

Policy architectures for electric mobility

Antunes Muaquesse

`amuaq100@uottawa.ca`

Ottawa University

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Abstract

Electric mobility is commonly evaluated through vehicle registrations, market shares, and charging-point density. These indicators reveal diffusion but say little about the public mechanisms that make electrification durable, fragile or socially selective. This article examines how policy architectures shape electric mobility in Quebec, Norway and the Netherlands. The policy-instruments approach provides the primary theoretical framework, while policy mixes, institutional, energy, and territorial contexts, together with actor coalitions, are treated as complementary analytical dimensions. Methodologically, the study uses a qualitative comparative documentary design based on legislation, documents, official statistics, institutional reports, and peer-reviewed research. The findings identify three distinct policy architectures: a fiscally driven mass-market trajectory in Norway, an infrastructure and urban-integration model in the Netherlands and a multilevel, hydroelectricity-based configuration in Quebec (Canada). In Norway, removing EV purchase-tax exemptions would have reduced the 2021 EV sales share from 66% to about 25% highlighting both the power and the fiscal dependence of these incentives. Across the cases, adoption depends less on individual incentives than on how regulatory, economic, organizational, informational, and standard-setting instruments are combined, sequenced, implemented and recalibrated. High adoption rates can conceal fiscal dependence, unequal access, territorial disparities and infrastructure constraints. The article contributes theoretically by conceptualizing electric mobility as an instrumented policy architecture rather than merely as an outcome of technological diffusion or isolated incentives. For policymakers, it identifies four conditions for durable electrification: reducing entry costs, securing everyday use, stabilizing expectations and adapting instruments without undermining policy credibility.

Introduction

Transport remains one of the most persistent obstacles to decarbonizing modern economies (Newman et al., 2017). As climate impacts intensify and energy markets become more volatile, electric mobility (EM) has moved to the center of public agendas. It is often presented as a technological route away from fossil-fuel dependence, yet its deployment requires much more than replacing combustion engines with batteries. Public authorities must anticipate electricity demand, regulate vehicle supply, coordinate charging infrastructure, and decide how transition costs and benefits will be distributed. EM is therefore not simply a market-diffusion process. It is a politically governed transformation. Canada's recent experience illustrates this temporal tension. After federal electric vehicle (EV) purchase incentives were suspended in January 2025 when program funding was exhausted, EV sales fell sharply. In February 2026, Ottawa reinstated incentives of up 5,000 Canadian dollars while replacing the federal EV availability mandate with tighter vehicle-emission standards and renewed charging investments (Government of Canada, 2026). Boin et al., (2009) show that crises generate contests over diagnosis, responsibility, and policy response. Stone (1989) similarly demonstrates that causal narratives influence which problems reach agendas and which solutions appear legitimate.

I use the expression Crisis-mediated Advantage (CMA) as a causal heuristic for this dynamic, not as an accusation against public authorities. The term identifies actors who enter or reposition themselves in the policy process once a crisis has acquired political and economic value. Political leaders may use urgency to display responsiveness during elections, coalitions may frame emergency measures to preserve established advantages, and firms may pursue contracts, subsidies or markets opened by accelerated intervention. Crises therefore do not automatically produce structural reform. They create openings that can support coherent transformation, but can also be converted into electoral capital, fiscal transfers or commercial opportunities. This temporal tension makes anticipatory governance central to the analysis. Guston (2014) defines it as acting while meaningful choices remain available rather than claiming perfect foresight. Although this cannot eliminate crises, it can reduce the political and financial space available for their opportunistic use. By investing before bottlenecks become acute, setting credible long-term rules, coordinating institutional responsibilities, and building adaptive capacity, public authorities can prevent emergency politics from substituting for policy design.

The rapid statistical growth of electric mobility makes this distinction important. Global electric-car sales approached 14 million in 2023 and accounted for about 18% of new car sales, compared with 2% in 2018 (International Energy Agency, 2024). Market shares, registrations, and charging-point ratios reveal diffusion, but not the public mechanisms that produce, stabilize, or weaken it. A high adoption rate can rest on purchase subsidies, supply mandates, company-car rules, public charging investment, or favorable electricity prices. It can also conceal fiscal dependence, unequal access, or vulnerability to policy reversal. Yang et al. (2026a), reviewing 76 empirical studies, show that electric-vehicle policies affect not only market diffusion but also industrial, environmental, and social outcomes, while their documented effectiveness varies according to policy type, context, measurement, and implementation.

Existing research has identified numerous instruments and policy-mix effects, but it remains less explicit about how these instruments are hierarchized, institutionally organized, sequenced, and recalibrated across contrasting governance settings. I therefore ask, how do policy architectures shape the deployment of electric mobility in Quebec, Norway, and the Netherlands? My primary theoretical framework is the policy-instruments approach. Lascoumes and Le Galès (2004) show that instruments are not neutral technical devices. They embody representations of public problems, define target populations, organize relations between authorities and governed actors, and distribute resources, constraints, costs, and benefits. This perspective directs attention to what rebates, tax exemptions, Zero-emission vehicle (ZEV) mandates, charging programs, and technical standards produce.

I use policy architecture to describe the configuration through which instruments are combined, sequenced, institutionally embedded, politically supported, and adjusted over time. Policy-mix scholarship complements this instrument-centred framework. Howlett and Rayner (2007) emphasize coherence among policy components, while Rogge and Reichardt (2016) highlight consistency and credibility. Kern et al. (2019) add that transition policies must remain stable enough to guide expectations while retaining the capacity to adapt. Institutional, energy, and territorial contexts, together

with actor coalitions, are therefore treated as conditions that shape instrument effects rather than as separate theoretical frameworks.

The comparison brings together three contrasting configurations. Norway represents fiscal massification, in which tax exemptions and use advantages made electric vehicles economically attractive over time (Cincotta & Thomassen, 2025). The Netherlands illustrates an infrastructure-oriented and urban model structured by charging, leasing, taxation, parking rules, and Zero-emission zones. Zhang et al. (2025b), however, show that access remains differentiated by income, education, and ownership patterns. Quebec offers an infranational and multilevel configuration supported by hydroelectricity, purchase incentives, a Zero-emission vehicle (ZEV) mandate, and Hydro-Québec's organizational capacity (*Ministère de l'Économie, de l'Innovation et de l'Énergie*-MEIE, 2026). Aubertin et al. (2024) show that this trajectory was also supported by distinctive climate and economic-independence narratives. Lavictoire et al. (2025) identify constraints associated with winter electricity demand and territorial conditions, while Martinek (2021) raises questions about the social selectivity of purchase subsidies.

Methodologically, I conduct a qualitative comparative documentary analysis based on legislation, policy plans, program documents, official statistics, institutional and operator reports, and peer-reviewed research. The analysis reconstructs the sequencing, interaction, implementation, and recalibration of instruments within each case. It seeks analytical rather than statistical generalization by identifying mechanisms that connect public intervention to observable trajectories (George & Bennett, 2005; Yin, 2018). I argue that robust electric-mobility trajectories depend less on one decisive incentive than on four interconnected capacities: reducing entry costs, securing everyday use, stabilizing expectations, and adjusting instruments without undermining policy credibility. The article first develops the instrument-centred framework, then explains the comparative documentary design, reconstructs the three policy architectures, and discusses their implications for robustness, distribution, and anticipatory governance. The article contributes to policy theory by conceptualizing electric mobility as an instrumented policy architecture. It contributes to public action by showing how anticipatory governance can reduce the openings through which delayed problems become unusually costly and politically or commercially exploitable.

I - Analytical framework

I approach electric mobility as a problem of public action rather than as the predictable diffusion of a superior technology. Electric vehicles (EV) become economically accessible, practically usable, and politically legitimate through public intervention. Tax measures alter relative prices, supply mandates reorganize automobile markets, charging programs shape daily use, and standards determine whether infrastructures can operate together. The analytical challenge is therefore not only to identify which instruments exist, but to explain how they define the transition, interact with one another, and acquire different effects across contexts.

a) Instruments as political forms of intervention

Lascoumes and Le Galès (2004) provide the starting point. They define a policy instrument as both a technical and social device that organizes relations between governing authorities and governed actors. An instrument does not merely implement a settled objective. It identifies who should change behaviour, establishes who is eligible for support or subject to constraint, and distributes costs, benefits, and responsibility. This perspective changes how electric-mobility policies are interpreted. A purchase rebate does more than lower a vehicle's price. It constructs the purchaser as a central agent of decarbonization, favors households able to enter the vehicle market, and transfers part of the transition cost to public budgets. A ZEV mandate defines the problem differently by assigning responsibility to manufacturers and regulating supply. A public charging network shifts attention from individual choice toward collective infrastructure and the practical conditions of use.

California's Zero-Emission vehicle regulation illustrates this supply-side mode of governing. Since 1990, the California Air Resources Board has required automakers to deliver ZEV to the state's market, thereby shifting part of the responsibility for transition from individual consumers to vehicle manufacturers (California Air Resources Board-CARB, n.d.). Incorporated into the broader Advanced Clean Cars framework, the regulation shows how public authority can influence technological availability and provide a long-term market signal rather than relying exclusively on purchase incentives. Hood (1983) helps identify the governmental resources mobilized in these interventions (authority, finance, information, and organization). Vedung (1998) distinguishes coercion, inducement, and persuasion, while Borraz (2005) shows that standards are also political instruments because they organize coordination and define acceptable performance. I consequently distinguish five functional groups: legal and regulatory instruments, economic and fiscal measures, organizational arrangements, informational measures, and norms and technical standards. The classification is not an inventory exercise. It guides analysis of what each instrument produces, whom it empowers, and which barriers it addresses.

The Dutch company-car system illustrates this point. Corporate and leasing arrangements accelerated electric-vehicle diffusion, but they also channelled access through employers, fleet managers, and workers eligible for company cars (International Council on Clean Transportation-ICCT, 2021). The relevant outcome is therefore not only a higher number of vehicles. The instrument shaped the social pathway through which electrification occurred. Individual instruments, however, cannot explain a transition. A rebate may increase demand but remain weak if manufacturers supply few vehicles. A mandate can restructure supply but lose credibility if charging is inaccessible. Infrastructure can reduce range concerns but remain underused when it is badly located, unreliable, or incompatible with housing and parking conditions. Howlett and Rayner (2007) show that instruments may reinforce, duplicate, or contradict one another. Rogge and Reichardt (2016) describe policy mixes as combinations of objectives, strategies, instruments, and processes whose quality depends on coherence, consistency, and credibility.

Kern et al. (2019) add a temporal requirement: transition policies must remain stable enough to guide expectations while retaining the capacity to learn and adjust. Axsen et al. (2020) translate this policy-mix logic directly into the field of road-transport decarbonization. They argue that deep emissions reductions are unlikely to result from electric-vehicle incentives alone and require a strong, integrated policy mix led by stringent regulation, complemented by pricing mechanisms and measures that reduce vehicle travel. Their analysis is important because it places vehicle electrification within a broader transformation of mobility rather than treating technological substitution as a sufficient climate strategy. It also suggests that the strength of a policy mix depends not only on the number of instruments adopted, but on whether they jointly address vehicle technology, energy use, travel demand, and the continued attractiveness of fossil-fuel mobility.

Building on these contributions, I define policy architecture through four dimensions: instrument hierarchy, which distinguishes central from supporting tools, sequencing, which traces the order in which measures are introduced, institutional responsibility, which identifies the organizations responsible for implementation, and adaptive recalibration, which assesses whether instruments can be revised without weakening long-term direction. A policy mix identifies what coexists, a policy architecture explains how instruments are prioritized, ordered, carried, and adjusted. Quebec's integrated energy plan provides a concrete illustration. Its 25-year governmental horizon is connected to regulatory oversight by the *Régie de l'énergie* (Energy board), 15-year electricity-supply planning by Hydro-Québec, and a corresponding transmission-development plan (MEIE, 2026, p. 7–9). These arrangements do not prove successful implementation, but they show that policy architecture involves institutional responsibilities and temporal sequences, not simply a list of measures.

b) Anticipatory governance and crisis-mediated advantage

The temporal orientation of policy architecture is especially important in climate and energy transitions. Many pressures associated with electric mobility are uncertain in scale but foreseeable in direction. Electricity demand will rise, public charging will need to expand, fuel-tax revenues will decline, and benefits designed for early adopters will become increasingly costly or difficult to justify. Anticipation means preparing institutions and adjustment mechanisms before these pressures become emergencies. Anticipatory governance is not rigid forecasting. Guston (2014) emphasizes learning, engagement, and the preservation of alternatives. The Integrated Energy Resources Management Plan (IERMP) follows a similar logic by combining a long-term direction with revisions at least every six years and by prioritizing measures whose benefits remain plausible under different scenarios (MEIE, 2026, p. 21). I refer to this combination of directional stability and revision as adaptive anticipation.

Under compressed decision time, actors with institutional access, ready-made technologies, or established narratives may gain influence. I refer to this temporal mechanism as crisis-mediated advantage. Crises can accelerate learning and reform, but they do not determine the content of response. Boin et al. (2009) show that crises produce framing contests, and Stone (1989) explains how causal stories allocate blame and privilege particular interventions. The European energy crisis following

Russia's invasion of Ukraine in 2022 provides an illustrative example. The crisis sharply compressed decision time, but European policymakers did not respond on a blank slate. Renewable energy, electrification, energy efficiency, and accelerated permitting were already embedded in the European Green Deal and Fit for 55. REPowerEU subsequently reframed and accelerated these existing options as instruments of both decarbonization and energy security, including a proposed increase in the 2030 renewable-energy target from 40% to 45% (European Commission, 2022; Kuzemko et al., 2022; Vezzoni, 2023). At the same time, emergency efforts to diversify gas supplies show that crises do not predetermine a single policy direction. Rather, they can temporarily advantage actors, technologies, and policy narratives that are institutionally established and immediately deployable.

c) Policy stabilization and differentiated effects

Policy architectures are conditioned by the environments in which they operate. Institutional context determines which level of government can tax, regulate supply, finance infrastructure, or coordinate implementation. Energy context shapes the emissions benefit, operating cost, and network consequences of electrification. Territorial context affects travel distance, housing, parking, and the balance between private and public charging. These conditions are not passive background variables. They change the barriers that instruments must address and the distribution of their effects (Yang et al., 2026b). Chen's (2024) analysis of China supports this contextual interpretation by showing that the relationship between charging provision and electric-vehicle sales varies substantially among regions.

Architectures are also politically sustained. Sabatier and Jenkins-Smith (1999) show that coalitions coordinate actors around shared beliefs and resources, while Zittoun et al. (2021) emphasize that policy solutions are formulated and defended through arguments in political arenas. Electric mobility can be narrated as climate action, industrial modernization, energy security, consumer assistance, or urban reform. These narratives help assemble coalitions, but they can also conceal disagreement over who pays and who benefits. Hajer (1995) explains how a common storyline may unite actors whose underlying interests differ. I therefore treat contexts and coalitions as extensions of the instrument-centred framework. Contexts explain why the same formal measure can work differently across jurisdictions. Coalitions and narratives explain why some combinations acquire durable political support while others are contested or rapidly reversed. They also matter during recalibration: a reduction in assistance can be framed as market maturity, fiscal retrenchment, or abandonment of climate ambition, with different consequences for credibility.

Norway provides an illustration of these differentiated effects. A relatively stable national policy architecture, centred on favourable vehicle taxation, helped sustain high electric vehicle adoption over time. Cincotta and Thomassen (2025) estimate that removing the main purchase-tax exemptions would have reduced the EV share of new-car sales in 2021 from 66% to about 25% (p. 1). Yet the importance of individual instruments varies across territories. Schulz and Rode (2022), studying 356 Norwegian municipalities, find that the installation of the first public charging station in mostly rural areas was associated with a roughly 200% increase in local BEV ownership over five years. The Norwegian case

therefore shows that a stable national policy architecture does not produce uniform effects: while fiscal incentives reduce acquisition costs broadly, charging infrastructure becomes particularly consequential where territorial conditions make access a binding constraint.

d) Analytical expectations

The framework generates four expectations. First, comparable instruments should produce different effects when institutional, energy, territorial, and social conditions differ. Second, robust architectures should combine the capacities to reduce entry costs, secure everyday use, stabilize expectations, and adapt as markets expand. Third, coalitions and public narratives should influence which instruments are selected and how recalibration is interpreted (Sabatier & Jenkins-Smith, 1999; Zittoun et al., 2021). Fourth, anticipatory coordination should reduce abrupt fiscal escalation and the influence conferred by compressed decision time. These expectations guide a structured comparison of four architectural dimensions: instrument hierarchy, sequencing, institutional responsibility, and adaptive recalibration. The analysis asks how each configuration addresses barriers, distributes authority, and changes without losing direction or reproducing avoidable inequalities.

Methodology

This article uses a qualitative comparative documentary design to explain how public action produces different electric-mobility trajectories in Quebec, Norway, and the Netherlands. The objective is not to rank jurisdictions by market share or charging density. It is to reconstruct the processes through which instruments are introduced, combined, implemented, contested, and recalibrated. This design connects a practical policy problem to a mechanism-based theoretical explanation.

a) Comparative design and case selection

Case-study research is appropriate when a contemporary phenomenon cannot be separated cleanly from its context (Yin, 2018). A purchase rebate does not operate independently of household income, vehicle availability, housing, taxation, or charging access. Likewise, a Zero-emission vehicle (ZEV) mandate cannot be assessed without considering manufacturers' responses, administrative enforcement, infrastructure, and complementary demand-side measures. The comparison is explanatory rather than merely descriptive. George and Bennett (2005) distinguish mechanism-oriented comparison from designs that associate inputs and outcomes without reconstructing the process connecting them. I therefore do not infer that a subsidy caused an increase in registrations simply because the two occurred together. I examine how the measure altered costs or obligations, interacted with supply and infrastructure, influenced expectations, and later generated implementation or recalibration pressures.

The central unit of analysis is the policy architecture of passenger electric mobility. The units of observation are laws, regulations, fiscal provisions, program criteria, ZEV requirements, charging initiatives, standards, budget decisions, implementation reports, statistical trends, and documented

revisions. Other transport modes are included only when they reveal sequencing, public procurement, or institutional learning.

Quebec, Norway, and the Netherlands were selected through theoretical sampling (Eisenhardt, 1989). All three are advanced cases with substantial administrative capacity and established electric-mobility policies, which provides a common basis for comparison. They differ, however, in constitutional position, taxation, territorial density, electricity systems, and charging arrangements. Norway represents a national fiscal and regulatory trajectory built through differentiated vehicle taxation, use advantages, charging support, and later ZEV requirements (Figenbaum, 2024). The Netherlands represents an infrastructure-oriented and urban trajectory in which municipal charging, parking, company-car taxation, leasing, and ZEV zones interact (Tamis et al., 2026; Vermeulen et al., 2019). Quebec represents an infranational and multilevel trajectory combining hydroelectricity, purchase support, provincial supply regulation, federal measures, municipal intervention, and Hydro-Quebec's organizational role (Lavictoire et al., 2025; Martinek, 2021).

The institutional asymmetry is part of the explanation rather than a defect. Quebec operates within Canadian federal arrangements. Norway has broad national fiscal autonomy, and the Netherlands combines national, municipal, and European authority. The comparison therefore examines how institutional location affects the reach, coordination, and credibility of public intervention.

b) Materials and source hierarchy

The documentary base comprised 64 unique sources. Each source was assigned to one primary category for counting purposes, although several supported more than one analytical task. The case-specific corpus included 28 sources: eight concerning Quebec, seven concerning Norway, and thirteen concerning the Netherlands. Eleven sources provided comparative or international evidence, while twenty-five supported the theoretical and methodological framework. The common cutoff date was June 2026.

The corpus was assembled through an iterative, problem-oriented search rather than a systematic-review protocol. Academic sources were retrieved through publisher platforms and library databases, including ScienceDirect, Springer, SAGE, Taylor & Francis, Wiley, ProQuest Ebook Central, Cairn.info, MDPI, uOttawa Library, and EDP Sciences. Official materials were obtained from governmental, regulatory, statistical, and public-operator websites in the three jurisdictions, as well as from the European Alternative Fuels Observatory, the International Energy Agency, Statistics Canada, and *Institut de la statistique du Québec*. Search terms combined the names of the three jurisdictions with electric mobility, electric vehicle policy, policy instruments, policy mix, purchase incentives, vehicle taxation, charging infrastructure, ZEV mandate, implementation, policy recalibration, and distributional effects. The corpus included English and French language documents. Dutch and Norwegian origin materials were retained when an official English version or reliable institutional translation was available.

Four types of sources were retained: legal and regulatory documents, governmental strategies, program materials, and operator reports, official statistics, and peer-reviewed research. Documentary sources were assessed according to their provenance, purpose, credibility, and representativeness (Mogalakwe, 2009). Primary public sources were prioritized for legal provisions, program rules, institutional responsibilities, and chronology, official statistical agencies for quantitative indicators, and peer-reviewed studies for implementation mechanisms and distributional effects.

Sources were included when they documented instrument hierarchy, sequencing, institutional responsibility, adaptive recalibration, implementation, or contextual and distributional effects. Sources were excluded when they lacked identifiable provenance, duplicated a more authoritative source, addressed vehicle technology without a public-policy dimension, or concerned other transport modes without contributing to the comparative explanation. For each retained source, I recorded the jurisdiction, source type, date, instrument, target population, implementing organization, relevant indicators, and revision history. This audit trail linked documentary evidence to coding decisions and comparative claims.

c) Analytical procedure and coding

The analysis follows an abductive logic in which concepts and evidence are refined through iterative comparison (Haverland & Yanow, 2012). It proceeds in three stages. First, an intra-case reconstruction identifies the emergence, expansion, consolidation, and recalibration of the principal instruments. Time is treated as causal because the same measure may perform different functions as a market moves from early adoption to mass diffusion. Second, process-oriented analysis traces how formal design is translated through organizations, budgets, and implementation chains. Pressman and Wildavsky (1973) show that policy intentions can be transformed during implementation. I therefore examine administrative responsibility, capacity, accessibility, sequencing, and the triggers of revision. Third, a structured cross-case comparison applies common questions to each trajectory: Which barriers are targeted? Which actors carry responsibility? How are demand, supply, infrastructure, and standards sequenced? Do instruments reinforce or contradict one another? How are costs and benefits distributed? Does recalibration preserve a credible long-term direction?

The coding matrix distinguished four primary dimensions of policy architecture: instrument hierarchy, sequencing, institutional responsibility, and adaptive recalibration. Instrument hierarchy identified which measures performed central, supporting, or compensatory functions. Sequencing traced the order in which demand-side, supply-side, infrastructure, organizational, and standard-setting instruments were introduced or revised. Institutional responsibility identified which governmental levels, public organizations, municipalities, firms, and intermediaries carried implementation authority. Adaptive recalibration examined whether instruments could be modified as markets expanded without weakening policy direction or credibility.

Secondary codes captured institutional, energy, territorial, and social context, implementation capacity, actor coalitions and narratives, distributional consequences, and temporal orientation. Crisis-mediated advantage was coded through observable sequences rather than presumed intentions: prior recognition of a foreseeable pressure, delayed preparation, an acute trigger, compressed decision time, narrowed alternatives, and increased leverage for actors already possessing institutional access, technical capacity, or ready-made policy solutions. Anticipatory governance was identified through long-term investment schedules, transparent allocation rules, predetermined adjustment criteria, periodic review, institutional coordination, and protections for groups with limited adaptive capacity.

d) Validity and limitations

Validity was strengthened through triangulation across source types, a transparent hierarchy of evidence, an auditable coding process, and systematic comparison between formal commitments, implementation arrangements, statistical trajectories, and documented policy revisions. Following Watt (2007), I therefore maintained an audit trail of how theoretical expectations, source hierarchies, and case-specific assumptions influenced the analytical process. I also consider rival explanations, including income, vehicle supply, industrial innovation, consumer preference, fuel prices, and urban density. The objective is to identify how it enables, redirects, or constrains these influences.

Several limitations remain. Vehicle categories and charging definitions differ across jurisdictions. Registration data may combine private purchases, company cars, leasing, and fleets, and therefore indicate diffusion rather than equal access. Because electric-mobility policy changes rapidly, the findings remain dependent on the common cutoff date of June 2026, particularly for subsidy levels, tax provisions, market shares, and charging-infrastructure indicators. Finally, documents provide stronger evidence about formal design and observable revision than about private negotiation. Interviews and longitudinal implementation evidence could therefore examine how architectures are negotiated and recalibrated beyond publicly available sources.

Findings

The comparison identifies three distinct policy architectures rather than three stages of a common model. Table 1 summarizes their main differences in instrument hierarchy, sequencing, institutional responsibility, and adaptative recalibration.

Table 1
Comparative features of three electric-mobility policy architectures

Dimension	Quebec	Norway	Netherlands
Instrument hierarchy	Rebate and ZEV mandate, public charging and energy planning	Purchase and VAT differentiation, use advantages and charging	Charging and parking, company-car and leasing rules, ZEV zones
Sequencing	Demand and supply support before long-term grid integration	Fiscal differentiation, then use benefits, charging, and system integration	Corporate and fiscal channels, then dense charging and urban regulation
Institutional responsibility	Provincial government, Hydro-Québec, federal and municipal actors	National government and municipalities	National agencies, municipalities, operators, employers, and leasing firms
Adaptive recalibration and indicator	<i>Roulez vert</i> phase-down, 30.9% ZEV share in 2024	Gradual benefit reform, 95.9% BEV share in 2025	SEPP[1] ended in 2024, 40.2% BEV share in 2025
Note. Author's compilation. Indicators refer to new passenger-car registrations.			

[1] Subsidieregeling Elektrische Personenauto's Particulieren (Electric passenger car subsidy scheme for private individuals)

a) Quebec: multilevel acceleration and uneven adjustment

Quebec's architecture developed through layered sequencing rather than a single plan. Its hierarchy combines the *Roulez vert* rebate and the ZEV mandate as central demand and supply-side instruments, supported by Hydro-Québec's Electric Circuit, federal incentives, municipal planning, and building measures. Institutional responsibility is distributed among the provincial government, Hydro-Québec, federal authorities, and municipalities. The 2011–2020 action plan initiated this configuration, while the Plan for a Green Economy 2030 embedded it in broader climate and energy policy (Gouvernement du Québec, 2011, 2023).

The architecture produced rapid diffusion. ZEV accounted for 30.9% of new registrations in Quebec in 2024, and the province represented 54.4% of Canadian ZEV registrations that year (Statistics Canada, 2025). These figures do not prove that each instrument had an independent causal effect, but the combination changed both demand and supply. The rebate reduced the purchase-price gap, while the mandate encouraged manufacturers to allocate qualifying vehicles to the provincial market. Quebec's electricity advantage is real but incomplete. In 2022, electricity represented 41% of final energy

consumption, while fossil sources still accounted for about 52%, with petroleum products concentrated largely in transport (MEIE, 2026). Figure 1 highlights this structural tension: Quebec combines a strong electricity base with continued fossil-fuel dependence, which helps explain the strategic importance of transport electrification.

Note

Electricity accounted for 41% of final energy consumption, compared with approximately 52% from fossil fuels. Adapted from MEIE (2026, Fig. 2, p. 13).

This energy structure helps explain why transport electrification occupies a strategic position in Quebec's policy architecture: it shifts energy demand from a fossil-dependent sector toward an electricity system largely organized around domestic hydroelectric generation. Hydro-Québec gives the architecture an organizational capacity that a purely market-led charging model would lack. The IERMP further embeds this role through a 15-year electricity-supply plan and a corresponding transmission-development horizon (MEIE, 2026). It also identifies bidirectional charging as a potential flexibility resource. These provisions are anticipatory because they connect vehicle diffusion to infrastructure investments whose construction and financing extend beyond electoral cycles.

The main weakness is temporal imbalance. Purchase incentives can alter registrations quickly, whereas grid reinforcement, apartment charging, and regional coverage require longer lead times. Lavictoire et al. (2025) show that fleet electrification must be assessed in relation to winter peaks and electricity demand. The IERMP projects final electricity demand rising to about 281 TWh by 2050 even as total energy consumption declines, partly because electric technologies are more efficient (MEIE, 2026). The success of vehicle policy can therefore shift the policy bottleneck from adoption to system integration.

Distribution is another weakness. Martinek (2021) notes that purchase assistance is more accessible to households already able to acquire a vehicle. The rebate does not resolve credit constraints, limited access to private parking, or weak public charging in some territories. It distributes public support through vehicle ownership and can therefore accelerate adoption while remaining socially selective. The temporary suspension of *Roulez vert* between 1 February and 31 March 2025 exposed the limits of adaptive recalibration. The program subsequently entered a progressive phase-down, with assistance declining from 2025 and ending after 31 December 2026 (Gouvernement du Québec, 2026). Although recalibration is justified as the market matures, the suspension made eligibility dependent on registration dates and temporarily excluded vehicles registered during the interruption, creating a stop-and-go signal for households, dealers, and manufacturers.

b) Norway: cumulative fiscal differentiation and mature-market recalibration

Norway's architecture was cumulatively assembled rather than implemented from a comprehensive blueprint. Its hierarchy placed differentiated purchase taxes and value-added-tax treatment at the center, supported by toll, parking, and bus-lane advantages, charging investment, and later ZEV requirements. Sequencing followed market development: fiscal differentiation reduced entry costs, use advantages supported adoption, and infrastructure and regulatory measures expanded as the market matured. National institutions carried the main responsibility, while municipalities implemented several use advantages. Figenbaum (2024, 2026) shows that learning by doing gradually produced a more stable architecture and more conventional recalibration after 2014.

Each instrument addressed a different barrier. Tax measures lowered entry costs relative to highly taxed combustion vehicles. Use advantages altered the economics of daily travel. Charging reduced practical uncertainty. Long-term national objectives signaled to consumers, municipalities, utilities, and manufacturers that electrification was not a temporary experiment (Norwegian Ministry of Transport, 2025). Cincotta and Thomassen (2025) confirm that Norwegian incentives worked by transforming relative vehicle costs, not by rewarding environmental preference. Comparative evidence from the Nordic countries further indicates that operating costs form part of this relative-price architecture. Zhang et al. (2026) find that gasoline prices have a stronger effect on battery-electric vehicle (BEV) adoption than electricity prices, with particularly pronounced responses among lower-cost models and less-established brands. Energy prices can therefore complement purchase subsidies and tax differentiation by continually reshaping the comparative cost of electric and combustion vehicles.

Asgarian et al. (2023) complement this empirical account through a game-theoretic model showing that Norwegian policy can influence electric-vehicle adoption simultaneously through consumer subsidies, fossil-vehicle and fuel taxation, and support for battery research and development. Their model illustrates how public intervention operates across the supply chain by shaping household costs, battery prices, technological investment, and manufacturers' decisions. I use this modelling-based study to clarify the interaction among instruments rather than as direct *ex post* evidence of observed policy effects.

By 2025, BEV accounted for 95.9% of new passenger-car registrations in Norway, rising to 97.6% in December. The December surge partly reflected purchases brought forward before revised value added tax (VAT) rules entered into force in January 2026, illustrating both the cumulative effectiveness of Norway's policy architecture and the continuing sensitivity of adoption to fiscal recalibration (European Alternative Fuels Observatory-EAFO, 2026b). These results demonstrate substantial policy capacity, but they also create a mature-market problem: instruments designed to support a marginal technology become increasingly costly or functionally inappropriate once that technology dominates new registrations. Tax exemptions reduce revenue, toll advantages become harder to sustain, and bus-lane privileges can undermine public-transport objectives.

Norway's response distinguishes adaptive recalibration from policy instability. Benefits have been modified gradually within a continuing ZEV direction. Households and firms can therefore interpret

adjustment as a change in instrument calibration rather than abandonment of the transition. Kern et al.'s (2019) distinction between stability and adaptability is visible here: credibility rests on continuity of direction, not the permanent preservation of every benefit. The architecture has also shifted toward system integration. The national charging strategy links passenger-car objectives to rapid-charging availability and extends planning to vans, buses, coaches, and heavy vehicles (Norwegian Ministry of Transport, 2023). As adoption scales, policy attention moves from whether vehicles will be purchased to when, where, and at what cost they will charge. Brockmann and Guajardo (2026) show that charging patterns and electricity-price dynamics can create new network pressures, making flexibility and coordination central to the next phase. Norway leaves comparatively less room for crisis-mediated advantage in the foundational phase because the core architecture preceded mass adoption. Long-term rules reduced the need to improvise a market under acute pressure. Opportunities do not disappear, however, they migrate toward grid investment, charging technology, procurement, and the distribution of fiscal costs. Anticipation changes the conditions under which interests compete rather than eliminating them.

c) The Netherlands: infrastructure integration and socially differentiated access

The Dutch architecture places public charging and urban regulation at the center, supported by a diversified policy mix. Sequencing linked early fiscal and corporate channels to expanding public charging and later urban-access regulation. Institutional responsibility is shared among national agencies, municipalities, infrastructure operators, employers, and leasing firms. This integrated architecture has supported substantial market diffusion. In 2024, BEV represented 34.9% of new passenger-car registrations in the Netherlands, up from 30.7% in 2023, while their share of the total passenger-car fleet reached 6.1%. However, petrol vehicles still accounted for 75.1% of the fleet, showing that rapid growth in new registrations does not immediately transform the broader vehicle stock (EAFO, 2025).

The electric-vehicle (EV) market continued to expand in 2025. The Netherlands registered 156,139 new battery-electric passenger cars, an increase of 18.1% compared with 2024, giving BEVs approximately 40.2% of new passenger-car registrations. When plug-in hybrids are included, electrically chargeable vehicles represented about 49.0% of the new passenger-car market. By December 2025, the charging network had also reached 209,513 charging points, indicating that market expansion continued alongside infrastructure development (EAFO, 2026a; Netherlands Enterprise Agency - NEA, 2026). This extensive infrastructure base supports everyday EV use, but it does not operate automatically. Territorial density and municipal involvement make neighborhood charging feasible, while communication, local agreements, payment systems, and rules of use remain necessary for effective implementation (Tamis et al., 2026). Wolbertus et al. (2018) further show that charging and parking measures can produce interacting and sometimes conflicting effects. Drawing on 1.7 million public-charging sessions in the Netherlands and a stated-choice experiment, they find that daytime-charging rules can reduce parking

pressure while weakening purchase intentions, whereas free parking can encourage prospective adopters but increase connection times. Charging policy must therefore be assessed simultaneously in terms of infrastructure use, parking management, and vehicle adoption. Vermeulen et al. (2019) likewise demonstrate that the effectiveness of charging depends on how infrastructure is integrated into daily mobility.

Company-car taxation and leasing were major channels of early diffusion. These arrangements reduced risk for users and accelerated fleet turnover, but they also distributed access through employment and organizational status. ICCT (2021) reported that companies accounted for a large majority of new electric passenger-car registrations in 2020. These organizational pathways also influence how electric vehicles are used. Zhang et al. (2025a) find no evidence that BEV or plug-in hybrid electric vehicle (PHEV) powertrains themselves generate a rebound effect in single-car Dutch households. The higher vehicle-kilometres travelled observed among electric-vehicle users is explained largely by the greater prevalence of leased and company vehicles, which are associated with more frequent travel and longer daily distances regardless of powertrain. Ownership and leasing arrangements therefore shape mobility outcomes alongside vehicle technology. Zhang et al. (2025b), using data from more than 125,000 households, find that electric vehicles are more common among higher-income, highly educated, urban, and multi-car households and among leasing users. Hu et al. (2025) identify a similarly advantaged profile among vehicle-to-grid participants in Utrecht.

Private purchase and lease subsidies broadened access, including through support for used vehicles, but the Dutch architecture remained less dependent on one consumer rebate than Quebec's. Assistance was layered onto municipal charging, corporate fleets, parking rules, and urban regulation. The gradual reduction of subsidies therefore did not remove the organizational foundations of everyday use. The phase-out of direct purchase support did not eliminate the wider policy architecture. The national SEPP purchase-subsidy scheme ended on 31 December 2024, while reduced vehicle taxation, municipal charging support, and locally differentiated parking and infrastructure measures continued to shape electric-mobility adoption (EAFO, n.d.; NEA, 2024). ZEV extend the architecture from encouraging a preferred technology to reorganizing access to urban space. They influence delivery firms, fleet operators, municipalities, and small businesses rather than only private purchasers (Government of the Netherlands, n.d.). Their transformative potential is accompanied by distributive risk. Large firms can often replace fleets earlier than small operators. Advance notice, transitional finance, transparent exemptions, and charging availability are therefore required if regulation is not to become a last-minute advantage for actors with greater capital and procurement capacity.

d) Cross-case comparison

My Table 1 summarizes the principal contrasts. Four findings emerge. First, no individual instrument explains the observed trajectories. Norway's tax advantages were embedded in a broader architecture combining sustained fiscal differentiation, use benefits, and charging provision. Quebec's purchase

rebate operated alongside supply regulation, public charging, and Hydro-Québec's organizational capacity. In the Netherlands, charging infrastructure was integrated with parking policy, leasing and company-car taxation, municipal governance, and technical standards. Across the three cases, diffusion therefore reflects configurations of instruments rather than the isolated effect of a single measure. Second, the three architectures developed different functional strengths. Norway placed particular emphasis on reducing entry costs and stabilizing long-term expectations. The Netherlands developed strong capacity for securing everyday use through charging infrastructure and territorial integration. Quebec combined demand support, supply regulation, and public organizational capacity, although multilevel governance and territorial variation made adjustment less uniform. These differences suggest that similar adoption outcomes can be produced through distinct institutional and instrumental configurations.

Third, context conditions the effects of instruments rather than merely surrounding them. Low-carbon electricity strengthens the decarbonization potential of electrification in Quebec and Norway, while grid capacity, winter peaks, settlement patterns, and access to private parking shape how that potential can be realized. Dutch urban density facilitates dense charging deployment but also increases reliance on public infrastructure among households without private parking. Instruments that appear formally similar therefore operate differently once embedded in distinct energy, institutional, and territorial settings. Fourth, diffusion should not be equated with robustness. Rapid market growth demonstrates that an architecture can stimulate adoption, but it does not establish fiscal sustainability, equitable access, infrastructure adequacy, or adaptive capacity. Robustness is better understood as the capacity to maintain policy direction while recalibrating instruments, infrastructure, and distributional protections as electrification moves from niche adoption toward mass diffusion.

Sequencing helps explain these differences in robustness. Norway first altered relative purchase costs and subsequently expanded attention to charging, system integration, and heavier transport. The Netherlands developed fiscal incentives, organizational capacity, and charging infrastructure in parallel, reducing dependence on a single consumer instrument. Quebec accelerated demand and supply while long-term grid integration was still being formalized. This unevenness is also visible within Quebec. In 2024 fully electric vehicles represented 66.8% of electric light-duty vehicles province-wide, but only 44.1% in *Nord-du-Québec* and 48.8% in *Abitibi-Témiscamingue*, compared with more than 70% in Laval, the Laurentides, and Montérégie (*Institut de la statistique du Québec*, 2024, p. 156–157). This variation suggests that a common provincial architecture is filtered through distinct territorial conditions. The significance of recalibration therefore depends not only on which instrument is modified, but also on the architecture surrounding it.

Reducing a subsidy within a diversified architecture is likely to generate a different credibility effect from reducing a highly visible instrument on which adoption has become strongly dependent. Institutional coordination further differentiates the cases. Hydro-Québec provides Quebec with a major organizational and infrastructural actor, Norwegian national institutions facilitate coordination between taxation and broader transport policy, while Dutch implementation relies more heavily on distributed coordination

among national agencies, municipalities, operators, employers, and leasing firms. The relevant distinction is whether responsibilities, investment capacity, and implementation authority are aligned with the timing and sequencing of policy instruments. Norway provides a concrete illustration of this timing effect. Ahead of revised VAT rules taking effect in January 2026, consumers brought purchases forward, contributing to a record year-end surge followed by a sharp fall in registrations in January (European Alternative Fuels Observatory, 2026; Schaal, 2026). This episode shows that recalibration can alter not only adoption levels but also the timing of market behaviour.

Discussion

The comparison shows that electric mobility is neither the spontaneous outcome of technological innovation nor the mechanical result of generous incentives. I find that it is produced through policy architectures that organize prices, supply, infrastructure, institutional responsibilities, and expectations over time. This finding supports the article's central argument but also clarifies where its theoretical contribution lies.

a) Policy architecture as an explanatory concept

Sociotechnical transition research explains why mobility systems resist change. Geels (2002, 2011) emphasizes the interaction of niches, established regimes, and broader pressures, while Markard et al. (2012) describe sustainability transitions as transformations of technologies, institutional structures, actor strategies, infrastructures, markets and practices. The three cases confirm this systemic view. Electrification changes taxation, parking, electricity demand, charging routines, automobile supply, and relations among governments, utilities, manufacturers, municipalities, and users. However, the multi-level perspective remains less specific about the concrete policy devices through which public authorities organize this reconfiguration. Lascoumes and Le Galès (2004) fill that gap. Quebec's rebate constructs private purchasers as agents of decarbonization, whereas its supply mandate places responsibility on manufacturers. Norway's tax structure governs through relative prices. Dutch charging and parking arrangements place municipalities and infrastructure operators at the center of implementation. The same policy objective is therefore translated into different social relations.

Policy architecture extends policy-mix analysis rather than replacing it. Howlett and Rayner (2007) explain how instruments reinforce or contradict one another. Rogge and Reichardt (2016) identify coherence, consistency, and credibility, and Kern et al. (2019) emphasize adjustment over time. Axsen et al. (2020) reinforce this argument in the transport sector by showing that deep decarbonization requires stringent regulation to be combined with pricing and measures addressing travel demand. My findings extend their sectoral proposition by showing that integration also depends on sequencing, institutional responsibility, territorial conditions, and the political management of recalibration. A policy mix shows what coexists.

A policy architecture explains which instruments are central, which organizations carry them, how they are sequenced, and whether their revision preserves a comprehensible direction. This distinction explains why politically visible instruments can be analytically misleading. Rebates can generate rapid registration effects, while standards, institutional coordination, and grid preparation produce slower and less visible benefits. Borraz (2005) shows that standards organize markets and responsibility even when they appear technical. Evaluation centered only on uptake can therefore overvalue incentives and undervalue the institutional foundations of daily use.

b) Robustness, context, and distribution

The findings suggest that robustness should not be equated with rapid diffusion. Norway's market transformation is a major policy achievement, yet its success makes some early instruments fiscally costly or functionally obsolete. Quebec's rapid growth coexists with stop-and-go adjustment and unequal access. The Dutch charging system supports everyday use while remaining intertwined with socially selective leasing and employment pathways. I define robustness as a moving equilibrium among four capacities: reducing entry costs, securing everyday use, stabilizing expectations, and adapting instruments. Weakness in one capacity can undermine the others. Affordable vehicles provide limited benefit without charging, and infrastructure can remain underused without supply, stable rules can become rigid, and frequent adjustment can weaken credibility. Context is part of this causal explanation. Araújo (2014) argues that energy transitions concern access, reliability, and institutional arbitration as well as technology. Quebec and Norway both benefit from low-carbon electricity, but their fiscal authority, settlement patterns, and institutional structures differ. Dutch density facilitates public charging but also makes residents without private parking dependent on municipal infrastructure. Context does not determine outcomes, it changes what instruments must do and how expensive or unequal they become.

Evidence from China similarly shows that charging infrastructure does not produce uniform effects across territories. Using monthly data from 2016 to 2019, Chen (2024) finds only a weak nationwide association between the number of charging points and electric-vehicle sales, while identifying stronger positive relationships in some regions, including Guangdong and Sichuan. Although the study's explanatory power varies across the regional models, its findings reinforce the argument that infrastructure effects are conditioned by local market development, territorial characteristics, and complementary policies rather than determined by charger numbers alone. These differentiated effects also have distributive implications. Instruments create target groups and territorial advantages from the outset. Martinek (2021) shows why Quebec's purchase assistance can privilege households able to buy a vehicle. Zhang et al. (2025b) and Hu et al. (2025) show that Dutch adoption and advanced charging services remain associated with income, education, leasing, and multi-car ownership. Varghese et al. (2024) and Ermagun and Tian (2024) demonstrate that charging equity and territorial distribution remain persistent concerns.

Evidence from the United States reinforces this distributional concern. Using federal income-tax data from 2006 to 2021, Borenstein and Davis (2025) find that tax credits for electric vehicles and other clean-energy technologies accrued predominantly to higher-income households: the top income quintile received approximately 60% of the total value, whereas the bottom three quintiles together received about 10%. Although these results cannot be transferred directly to the three cases examined here, they demonstrate how formally general incentives can remain socially selective when access depends on taxable income, capital, credit, and the capacity to purchase eligible technologies.

Taken together, these findings indicate that distribution should be treated as an internal property of policy architecture rather than as a correction added after adoption. A rebate-centered architecture may require income targeting, used-vehicle support, and alternatives for people without private parking. An urban regulatory architecture may require finance and exemptions for small firms. Following Jenkins et al. (2016), the relevant policy question concerns who receives benefits, whose needs are recognized, and who can participate in decisions.

c) Anticipation, crisis-mediated advantage, and policy learning

The comparison identifies crisis-mediated advantage as a temporal mechanism rather than a stable category of actors. When foreseeable pressures are insufficiently prepared for, urgency narrows alternatives and increases the leverage of actors with institutional access, technical capacity, or ready-made solutions. Stone (1989) and Boin et al. (2009) explain why this leverage matters. Crises intensify competition over causality, responsibility, and solution. Hajer (1995) further shows how discourse can join actors with different interests around a common storyline. In electric mobility, a crisis can be framed as a problem of consumer affordability, industrial supply, grid reliability, climate urgency, or public finance. Each framing favors different instruments and beneficiaries.

Canada provides a recent illustration. The federal Incentives for Zero-emission vehicles (iZEV) program was paused in January 2025 after available funds were exhausted, whereas its 2026 successor introduced a predetermined five-year decline in purchase incentives. This contrast illustrates the difference between adjustment triggered by exhausted capacity and recalibration designed in advance (Transport Canada, 2025). The distinction is therefore concerns prepared recalibration versus crisis-dependent adjustment. Public policy always requires flexibility. Prepared adaptation revises instruments within a stable direction, whereas crisis-dependent adjustment occurs only after pressure has raised public costs and increased the influence of actors able to act quickly.

d) Implications for policy theory and public action

For policy theory, the article links instrument effects to the organization of governing capacity. It shows that design, implementation, and temporal adjustment cannot be treated as separate analytical stages.

Pressman and Wildavsky (1973) demonstrated that policy intentions are transformed through organizational chains. Policy architecture brings those chains into the analysis of instrument combination.

For public authorities, four implications follow. First, incentives should include explicit review criteria and predictable phase-down schedules. Second, infrastructure should be planned against expected demand rather than installed only after scarcity becomes politically acute. Third, regulatory obligations should be synchronized with supply, charging, financing, and administrative capacity. Fourth, evaluation should move beyond registrations to include public cost, accessibility, reliability, territorial coverage, ownership patterns, and the consequences of recalibration. The cases do not offer a universal blueprint. Across the cases, the transferable lesson lies in a design principle: public action is more robust when instruments address complementary barriers, responsibilities are clear, and adjustment is anticipated before urgency becomes the dominant mode of governing.

Conclusion

This article examined how public action shapes the deployment of electric mobility in Quebec, Norway, and the Netherlands. I argue that electrification cannot be explained by technological progress or isolated incentives. It is governed through policy architectures that organize vehicle supply, acquisition costs, charging infrastructure, institutional responsibilities, political support, and adjustment over time. The comparison therefore moves beyond registrations, market shares, and charging-point density to identify the public mechanisms that make electrification durable, fragile, or socially selective.

The three cases reveal distinct architectures rather than variations of a universal model. Norway developed a trajectory of fiscal massification through the cumulative differentiation of electric and combustion vehicles, supported by charging infrastructure, use advantages, and long-term signals. The Netherlands embedded electrification in public charging, parking regulation, company-car taxation, leasing, municipal implementation, and urban mobility planning. Quebec combined purchase assistance, a ZEV mandate, low-carbon hydroelectricity, Hydro-Québec's organizational capacity, and multilevel intervention.

Across the cases, four interdependent capacities support robust electrification: reducing entry costs, securing everyday use, stabilizing expectations, and adapting instruments as technologies and markets evolve. Their effectiveness depends on sequencing, interaction, institutional embedding, and political stabilization. Policy architecture therefore extends instrument and policy-mix research by connecting instrument interaction to hierarchy, institutional responsibility, sequencing, and adaptive recalibration. The comparison also shows that diffusion and robustness are distinct: high adoption can coexist with fiscal dependence, territorial disparities, socially selective access, infrastructure constraints, and vulnerability to policy reversal.

Distribution is consequently an internal property of policy architecture. Purchase subsidies favour actors able to enter the vehicle market, leasing connects access partly to employment and corporate mobility,

and charging provision can advantage territories where deployment is easier. Robust architectures must therefore consider income, housing, territorial location, access to credit, charging availability, and the capacity of households and firms to respond to regulatory change.

The article also identifies crisis-mediated advantage as a temporal mechanism through which delayed preparation can narrow policy alternatives and increase the leverage of actors possessing institutional access, technical capacity, or ready-made solutions. Anticipatory governance matters because it preserves room for adjustment before urgency reshapes the distribution of costs, choices, and influence. Further research based on interviews and longitudinal implementation evidence could examine how these architectures are negotiated and recalibrated beyond what publicly available documentary sources reveal.

Ultimately, durable electric mobility depends on treating subsidies, taxation, regulation, infrastructure, and organizational capacity as parts of an interconnected architecture. Public authorities shape the transition through decisions about when to intervene, how to coordinate instruments and institutions, who bears responsibility, and whose interests are protected during adjustment. When these choices are anticipated, crises can accelerate an established transition. And, when preparation is delayed, urgency can increase the fiscal, political, and distributive costs of governing it.

Declarations

Author Contribution

I am the sole author.

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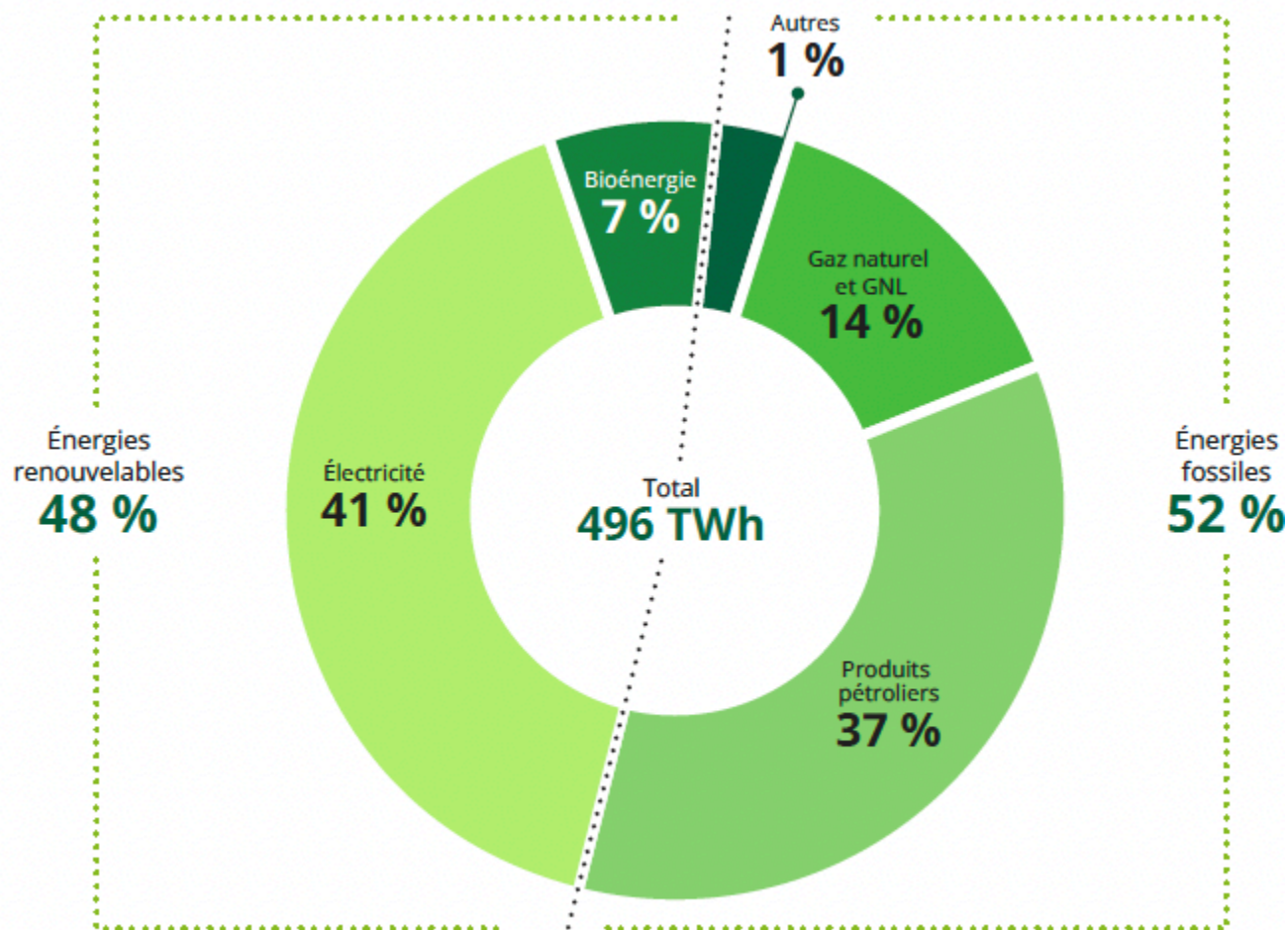
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Figures



GNL : Gaz naturel liquéfié

Figure 1

Final energy consumption by energy source in Quebec, 2022

Note. Electricity accounted for 41% of final energy consumption, compared with approximately 52% from fossil fuels. Adapted from MEIE (2026, Figure 2, p. 13).

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Figure 2

Legend not included with this version