By the conclusion of the initial exemption period, nearly 79.2% of new vehicle sales in Norway were EVs, emphasising the incentive's effectiveness in driving market transformation.[104]

97. NO: VAT Act, 2009
98. Norsk Elbil Forening (Norwegian EV association), *Norwegian EV policy* (2024), available at https://elbil.no/english/norwegian-ev-policy/ (accessed 30 July 2025).
99. J. Hetland, *ESA gives green light for Norway to continue tax reduction on electric vehicles for two more years*, EFTA Surveillance Authority (16 Dec. 2020), available at https://www.eftasurv.int/newsroom/updates/esa-gives-green-light-norway-continue-tax-reduction-electric-vehicles-two-more (accessed 30 July 2025).
100. ESA, *Notification of Amendments to VAT Benefits for Zero-Emission Vehicles* (2022).
101. *United Nations Framework Convention on Climate Change* (2022).
102. S. Dhar et al., *Transport*, in *Climate Change 2022 - Mitigation of Climate Change* pp. 1049-1160 (Cambridge University Press 2023), doi: 10.1017/9781009157926.012.
103. A. Mengden, *VAT Rates in Europe, 2024*, Tax Foundation (30 Jan. 2024), available at https://taxfoundation.org/data/all/eu/value-added-tax-2024-vat-rates-europe/ (accessed 30 July 2025).
104. Norwegian EV association, *supra* n. 98.

However, starting in January 2023, the exemption was partially scaled back to address concerns that the prior policy disproportionately favoured higher-income households who purchase luxury EV models.[105] The introduction of the NOK 500,000 cap aims to maintain broad accessibility to VAT benefits for most consumers while ensuring that more expensive EVs face VAT on the excess price. This adjustment is intended to sustain the growth of the EV market while encouraging consumers to opt for smaller, more affordable and lower-emission vehicles, thereby further advancing emission reductions within Norway's transport sector.

6.4.2. Additional benefits under vehicle registration and road taxes

This subsection reviews the cumulative advantages of full registration fee exemptions, toll reductions and other cost-saving mechanisms that further enhance the appeal of EVs in Norway.

Norway's embrace of EVs is shaped by its commitment to climate leadership combined with effective fiscal incentives.[106] Norway has set some of the world's most ambitious climate targets, including a legally binding goal that all new passenger vehicles sold must be zero-emission by 2025. This strong political will is underpinned by Norway's unique energy context: nearly 100% of its electricity comes from renewable hydropower, meaning that EVs represent an almost entirely clean mode of transport. To accelerate consumer uptake, Norway has implemented a comprehensive taxation strategy that heavily penalizes petrol and diesel cars while exempting EVs from VAT, registration fees and tolls. These fiscal measures create a powerful economic incentive that has shifted consumer behaviour decisively towards electric mobility. Additionally, widespread public support for environmental policies and the development of an extensive, reliable EV charging infrastructure have reinforced Norway's leadership role in the global EV transition, demonstrating how societal values and infrastructure readiness can combine to drive rapid adoption.[107]

In Norway, consumer preferences are shaped by a strong environmental ethic and a pragmatic focus on cost efficiency. The Norwegian public is deeply conscious of climate change, and many choose EVs primarily to reduce their personal carbon footprints. At the same time, the country's high taxes on petrol and diesel vehicles create a financial calculus where EVs are often the economically wiser choice. Given Norway's cold climate and dispersed population, consumers also prioritize vehicle features that ensure reliable long-range performance and resilience in winter conditions. Norwegian policies reflect these needs through comprehensive fiscal measures: full exemptions from VAT and registration fees make EVs financially competitive with conventional cars. Additionally, practical incentives such as free tolls, complimentary parking and access to bus lanes enhance convenience and everyday usability. Norway's extensive and well-maintained charging infrastructure further supports consumers' confidence in EV ownership, enabling long-distance travel without range anxiety.

In addition to Norway's well-known VAT exemption on EVs, the country has implemented a suite of additional tax benefits that further reduce the total cost of ownership for EV drivers. Chief among these are exemptions from vehicle registration fees, formally known as the one-time registration tax (*engangsavgift*), which can be substantial for internal combustion engine vehicles.[108] This exemption provides an immediate financial incentive at the point of purchase and has been instrumental in normalizing EVs as mainstream consumer choices. Norway's progressive fee structure, which imposes higher rates on heavier and more polluting vehicles, reinforces this shift by making internal combustion engine vehicles comparatively less attractive.[109]

Further supporting this policy architecture are substantial reductions or complete exemptions from recurring road-use costs. EVs in Norway benefit from reduced or waived toll road charges, ferry fares and public parking fees, fiscal measures that extend beyond the point of sale and incentivize continued EV usage. These benefits reduce the total cost of driving and are particularly influential in densely populated urban regions where tolls and parking fees can be prohibitively expensive. Such incentives are especially impactful for middle-income households, for whom ongoing operating costs play a central role in vehicle choice.

Together, these tax-related and fee-based benefits form a comprehensive incentive structure that addresses both the purchase and usage phases of vehicle ownership. This dual-phase approach ensures not only the initial adoption of EVs but also

105. D. Qorbani, H.P.L.M. Korzilius and S.E. Fleten, *Ownership of battery electric vehicles is uneven in Norwegian households*, 5 Communications Earth and Environment, Nature Publishing Group 1, doi: 10.1038/s43247-024-01303-z (2024).
106. *See* OECD, *Norway's evolving incentives for zero-emission vehicles* (2022), available at https://www.oecd.org/en/publications/2021/09/ipac-policies-in-practice_1a65968e/norway-s-evolving-incentives-for-zero-emission-vehicles_c74c1e9d.html (accessed 30 July 2025).
107. *See* H.G. Sælen and M. Aasen, *Exploring public opposition and support across different climate policies: Poles apart?*. 209 Ecological Economics, pp. 1-13 (2023), doi: 10.1016/j.ecolecon.2023.107838.
108. *See* NO: One-off registration tax, available at https://www.skatteetaten.no/en/business-and-organisation/vat-and-duties/car/one-off-registration-tax/ (accessed 30 July 2025).
109. *See* M. Same, *I'm in Norway — and EVs are everywhere. Here's what the country has done differently*, CNBC (2025) available at https://www.cnbc.com/2025/07/15/evs-are-everywhere-in-oslo-heres-what-norway-has-done-differently.html (accessed 30 July 2025).

sustained behavioural change in favour of cleaner transport modes. Importantly, these incentives have been embedded in broader environmental and urban planning strategies, demonstrating the power of fiscal design to produce transformative outcomes when coordinated with public infrastructure and sustainability goals. Norway's model offers a compelling example of how carefully calibrated tax and non-tax benefits can be used to re-engineer mobility systems in support of long-term environmental commitments.

7. Challenges and Strategic Considerations for Emerging Markets and Developing Economies

7.1. Introductory remarks

As emerging markets strive to accelerate the adoption of EVs through tax incentives, it is vital to understand that fiscal measures alone will not suffice. Achieving sustainable and inclusive growth in the EV market requires a holistic strategy that addresses key areas such as infrastructure development, equitable access and policy stability.

7.2. Infrastructure and grid capacity

One of the foremost challenges facing emerging markets and developing economies is the establishment of a reliable and extensive charging infrastructure. While tax incentives can help lower the upfront costs of EVs, their impact is limited if consumers do not have convenient and accessible charging points. Unlike many developed countries, emerging markets and developing economies often grapple with constraints related to grid capacity and the overall reliability of electricity supply. These limitations can severely hamper the rollout of EV infrastructure and, consequently, slow down adoption rates.

France's experience with the ETTC/CITE offers valuable lessons in this regard. The ETTC/CITE's inclusion of support not only for purchasing EVs but also for installing home charging stations directly targets a major consumer concern: range anxiety. This dual focus makes EV ownership more practical and attractive by addressing both vehicle cost and charging convenience. Similarly, Norway's remarkable EV market penetration owes much to its combination of VAT exemptions and the presence of a robust, publicly accessible charging network, emphasizing the importance of infrastructure alongside financial incentives.

For emerging markets and developing economies, it is therefore critical to ensure that tax incentives are complemented by strategic investments in grid expansion and upgrades. Prioritizing regions with the greatest EV potential and fostering public-private partnerships can mobilize the necessary resources and expertise for rapid deployment of charging infrastructure. Furthermore, encouraging decentralized and renewable energy-powered charging stations can reduce stress on the national grid while enhancing the environmental sustainability of EV adoption.

7.3. Equity and accessibility

Income inequality in many emerging markets and developing economies presents another significant challenge for EV incentive design. Without deliberate targeting, tax credits and subsidies often disproportionately benefit wealthier urban residents who can afford high-priced EVs, leaving low- and middle-income populations unable to participate in the transition. This dynamic risks exacerbating existing social and economic disparities.

Norway's recent adjustment to its VAT exemption policy, which caps benefits on higher-priced EVs, exemplifies a move towards more equitable incentive design. By limiting incentives for luxury vehicles, the policy encourages broader access and helps ensure that subsidies promote more affordable and environmentally efficient models. Additionally, alternative financing mechanisms such as microfinance programmes, leasing schemes, and pay-as-you-go models have proven effective in expanding EV accessibility beyond affluent consumers.

For emerging markets and developing economies, developing tiered incentive structures that provide greater support to lower-cost EVs and income-qualified buyers can help bridge the accessibility gap. Introducing innovative financing solutions, such as battery leasing, rent-to-own arrangements, and cooperative ownership models, can lower the initial barriers to EV ownership. Equally important is the need for public awareness campaigns that educate diverse communities about EV benefits, dispel misconceptions, and build trust in the technology, thereby encouraging uptake across a broader socio-economic spectrum.

7.4. Policy stability and long-term vision

A further critical consideration is the stability and predictability of tax policies related to EV adoption. Frequent policy shifts or sudden reductions in incentives risk undermining both consumer confidence and industry investment. This reality is exemplified by the recent slowdown in France's EV market in 2024, which analysts attribute partly to the uncertainty caused by rapid changes in tax incentives.

Stable and clear policy frameworks play a vital role in fostering consumer trust, giving automakers and infrastructure developers the confidence needed to make long-term investments. Embedding EV incentives within broader green industrial and economic development strategies also helps align these measures with national climate objectives and economic priorities, making policies more coherent and resilient.

Emerging markets and developing economies should consider committing to multi-year EV incentive programs that feature clear milestones and transparent goals, offering predictability for all stakeholders. Integrating EV tax incentives into comprehensive sustainable mobility strategies, which encompass public transport electrification, renewable energy targets and policies encouraging local EV manufacturing, can reinforce the overall impact. Additionally, establishing transparent mechanisms for regular policy review and adjustment will allow governments to balance fiscal sustainability with market stimulation, enabling a responsive yet stable regulatory environment.

7.5. Tariff barriers, industrial policy and the EV transition in emerging economies

A key challenge for emerging markets like South Africa is aligning long-standing industrial policy with the urgent need to promote domestic EV adoption. South Africa's automotive strategy, built on high import tariffs (often ranging from 20% to 30%, and potentially higher when combined with ad valorem duties and VAT) to protect local manufacturing for export, has supported industrial growth but raised vehicle prices domestically, limiting access for lower-income households.[110]

Introducing EVs into this context presents a dilemma: maintaining high tariffs on EV imports hinders affordability, while lowering them without domestic EV capacity risks undermining local industry. A balanced approach is needed, such as conditional tariff relief or rebates linked to local assembly and technology transfer. The Automotive Production and Development Programme (APDP) in South Africa has anchored industrial growth through rebates and incentives but has yet to integrate EV-specific measures.[111] Without targeted support for EV manufacturing, the programme may reinforce dependence on fossil-fuel production and miss global decarbonization shifts.

This vulnerability is heightened by global trade tensions. For example, United States tariff hikes have affected exporters like Mercedes-Benz, which assembles in South Africa, prompting reconsideration of their local footprint.[112] Relying solely on export markets without growing domestic demand exposes the sector to external shocks. A future-facing EV strategy must therefore address the entire EV value chain, balancing protectionism with selective tariff reform, localization and affordability to ensure inclusive growth.

While manufacturing EVs for export may seem pragmatic, a purely outward-facing approach risks repeating exclusionary patterns. As EV costs decline globally, emerging markets must pursue dual-track strategies, expanding domestic access through fiscal incentives and public procurement, while leveraging industrial policy to scale up local EV production for both domestic and export markets.

Comparative cases offer lessons. India's Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme supports affordable, locally manufactured EVs through targeted subsidies.[113] Brazil, facing similar affordability constraints, is testing a mix of tariff reform and local content rules.[114] The European Union's experience is less instructive on tariffs due to its common trade regime.[115] These examples emphasize the need for context-sensitive, phased policies that link tariff and tax design to broader development and sustainability objectives.

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110. *See* Department of Trade, Industry and Competition, *Geared for Growth: South Africa's Automotive Industry Master Plan to 2035 – A report of the South African Automotive Master Plan Project* (2018), available at https://www.thedtic.gov.za/wp-content/uploads/Masterplan-Automotive_Industry.pdf (accessed 30 July 2025).
111. *See* Republic of South Africa, *The International Trade Administration Commission of South Africa – Amended Automotive Production and Development Programme Phase 2 (APDP 2) Regulations* (July 2022), available at https://www.itac.org.za/upload/Amended%20APDP%20Phase%202%20Regulations%202022.docx (accessed 30 July 2025).
112. *See* D. van Huyssteen, *Trump tariffs threaten thousands of Eastern Cape manufacturing jobs — but mitigating action can be taken*, Daily Maverick (13 July 2025), available at https://www.dailymaverick.co.za/opinionista/2025-07-13-trump-tariffs-threaten-thousands-of-eastern-cape-manufacturing-jobs-but-mitigating-action-can-be-taken/ (accessed 30 July 2025).
113. *See* Urja Dakshata Information Tool, *Faster Adoption and Manufacturing of (Hybrid) and Electric Vehicles (FAME)* (2025), available at https://udit.beeindia.gov.in/fame/ (accessed 30 July 2025).
114. *See* L. Lima Chagas, *Trade, Protection and Competitiveness in Brazil: the case of the auto industry*, Doctoral thesis (University of East Anglia 2019); A. Mandacaru Guerra et al., *New industrial policy for a new world: Seizing Brazil's opportunities in the energy transition*, NetZero Industrial Policy Lab Geopolitical Brief 3 (2025).
115. *See* "The EU single market, a tariff-free area", available at https://www.consilium.europa.eu/en/policies/eu-tariffs-explained/#single-market (accessed 30 July 2025).

8. Conclusions

The global EV transition is not a straightaway sprint, it is a technical race full of sharp corners, high-speed decisions, and the need for tailored vehicles to handle each track's unique terrain. Emerging markets and developing economies are entering this race not from pole position, but with an opportunity to leap ahead, provided they choose the right policy vehicle.

China has proven what can happen when a government hits the accelerator hard and early. With extensive state subsidies, tax exemptions and industrial-scale infrastructure development, China transformed a niche interest into the world's largest EV market. Its model shows what can happen when ambition matches the scale of the challenge. Yet this strategy is finely tuned to China's own conditions — centralized control, vast fiscal capacity and strong domestic manufacturing. Exporting this model to emerging markets and developing economies with weaker state capacity could result in policy misfires or breakdowns on the track.

France takes a more measured approach, balancing fiscal incentives with regulatory disincentives under the European Union's emissions framework. Its "bonus-malus" system, tied to vehicle emissions, nudges consumers toward cleaner technologies while penalizing high polluters. The ETTC/CITE further supports adoption by making it easier for consumers to install charging infrastructure at home. France's precision engineering offers valuable lessons on the importance of coupling financial carrots with regulatory sticks, but it still assumes a level of grid stability, consumer purchasing power and institutional trust that may not hold in all developing contexts.

Norway, the true pacesetter in this race, demonstrates what is possible when tax incentives are used not just as tools, but as the engine of an entire national strategy. By eliminating VAT, offering free tolls, subsidizing EV infrastructure and reducing benefits on ICE company cars, Norway created a policy ecosystem that rewired the entire value chain of mobility. With EVs accounting for over 80% of new car sales, the results speak volumes. But the question remains: can this high-octane model perform on the rougher, less predictable road conditions of developing economies?

This brings us to the core challenge for emerging markets and developing economies. The transition from ICE vehicles to EVs may promise lower emissions, but it also risks economic, labour and social turbulence if not managed with care. These markets often rely heavily on ICE vehicle-related industries, vehicle repair shops, fuel distribution chains and mechanical training institutes, all of which face disruption in an electric future. Moreover, the high upfront cost of EVs, compounded by dependence on imported technology and a lack of domestic manufacturing capacity, can create economic vulnerabilities and deepen reliance on global supply chains.

Labour markets will also feel the shock. As EV production demands a different skill set, battery management, software diagnostics and electronics, many workers risk displacement. Without large-scale retraining and social safety nets, this green transition may leave blue-collar workers behind. Furthermore, EV infrastructure tends to cluster in cities, widening the mobility gap between urban and rural populations. Without policy safeguards, the EV revolution risks reinforcing rather than reducing structural inequities.

And then there's the environmental justice paradox: while EVs reduce tailpipe emissions, their batteries require minerals like cobalt and lithium, often sourced from countries in the Global South under extractive, sometimes exploitative, conditions. The clean future for one part of the world must not come at the environmental or human rights expense of another.

To avoid these pitfalls, emerging markets and developing economies need more than borrowed blueprints, they need custom-built policy engines. These include inclusive industrial policies that stimulate domestic EV and battery production, public-private partnerships to share financial risks and retraining initiatives that prepare workers for the jobs of tomorrow. Financial incentives must be designed with equity in mind, targeted subsidies for low-income households, support for rural infrastructure development and shared mobility options like electric buses and e-rickshaws that broaden access beyond private car ownership.

The race to EV adoption is not just about crossing the finish line first. It is also about ensuring that the journey is just, inclusive and transformative. Winning means more than market share, it means aligning fiscal policy with sustainable development, creating green jobs without leaving workers behind, and building resilient infrastructure that serves all communities, not just the wealthy and urban.

Emerging markets and developing economies must now shift gears. The examples of China, France and Norway offer invaluable guidance, but the terrain ahead calls for bespoke strategies tailored to each nation's unique conditions. With the right mix of incentives, investments and industrial planning, the Global South can drive the next chapter of the EV revolution, not as spectators, but as leaders writing their own high-speed, high-stakes, low-emissions story.