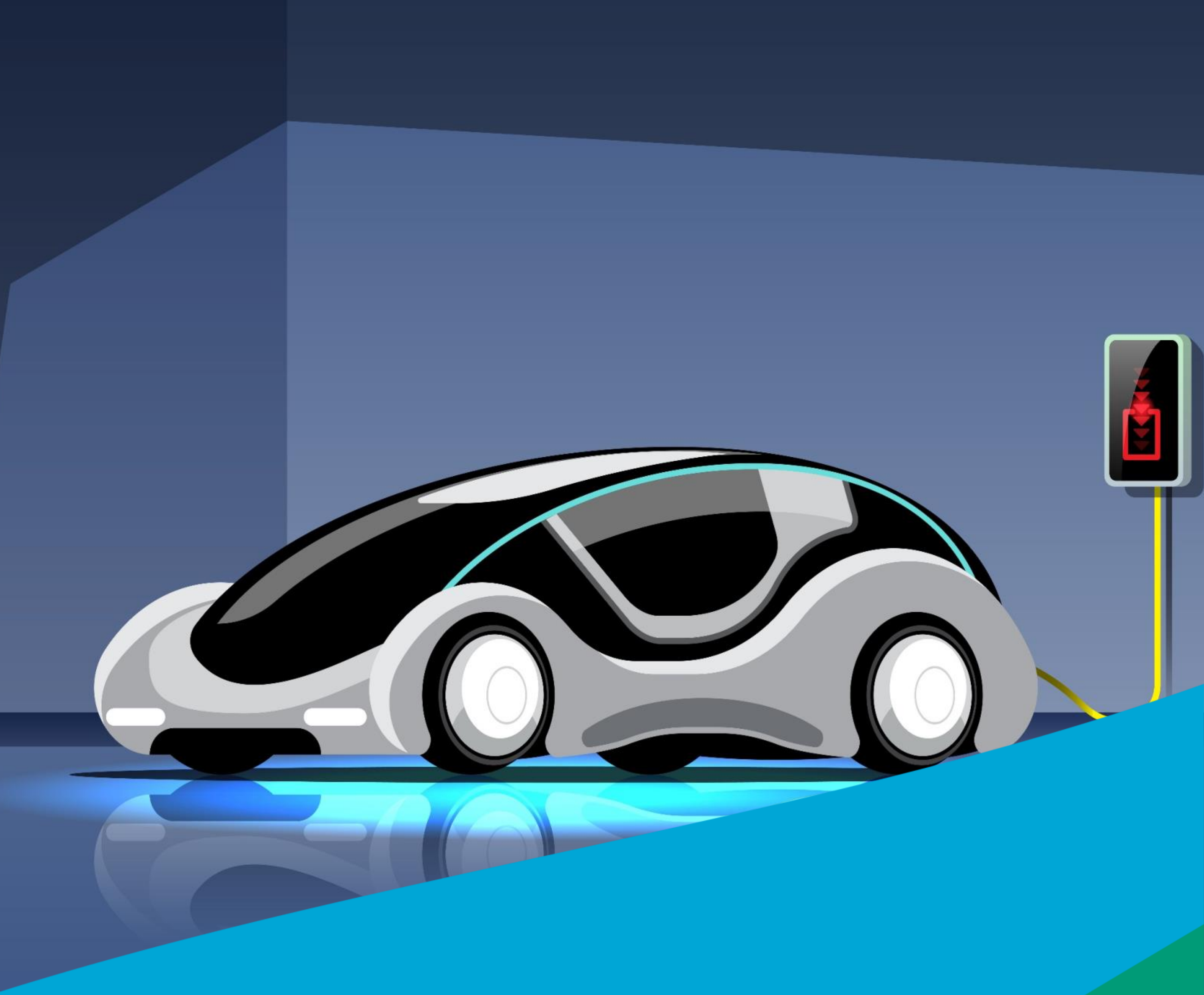

Uncovering institutional discrepancies governing electric vehicle adoption in the Netherlands

Application of the Institutional Network Analysis to electric passenger vehicle adoption

MSc thesis Complex Systems Engineering and Management

Julia Ponfoort

TU Delft

"The presence of good rules… does not ensure that appropriators will follow them."

Elinor Ostrom

(Governing the Commons: The Evolution of Institutions for Collective Action)

Uncovering institutional discrepancies governing electric vehicle adoption in the Netherlands

Application of the Institutional Network Analysis to electric passenger vehicle adoption

By

J.J.P. Ponfoort

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Statement on the use of AI tools*: I hereby declare that I made use of OpenAI’s tool ChatGPT during this thesis. The tool was used solely to improve academic phrasing and to provide general background information in the early stages of the research. All outputs generated by ChatGPT were carefully assessed by me and verified with reliable sources.*

Cover: Electric automobile in modern style is charging in garage power station by jcomp (n.d.).

Preface

In my first year of the bachelor's programme *Technische Bestuurskunde* at Delft University of Technology, I was introduced to the *Grammar of Institutions*. I remember being intrigued by how something as qualitative and ambiguous as written and unwritten rules could be captured in such a clear, analytical structure. At the same time, I was an eighteen-year-old, first-year student, overwhelmed by the fun of student life. In other words: I paid little attention to what this framework might later mean for my academic career.

Years later, during the second year of my master's programme *Complex Systems Engineering & Management*, I found myself struggling with a question that many of my peers faced: what topic should I choose for my graduation project to end my academic career in a way that truly feels rewarding? At that point, I crossed paths with Joyce Kooijman during her course *Law and Institutions*. I knew the course interested me, but it was not until the guest lecture by Amineh Ghorbani that things really fell into place. During the lecture, I realised how much the Grammar of Institutions resonated with me, and I was intrigued by the *Institutional Network Analysis* that combined the Grammar of Institutions with network analysis. The method offered exactly what I was looking for: a way to study complex socio-technical systems while still leaving room for interpretation, nuance, and an understanding of human behaviour.

Once Amineh agreed to supervise my graduation project with the Institutional Network Analysis as research method, the remaining challenge was to find a suitable domain. Given my academic background in the transport and logistics track and a long-standing interest in mobility and sustainability, it was a natural step to study the institutional environment of zero-emission vehicles. This research took shape under the supervision of Yashar Araghi at TNO. However, only during the thesis did I realise how little I actually knew about the Dutch electricity system and charging infrastructure. My specialization had focused mainly on transport and supply chain, while energy-related topics had largely belonged to another track. As a result, I had to develop an understanding of this complex system with little prior knowledge, while simultaneously working with the Institutional Network Analysis which required much practice to master.

This process proved challenging, but not impossible. I stepped outside my comfort zone, grew academically, and learned the value of asking for help when needed, rather than trying to solve it all on my own. The research demanded critical thinking and persistence, and it taught me about resilience in a way that I will take with me beyond this thesis.

I am proud to present this work, and I have genuinely enjoyed the process from start to finish. I hope you will enjoy reading it as much as I enjoyed writing it.

With warm regards,

Julia Ponfoort

Executive summary

Electric vehicles (EVs) are seen as the cornerstone in the transition toward sustainable mobility. In this transition, the Netherlands has positioned itself as a frontrunner in Europe with ambitious targets. However, the transition to electric passenger mobility is progressing more slowly than anticipated, resulting in a gap between policy ambitions and actual EV uptake. At the same time, the Dutch government is removing financial incentives that have proven to stimulate EV adoption. This raises the question whether the current **institutional environment** effectively supports the large-scale adoption of EVs.

Barriers to EV adoption are often described as technological, financial, infrastructural, or socio-psychological, but they are ultimately shaped by public policy, regulation, and behaviour. In other words, they are rooted in **institutions**. Ultimately, EV adoption depends on the coherence and robustness of the regulatory framework governing energy, mobility, and fiscal policy. However, potential **institutional discrepancies** within these frameworks could undermine policy effectiveness or weaken intended incentives. Therefore, the objective of this thesis is to identify institutional discrepancies that may hinder the potential uptake of passenger EVs in the Netherlands. Through this, we can formulate recommendations that enhance the current institutional framework. Therefore, the central research question is:

How do discrepancies within the institutional environment influence the potential uptake of electric passenger vehicles in the Netherlands in the coming 5 years?

To answer this question, the research applies the **Institutional Network Analysis** (INA) to analyse the institutions governing EV adoption in a systematic way. For this, we collected policy and legal documents as well as research reports to extract institutional statements describing laws, policy implementation, and policy objectives. These statements were classified into **institutions-in-form**, **institutions-in-use**, and **policy intent**, where the policy intent extends the existing INA scope. After coding the statements with the Institutional Grammar 2.0, we constructed **Institutional Network Diagrams**. From the diagrams, we identified discrepancies between institutions.

The analysis revealed institutional discrepancies that may hinder EV adoption related to **public charging costs** and **car taxation**. To mitigate these discrepancies and ultimately stimulate EV adoption in the Netherlands, we propose several **policy recommendations**.

With respect to charging costs, we found discrepancies regarding **ad hoc charging** and **price transparency** in public charging. Both topics are strongly regulated under EU law, yet EV users do not fully experience the intended benefits. The use of ad hoc charging remains low because many EV drivers are unaware of it or do not understand its advantages. For this, we propose three policy recommendations. First, awareness campaigns should be initiated to inform potential users. Second, an app could be developed to enhance price oversight of ad hoc payments. Third, the monitoring scope of ad hoc charging in the *Nationaal Laadonderzoek* could be extended to understand how ad hoc charging diffuses among EV drivers. Regarding price transparency, we found that charging point operators or e-mobility service providers often not adhere to the EU law as users report difficulty understanding or accessing charging cost information. To address this, two policy recommendations

are proposed. First, the Authority for Consumers and Markets could issue renewed public warnings to charging point operators about insufficient price transparency. Second, user feedback could be integrated into monitoring activities to assess whether charging prices are accessible for EV drivers.

Related to car taxation, the IND about the **mobility agenda** reveals interrelated institutional discrepancies. On the one hand, we found structurally tensed policy goals, which are stimulating EV adoption while maintaining stable tax revenue. This results in misaligned outcomes. For example, financial incentives for EVs are phased out to mitigate tax loss just as adoption begins to scale. On the other hand, policy intents lack clear rules to guide or assess its implementation. For example, how mobility costs should be distributed across car users remains undefined in the institutions. This creates ambiguity and reduces accountability. Therefore, three policy recommendations are proposed to address this. First, the government should assess the feasibility and effectiveness of income-based EV incentives, which gives financial support to people who need it in order to adopt an EV. Second, the government should invest in research to identify pathways toward self-sustaining EV adoption, instead of adoption only relying on financial incentives.

Methodologically, this study extends the traditional INA by introducing **policy intent** as an additional type of institutional statement alongside institutions-in-form and institutions-in-use. Through this we could assess whether the rules in place, policy implementation and actual user behaviour reflected the intended effect of the law or the policy in the first place. Through this, we observed discrepancies that would remain invisible if we had only analysed the institutions-in-form and institutions-in-use. As a result, the study demonstrates how the INA can be extended to better understand the institutional framework in policy-driven socio-technical transitions such as the shift to electric mobility.

The research has focused on the **national level** and provides insight into the alignment between EU legislation and national implementation, as well as how mobility policy is developed at the national level. However, many EV-related policies are implemented at regional or municipal levels, such as the rollout of charging infrastructure. Future research could therefore include these governance levels to capture a more complete view of the institutional environment governing EV adoption.

Overall, this thesis concludes that limited EV adoption in the Netherlands is not caused by a lack of ambition by the Dutch state but through **discrepancies between policy objectives, formal rules, and practical outcomes**. The discrepancies create uncertainty for end users through financial risk and limited long-term policy direction. In the coming five years, this uncertainty is likely to constrain the potential uptake of electric passenger vehicles. This is unless the institutions become more coherent, predictable, and better aligned with the conditions that are required for users to transition to electric mobility.

Acknowledgments

I would like to express my sincere gratitude to my supervisors for their guidance and support throughout this research. Amineh Ghorbani, my first TU Delft supervisor and committee chair, whose guidance strongly shaped the quality of this thesis. Our discussions challenged me to think more rigorously about my findings. Your trust encouraged me to push the boundaries of my capabilities and position my work as a meaningful contribution to the Institutional Network Analysis.

I thank Joyce Kooijman, my second TU Delft supervisor, for taking the time to supervise this thesis despite your very busy schedule. Your expertise in Dutch legal frameworks, as well as your critical eye for structure of the research, added depth and precision to this thesis.

I would like to thank Yashar Araghi, my supervisor at TNO, for giving me the opportunity to conduct my thesis under his supervision and for creating a welcoming environment at TNO. I am grateful for the time you made available to explain the ins-and-outs of the zero-emission mobility domain and to discuss my work alongside your many responsibilities at TNO. Your knowledge on electric vehicles and the charging infrastructure system provided essential context for my research.

Within TNO, I had the opportunity to meet and speak with a diverse group of inspiring individuals, each contributing to applied research and innovation within their own field of expertise. People took the time to discuss my research, share insights from their work, and provide feedback when I asked for it. I am grateful that I had the opportunity to write my thesis at TNO and experience this environment firsthand.

Finally, I would like to thank my parents, and especially my mother, for her constant encouragement. I thank Tijn, for keeping me sharp by asking out-of-the-box questions, and my best friend, Zoë, for helping me regain perspective when needed.

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Table of Abbreviations

ACM	Autoriteit Consument & Markt
AFIR	Alternative Fuel Infrastructure Regulation
BEV	Battery electric vehicle
BPM	Belasting van personenauto's en motorrijwielen
BZK	Ministry of the Interior and Kingdom Relations
CPO	Charging point operator
CO_2	carbon dioxide
DSO	Distribution system operator
e-MSP	e-Mobility service provider
EV	Electric vehicle
EZ	Ministry of Economic Affairs
IAD	Institutional Analysis & Development framework
ICE	Internal combustion engine
IenW	Ministry of Infrastructure and Water Management
IG	Institutional Grammar
INA	Institutional Network Analysis
IND	Institutional Network Diagram
KEV	Klimaat- en Energieverkenning
KGG	Ministry of Climate and Green Growth
KP	Klimaatplan
KW	Klimaatwet
MRB	Motorrijtuigenbelasting
NLO	Nationaal Laadonderzoek
PBL	Planbureau voor de Leefomgeving
PHEV	Plug-in hybrid electric vehicle
RVO	Rijksdienst voor Ondernemend Nederland
TSO	Transmission system operator

1 Introduction

The European Union (EU) has set ambitious targets to address climate change. As part of the European Green Deal, the EU aims to achieve climate neutrality by 2050 and reduce greenhouse gas emissions from transport by 90% compared to 1990 levels (European Parliament, 2024). Given that car mobility is one of the largest contributors to transport emissions in Europe, the decarbonization of passenger vehicles has become a central policy priority. Electric vehicles (EVs) are widely seen as a cornerstone to drive this transition. This places EV adoption to the top of political, industrial, and societal agendas across EU member states (Khatua et al., 2023; Panda & Tindemans, 2024; Veza et al., 2023; Zhao et al., 2023).

Within this broader transition, the Netherlands has positioned itself as a frontrunner. The Dutch government aims to reduce CO_2 emissions by 95% by 2050 and has set ambitious targets for the electrification of passenger transport (Ayvens, 2024; IenW, 2025a). By 2030, approximately 1.9 million passenger EVs should be driving on Dutch roads, representing around 19% of the total fleet (IenW, 2025a). In that same year, all newly sold passenger cars should be emission-free. To support this transition, the government has introduced a range of policy measures, including financial incentives for EV purchases, regulatory targets, and investments in charging infrastructure. To support this transition, the government has introduced financial incentives and invested in the expansion of charging infrastructure.

Despite these ambitions, the transition is progressing more slowly than anticipated. As of May 2025, only 6.5% of passenger vehicles in the Netherlands are fully electric (RVO, 2025a). Projections suggest that zero-emission vehicles will represent only between 26 and 40% of new sales by 2030, well below the government target of 100% (Paradies et al., 2023). This gap between ambition and reality suggests that significant barriers to EV adoption remain. At the same time, the government reduces the financial incentives that previously helped to stimulate adoption, including abolishing the purchase tax exemption for EVs as of 2025 and phasing out reductions in motor vehicle tax (ANWB, n.d.; Belastingdienst, 2025; Ministerie van Algemene Zaken, 2026). Reducing incentives while adoption targets are far from reached raises the question of whether the current policy framework is effective in driving the transition. Understanding why EV adoption does not accelerate at the pace envisioned by policymakers is therefore essential as identifying the barriers that hinder EV uptake can help explain this gap and inform more effective policies for the electrification of passenger transport (Qadir et al., 2024).

1.1 Previous research on barriers to passenger EV adoption

Extensive research has examined barriers to EV adoption and proposed ways to mitigate them. This section presents the barriers identified in literature in four categories: technological (section 1.1.11.1.1), infrastructural (section 1.1.2), financial (section 1.1.3), and socio-psychological (section 1.1.4). Ultimately, this literature review brings us to the research gap in section 1.2.

1.1.1 Technological barriers

Technological barriers relate to limitations of the vehicle technology itself and are widely recognised as important determinants of EV adoption (Pamidimukkala et al., 2024). Frequently cited barriers are battery concerns, driving range, charging time, and broader technological uncertainty.

One frequently discussed battery-related concern is degradation. Frequent charging, particularly through fast chargers, can accelerate battery wear and reduce lifespan (Haghani et al., 2024; Shahed & Rashid, 2024). Although battery management strategies can mitigate degradation (Haghani et al., 2024; Yu et al., 2025), concerns about limited battery lifespan persist due to high battery replacement costs (Pamidimukkala et al., 2024). Another battery-related barrier to EV adoption is safety. In case of a car accident, damage to battery cells can lead to ignition or explosion (Kumar et al., 2025; Schieman et al., 2016). In addition, environmental concerns related to battery disposal exist as EV batteries contain hazardous materials that require careful end-of-life handling (Giansoldati et al., 2020; Kumar et al., 2025). However, empirical studies suggest that such environmental concerns do not significantly influence EV adoption decisions (Pamidimukkala et al., 2024).

Other frequently cited technological barriers are limited driving range and lengthy charging (Adhikari et al., 2020; Li et al., 2017; Pamidimukkala et al., 2024; Paradies et al., 2023). Although EV range has improved in significantly, it remains lower than that of internal combustion engine (ICE) vehicles, which may discourage adoption among drivers who frequently undertake long-distance trips (Berkeley et al., 2018). Moreover, external conditions can further reduce range as cold temperatures reduce battery capacity while simultaneously increasing energy demand for cabin heating (Steinstraeter et al., 2021; Zhao et al., 2022). Such range reductions can affect adoption behaviour, with Gao et al. (2025) observing a measurable decline in EV sales during periods of extreme cold.

Finally, technological uncertainty can influence EV adoption, referring to the unpredictability of future technological performance and costs (Bstieler, 2005). Rapid technological developments in the EV market creates uncertainty about future vehicle performance and prices, which can delay adoption decisions (Hong et al., 2020; Fu et al., 2024). Reducing such uncertainty has been shown to contribute to higher EV adoption rates (Fu et al., 2025).

1.1.2 Infrastructural barriers

Access to charging infrastructure is widely recognised as a condition for large-scale EV adoption (Burra et al., 2024; Pamidimukkala et al., 2023). While home charging remains the most dominant among current users, the literature consistently emphasises that widespread adoption depends on the availability of sufficient public charging (Almatar, 2023; Ashby et al., 2025; Guo et al., 2024; IEA, 2025; Pezeshknejad et al., 2026). This is particularly important for households without private parking, who are significantly less likely to adopt EVs without public charging close to their home (Ashby et al., 2025; Kristoffersson et al., 2025).

In response, the government aims to accelerate the expansion of public charging infrastructure (IenW, 2025b). However, literature shows that this rapid rollout puts additional pressure on local distribution grids (Mashhoodi & Unceta, 2023). Many of these grids were not designed to accommodate the higher and more variable electricity demand associated with EV charging (Tayri & Ma, 2025). When local demand exceeds available capacity grid congestion can occur, which limits the ability to connect new charging points or accommodate simultaneous charging demand (TNO, 2025). This can slow the expansion of charging infrastructure and thereby constrain EV adoption.

To address grid constraints, scholars propose grid management strategies and technologies, such as smart charging, load shifting, vehicle-to-grid, and coordinated charging schemes, which aim to better align EV charging with available grid capacity (Apata et al., 2023; Chandra et al., 2024; Mashhoodi & Unceta, 2023; Powell et al., 2022; Van Eijk et al., 2025). Other studies highlight the need for grid expansion to accommodate long-term electrification trends (Li & Jenn, 2024).

Recent studies emphasize that charging infrastructure barriers must be understood within the broader context of cross-sector electrification. For this, studies examine its interaction with technologies such as heat pumps and solar panels (Asare-Bediako et al., 2014; Brinkel et al., 2019; Damianakis et al., 2023; Haakana et al., 2018; Kong et al., 2021). This broader focus reflects that electrification extends beyond mobility and, together with other technologies, contributes to pressure on distribution grids.

1.1.3 Financial barriers

Across literature, financial barriers emerge as strong determinants for EV adoption (Pamidimukkala et al., 2023, 2024). The high upfront purchase price remains the most prominent barrier, particularly for lower-income households (Anastasiadou & Gavanas, 2022; Caulfield et al., 2022; Pamidimukkala et al., 2023; Tayri & Ma, 2025). Empirical studies show that financial incentives, such as subsidies and tax exemptions, can significantly increase EV adoption when appropriately implemented (Martins et al., 2024; Ribeiro & Silveira, 2023; Van Dijk et al., 2022). However, other studies suggest that incentive-based policies can generate market distortions and welfare inefficiencies (Fu et al., 2025).

Another financial barrier is the uncertainty regarding resale value. The relatively young second-hand EV market, combined with rapid technological advancements, contributes to the fact that EVs depreciate faster than ICE vehicles (Diouf, 2025; Pamidimukkala et al., 2023). This uncertainty increases perceived financial risk. Additionally, charging-related costs also influence adoption decisions. These include the installation costs of private charging infrastructure (Pezeshknejad et al., 2026), as well as the complexity and limited transparency of public charging tariffs (Wolbertus & Van den Eijnden, 2020). Together, these findings suggest that financial barriers extend beyond vehicle price alone and encompass broader cost structures related to taxation, incentives, resale markets, and charging conditions.

1.1.4 Socio-psychological barriers

The literature highlights the effect of socio-psychological factors on EV adoption. Car purchasing decisions are influenced by values, beliefs, attitudes, and habitual behaviour, which affect how individuals perceive new technologies (Lane & Potter, 2007). In the context of EVs, consumer acceptance is closely linked to behavioural change, as adoption requires adjustments in routines and mobility practices (Schiaroli & Fraccascia, 2025). Positive perceptions, such as enjoyment of driving an EV or a sense of environmental responsibility, are positively associated with EV adoption.

At the same time, some psychological barriers discourage adoption. Most extensively studied is *range anxiety*, defined as the concern that an EV's battery may be insufficient to reach a destination (Van Dijk et al., 2022). Studies show that range anxiety reduces perceived ease of use and negatively affects adoption (Rainieri et al., 2023). Proposed solutions include expanding fast-charging infrastructure, improving charging accessibility on the neighbourhood-level, and adapting parking layouts to facilitate charging availability (Bonges & Lusk, 2015; Mashhoodi & Van Der Blij, 2020; Neaimeh et al., 2017). More recent studies, however, suggest that the relevance of range anxiety is declining as battery technology improves and driving range increases (Ibanibo et al., 2025).

1.2 Research gap: the need for an institutional analysis

Previous research has identified a wide range of technological, infrastructural, financial, and socio-psychological barriers. Studies typically propose adjusting or extending policy in order to overcome barriers. In practice, however, many of these barriers are already deeply shaped by policy, regulation, and social norms. This suggests that barriers may not only be external challenges to policy but may also emerge from the *institutional framework* itself, which refers to the broader social context in which institutions prescribe rules and beliefs that shape the behaviour and choices of actors operating within a given domain (Swaminathan & Wade, 2016). Consequently, EV adoption depends on the coherence and robustness of the regulatory framework governing energy, mobility, and fiscal policy (Qadir et al., 2024; Steinhilber et al., 2013).

This becomes clear when we consider the different barriers identified in literature. Technological barriers are influenced by standards and market conditions that shape technological development. Infrastructural barriers, such as grid congestion or the rollout of charging infrastructure, depend on procedures and interactions with other policy domains, such as energy and the built environment. Together, they influence how fast infrastructure can be deployed. Financial barriers are mitigated by subsidies and taxes, but those are subject to decisions and trade-offs made within the broader fiscal system of the Netherlands. Finally, socio-psychological barriers, such as willingness to adopt EVs, are influenced by awareness campaigns and the long-term consistency of policy signals.

When we recognize that technological, infrastructural, financial, and socio-psychological barriers are partly produced, reinforced, or mitigated by institutions, we can analyze EV adoption from a broader institutional perspective. From this perspective, policy and law form the arena in which these dynamics are coordinated (Ostrom, 2005). However, the institutional dimension of EV adoption has received limited attention in previous research (Khatua et al., 2023). When institutional perspectives are applied, they often focus on the institutional barriers associated with a specific technology or policy instrument rather than analysing the broader institutional environment shaping EV adoption (Van Eijk, 2025). One notable exception is the study by Khatua et al. (2023), which adopts a broader institutional perspective. However, rather than analysing concrete rules and regulations, the study models institutional dynamics using outcome-based indicators such as EV sales and driving range.

What is missing is a systematic analysis of the institutions themselves to assess whether discrepancies exist within the institutional environment governing EV adoption. This is important, because the institutional environment governing EV adoption is complex, as it covers different policy domains and governance levels, and includes many stakeholders from different sectors. The institutions may misalign or leave gaps which undermine the effectiveness of policy. Because such analysis has not been done before, it remains unclear whether discrepancies exist that contribute to the persistent gap between policy ambitions and actual EV adoption (Ghorbani et al., 2024; Pastor, 2024).

1.3 Research objective and research questions

In the context of EV adoption, barriers arising from the institutional environment have not yet been analysed in a systematic way. Therefore, the objective of this research is to uncover institutional discrepancies that hinder EV adoption in the Netherlands. To achieve this, the study analyses the institutional environment governing EV adoption in order to understand how rules and policies interact across policy domains and governance levels, and what mechanisms exist to support EV uptake. By identifying the discrepancies between institutions, the research aims to formulate policy recommendations that enhance the existing institutional framework.

Following the research objective, we have formulated the main research question:

How do discrepancies within the institutional environment influence the potential uptake of electric passenger vehicles in the Netherlands in the coming 5 years?

To answer the main question, we propose the following three sub-research questions that guide the research:

1. What stakeholders are involved in the institutional environment of EV adoption?
2. What institutions govern EV adoption?
3. What discrepancies exist within the institutions governing EV adoption?

1.4 Report outline

Through a structured, qualitative and explanatory approach, this study identifies institutional discrepancies within the institutional environment governing EV adoption in the Netherlands. Chapter 2 introduces the stakeholders involved in the institutional environment of EV adoption through a visualised stakeholder map. The map reveals the complexity of the electric mobility environment and defines the scope of the data collection in Chapter 4. Chapter 3 presents the institutional theory underlying the method of this research, which is the Institutional Network Analysis (INA). This method allows us to study the relationships between institutions and identify discrepancies within the institutional framework governing EV adoption (Ghorbani et al., 2024; Pastor, 2024). Where Chapter 3 forms the theoretical foundation of this research, Chapter 4 builds on this by describing the methodological steps undertaken for this research. It also presents the dataset constructed in preparation of the INA. Building on this, Chapter 5 presents the institutional network diagrams based on the dataset and identifies the discrepancies that emerge from these networks. Then, Chapter 6 synthesizes these discrepancies by interpreting the results and formulating informed policy recommendations. Chapter 7 discusses the research by reflecting on the research approach, the methodological contribution, the limitations of the study, and directions for further research. Finally, Chapter 8 concludes the report by answering the research questions.

2 Stakeholders within the institutional environment of EV adoption

This chapter introduces the stakeholders involved in the institutional environment of EV adoption in the Netherlands. The institutional environment refers to the broader social context in which institutions prescribe rules and beliefs that shape the behaviour and choices of actors operating within a given domain (Swaminathan & Wade, 2016). In the context of EV adoption, the institutional environment consists of market players, public organisations, government bodies and end-users, whose interactions are governed by legislation, policies and behaviour. The presence of actors operating across different governance levels and regulatory domains makes this environment inherently complex (Azarnoosh et al., 2024; Qadir et al., 2024).

To structure this complexity, this chapter proposes a stakeholder map. It identifies the key actors involved in EV adoption and visualises their relationships, shown in Figure 1. The map builds on the framework of Wolbertus et al. (2020), who analysed stakeholder dynamics in the development of EV charging infrastructure. This study extends their framework to capture the broader institutional environment of EV adoption, informed by Dutch policy documents and academic literature.

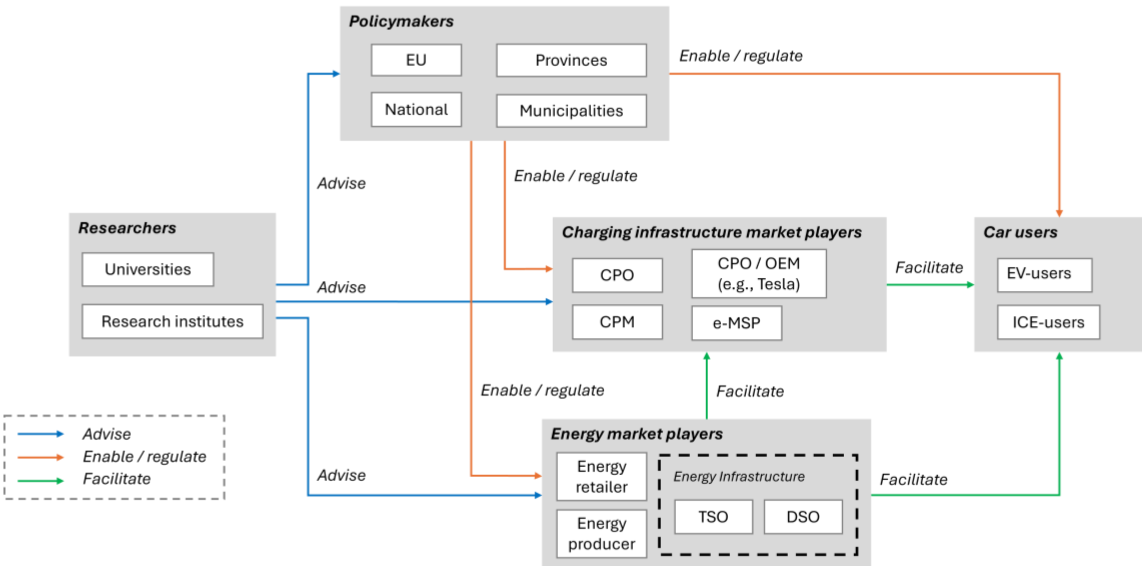

Figure 1: Stakeholder map of EV adoption

Figure 1 presents five actor groups in grey rectangles, with individual actors in white rectangles. Between the groups, the coloured arrows indicate functional roles performed by one actor group toward another. These roles are categorised into three types: advising (blue), enabling or regulating (orange), and facilitating (green), as specified in the legend (Wolbertus et al., 2020).

It is important to note that the stakeholder map is intentionally simplified in two ways. First, the depicted links do not imply that every actor within one group exercises the indicated role toward all actors in another group. Instead, the arrows represent aggregated and typical interaction patterns between actor groups. Second, only one-directional relationship arrows are included in the map.

Reciprocal interactions may exist in practice. For example, in the form of lobbying from market players to policymakers. However, we only included the interactions that are most relevant for answering the research question of this thesis. In this way, the map provides a high-level overview of the institutional landscape rather than an exhaustive representation of all relationships.

The remainder of this chapter introduces the main actor groups depicted in Figure 1. Section 2.1 discusses the researchers with a focus on the research institutions. Section 2.2 describes the policymakers across different governance levels. Section 2.3 discusses the players in the EV charging infrastructure market, facilitating public charging to EV users. Section 2.4 presents the energy market players, thereby distinguishing between actors related to the grid and actors related to the production and selling of electricity. Lastly, section 2.5 discusses the car users and their different characteristics. Section 2.6 finishes the chapter by concluding.

2.1 Researchers

The researchers are universities and public research institutes that provide independent analysis to inform decision-making within the EV adoption domain (Wolbertus et al., 2020). Their primary role in the institutional environment is advisory: they generate knowledge on technological developments, behavioural trends, and policy impacts.

We highlight two research institutes relevant in the context of EV adoption: the *Planbureau voor de Leefomgeving* (PBL) and *TNO*. PBL is an independent research institute that conducts analyses in the fields of environment, nature, and spatial planning. Although formally part of the Ministry of Infrastructure and Water Management (IenW), it operates independently and conducts research for other ministries as well (PBL, n.d.). Within the context of EV adoption, PBL evaluates mobility and climate policies and assesses their environmental impacts (Geilenkirchen et al., 2024).

TNO conducts applied research to support policymakers at different government levels. Its activities include policy impact assessments and evaluations of policy implementation processes. Through this role, TNO contributes to addressing societal challenges and strengthening the long-term innovation and earning capacity of the Netherlands (Ministerie van BZK, 2025a; TNO, n.d-a, n.d.-b).

Although researchers do not create regulations or implement operations, their research shapes how EV-related policies are designed and interpret. In this way, they contribute to identifying barriers and opportunities for EV adoption within the institutional environment (Wolbertus et al., 2020).

2.2 Policymakers

The policymaking field consists of different governance levels shape the regulatory environment of EV adoption (Wolbertus et al., 2020), including the EU, the national government, and regional and local authorities, each with distinct responsibilities and policy instruments (NIMD & IPP, 2008). Within this multi-level framework, the national government acts as a central link between policymaking on EU-level and policy implementation by provinces and municipalities (Geilenkirchen et al., 2024).

2.2.1 European Union

The EU sets the strategic direction for electric mobility through a layered system of climate targets, strategies and legislation. The climate targets are defined by the European Green Deal, which functions as a roadmap for achieving climate neutrality by 2050. It includes the intermediate target of reducing greenhouse gas emissions by 55% by 2030 compared to 1990 levels (Erbach & Jensen, 2024; Fetting, 2020). Rather than prescribing rules itself, the Green Deal provides the overarching framework to develop regulations and directives. *Regulations* apply directly in all member states once adopted, whereas *directives* establish binding objectives that need to be transposed into national law.

European Climate Law (Regulation 2021/1119) formalises the targets set out in the Green Deal. In addition, the *Fit for 55 package* translates the Green Deal goals into laws. An example is the *Alternative Fuel Infrastructure Regulation* (AFIR), which establishes binding requirements for the deployment of EV charging infrastructure across member states (European Commission, 2024; Regulation 2023/1804). Together, these instruments define the institutional framework within which national governments develop their EV policies.

2.2.2 National government

The Dutch national government plays a central role in the electrification of mobility. Its responsibilities are twofold: to transpose EU directives into national law and to define national objectives and policy instruments for EV adoption. In climate policy, approximately 80% of laws and regulations originate from agreements made at the European level (Eerste Kamer der Staten-Generaal, n.d.). As a result, national policy in this domain is strongly influenced by EU legislation.

National policies, laws, and regulations are prepared at the ministerial level. The Ministry of Climate and Green Growth (KGG) coordinates national climate policy (KGG, 2025; Paradies & Mesdaghi, 2025). In context of EV adoption, they define national climate targets decarbonising mobility. The Ministry of IenW translates these climate objectives into mobility policy, including the rollout of charging infrastructure and the integration of EVs into the mobility system. The Ministry of Finance is responsible for fiscal instruments that influence EV adoption, including vehicle taxation, subsidies, and other financial incentives. Although responsibilities are divided over the ministries, they work together closely to create effective policy.

The ministries are supported by executive agencies for implementing and overseeing policies. The *Netherlands Enterprise Agency* (RVO) administers subsidies and innovation programs, the *Authority for Consumers and Markets* (ACM) monitors competition and fairness in the energy market, and the *Tax Administration* is responsible for tax collection.

2.2.3 Provinces and municipalities

Provinces are positioned between the national government and municipalities: they implement national legislation and develop regional policies for tasks that exceed the local scale of municipalities but do not require national intervention (BZK, 2025b; ProDemos, 2017). In the context of EV adoption, provinces translate national climate targets into regional mobility programmes (IPO, 2025; Klimaatakkoord, 2019). In these programmes, the provinces give strategic direction for public charging rollout and zero-emission zones. Implementation of these programmes takes place at the municipal level. As a result, provinces and municipalities collaborate closely to facilitate charging infrastructure, for example for installing charging stations through tenders (Klimaatakkoord, 2019). For example, Noord-Holland's *Menukaart Duurzame Mobiliteit* provides municipalities with a structured set of policy tools for local EV implementation (ElaadNL, 2020; Provincie Noord-Holland, 2024a, 2024b). Municipalities may also create local rules, for example on parking policy to stimulate EVs (BZK, 2024; Gemeente Amsterdam, n.d.).

2.3 Charging infrastructure market players

Within the charging infrastructure market, Wolbertus et al. (2020) identify four actors: charging point operators (CPOs), charging point manufacturers, e-mobility service providers (eMSPs) and original equipment manufacturers (OEMs), which refers to car manufacturers. This segmentation is supported by Van Eijk et al. (2025) and reflects the layered structure of the EV charging market.

2.3.1 Charging point operators

CPOs manage the operation and maintenance of charging stations, including technical and administrative tasks (RVO et al., 2021). They manage the charging infrastructure and sell electricity directly to EV drivers or through e-MSPs, thereby facilitating access to charging services (Wolbertus et al., 2020). For public charging infrastructure, municipalities typically select CPOs through competitive tendering procedures (ElaadNL, 2020).

2.3.2 Charging point manufacturers

Charging point manufacturers operate upstream in the value chain by developing the hardware used in charging infrastructure. Their activities are subject to an increasing number of technical and regulatory requirements related to interoperability, safety, and cybersecurity, which constrain design and deployment choices (Van Eijk et al., 2025).

2.3.3 E-mobility service providers

EV drivers buy electricity from charging stations via e-mobility service providers (eMSPs), who facilitate payment and user authentication through contractual agreements with CPOs (RVO et al., 2021; Wolbertus et al., 2020). Their business models involve subscription-based or usage-based pricing structures, positioning them as intermediaries between CPOs and car users.

In the Netherlands, public charging can be paid for with a charging card, a charging app, or via ad hoc payment. Charging cards and apps are typically provided by MSPs. These cards function as an access key to activate public charging points, after which charging costs are settled automatically through the associated contract. Ad hoc charging, by contrast, does not require a contract and allows EV drivers to pay directly at the charging point with a debit card, contactless payment, or a QR code.

2.3.4 Original equipment manufacturers as CPO (e.g. Tesla)

Car manufacturers also play an important role within the charging market. This is because several EV manufacturers also develop their own charging networks to ensure infrastructure quality aligns with their service standards. They are important as they drive innovation. Here, Tesla is a prominent example (Wolbertus et al., 2020).

2.4 Energy market players

Players within the energy market plays a facilitating yet critical role in EV adoption by providing the technical infrastructure required for electricity provision. As shown in Figure 1, responsibilities within this market are divided into two areas. On the one hand, we identify actors responsible for the grid through which the electricity is distributed. These are the transmission system operators (TSOs) and distribution system operators (DSOs). On the other hand, we identify actors responsible for the supply and sale of electricity to end users, namely the energy producer and energy retailer. All three actors are heavily regulated by policymakers.

2.4.1 Transmission system operators

TSOs manage the high-voltage grid and are responsible for ensuring national grid stability, including cross-border electricity flows. The Dutch government has appointed TenneT as the sole operator of the high-voltage grid. Therefore, TenneT holds a natural monopoly (Tennet, n.d.). Because of this, the ACM supervises TenneT closely to prevent misuse of this position. Based on statutory frameworks, the ACM establishes requirements for the quality and safety of the electricity grid and sets tariffs that TenneT may charge its clients, which are, for example, DSOs (ACM, 2026).

2.4.2 Distribution system operators

DSOs operate the medium- and low-voltage networks and therefore facilitate the connection for charging infrastructure to the grid. They design and maintain the local electricity network and are thus key enablers of both public charging stations and private home charging (RVO et al., 2021). Each DSO serves their own designated geographic regions as their responsibilities are territorially defined and regulated. For the region North-Holland, Liander is the DSO while Stedin operates in South-Holland. DSOs facilitate connections to the grid to CPOs for charging infrastructure. Regular charging stations are connected to the low-voltage grid, while fast charging stations are connected to the medium-voltage grid (Stultiens, 2024).

Similar to TSOs, DSOs operate as regulated monopolies within their service areas. Their activities are therefore closely supervised by the ACM, which sets rules to prevent market abuse (ACM, 2026). These regulations include oversight of tariffs and conditions for grid access to ensure fair and reliable operation of the electricity network.

2.4.3 Energy producer and energy retailer

Energy producers generate electricity. They operate power plants or renewable energy installations, such as wind farms, solar parks or gas power plants. Producers sell electricity on wholesale electricity markets or through long-term contracts to energy retailers (RVO et al., 2021). Energy retailers sell electricity to end users such as households, businesses, and EV charging operators. Through this role, retailers facilitate the supply of electricity to EV drivers, either indirectly via charging point stations or directly to households through home charging. Both energy producers and retailers operate under strict supervision of the ACM (2026) as legally anchored in the Energiewet[1]. To operate in the Dutch electricity market, companies must obtain a licence demonstrating that they meet regulatory requirements, including reliability and financial stability.

Some companies operate as both energy producers and retailers. Examples in the Netherlands include Vattenfall and Eneco, which generate electricity while also supplying it to end users. Both producers and retailers rely on the electricity grid facilitated by the TSO and DSOs to transport electricity to consumers.

2.5 Car users

Car users are the central actors in the institutional environment of passenger EV adoption. They interact directly with charging infrastructure through CPOs and access charging services via MSPs. At

[1] Energiewet (2026, 1 Januari). https://wetten.overheid.nl/BWBR0050714/2026-02-14

the same time, they rely on electricity supplied through the energy system and are influenced by policies and financial incentives designed by policymakers to stimulate EV adoption.

The stakeholder map distinguishes between ICE vehicle users and EV users. Both groups are subject to vehicle-related regulations and fiscal policies. To stimulate EV adoption, ICE vehicle owners pay higher taxes and EV users benefit from subsidies or tax advantages.

Within EV users, further distinctions exist between battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs). These vehicle types are subject to partly different policies, particularly with respect to taxation and subsidies. As a result, policies do not address EV users as a uniform group. In addition, access to charging infrastructure is typically more critical for BEV users, as these vehicles rely entirely on electricity. Differences also exist in how vehicles are bought. Cars may be privately owned or leased or provided by employers as company vehicles. These arrangements differ in terms of who bears purchase and charging costs and financial risks. Furthermore, vehicles may be used for private or business purposes. All this impacts the extent that users are affected by policies.

Regardless of these distinctions, all EV users rely on access to charging facilities to operate their vehicles. This creates a facilitating relationship with charging infrastructure providers and energy retailers, who facilitate vehicle use by providing charging services and electricity. Consequently, the availability, accessibility, and reliability of charging infrastructure shape the everyday mobility practices of EV users. At the same time, users are influenced by policies such as vehicle taxation, subsidies, and regulatory conditions that affect the costs and feasibility of EV ownership and use.

2.6 Conclusion on stakeholders in the institutional environment of EV adoption

This chapter mapped the key stakeholders involved in the institutional environment of EV adoption. The analysis shows that EV adoption takes place within a complex environment that spans different domains and governance levels, with much interdependency between stakeholders. Therefore, the map defines the institutional scope of the research and guides the selection of documents used for data extraction in the INA in Chapter 4. Before we dive into the method steps of this research, Chapter 3 introduces the theoretical framework underlying the INA.

3 Theoretical background of the Institutional Network Analysis

We apply the Institutional Network Analysis (INA) to answer the research questions of this thesis. The INA is a framework that combines concepts from different institutional theories and methods to examine how rules and behaviour structure interaction between individuals and organisations. This makes the INA suited to analyse complex policy domains such as EV adoption, where various actors operate within an extensive and evolving institutional environment.

This chapter introduces the theoretical foundations of the INA. Section 3.1 elaborates on the concept of institutions and distinguishes between formal and informal institutions and between institutions-in-form and institutions-in-use. Section 3.2 introduces institutional statements and the Grammar of Institutions which forms the theoretical basis for the INA. Then, section 3.3 discusses the concept of action situations, drawing on the Institutional Analysis and Development framework, and explains how action situations serve as the basis for constructing institutional network diagrams in the INA. Lastly, section 3.4 synthesises this chapter's insights and establishes the link to the methodology presented in Chapter 4.

3.1 Introducing institutions

As said before, the INA provides a framework to examine institutions governing EV adoption. But what *are* institutions exactly? Defined by Ostrom (2005, p. 20), "**institutions** are the prescriptions that humans use to organize all forms of repetitive and structured interactions". In this way, institutions can be viewed as the rules that shape how actors interact, make decisions, and allocate resources (North, 1991; Crawford & Ostrom, 1995). The choices individuals make during this process, have consequences for themselves and for others (Arjomandi et al., 2025; Ostrom, 2005).

We can distinct between formal and informal institutions. **Formal institutions** include law, policies, and standards, whereas **informal institutions** encompass norms, routines, and shared understandings (Käsbohrer et al., 2024; North, 1990; Ostrom, 2005). In the context of EV adoption, for example, a formal institution could be a tax regulation that provides a financial incentive for purchasing an EV rather than a fossil-fuelled one. An informal institution, by contrast, may be the social norm that driving an EV is more environmentally responsible, which influences consumer behaviour without being defined in any official document. In short, the financial incentive is explicitly written and enforceable, while the consumer perception is unwritten and socially embedded.

Another way of differentiating between institutions is the distinction between **institutions-in-form** and **institutions-in-use**. Institutions-in-form refer to formally written rules, whereas institutions-in-use describe how actors interpret and apply these rules in practice (Ghorbani, 2024; Ostrom, 2005). The effectiveness of policies can be explained by the degree to which institutions-in-form align with institutions-in-use, which should be understood as a spectrum (Cole, 2017). The closer they are aligned, the more effectively the institution in question works. Several applications of the INA examine discrepancies between these two concepts (Ghorbani, 2024; Pastor, 2024). Ghorbani (2024) distinguishes two types of institutional discrepancies: misalignments and voids. Misalignments occur when institutions-in-form do not correspond with the institutions-in-use, resulting in inconsistent or even contradictory rules and practices. Voids arise when no institution-in-form exists for a given action, causing practices to be shaped primarily by institutions-in-use in the absence of formal guidance.

3.2 Institutional statements and the Grammar of Institutions

Institutional statement and institutions are often used interchangeably in literature, but they are two distinct concepts. **Institutional statements**[2] are a way of expressing institutions, which "encompass a broad set of shared linguistic constraints and opportunities that prescribe, permit, or advise actions or outcomes for individuals […]" (Ostrom, 2005, p. 137-138). Institutional statements are governed by an underlying grammatical structure: the **Grammar of Institutions** (Crawford & Ostrom, 1995; McGinnis, 2011). Institutional Grammar (IG) provides a syntax to identify generalizable components of institutional statements (Crawford & Ostrom, 1995; Frantz & Siddiki, 2021). Because of this, each component conveys a specific type of information.

The syntax is valuable because it enables any institutional statement, regardless of how it appears in natural language, to be translated into these core components. This standardisation facilitates comparison, analysis, and synthesis across different statements, which is particularly advantageous when examining complex policy contexts (Basurto et al., 2010; Crawford & Ostrom, 1995).

This is exactly the reason why the INA builds directly on the IG: it allows the deconstruction of institutional statements which can then be represented as part of a network. The INA incorporates the latest version of IG, which is called the **Institutional Grammar 2.0** (IG 2.0) introduced by Frantz & Siddiki (2021) (Ghorbani et al., 2024). The syntax consists of different components explained in Table 1. To qualify as an institutional statement, they should at least include an Attribute, Aim and Context. The other components are not necessary (Ghorbani et al., 2024).

Table 1: Overview of the IG 2.0 syntax (Frantz & Siddiki, 2021)

Component		Definition (IG 2.0)
Attribute	A	The actor (individual or organisation) to whom the institutional statement is directed. Attributes can include identifiers (e.g., "driver") and descriptive properties (e.g., "EV driver").
Object	B	The receiver of the action described in the Aim, performed by the Attribute. Objects can be both animate (e.g., a person or group) or inanimate (e.g., an item). They can be coded as a **direct object**, which is the immediate target of the aim, or an **indirect object**, which is the entity affected by the interaction of the direct object and the aim. Each can include identifiers and descriptive properties.
Deontic	D	The prescriptive or permissive operator that indicates to what extend the actor is obligated, prohibited, or allowed to carry out the Aim. For instance, "must" typically signals a binding rule, while "should" may indicate either a rule or a norm.
Aim	I	The action of the institutional statement.

[2] In the remainder of this thesis, the term "statement" refers to an institutional statement. The two terms are used interchangeably for readability.

Context	C	The circumstances under which the statement occurs, for which two types are distinguished. **Activation Conditions** describe conditions under which a statement is instantiated. **Execution Constraints** capture behavioural specifications of an enacted institutional statement within a situation, thus how the action must be carried out once activated.
Or else	O	Denotes the sanction that is applied if the statement is not complied with.

3.3 The Institutional Analysis and Development framework proposing action situations

The INA is grounded in the **Institutional Analysis and Development (IAD) framework** (Ghorbani et al., 2024). The IAD framework was conceived mid 1980s by Elinor Ostrom but continually refined since then (1990, 2005) and has been widely adopted by scholars in the field (Cole, 2019). The framework provides a systematic way to analyse institutions and understand how they develop and influence human behaviour in complex settings (Milchram et al., 2019; Pastor, 2024).

The IAD framework introduces the concept of **action situation**, defined as "the social space where participants […] interact, exchange goods and services, solve problems, dominate one another, or fight" (Ostrom, 2005, p. 14). These situations often entail competing interests of participants and constrained resources, which can give room to various challenges (Cole, 2019). Action situations are particularly useful as they are an abstraction of the real environment which allows researchers to divide complex systems into smaller units of analysis (Ostrom, 2005; Milchram et al., 2019). Through this, it is possible to zoom in on specific events happening within a policy domain

The INA builds on this by clustering and linking institutional statements within and across action situations. We visualise this through **Institutional Network Diagrams** (INDs) (Ghorbani et al., 2024; Mesdaghi et al., 2021).

3.4 Conclusion on theoretical background of the INA

This chapter outlined the theoretical foundation of the INA. This research applies the INA by identifying institutions-in-form and in-use governing EV adoption. In addition, we extend the scope of the traditional INA by incorporating policy intent as an additional type of institution, referring to the objectives that policymakers aim to achieve when creating institutions-in-form. Through the inclusion of the policy intent, we can systematically compare intended goals, formal rules, and observed actions. The next chapter elaborates on the methodological implications of this extension.

We translate the institutions-in-form, institutions-in-use and policy intents into institutional statements using the IG 2.0 syntax and cluster them in action situations. Subsequently, we visualise the action situations through INDs, which show how the statements are connected. Ultimately, we can identify patterns and discrepancies within the institutions governing EV adoption in the Netherlands.

Chapter 4 translates the theoretical framework outlined in this chapter into a concrete method steps, detailing data sources, coding procedures, and tools adopted in this thesis.

4 Methodology

Building on the theoretical foundation of the INA presented in Chapter 3, this chapter operationalises the research approach by detailing step by step how the study is conducted to meet the research objective. Section 4.1 outlines the six method steps of this research, including the methodological contribution of this thesis to the INA (section 4.1.3). Section 4.2 presents the collected documents and the dataset we constructed by conducting the first four method steps.

4.1 Steps of the method

Figure 2 shows the six method steps of this research. The steps are based on the work by Ghorbani et al. (2024) but adjusted to fit the objective of this research. Although Figure 2 may suggest a linear sequence of steps, the process is in practice very iterative. Developments or findings in later stages of the research required us to revisit earlier steps and refine assumptions or interpretations.

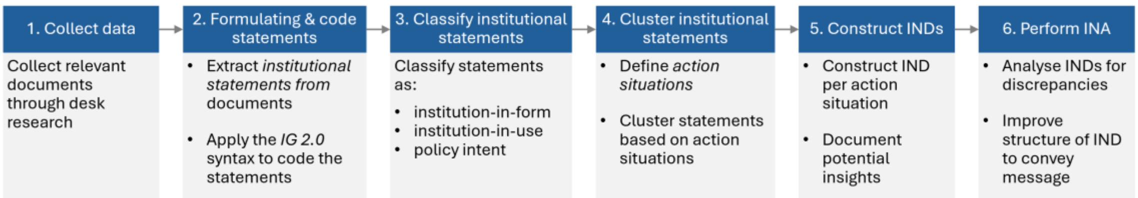

Figure 2: Steps of the INA in this research

After conducting the INA in step 6, we formulate policy recommendations aimed at mitigating the identified discrepancies. The remainder of this section follows the methodological steps of the research. Each step is presented in a separate subsection.

4.1.1 Step 1: Collect the data

The goal of the data collection phase is to create an exhaustive set of documents that allows us to identify and analyse all relevant institutions governing EV adoption. Therefore, we discuss the type of data we used (section 4.1.1.1) and how we selected the data sources (4.1.1.2).

4.1.1.1 Focus on written sources

Previous applications of the INA have drawn on a combination of desk research and interviews to find both written and unwritten institutions. This thesis limits the data collection to written sources only, which is motivated by two considerations:

1. The institutional environment governing EV adoption in the Netherlands is extensively documented. Relevant institutions can be found across a wide range of written sources, including legal texts, policy documents, and research reports. These sources provide sufficient depth to identify institutional statements without relying on additional primary data collection.
2. The extraction of institutional statements from interviews introduces a high degree of interpretive uncertainty. While qualitative research always involves some level of interpretation, interviews require an additional layer of reasoning (Basurto et al., 2010; Noppers et al., 2019; Willig, 2017). Given the limited timeframe of this thesis and the restricted number of interviews that could realistically be conducted, relying on interviews would increase the risk of selective

representation and researcher bias, while offering limited value compared to the existing documentation.

4.1.1.2 Selecting data sources

The research relies on three types of documents that we collect through desk research:

1. **Legal documents**, representing codified law.
2. **Policy documents**, showing how the law is interpreted and implemented.
3. **Research reports**, including behavioural studies on EV users as well as studies that assess the effects and performance of implemented law and policies.

The identification of the legal and policy documents was guided by the stakeholder map presented in Chapter 2 (Figure 1, p.18). To scope the data collection, we refined the map in two ways, as presented in Figure 3. First, we include only policymakers at the EU and national level as the research objective focuses on EV adoption across the Netherlands. Second, we include only regulating and enabling relationships. This aligns with the objective of this study, which focuses on identifying the institutional barriers embedded in the regulatory and policy framework governing EV adoption. All arrows therefore originate from policymakers and are directed toward other actor groups, representing situations in which policymakers define rules or incentives that shape the behaviour of actors. Accordingly, advisory and facilitating relationships were excluded.

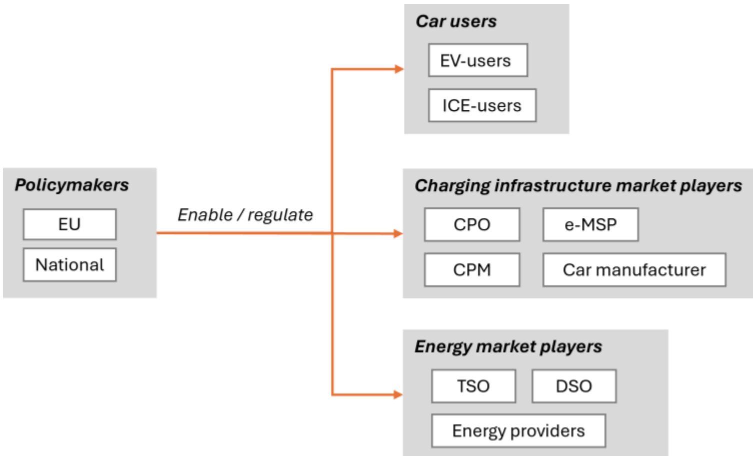

Figure 3: Stakeholder map narrowed down for data collection

To find legal documents, we used the *Wettenbank* on Overheid.nl, which is an accessible database of Dutch written law. Searches were conducted based on the actors identified in the stakeholder map, combined with EV-related keywords. The identification of policy documents and research reports required a broader search strategy. This included targeted searches on government websites, reference tracing in legal documents, and broader searches of publicly available sources. The completeness of the resulting set of sources was validated by an expert at TNO.

Initially, European documents were considered out of scope as this research focuses on EV adoption in the Dutch context. However, during later steps we observed that policy documents and research reports repeatedly referred to EU regulations that were not included in our original set of legal documents. This is because EU regulations apply directly in all member states and therefore do not require to be transposed into national law. As a result, they were not identified through the initial search in the national legal database. Given the importance of those institutions and to ensure completeness of the dataset, these EU regulations were subsequently identified and included.

4.1.2 Step 2: Formulating and coding institutional statements

After collecting the relevant documents, the next step is to systematically extract and code institutional statements to construct the dataset. In step 5 of the research, we use this dataset to build the network diagrams, from which we identify institutional discrepancies. This section describes how we extracted and formulated institutional statements (section 4.1.2.1) and how we applied the coding syntax (section 4.1.2.2).

4.1.2.1 Approach to extracting and formulating institutional statements

The approach to extracting and formulating institutional statements is visualised in Figure 4. First, we (A) scan the documents for relevant sections on EV adoption. Then we (B) identify institutions by extracting units of observation and label relevant information. Lastly, we (C) formulate and code each statement simultaneously using the IG 2.0. As Figure 4 shows, the procedure is informed by the first three steps of the guidelines proposed by Basurto et al. (2009), which provide a structured approach for extracting institutions from written sources.

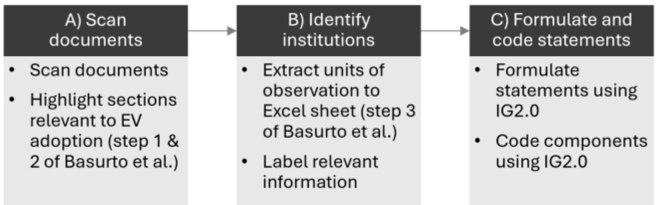

Figure 4: Approach to identifying and coding institutional statements

Previous research applying the INA often separates the formulation of statements from their coding with the IG syntax (e.g., Pastor, 2024). In this research, however, we carried out these activities simultaneously. This is because formulating well-defined institutional statements requires an understanding of how they will be coded in the subsequent step, and this understanding only develops through applying the IG in practise. This revised approach ensured that statements were formulated in a way that allowed consistent coding with the IG.

4.1.2.2 IG 2.0 Core syntax for formulating and coding institutional statements

For coding the statements, we apply the syntax of the Institutional Grammar 2.0 developed by Frantz & Siddiki (2021). In this study, we apply IG Core as opposed to IG *Extended* and IG *Logico*. This is because it provides sufficient power to identify and relate institutional statements relevant to EV adoption. This avoids the additional coding granularity and logical formalisation of IG Extended and IG Logico that are not required for the research objective.

The IG 2.0 Core distinguishes between two types of statement origins, each using a different syntax: constitutive and regulative. *Constitutive statements* consist of assigning or endowing entities with positions, attributes, or other 'institutional' properties, whereas *regulative statements* typically concern the regulation of behaviour and actions. This research only considers regulative statements. The list below is a comprehensive overview of the eight components of the regulative IG 2.0 Core syntax. It is based on Frantz & Siddiki (2021, 2024) as presented in Chapter 3.2 (Table 1, p. 25).

- Attribute [A]: the actor responsible for a given statement. They carry out the institution, or they are the one to whom the institution applies.
- Direct Object [Bdir]: the receiver of the institution.
- Indirect Object [Bind]: the thing affected by the application of the aim to direct objects

- Deontic [D]: it expresses obligation, permission, or prohibition.
- Aim [I]: the action of the statement.
- Activation Condition [Cac]: describes conditions under which a statement is activated.
- Execution Constraint [Cex]: captures behavioural specifications of an enacted institutional statement within a situation.
- Or else [O]: sanction that is applied if the institution is not followed.

We code the statements in *Microsoft Excel*. Each row in the dataset represents one institutional statement, to which we assign a unique ID and include the source document to ensure traceability. The IG 2.0 components are included as separate columns, allowing us to systematically decompose each statement according to the syntax. Through this format, we can compare statements, filter them, and include further classification in subsequent steps of the analysis.

4.1.3 Step 3: Classify institutional statement

After compiling the dataset of coded institutional statements in Excel, the next step is to classify each statement by type. In this research, three categories are distinguished: institutions-in-form, institutions-in-use, and policy intent. The introduction of the policy intent as a third category constitutes a methodological extension of the INA as it has not been applied before. First, section 4.1.3.1 justifies the inclusion of policy intent as a distinct statement type. Then, section 4.1.3.2 explains what criteria we used to differentiate between statement types in the dataset.

4.1.3.1 Extending the INA with the policy intent

Applications of the INA generally distinguish between institutions-in-form and institutions-in-use. This distinction is particularly useful when the research objective is to assess whether formally established rules are implemented or followed in practice. The comparison then reveals discrepancies between what is prescribed and what actors actually do. This approach, however, presupposes that the formal rules themselves adequately reflect the objectives they are meant to realise. In other words, it assumes that institutions-in-form are coherent translations of the policy goals that motivated their creation in the first place. In the context of EV adoption, this assumption cannot be taken for granted.

This is because EV policy is characterised by multiple, and sometimes competing, objectives. Goals related to climate mitigation, fiscal stability, affordability of mobility, grid reliability, and social equity may coexist within the same policy agenda. As a result, institutions-in-form may embed trade-offs or ambiguities that are not immediately visible when only comparing rules with institutions-in-use. Moreover, it is possible that policy goals are explicitly articulated in strategic documents but not translated into binding rules. In such cases, discrepancies exist between stated ambitions and formalised institutions, even if implementation is consistent with the written rules.

If this analysis were limited to institutions-in-form and institutions-in-use, these types of discrepancies would remain invisible, increasing the risk that policy goals are not achieved. Therefore, this research introduces **policy intent** as a third statement type to capture discrepancies between articulated goals, formal rules and observed outcomes, thereby broadening the scope of barriers to EV adoption.

4.1.3.2 Distinguishing between institutions-in-form, institutions-in-use, and policy intent

Table 2 shows an overview of the three types of statements and in what documents they can be found. The classification of the statement types is included in the Excel dataset as a separate column.

Table 2: Three statement types and where to find them

Statement type	What does it express?	Where to find?
Institutions-in-form	Derived from formal rule or law	Legal documents
Institutions-in-use	Derived from implementation of policy or from behaviour or perception	Policy documents & Research reports
Policy intent	Intention of institution-in-form or in-use conducted by policymaker	Policy and legal documents

Institutions-in-form refer to formal rules and regulations codified in legal documents. **Institutions-in-use** reflect how these rules are implemented through policy and interacted with. In this research, they capture the observable actions and choices of policymakers and EV drivers. For example, how policymakers operationalise institutions-in-form or how EV drivers respond to financial incentives. Therefore, we find the institutions-in-use in policy documents and research reports.

Policy intent statements articulate the underlying objectives policymakers pursue when creating institutions-in-form. In addition, policy intent may articulate the rationale underlying an institutions-in-use, but only when undertaking by a policymaker. As a result, the policy intent expresses what a policymaker aims to achieve through a rule or policy. Therefore, they do not capture the motivations of market actors or consumers when they undertake institutions-in-use. Policy intent statements are typically formulated in goal-oriented language, using verbs such as *aim to, strive for,* or *want to*, but it is also important to look at the context of the statement. While they are most commonly found in policy documents, they may also appear in legal texts if this includes an explicitly stated objective.

4.1.4 Step 4: Defining action situation to cluster the statements

After compiling and classifying institutional statements in Excel, the next step is to cluster them into action situations. In earlier INA studies, action situations are defined prior to the analysis. In this research, however, we derive the action situations from the data. This choice is made for two reasons. First, EV adoption does not follow a single, clearly delineated process. Second, no existing theoretical framework sufficiently captures the variety of institutional contexts involved in EV adoption.

We derive the action situations through a combination of qualitative and descriptive techniques. We use mind maps to explore recurring themes across statements, and we subdivided the maps when they became too complex. In parallel, we apply descriptive statistics using pivot tables in Excel to identify dominant topics within the dataset. Based on this process, we define action situations as clusters of institutional statements. Each statement is subsequently assigned to one of the action situations using an additional column in the Excel sheet.

4.1.5 Step 5: Construct institutional network diagrams

In this step, we construct INDs for selected action situations. Not all action situations are visualised through an IND; we focus only on those that are most relevant for identifying discrepancies. Also, an IND does not necessarily include all statements from an action situation. Instead, it includes the statements that are most important for understanding the identified discrepancy in that context.

Each IND can vary in scope and complexity, depending on the number of included statements and the connections between them. This section explains the visual conventions used for constructing INDs. Section 4.1.5.1 presents the format used to represent statements in the network diagram. Section 4.1.5.2 presents the two connection types used to link institutional statements to form a network. The diagrams are constructed using the online tool Draw.io.

4.1.5.1 Component-level diagram of statements

Network diagrams can be represented in two ways (Ghorbani et al., 2024). **Statement-level diagrams** provide a high-level overview by representing each institutional statement as a single node. **Component-level diagrams** offer more detailed insights by representing syntactic components as nodes and links within the network. In this research, we construct component-level diagrams as they provide deeper insight into the content of the institutional statements. To construct the diagrams, we follow the network format proposed by Ghorbani et al. (2024). Figure 5 presents the component-level diagrams of an institution-in-form (white), institution-in-use (orange) and policy intent (blue).

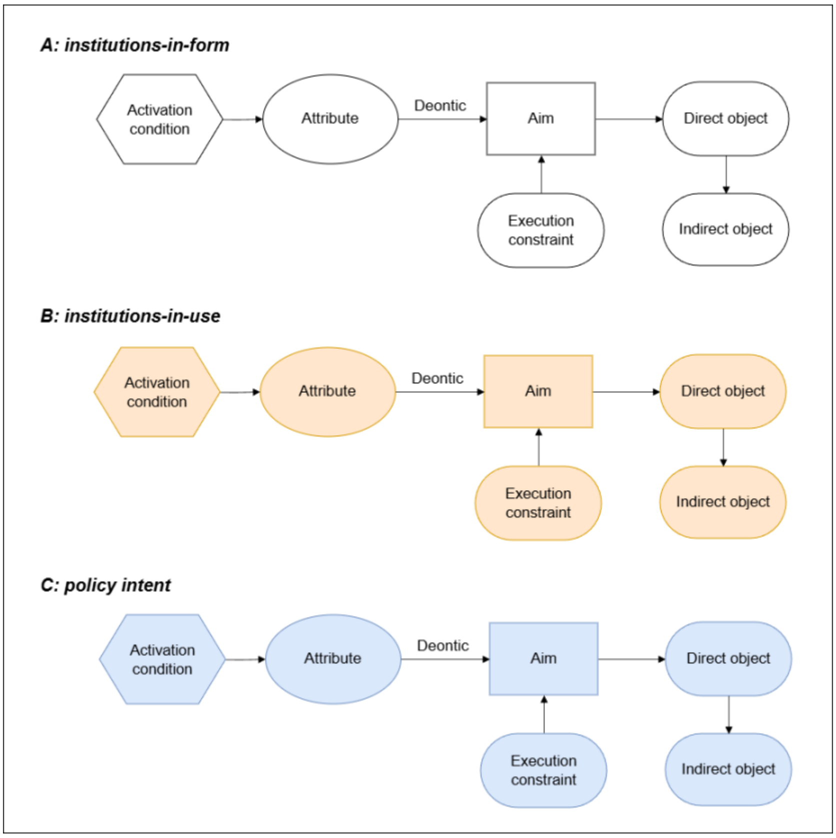

Figure 5: Colour-coded institutional statements represented in component-level format

In Figure 5, all syntactic components are included as nodes except for the deontic. The institutional statement is initiated by the activation condition, which specifies the circumstances under which the statement becomes applicable and connects to the attribute who is responsible for undertaking the aim of the institution. The attribute is linked to the aim through a connection representing the deontic, as the deontic qualifies the extent to which the attribute is obligated, permitted, or prohibited to perform the aim. The aim connects to the direct object, which is the immediate receiver of the interaction between the attribute and the aim. The direct object is subsequently linked to the indirect object, reflecting that the indirect object is affected by the combination of the aim and the direct object. Finally, the execution constraint is linked to the aim because it specifies how the action must be carried out once the statement is activated.

Representing the aim as a node holds the advantage to capture institutional linkages better as the network can then reflect the actions that take place sequentially. This is relevant for this study as EV adoption does not follow a defined process, and we are trying to understand how it works.

4.1.5.2 Connections between statements to form network

Three ways exist to connect institutional statements to form a network: actor-driven, outcome-driven, and sanction-driven connections (Ghorbani et al., 2024). In this research, only the first two types appear and are therefore discussed. Figure 6 illustrates the possible connections at the component level. For each connection type, the conditions under which a connection is drawn are explained.

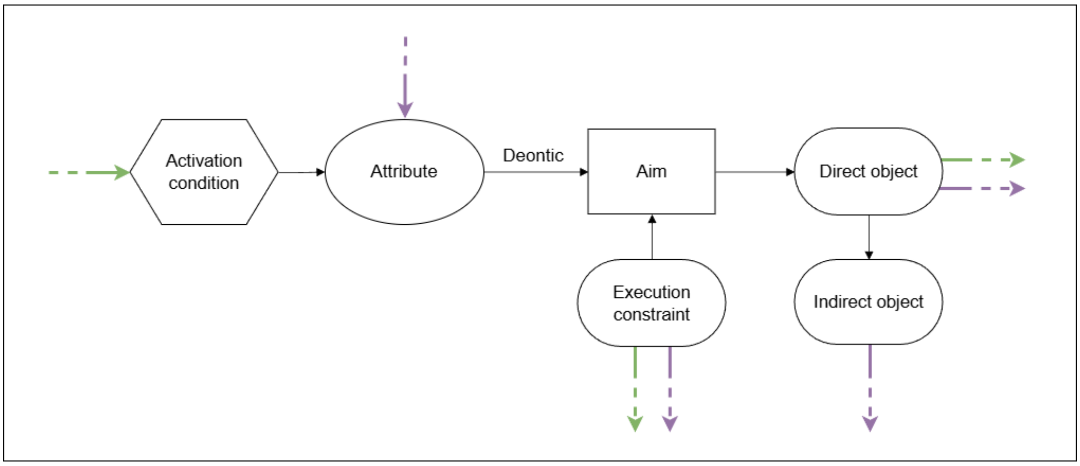

Figure 6: Potential origins and destinations of actor-driven (purple) and outcome-driven (green) connections

Actor-driven connections link the animate direct or indirect object of one institutional statement to the attribute of a subsequent statement. In such cases, an actor that is affected by the aim of the first statement becomes the actor that carries out the aim of the subsequent statement. This connection can be identified when the activation condition of the second statement refers to the first statement, either by including the attribute and aim of the first statement, or by including the properties of the objects together with the same aim.

Outcome-driven connections essentially say that the implementation of the first statement produces a specific outcome that alters the context, thereby triggering a subsequent statement. Such connections originate either from the inanimate direct object or from the execution constraint of the first statement, as illustrated in Figure 6. These are then linked to the activation condition of the second statement if this condition includes the indirect direct object and the aim of the first statement, or if it includes the execution constraint and the aim of the first statement.

Figure 7 shows an example of both connection types.

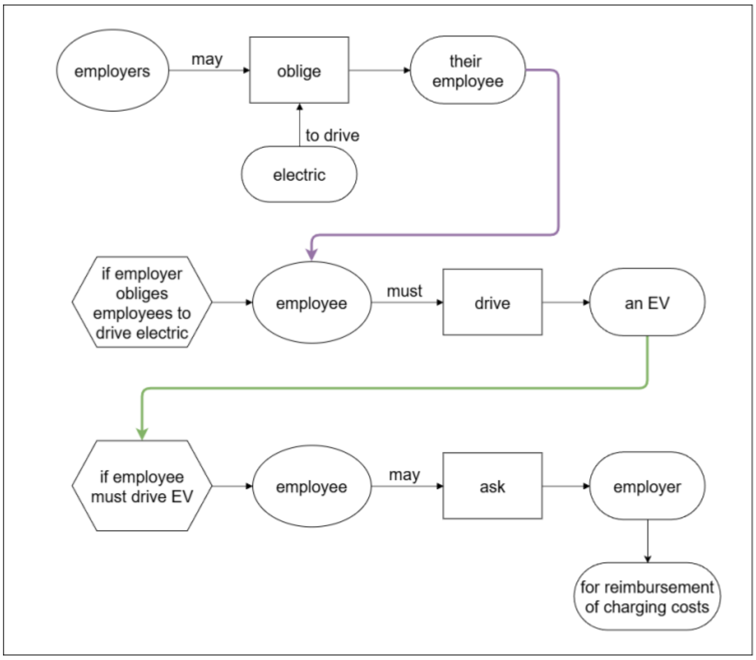

Figure 7: Example of actor-driven (purple) and outcome-driven (green) connection

4.1.6 Step 6: Analyse network diagrams

In the final step, we analyse the constructed INDs to identify institutional discrepancies. This involves interpreting the structure of the networks and examining how institutional statements relate to one another within and across action situations. We explain what approach we used to identify discrepancies (section 4.1.6.1) and how we make these discrepancies transparent to the reader through restructuring of the diagrams (section 4.1.6.2).

4.1.6.1 Identify patterns to find discrepancies

Unlike the previous steps, this phase is more interpretive and does not follow a structured procedure. Therefore, the analysis is guided by the research objective. Given that this research aims to uncover discrepancies within the institutions governing EV adoption, the analysis focuses on identifying inconsistencies, gaps, and misalignments in the patterns formed by institutional statements.

As a starting point, we structure the analysis around the three statement types: institutions-in-form, institutions-in-use, and policy intent. First, for each action situation, we examine whether statements of the same type are internally coherent and consistent with one another. Second, we compare the different statement types within the same action situation to assess whether formal rules align with stated policy goals and with observed practices.

4.1.6.2 Visual structuring of the IND to communicate discrepancies

Identifying institutional discrepancies requires qualitative interpretation. Therefore, it is essential to make transparent how we derive discrepancies from the IND. This is particularly important when an IND contains many statements and connections, which can make it difficult to follow the descriptive text alongside the diagram. Explicit guidance in the diagram clarifies how we identify patterns and compare statements, making it clear how a discrepancy is found. Therefore, the INDs, in addition to the statements and connections, include two types of rectangles, presented in Figure 8.

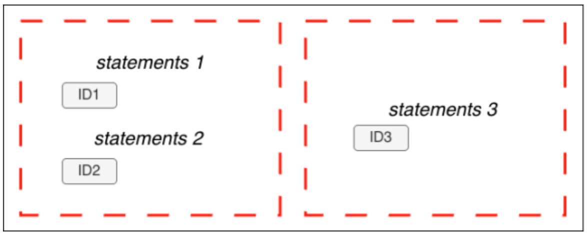

Figure 8: Overview of the rectangles used in diagrams to communicate insights

To start, we use **small grey rectangles** to indicate the statement IDs, allowing each statement to be traced back to the dataset. Second, we use a **black rectangle** to cluster relevant statements from one action situation that together show a specific insight. These clusters include only the statements needed to derive that insight and thus do not necessarily include all statements belonging to an action situation. Third, we use a **dashed red rectangle** to group statements within the black rectangle to show what parts of the network we compare with each other. From this comparison, discrepancies arise. For the black and the red rectangles, statements do not all need to be connected with each other. Also, connections may exist between statements in different dashed red rectangles.

4.2 Data construction and analysis in preparation for the INA

This section operationalises steps 1 to 4 of the methodology outlined in section 4.1 (Figure 2, p.27). Section 4.2.1 presents the collected documents from which we extracted institutional statements. Section 4.2.2 describes the standardized terminology we used to formulate institutional statements in a consistent manner. Section 4.2.3 presents and discusses the resulting dataset of statements. Section 4.2.4 provides a descriptive analysis of the dataset, which informed the identification of action situations. An overview of these action situations is presented in section 4.2.5.

4.2.1 Documents collected in this research

Following the data collection guidelines outlined in section 4.1.1, we selected five legal documents, one policy document, and two research reports. Table 3 provides an overview of the collected documents, their content and the acronym we use to address them in the dataset. Together, the set of documents gives a complete overview of the institutions governing EV adoption.

All legal documents are subject to change over time. Therefore, Table 7 in Appendix A specifies the legal versions consulted and indicates whether legislative amendments are announced. The citing of the policy documents and research reports is included in the References.

In the remainder of this thesis, we will refer to the documents using the acronym in Table 3.

Table 3: Overview of collected documents

Acronym	Document	Content of document	Document type
KW	*Klimaatwet*	Translates EU climate targets and reduction goals to Dutch law	Legal (NL)
BPM	*Wet op de belasting van personenauto's en motorrijwielen 1992*	Formalises taxation for buying vehicle	Legal (NL)
MRB	*Wet op de motorrijtuigenbelasting 1994*	Formalises recurring taxation of vehicle ownership	Legal (NL)

WA	*Wet op de accijns*	Formalises excise duties on motor fuels	Legal (NL)
AFIR	*Alternative Fuel Infrastructure Regulation (Regulation (EU) 2023/1804)*	Formalises deployment and interoperability of public charging infrastructure	Legal (EU)
KP	*Klimaatplan 2025 – 2035*	Describes Dutch climate policy for the upcoming 10 years per sector	Policy
KEV	*Klimaat- en Energieverkenning 2025*	Evaluates implemented climate policy	Research report
NLO	*Nationaal Laadonderzoek 2025*	Survey on charging behaviour of EV drivers	Research report

The five legal documents are selected as they constitute the core regulatory framework governing EV adoption in the Netherlands. The **KW** establishes the overarching legal framework for Dutch climate policy and sets binding climate targets that guide subsequent policy development. The laws on **BPM** and **MRB** define taxation schemes for car registration and ownership, specifying how tax is calculated and applicable exemptions. The **WA** is included to compare between fossil fuel taxation and the tax on EVs. Finally, the **AFIR** gives EU-wide standards on public charging infrastructure rollout, including requirements related to payment options.

One policy document is included: the **KP**, which sets out national climate policy and proposes measures toward climate neutrality for the period between 2025 and 2035. It is selected as it is mandated by the KW and translates the law into policy measures.

Two research reports are selected: the KEV and the NLO. The **KEV**, published annually by the PBL, evaluates climate policy per sector, including mobility, and monitors developments in greenhouse gas emissions and the energy system. As it assesses the implementation and expected effects of existing policies, it provides insight into how mobility policy is translated into practice. The **NLO** was included to capture recurring charging behaviour and preferences among Dutch EV drivers, thereby providing insight into how institutions are used in practice.

4.2.2 Standardising terminology across statements

Across the collected documents, the same actors and objects are often referred to using different terms. Therefore, we standardised the terminology during the extraction and formulation of the institutional statements. By doing this, the construction and analysis INDs becomes easier. We standardised terminology in statements in two ways:

1. Terms with the same meaning were grouped under a single name. For example, “EV owner” and “someone who owns an electric vehicle” refer to the same actor.
2. Terms were grouped under broader categories when further distinction did not add analytical value. For example, no distinction was made between ministries and their executive agencies as the analysis focused on ministries as the decision-making actors. This limited complexity of the institutional landscape without losing meaning.

Appendix B provides an overview of all standardised terms, distinguishing between people and organisations (Table 10) and inanimate terms (Table 11).

4.2.3 Extracted statements in the dataset

Table 12 in Appendix C presents the complete list of statements included in the dataset. To give insight in the origin of statements, Table 4 provides an overview of the number of institutions-in-form, institutions-in-use and policy intents identified per document.

Table 4: Distribution of institution types across document

Document		Institutional statements			
Name	*Type*	*in-form*	*in-use*	*intent*	**Total**
KW	Legal	14	None	4	18
BPM	Legal	9	None	None	9
MRB	Legal	8	None	None	8
WA	Legal	6	None	None	6
AFIR	Legal	13	None	1	14
KP	Policy	None	51	37	88
KEV	Research	None	17	None	17
NLO	Research	None	51	None	51
Total		50	119	42	211

What stands out from Table 4, is that institutions-in-use occur two to three times more frequently than institutions-in-form or policy intents. This is noteworthy because five legal documents were analysed, compared to only one policy document and two behavioural research reports.

This distribution can largely be explained by the scope and content of the documents. The legal documents are concisely written and often contain only a limited information directly related to EV adoption. In contrast, the KP, for example, dedicates substantial attention to the electrification of mobility, resulting in more institutional statements. Similarly, the research reports contain extensive information on EV policy and charging behaviour, which explains the relatively high number of institutions-in-use extracted from these sources.

Moreover, the KW is a highly is a concise framework law, while the substantive implementation of climate policy is primarily articulated through the KP. As a result, many climate-related institutions appear as institutions-in-use rather than as institutions-in-form embedded in legislation. This suggests that climate-related practices are often governed through policy implementation rather than embedded in law.

4.2.4 Descriptive analysis of the dataset

Table 13 in Appendix D shows that the distribution of attributes is highly concentrated. Almost 90% of all attributes are coded as either policymakers or car users, indicating that the institutional dataset is primarily centred around policymaking and user behaviour. Within the policymaker group, the Dutch state accounts for 82% of the attributes, while EV drivers represent 58% of all car users. In contrast, market actors across the energy and charging infrastructure domains together account for just over 4% of the attributes. This concentration implies that the analysis predominantly captures top-down institutional steering and bottom-up user practices. Institutional dynamics involving market actors are relatively underrepresented. Consequently, the INA results are particularly suited for analysing interactions between state and EV user. Therefore, we focus potential misalignments between policy design and experienced outcomes, rather than competitive or coordination dynamics among market actors.

4.2.5 Action situations identified for EV adoption

Through the descriptive analysis and mind mapping, twenty action situations emerged from the data related to EV adoption. **Error! Reference source not found.** presents an overview of the action s ituations as well as the number of statements allocated to a particular action situation. We also indicate whether an IND is constructed for the action situation. The INDs are presented in the Chapter 5.

Table 5: Overview of action situations and number of allocated statements

Action situations	Statements per AS				IND?
	in-form	*in-use*	*intent*	Total	
ad hoc charging	10	1	5	16	Yes
availability of public charging infrastructure	-	-	8	8	-
business travel	-	-	5	5	-
charging card	-	-	7	7	-
charging costs	-	-	4	4	-
charging technologies	-	1	10	11	-
climate agenda: create policy	3	8	7	18	-
climate agenda: implement policy	4	5	5	14	-
climate agenda: reduction goals	1	6	3	10	-
EV production	-	-	3	3	-
expand electricity grid	-	8	4	12	-
fuel costs	6	-	3	9	Yes
home charging	-	-	18	18	Yes (appendix)
mobility agenda	-	8	9	17	Yes
monitoring climate agenda	6	-	3	9	-
owning a car (MRB)	8	-	2	10	Yes
participation in energy transition	-	3	15	18	-
price transparency for public charging	3	-	2	5	Yes
registering a car (BPM)	9	-	-	9	-
use electricity grid	-	2	6	8	-

INDs were constructed only for action situations that are most relevant to EV adoption. Also, an IND was only created when an action situation contained a sufficient number and diversity of institutional statements to enable comparison between institutions-in-form, institutions-in-use, and policy intent. In addition, priority was given to action situations where preliminary inspection suggested potential tensions or inconsistencies between the institutions.

4.3 Conclusion on methodology

The steps described in section 4.2 prepared the dataset required to conduct the INA by undertaking the first four steps of the method. By collecting the relevant documents, extracting and standardising institutional statements, and clustering them into action situations, the dataset enables the construction of INDs. Chapter 5 conducts the remaining two method steps: it presents the INDs that visualise the relationships between institutions-in-form, institutions-in-use and policy intent within action situations, and it describes the identified discrepancies.

5 Results

This chapter presents the results of the Institutional Network Analysis. We present the INDs constructed for the selected action situations, as outlined in section 4.2.5. Figure 9 reproduces the visual conventions used in the INDs. It is included as a reference to support understanding of the diagrams in this chapter.

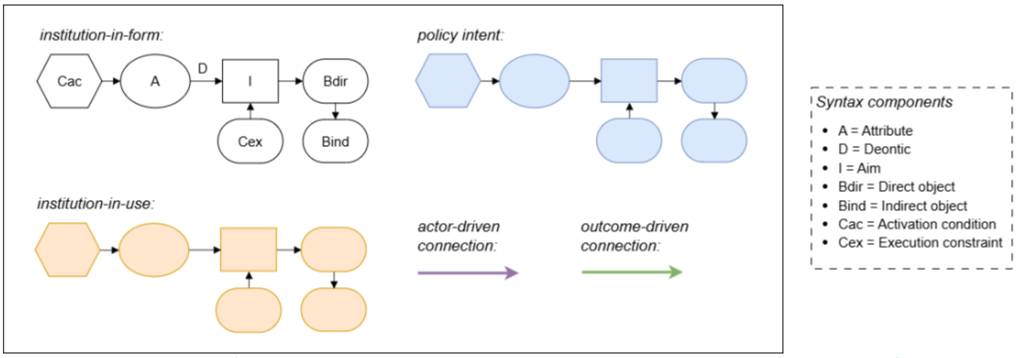

Figure 9: Recap of statement components and types, and connections, as discussed in Chapter 4

The results are organised around two central themes: EV charging costs (section 5.1) and car taxation (section 5.2). For each network diagram, we explain the structure of the network diagram and whether a discrepancy is identified. When a discrepancy emerges, we specify whether it concerns a misalignment or a void and explain how it follows from the configuration of institutional statements.

5.1 Results on charging costs

This section presents the results related to EV charging costs. Specifically, we have found results on ad hoc charging (section 5.1.1) and price transparency when using public charging (section 5.1.2).

5.1.1 Action situation: Ad hoc charging

Figure 10 presents the network diagram that captures ad hoc charging as an action situation. *Ad hoc charging* refers to a payment method that allows EV drivers to pay directly at the public charging point with a debit card, contactless payment, or a QR code. In this way, EV drivers do not require a contract or subscription with an e-MSP

The diagram includes institutions-in-form from EU law that specify obligations to market players regarding the facilitation of ad hoc charging. Institutions-in-use capture EV charging behaviour, while the policy intent captures the intended effect of ad hoc charging for EV drivers. From the IND, an institutional void arises.

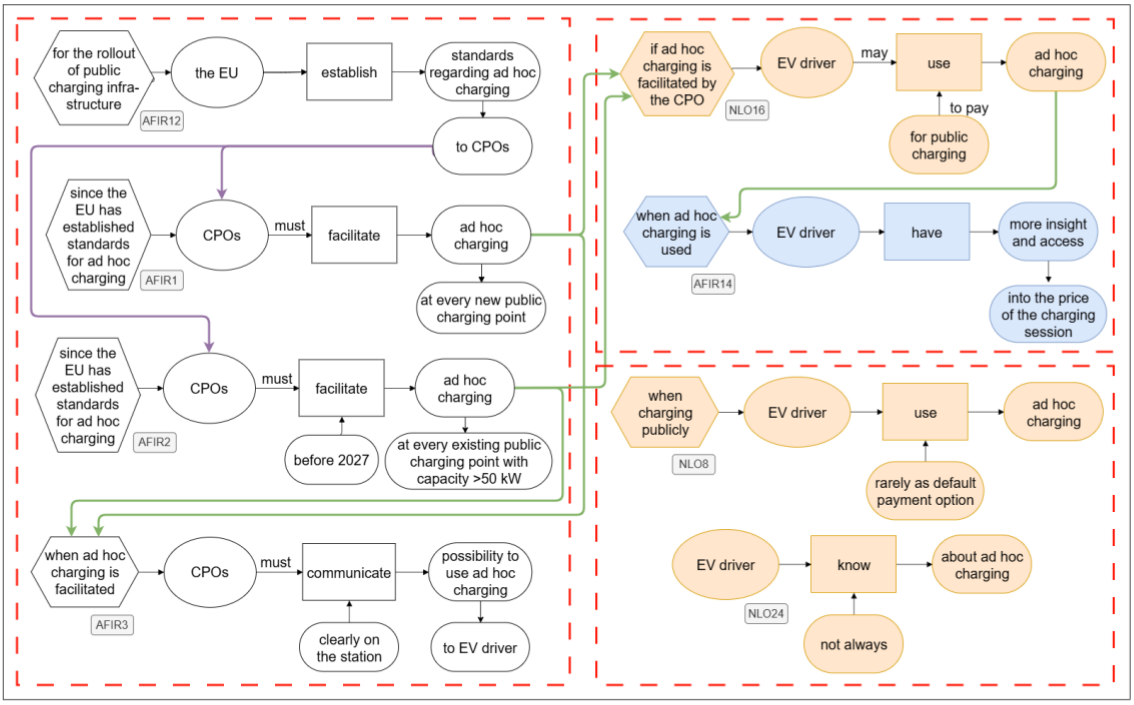

Figure 10: IND of action situation "Ad hoc charging"

The left part of the diagram contains only institutions-in-form that follow from the AFIR. This part shows how ad hoc charging is formally institutionalised. The network shows that, for the rollout of public charging infrastructure, the EU establishes standards regarding ad hoc charging (AFIR12). These standards are directed at CPOs. As a result, CPOs are subject to a binding obligation to facilitate ad hoc charging at the publicly accessible recharging points operated by them. This obligation applies to all newly installed public charging points (AFIR1) and to existing public charging points with a capacity above 50 kW (AFIR2). For these existing charging points, the implementation must be fulfilled before 2027. In addition, when ad hoc charging is facilitated, CPOs are obligated to communicate the possibility of using ad hoc charging clearly at the charging station to the EV driver before they initiate a charging session (AFIR 3). This obligation links the facilitation of ad hoc charging to providing information to the user.

The top right of the diagram shows how the formalisation of ad hoc charging connects to use. NLO16, an institution-in-use, indicates that when ad hoc charging is facilitated by the CPO, an EV driver may choose to use ad hoc payment for public charging. The decision to use ad hoc charging is therefore left to the EV driver. A subsequent statement shows that, when ad hoc payment is used, the EV driver has more insight into the price of the charging session (AFIR14). This statement is coloured blue to indicate a policy intent, reflecting the intended effect of policymakers when implementing ad hoc charging.

On the bottom right, two unconnected statements indicate that EV drivers rarely use ad hoc charging as default payment option (NLO8) and do not always know about the existence of ad hoc charging (NLO24). The network, however, contains no institution-in-form that assigns responsibility to any actor for addressing this lack of use or awareness. As this absence of rules may limit the uptake of ad hoc charging, we identify this as a void.

5.1.2 Action situation: Price transparency for public charging

Figure 11 presents the IND for the action situation concerning price transparency for public charging. It refers to the extent that EV drivers know the cost of a charging session before they start charging. The network includes institutions-in-form that follow from EU law and define formal obligations for market players on the left side. On the right side, institutions-in-use reflect observed outcomes for EV drivers with respect to price insight on the right. From this IND, an institutional misalignment arises.

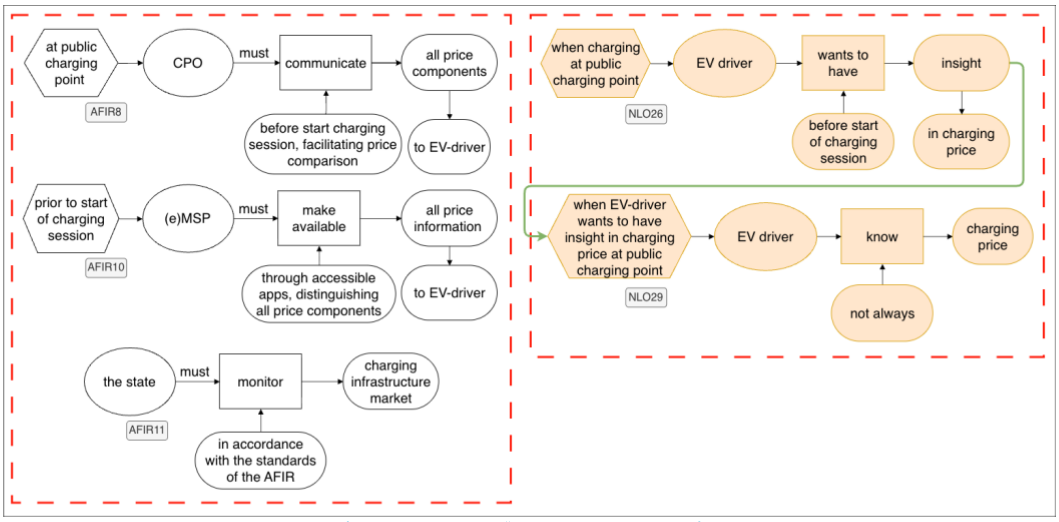

Figure 11: IND of action situation "Price transparency for public charging"

On the left side of the network, the two top institutions-in-form specify obligations for CPOs and e-MSPs regarding the communication of charging prices (AFIR8, AFIR9). Both players are required to communicate all price components before the start of the charging session at public charging stations. The CPO needs to do this on their display by making it easy for the user to compare the different payment options. The e-MSP needs to do this in their app. Through this, the user of the station should be able to make an informed choice about what station and payment method they want to use. Furthermore, we see that the state must monitor this price transparency in the charging infrastructure market (AFIR11). Together, these three institutions form a legal framework to ensure transparent charging prices for EV drivers when using public charging infrastructure.

The right side of the network presents two institutions-in-use. When charging publicly, a substantial share of EV drivers wants to have insight in the charging price before initiating a charging session (NLO26). However, among those EV drivers who want such insight, 15% do not always know the charging price at public charging points (NLO29). This indicates an institutional misalignment between the formal obligations on EU level imposed on CPOs and e-MSPs and the experienced level of price transparency for EV drivers in practice. This discrepancy persists despite the formal obligation of the Dutch state to monitor the charging infrastructure market.

5.2 Results on car taxation

This section presents the results regarding car taxation. In the Netherlands, two key taxes apply to cars: the BPM, paid once upon vehicle registration, and the MRB, a recurring ownership tax. Sections 5.2.1 and 5.2.2 present the INDs showing how these mechanisms are institutionalised. No discrepancies arise from these INDs, but they are included as they inform the IND of the mobility agenda, presented in section 5.2.3.

5.2.1 Action situation: Registering a car (BPM)

Figure 12 presents the IND that institutionalises the BPM through institutions-in-form. No direct discrepancy emerges from this action situation. Instead, the diagram is included to provide insight into mechanism of the BPM tax. This understanding is important as it informs the IND of the mobility agenda (section 5.2.3).

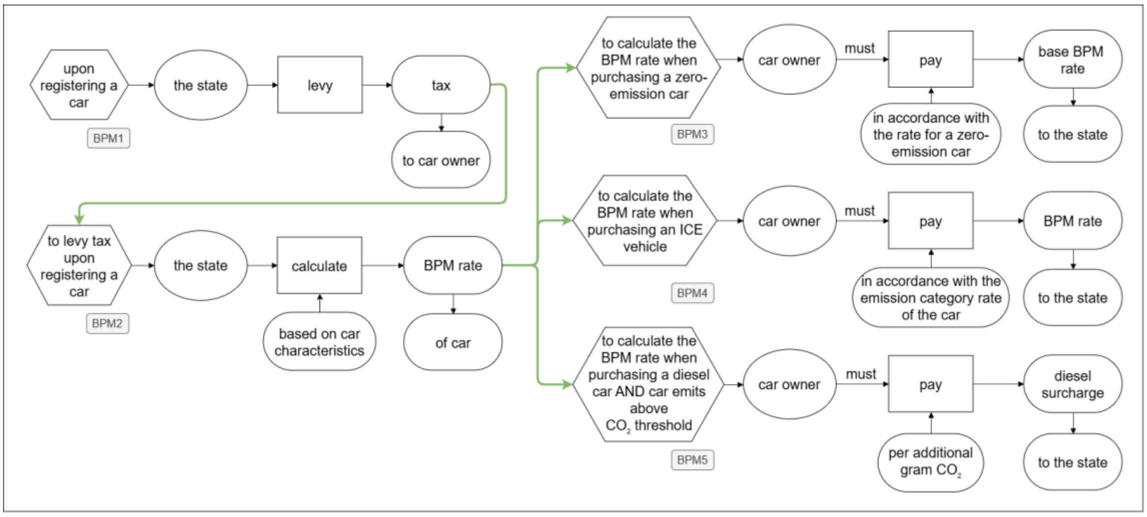

Figure 12: IND of action situation "Registering a car (BPM)"

As the diagram shows, the state levies BPM upon registering a car by a car owner (BPM1). When the tax is levied, the state calculates the BPM rate the car owner has to pay, which depends on characteristics of the car (BPM2). When the car owner has registered a zero-emission vehicle, the BPM rate is calculated according to the base rate for zero-emission vehicles (BPM3). When registering a vehicle with an ICE, the car owner has to pay a BPM rate in accordance with the emission category of the vehicle (BPM4). Higher emission categories apply a higher rate per additional gram, resulting in an accelerating increase of BPM. This means that, for example, hybrid owners pay less BPM than ICE vehicle owners. Lastly, when the car owner registers a diesel car with higher CO_2 emissions than the specified threshold, the car owner must pay a surcharge (BPM5). This surcharge is calculated based on the CO_2 emissions of the vehicle.

The diagram shows that within this action situation two actors play a role: car owners and the state, where the state is responsible for levying and calculating the tax while the car owner is the one paying the tax, where the tax depends on vehicle emissions, fuel type, and emission thresholds. An important insight here is that EVs are not exempted from BPM, which was the case until January 2025 (RVO, 2026). However, EV drivers still pay significantly less BPM due to the fact that EV drivers only pay a base rate when registering their EV while owners of ICE vehicles pay more.

5.2.2 Action situation: Owning a car (MRB)

Figure 13 presents the IND that institutionalises the MRB through institutions-in-form. No discrepancy emerges from this diagram. The diagram is included to provide insight into how the MRB tax mechanism works and serves to informs the IND of the mobility agenda (section 5.2.3).

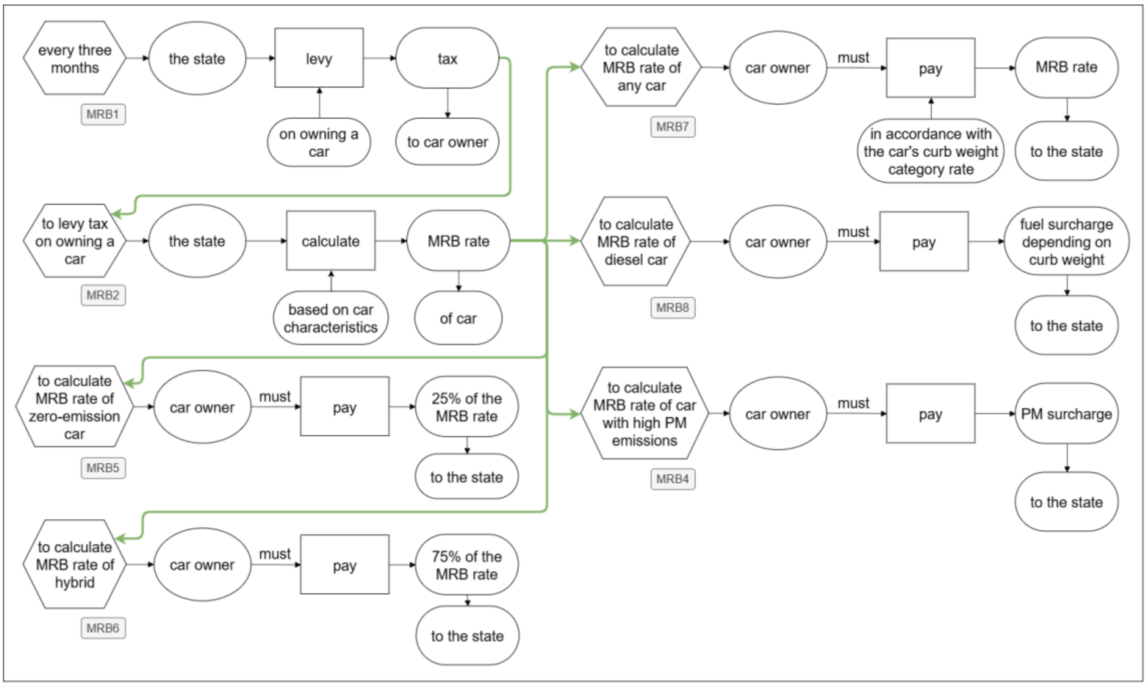

Figure 13: IND of action situation "Owning a car (MRB)"

The network diagram shows that the state levies MRB every three months to all car owners (MRB1). To levy the tax, the state calculates the MRB based on characteristics of the car (MRB2). For this, six outcome-driven connections are made to institutions-in-form that together determine the total MRB that needs to be paid by the car owner. To start, the curb weight of the car determines the base MRB rate that the car owner must pay (MRB7). In addition to this base rate, the car owner may have to pay surcharges. For diesel cars, the owner must pay a fuel surcharge calculated based on the car's curb weight (MRB8). For a car with high particulate matter (PM) emissions, the car owner has to pay a surcharge for this as well (MRB4).

On the bottom left, the diagram includes reduced MRB rates for EVs. For zero-emission vehicles, the MRB rate is reduced to 25% of the standard rate (MRB5). Hybrid vehicles are subject to a reduced rate of 75% of the standard MRB rate (MRB6). In both cases, the car owner must pay the reduced MRB amount to the state.

Similar to the IND on BPM, only the state and the car owner are involved in this action situation. Both INDs include a diesel surcharge, while only MRB includes a PM surcharge. Another important difference is that the MRB still includes a discount for EVs. However, this discount will be phased out in the coming years (RVO, n.d.).

5.2.3 Action situation: Mobility agenda

Figure 14 presents the action situation of the mobility agenda. The diagram is split into three red rectangles, indicated with A, B, and C for clarity. The diagram includes several policy intents relevant to mobility policymaking. Institutions-in-use reflect the actions of policymakers and the behaviour of EV drivers. From this action situation, four discrepancies emerge: two misalignments and two voids.

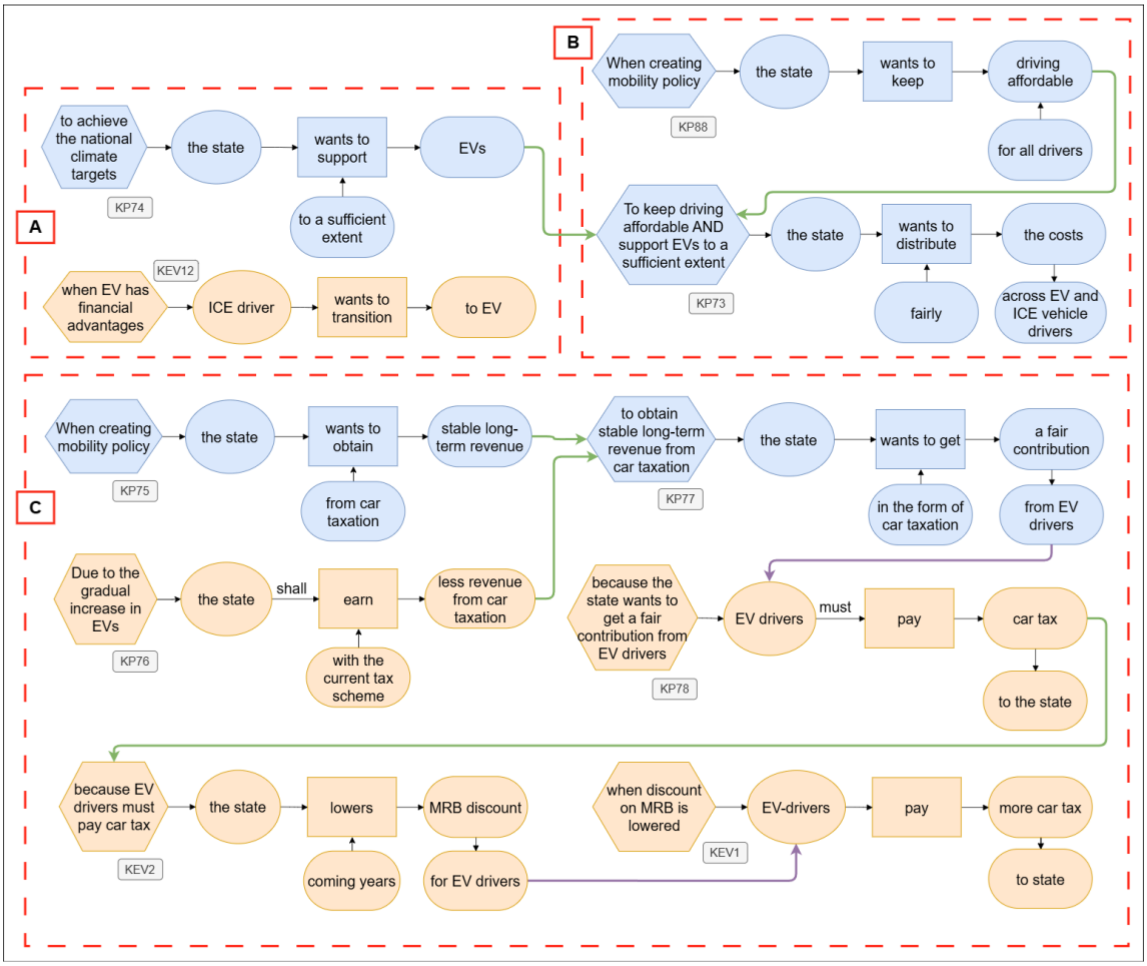

Figure 14: IND of action situation "Mobility agenda"

Figure 14A shows two statements. Policy intent KP74 shows that the state wants to support EVs to a sufficient extent to achieve the national climate targets, including decarbonising mobility. This policy intent is accompanied by an institution-in-use, KEV12, which indicates that car drivers are more likely to switch to an EV when there are financial advantages associated with an EV.

Figure 14B shows that, in parallel, the state aims to keep driving affordable for both EV drivers and ICE vehicle drivers when creating mobility policy (KP88). The objectives of supporting EVs (KEV12) and keeping driving affordable, jointly trigger the subsequential objective, which is that the state wants to distribute costs across all EV and ICE vehicle drivers fairly (KP73).

Figure 14C focuses more specifically on the car taxation part of the mobility agenda. The state wants to obtain a stable long-term revenue from car taxation (KP75). In parallel, the state earns less revenue from car taxation under the current tax scheme due to the gradual increase in EVs (KP76). This institution-in-use aligns with the INDs of BPM (Figure 12) and MRB (Figure 13), which show that lower CO_2 emissions lead to reduced BPM payments and EVs receive MRB discounts. To obtain stable long-term revenue, the state wants to get a "fair contribution" from EV drivers in the form of car tax (KP77). Because of this intent, the EV drivers must pay car taxes to the state (KP78). This institution triggers the state to lower the discount on MRB, because of which EV drivers have to pay more car taxes, shown by KEV2 and KEV1, respectively.

Four potential discrepancies are defined by analysing the IND on the mobility agenda:

1. First, the state wants to support EVs (KP74) but at the same time removes tax discounts for EVs (KP78, KEV2, KEV1). This misalignment between the policy intent, and what the state is actually doing is important as financial incentives drive EV adoption, as indicated by KEV12.
2. Second, we see that the policy intent of wanting to earn a stable income from car taxation (KP75) is not achieved with the current tax scheme, and thus the government will not gain a stable income in the coming years (KP76). This indicates a misalignment between the policy intent and the institution-in-use.
3. Third, an institutional void is identified with respect to the policy intent of distributing costs across all car users (KP73). Although this objective follows logically from the combined aims of supporting EV adoption and keeping driving affordable, it is not supported by institutions-in-form that specify how such cost distribution should be operationalised. As a result, this policy intent remains unanchored in formal rules and cannot guide implementation or evaluation of policy.
4. Fourth, an institutional void is observed in relation to the policy intent of ensuring a fair tax contribution from EV drivers (KP77). While the state explicitly formulates this intent and links it to the obligation for EV drivers to pay car taxes, no institutions-in-form exist that specify what constitutes fairness in this context. The IND does not indicate how the level of taxation relates to environmental impact, usage, or other criteria. Consequently, it is not possible to assess whether the current tax contribution of EV drivers aligns with the stated objective of fairness.

5.3 Concluding remarks on results

In this chapter, we identified institutional discrepancies that emerge from the configuration of institutions-in-form, institutions-in-use, and policy intent within different action situations. Related to EV charging cost, discrepancies arise between EU legislation and how its intended benefits are experienced by users in practice on the Dutch level. Related to car taxation, misalignments and institutional voids emerge in the formulation of mobility policy.

Chapter 6 builds on these findings by synthesising the identified discrepancies with insights from the literature. This helps explain how and why these discrepancies emerge and how we could mitigate them. Based on this, we propose policy recommendations.

6 Synthesis of results

This chapter synthesises the results from Chapter 5 by interpreting the discrepancies in light of literature. We examine why these discrepancies occur, whether they are expected, and what alternative explanations may exist. Based on this interpretation, we formulate policy recommendations aimed at mitigating the identified discrepancies. It is important to note that this research does not give recommendations on the legal aspect.

Table 6 provides an overview of the discrepancies identified in Chapter 5, divided over the two central themes: charging costs and car taxation. Each discrepancy is assigned a number, which is used throughout this chapter to facilitate reference and clarity. We follow this structure in the synthesis: section 6.1 addresses charging costs, and section 6.2 focuses on car taxation. Section 6.3 summarizes and discusses the impact of the formulated policy recommendations.

Table 6: Overview of identified institutional discrepancies

Theme	ID	Action situation	Type of discrepancy	Discrepancy
Charging costs	1	Ad hoc charging	Void	Missing institution(s)-in-form
	2	Price transparency in public charging	Misalignment	Institution-in-form = not institution-in-use
Car taxation	3	Mobility agenda	Misalignment	Policy intent = not institution-in-use
	4	Mobility agenda	Misalignment	Policy intent = not institution-in-use
	5	Mobility agenda	Void	Missing institution(s)-in-form
	6	Mobility agenda	Void	Missing institution(s)-in-form

6.1 Synthesis of discrepancies regarding charging costs

This section discusses the discrepancies related to EV charging costs. First, we discuss the discrepancy concerning ad hoc charging (section 6.1.1). Subsequently, we formulate policy recommendations to address this discrepancy (section 6.1.2). Then, we discuss the discrepancy concerning the price transparency of public charging (section 6.1.3), followed by policy recommendations (section 6.1.4).

6.1.1 Discrepancy 1: Void in institutions governing ad hoc charging limits uptake

The results show a discrepancy within the institutions governing ad hoc charging at public charging infrastructure. While the EU has formally regulated the conditions under which ad hoc charging must be facilitated, its actual use remains limited. In addition, a substantial share of EV drivers is unaware of the existence of ad hoc charging. As no institution within the action situation addresses this gap, we identify it as an institutional void.

Why does this gap matter? Not having access to home charging is seen as a barrier for those who do not have an EV as public charging is often perceived as complex (Ashby et al., 2025). To make public charging more attractive, it is important that access and payment is as simple as possible (Hardman et al., 2018). Ad hoc charging is a technology that improves price transparency and charging access when paying at a public charging station. When charging ad hoc, the EV driver sees one clearly visible price before they initiate a charging session. Therefore, it avoids the price variability common in contract-based charging when using a charging card or app, or that the price is only shown after the charging session is completed. Accessibility is improved as EV drivers do not need a charging card and can pay directly with a debit card, while charging cards themselves do not provide access to all public charging points (Letmathe et al., 2025). For this reason, the EU has put large efforts into stimulating the widespread adoption ad hoc charging through the AFIR.

However, we see that ad hoc charging is adopted very little by EV drivers. And, based on the INA, we think a key explanation is the lack of awareness on ad hoc charging among EV drivers. This lack of awareness extends beyond simply knowing the technology exist. It also includes that EV drivers understand how it works and what benefits it offers (Hardman et al., 2018). Currently, the AFIR specifies that CPOs are required to clearly display the option to use ad hoc charging at their charging station next to the other payment options. But we think this is not enough to really drive adoption of the payment method: only presenting an option does not necessarily result in an understanding on the user side. Let alone that it will convince a potential user to switch to a new payment method instead of their preferred one. This aligns with Rogers (2003) on technology adoption: in contexts perceived as complex or unfamiliar, potential users tend to choose known or default options. To drive adoption, you have to actively educate potential users about the benefits and how it works. Currently, the AFIR does not assign this responsibility.

That awareness on ad hoc charging is low, deviates a bit from expectations. The AFIR has been in place only since 2023, so it is understandable that not all EV owners are immediately aware of ad hoc charging. However, you would expect a gradual uptake as more and more charging stations are installed that allow for ad hoc charging. However, the awareness has not increased; it has even slightly declined in 2025 compared to 2024 (NLO, 2025). Furthermore, as CPOs have to make investments to facilitate ad hoc charging, it is shame it is not used to its full potential.

An alternative explanation limiting uptake of ad hoc charging relates to the perceived added value of the technology. While ad hoc charging offers advantages, such as direct price transparency, EV drivers may not experience this as a significant improvement in daily practice. For example, e-MSPs often provide clear overviews of charging expenses in their apps, which may be perceived as more useful than insight into the price of a single charging session. In addition, CPOs are allowed to charge an extra fee for ad hoc payments, which can reduce potential price advantages compared to contract-based charging. However, in this moment, ad hoc charging adoption is still in the begin phase. So, we should put efforts in integrating the technology to its full potential. To do so, we should address user awareness as a precondition for use in the institutional framework. The persistent lack of awareness, despite the existing regulatory framework, indicates that the absence of institutions targeting user awareness forms a critical bottleneck in this action situation.

6.1.2 Policy recommendations for institutional void in ad hoc charging

Based on the synthesis, we formulated three policy recommendations to address the lack of awareness and use on ad hoc charging: awareness campaigns on ad hoc charging, development of an app, and expanding the scope of monitoring ad hoc charging adoption.

Policy recommendation 1: Initiate national awareness campaigns about ad hoc charging

To address the institutional void regarding user awareness, we recommend that the Ministry of IenW initiates and coordinates awareness campaigns about ad hoc charging. The campaign should clearly communicate what ad hoc charging is, how it works, and what benefits it offers compared to contract-based charging.

A relevant precedent is the national rollout of *OVpay* in June 2023, which enables public transport users to check in and out using their debit card, credit card, or mobile phone instead of an *OV-chipkaart*. This rollout was accompanied by a large-scale media campaign initiated by the Ministry of IenW (2023) to inform travellers about the system and build trust in its ease of use. The campaign emphasised ease of use and built trust in the new system, thereby facilitating the transition from the traditional OV-chipkaart to direct payment. By clearly explaining the functionality and emphasising convenience, the campaign increased adoption at a large scale (GVB, 2024).

A similar approach could be adopted for ad hoc charging. While CPOs are already legally obliged to facilitate ad hoc charging, no actor is currently responsible for ensuring public awareness of the option. Assigning this responsibility to the Ministry of IenW would ensure coordinated communication at the national level, reduce uncertainty among EV drivers, and strengthen familiarity with the payment option. This directly addresses the identified institutional void and supports the effective uptake of ad hoc charging by supporting the existing EU law.

Policy recommendation 2: Develop a central app for oversight of ad hoc charging expenses
We recommend facilitating the development of one central app that gives EV drivers a clear overview of their ad hoc charging sessions and related expenses. The app should present the overview of all charging sessions by automatically collecting ad hoc payments via the user's bank account and allow users to export transactions. For example, for business travel reimbursement.

This recommendation follows from the observation that ad hoc charging does not provide the structured cost overview that e-MSP apps offer for contract-based charging. While ad hoc charging improves price transparency per session, EV drivers may perceive limited added value if they lack insight into their overall charging history and expenses. A central overview would increase the practical attractiveness of ad hoc charging and make it comparable in convenience to contract-based alternatives. A similar approach was adopted with the OVpay app, which allows users to link their bank account and automatically collect public transport payments into a clear overview. This supports transparency and simplifies administrative tasks such as expense declarations. Applying this approach to ad hoc charging would improve usability and could support a greater uptake.

Policy recommendation 3: Expand monitoring scope of ad hoc charging in the NLO
As a final recommendation, we propose expanding the monitoring of ad hoc charging within the *Nationaal Laadonderzoek* (NLO). The research is commissioned by RVO, which would therefore be responsible for incorporating this expansion into future editions.

This expansion is important because awareness and use may differ across EV drivers and charging contexts. By linking awareness and usage levels to user characteristics and charging contexts, such as private versus business vehicles, reimbursement practices, and reliance on public charging, the monitoring can reveal where the uptake of ad hoc charging remains limited and for whom. This provides a stronger basis for targeted communication and for assessing whether interventions actually improve awareness and use. Furthermore, this recommendation is feasible and cost-effective because it builds on an existing monitoring instrument rather than initiating new research.

6.1.3 Discrepancy 2: Price transparency rules misalign with experienced price transparency

The results show that EU rules governing price transparency for public charging misalign with what EV drivers in the Netherlands actually experience. Through the AFIR, the EU obliges CPOs and e-MSPs to communicate pricing information to EV drivers before they initiate a charging session. The national government is responsible for monitoring compliance. However, this price transparency is not fully experienced by users. Even among EV drivers who explicitly attach high importance to knowing the charging price, 15% do not always know the price when starting a charging session at a public charging point (NLO, 2025).

A study by the *Nationaal Kennisplatform Laadinfrastructuur* (NKL, 2025) further illustrates this issue. Only about half of the prices listed on invoices correspond to the price that was available to users beforehand in the app or at the charging point. In addition, they found that at roughly 20% of all charging points, no tariff information is available before charging.

Due to this limited price transparency, EV drivers may face unexpectedly high charging costs and have difficulty comparing charging options (Wolbertus & Van den Eijnden, 2020). Although individual price differences may appear small, even a difference of €0.02 per kWh can accumulate to significant monthly cost differences for frequent users of charging stations. Law et al. (2025) note that financial uncertainty in charging costs affects adoption. Particularly lower- and middle-income households, as they are less likely to have access to private charging infrastructure. Therefore, they depend more on public charging (Lou et al., 2024). As a result, the lack of price predictability in public charging could have a disproportionate effect on this group.

This insight has important implications for EV adoption. Current EV owners are, on average, richer, more urban, and higher educated than non-EV owners (Wang et al., 2025; Zhang et al., 2024). For this group, limited price transparency is less likely to form a decisive barrier. However, if EV adoption is to expand beyond this early-adopter group, the constraints faced by those who have not yet switched become increasingly relevant. For them, especially those more dependent on public charging, the predictability and transparency of charging costs are preconditions for buying an EV.

We also consider alternative explanations for the identified misalignment. The analysis relies on survey data from the NLO (2025), which shows that EV drivers lack insight into charging prices, but the survey does not reveal the underlying reason for this. Drivers may lack insight because tariff information is absent before charging, because the final invoice does not match the price shown beforehand, or because the information is difficult to interpret. Because of this, we cannot fully assume that limited price insight is caused by insufficient communication from CPOs and e-MSPs, as it could also be explained by difficulties on the user side when interpreting complex pricing information. This ambiguity also complicates how the state can effectively monitor price transparency. It raises the question of whether occasional sample-based inspections by independent parties are sufficient, or whether monitoring should rely more on user feedback.

However, given that current EV users are relatively highly educated, and that apps should be accessible to all user groups, the findings that 15% of EV drivers who actively seek price insight still lack it cannot be explained solely by user misunderstanding. Overall, addressing this discrepancy is important to support the broader adoption of EVs (Wolbertus & Van den Eijnden, 2020).

6.1.4 Policy recommendations for misaligned price transparency rules

We formulate two policy recommendations aimed at strengthening price transparency at public charging stations.

Policy recommendation 4: Stimulate CPOs to improve price transparency through public warning by the ACM

The ACM is responsible for monitoring compliance with price transparency obligations in the Dutch charging market. However, public communication on this topic has been limited in recent years. The latest statement by the ACM about the limited price transparency in the public charging market dates from May 2021 (ACM, 2021). At that time, the ACM concluded that transparency improved as a result of this warning. Given the continued transparency issues identified in this research and by recent studies (NLO, 2025; NKL, 2025), the ACM could take a more active monitoring role. Renewed public warnings could encourage charging providers to improve price communication. Such intervention has already proven effective in the past and could therefore be repeated to reinforce compliance with transparency rules.

Policy recommendation 5: Integrate user feedback into monitoring of price transparency

Monitoring could further be strengthened by systematically collecting user feedback on perceived price transparency at public charging points. Currently, signals from users mainly reach regulators through formal complaints (ACM, 2021). These complaints reveal individual cases of non-compliance, but they provide limited insight into patterns of experienced price transparency across the charging network. Therefore, a more proactive approach could complement this complaint-based system.

For example, EV drivers could be asked through short surveys whether they were able to clearly identify the total charging price before starting a charging session. The ACM could initiate and oversee this monitoring mechanism, while the NKL coordinates the data collection and aggregation. These surveys could be presented to users through charging apps or immediately after a charging session by collaborating with CPOs and eMSPs. The responses could then be aggregated per CPO, allowing the ACM to identify charging providers whose stations consistently receive low scores on experienced price transparency and subject them to further review.

6.2 Synthesis of car taxation discrepancies

This section discusses the discrepancies we found related to car taxation. They follow from the action situation mobility agenda. In contrast to the two discrepancies related to charging costs, these discrepancies are more interrelated. Therefore, we address them through several policy recommendations that together form a coherent framework.

We will first discuss the two misalignments between policy intents and the actual policy in place (section 6.2.1). Then the two voids, which show that policy intents are articulated at a high-over level but barely institutionalised through institutions-in-form (section 6.2.2). Finally, we present policy recommendations to mitigate the discrepancies (section 6.2.3).

6.2.1 Discrepancies 3 & 4: Policy intents for car taxation misalign with institutions-in-use

The results from the mobility agenda show that two policy objectives are pursued at the same time but do not align with the actual decisions of policymakers. On the one hand, the state aims to support

EV adoption as a pathway to reach the climate goals, primarily through incentives for EV drivers. These incentives include reduced BPM payments due to lower CO_2 emissions, EV discounts on MRB and the exemption from fuel excise taxes. On the other hand, the state seeks to secure stable long-term revenue from car taxation. Under the current tax schemes, these objectives conflict. As EV adoption increases, revenues from BPM and MRB decline, undermining the objective of stable tax income. The State Secretary for Finance estimates that this tax erosion could reach between €2.5 and €4.6 billion by 2040, depending on the calculation method (Van Oostenbruggen, 2025). In response, the state gradually increases taxes for EV drivers by phasing out fiscal advantages. This policy response, however, directly weakens the objective of supporting EV adoption. The INA thus reveals a structural tension between policy intents, resulting in the misalignments between policy objectives and institutions-in-use.

The two interrelated discrepancies reveal a trade-off. First, the policy intent to secure stable tax revenue is not reflected in outcomes, as tax income structurally declines with increasing electrification. Second, the intent to support EV adoption is weakened by the gradual removal of fiscal incentives, despite evidence that financial incentives remain crucial for encouraging mass adoption of EVs (Qadir et al., 2024; Schub et al., 2025). Phasing them out without introducing alternatives reduces the effectiveness of EV policy.

From 2026 to 2028, the state attempts to mitigate declining BPM revenues by lowering the CO_2 thresholds for the emission categories and increasing the price of CO_2 annually (RVO, 2025a). However, this is not a future-proof approach to securing a stable tax income. CO_2 thresholds cannot be lowered indefinitely, and increasing the marginal rates does not prevent revenue decline once a growing share of vehicles falls into low- or zero-emission categories. In a letter to Parliament, the State Secretary for Finance therefore argues that the car taxation system is in urgent need of reform (Van Oostenbruggen, 2025). This finding aligns with literature, which argues that correcting market failures and deploying traditional policy instruments alone is insufficient to address complex challenges associated with sustainable transition processes (Kok et al., 2025).

Research on environmental taxation further highlights the inherent tension between steering behaviour and securing stable revenue. Environmental taxes are typically designed to induce sustainable behaviour and do not provide a reliable long-term revenue source (Freire-González & Puig-Ventosa, 2018; Chen et al., 2025). Once the desired behavioural shift occurs, the tax base predictably declines. Moreover, environmental taxation can have unequal consequences on population groups due to differences in consumption behaviour and access to sustainable alternatives (Domguia, 2023). Research shows that the current EV users generally have a higher income and, therefore, have disproportionately benefited from financial incentives compared to households with lower income (Law et al., 2025; Wang et al., 2025; Zhang et al., 2024). This issue is not unique to EV adoption as it reflects a broader concern within the energy transition. Therefore, some scholars argue that only a radical shift towards inclusive, democratic policy design can help include all people in the energy transition (Hanke et al., 2023).

One possible explanation for the coexistence of these conflicting policy objectives is the presence of strategic ambiguity in policymaking. Strategic ambiguity refers to the deliberate use of broad policy goals that allow policymakers to pursue multiple objectives without explicitly prioritizing between them (Bach et al., 2025; Qi et al., 2025). In the context of car taxation, the government promotes both EV adoption and stable tax revenues without specifying how these goals should be reconciled. While this provides policymakers with more flexibility to navigate competing priorities, it can generate tension within the institutional framework. When objectives coexist without a clear hierarchy, the risk exists that policy instruments undermine each other. The phasing out of EV incentives while electrification still needs to be promoted illustrates how this happens in practice.

Nevertheless, EV technology undergoes rapid development, and the adoption trajectory remains uncertain. Therefore, maintaining flexibility in tax policy could be seen as more preferable than committing to a fixed long-term fiscal framework. The short-term adjustments to BPM and MRB could therefore reflect a strategy of incremental policymaking rather than a lack of institutional coherence.

Another explanation is that external conditions outside the scope of mobility policy increase the tension between the policy objectives. For example, investments required to address grid congestion and challenges regarding housing, nitrogen policy, and defence, may constrain the support for EV incentives. However, even when accounting for these factors, the absence of alternative instruments to secure stable revenue or sustain EV adoption suggests that the competing policy objectives are not institutionalised in a coherent manner within the current legal and policy frameworks.

6.2.2 Discrepancies 5 & 6: Policy intents for car taxation lack institutions-in-form

Within the mobility agenda, the government articulates policy goals that are central to mobility policymaking. However, the analysis shows that some intents are not supported by institutions-in-form that specify how they should be operationalised. As a result, it is not possible to assess whether observed outcomes align with the stated objectives. This is the case for two policy intents: the fair distribution of mobility costs across car users and the fair tax contribution of EV drivers.

The voids are problematic for several reasons. When examining how these goals are translated into practice, it becomes evident that there is limited clarification of what constitutes a “fair” distribution or contribution. No indicators or criteria are specified that would allow for an assessment of whether these objectives are met in practice. In addition, it remains unclear which costs are included when referring to the distribution of mobility costs. For example, it is ambiguous whether the cost distribution refers to road maintenance costs, investments in electricity grid expansion to support EV charging, or other cost categories. It is equally unclear how these costs then should be distributed. For instance, it is not specified to what extent owners of ICE vehicles should contribute to investments in EV charging infrastructure, or whether such costs should primarily be borne by EV users. This lack of operationalisation undermines accountability, as it becomes difficult to determine whether the state is succeeding or failing in achieving its own objectives.

We could argue that the vagueness of these policy intents is intentional, meaning that policymakers may deliberately keep concepts such as fair cost distribution and tax contribution open to interpretation. As discussed in section 6.2.1, this strategy is referred to as strategic ambiguity (Bach et al., 2025; Qi et al., 2025). Maintaining such flexibility allows governments to adapt taxation policies over time, respond to technological developments in the EV market, and adjust fiscal instruments as political priorities change. In addition, the use of broad concepts such as fairness can increase the political acceptability of policy measures (Qi et al., 2025). This flexibility can be beneficial, as it prevents the institutional framework from becoming overly rigid.

However, maintaining this vagueness may negatively impact EV adoption. Without clear definitions or rules, the policy objectives provide limited guidance for implementation. Broad and vague policy terms transfer interpretation to lower-level actors, which push down responsibility. This increases task ambiguity and ultimately reduces accountability for national policymakers (Qi et al., 2025). Literature argues that this is problematic, as effective policymaking requires coherent alignment between policy goals and the instruments used to achieve them (Howlett, 2009). Moreover, the absence of clear long-term principles may reduce predictability for potential EV adopters and other actors in the mobility system, who depend on stable policy signals when making long-term investment or purchasing decisions. For example, the short-term phasing out of EV tax discounts gives mixed signals to potential adopters as it indicates that long-term cost planning is not firmly embedded within the institutional framework. Therefore, we argue that this approach is problematic, as sustainability transitions require long-term policy frameworks rather than short-term adjustments (Köhler et al., 2019; Kok et al., 2025). If the vagueness is indeed intentional, it represents a trade-off: preserving flexibility in policymaking comes at the cost of reduced policy clarity, accountability, and predictability for the transition to electric mobility.

An alternative explanation for the voids in our networks is that relevant institutions governing cost distribution and fair EV contribution exist but are not captured within the data collection of this research. Cost allocation mechanisms may, for example, be embedded in fiscal documents rather than in mobility policy documents. However, the data collection for this research deliberately included the most important national policy and legal sources related to mobility and climate. The lack of specification in these documents suggests that, even if cost distribution is addressed elsewhere, it is not institutionally anchored within the mobility agenda itself. This reinforces the conclusion that, within this action situation, the policy intents lack institutional embedding.

6.2.3 Policy recommendations for discrepancies on car taxation

The discrepancies identified in the mobility agenda reveal structural tensions that cannot be resolved through incremental fiscal adjustments alone. Developing a future-proof car taxation system that simultaneously supports EV adoption, secures stable public revenue, and distributes costs fairly is a complex challenge that cannot be addressed through a single policy instrument.

<u>Policy recommendation 6: Assess the feasibility and effectiveness of income-based EV incentives</u>
To address both the tension between policy objectives and the lack of clarity surrounding fair cost distribution, the government should assess the feasibility of income-based EV incentive schemes. Current financial incentives for EV adoption have largely been applied uniformly across income groups. However, as discussed before, EV adopters are typically higher-income households and have therefore disproportionately benefited from financial incentives compared to lower-income households (Domguia, 2023; Law et al., 2025; Wang et al., 2025; Zhang et al., 2024). At the same time, financial barriers remain particularly significant for low- and middle-income households, limiting their ability to participate in the transition to electric mobility (Anastasiadou & Gavanas, 2022; Caulfield et al., 2022; Pamidimukkala et al., 2023; Tayri & Ma, 2025). This suggests that existing incentive structures may not align with the policy objective of a fair distribution of mobility costs. Income-based incentives could offer a way to redefine what constitutes fair cost distribution and tax contribution, as well as harmonize competing policy intents. Instead of subsidizing EV adoption across all income groups uniformly, financial support could be targeted towards households for whom the upfront costs of EV ownership remain a barrier. Such an approach could stimulate adoption where it is most needed while reducing the overall erosion on tax base.

Examples of differentiated incentive schemes already exist. In France, the *ecological bonus* for EV purchases varies depending on household income, providing higher subsidies to lower-income households (European Commission, 2025). Nevertheless, it should be noted that the effectiveness of financial incentives varies significantly across countries due to differences in mobility systems, income structures, and policy contexts (Martins et al., 2024). Therefore, it cannot be assumed that such schemes would produce similar outcomes in the Netherlands. For this reason, the Dutch government should conduct research to assess whether income-based EV incentives could simultaneously support EV adoption, improve fairness of mobility policies, and reduce pressure on tax base. Such research should evaluate behavioral responses and fiscal implications within the Dutch mobility context before implementing structural changes to the tax system.

Policy recommendation 7: Invest in research to identify pathways towards self-sustaining EV adoption
To address the tension between stimulating EV adoption and maintaining stable tax revenues, the government should invest in research aimed at identifying pathways through which EV adoption can become financially self-sustaining without relying primarily on subsidies or taxes. The current policy mix largely depends on tax incentives to stimulate EV uptake, rather than continuously adjusting subsidies or tax rates, policymakers should explore how EV adoption can be supported through a broader set of policy instruments that make EV use structurally attractive. This requires a multidisciplinary research agenda that examines behavioural, economic, technological, and spatial factors influencing EV adoption. The objective should be to identify combinations of measures that allow EV driving to remain attractive even as fiscal incentives are gradually reduced.

Such research should involve independent research institutes that closely collaborate with the Ministry of IenW and regional and municipal authorities to examine best practices and bottlenecks across governance levels. This is because many mobility-related measures fall within the latter's capabilities, such as parking policy, access regulations and charging infrastructure deployment. For example, the municipality of Amsterdam prioritises parking permits for EVs in certain areas, while drivers of ICE vehicles face significantly longer waiting times (Gemeente Amsterdam, n.d.). Such non-financial incentives could be transposed to other cities that are behind on EV adoption.

6.3 Impact of policy recommendations

Table 7 provides an overview of the policy recommendations formulated in this research that target the identified discrepancies at different levels. Together, they aim to strengthen the coherence between formal institutions, policy intent, and observed behaviour in practice.

Table 7: Overview of policy recommendations per institutional discrepancy

Discrepancies	Policy recommendation	Owner	Impact on discrepancy
Void in institutions governing ad hoc charging limits uptake	1. Initiate national awareness campaigns about ad hoc charging	Ministry of IenW	Reduces the awareness gap between the formal availability of ad hoc charging and users' knowledge of it
	2. Develop a central app for oversight of ad hoc charging expenses	Ministry of IenW	Increases the practical usability and benefits of ad hoc charging for users
	3. Expand monitoring scope of ad hoc charging in the NLO	RVO	Improves understanding of ad hoc charging adoption across different user groups and supports targeted policy responses

Price transparency rules misalign with experienced price transparency	4. Stimulate CPOs to improve price transparency through public warning	ACM	Directly encourages clearer price communication and reduces the gap between formal transparency rules and users' experience
	5. Integrate user feedback into monitoring of price transparency	ACM / Ministry of IenW	Aligns monitoring of price transparency with users' actual experience and makes it easier for users to report issues
Two policy intents for car taxation misalign with institutions-in-use & two policy intents lack institutions-in-form	6. Assess the feasibility and effectiveness of income-based EV incentives	Ministry of IenW	Supports the design of fiscal measures that better align policy intent with actual EV adoption behaviour
	7. Invest in research to identify pathways towards self-sustaining EV adoption	Ministry of IenW	Supports the development of policy that stimulates EV adoption without long-term financial support

The recommendations related to ad hoc charging are relatively direct in their impact. Awareness campaigns are a low-barrier intervention that does not require legislative change and requires primarily budgetary commitment. Developing a central app requires more coordination, as it involves collaboration with CPOs and e-MSPs, but its impact on the practical usability of ad hoc charging could be substantial. Expanding the monitoring scope of the NLO strengthens informed future policy and ensures that discrepancies can be detected earlier.

Price transparency in public charging is directly stimulated by public warnings of the ACM. This measure is relatively straightforward to implement and has proven effective in the past. Integrating user feedback into price transparency monitoring might be more difficult to implement as this goes outside of the regular ACM monitoring scope. It could therefore also be that the Ministry of IenW is the better actor to organise this.

The recommendations related to car taxation operate at a more strategic level. Assessing income-based incentives and investing in research toward self-sustaining EV adoption do not resolve the identified discrepancies directly, but they address the underlying problem, which is that policy intent is not sufficiently translated into concrete and coherent policy measures. These recommendations support policymakers to design incentives that are both effective and sustainable in the long term.

While we formulated recommendations to directly address the discrepancies, improving the overall coherence of the institutional environment requires more than resolving individual discrepancies in isolation. Therefore, the recommendations are strongest when pursued to accelerate EV adoption toward the pace envisioned by policymakers.

6.4 Concluding remarks on synthesis of results

In this chapter, we examined why the discrepancies occur, whether they were expected, and what alternative explanations may exist. This interpretation informed the formulation of policy recommendations aimed at mitigating the identified discrepancies. Building on this, Chapter 7 discusses and reflects on the research.

7 Discussion

This research has provided valuable insights into the existence of discrepancies within the institutional environment governing EV adoption, which informed the formulation of policy recommendations in Chapter 6. Now it is time to discuss the research. First, we discuss the methodological contribution of this thesis to the INA in section 7.1. In section 7.2, we reflect on the research approach. Then, we address the limitations of the research in section 7.3 and give direction for further research in section 7.4.

7.1 Methodological contribution

Previous applications of the INA primarily distinguish between institutions-in-form and institutions-in-use to analyse discrepancies between written rules and observed outcomes. This study extends the methodological scope of INA by introducing **policy intent** as a distinct type of institutional statement. Policy intent is conceptualised as a statement that precedes institutions-in-form as it expresses the objectives underlying the laws and policies created by policymakers. In addition, policy intent may articulate the rationale underlying an institutions-in-use, but only when undertaking by a policymaker.

By explicitly coding policy intent, the analysis moves beyond assessing whether rules align with practice, as it enables the analysis of how formal institutions emerge from articulated policy objectives. Because of this, we were able to see that sometimes intents are not translated in clear rules or that the intent does not align with what was happening in reality. If we did not account for policy intent in the dataset, we would not have been able to uncover this. Therefore, this is an important methodological contribution.

The remainder of this section explains from what sources policy intent statements can be extracted (section 7.1.1), what additional types of institutional discrepancies become visible by including the policy intent in the analysis (section 7.1.2), and in what research contexts it would be valuable to apply this extension of the INA (section 7.1.3).

7.1.1 Collecting and coding policy intent statements

Policy intent statements were identified primarily in the policy document, and occasionally in legal texts where the rationale or objective of regulation was explicitly articulated. These statements were coded using the same IG2.0 syntax as institutions-in-form and institutions-in-use. No additional requirements were imposed regarding which grammar components needed to be present. Policy intent statements are non-binding by definition because their function is not to assess compliance, but to contextualise why specific institutions-in-form exist and how they are expected to function.

Policy intent statements could also be extracted through interviews similarly as is done for institutions-in-use in prior research. However, this is not tested in this thesis as the data scope was limited to written sources only. Extracting statements from interviews would allow the identification of underlying objectives and rationales that are not explicitly documented.

7.1.2 New discrepancy types

By including policy intent as an additional type of institutional statement, we can identify discrepancies between policy intent and institutions-in-form, as well as between policy intent and institutions-in-use. Table 8 gives an overview of the different types of discrepancies and whether they were identified in this research. Below the table, we discuss the new discrepancy types.

Table 8: Additional discrepancies by including policy intent

Discrepancy between	Type of discrepancy	Found in this research?
Policy intent and institution-in-form	Misalignment (policy intent ≠ institution-in-form)	No
	Void (missing policy intent)	No
	Void (missing institution-in-form)	Yes
Policy intent and institution-in-use	Misalignment (policy intent ≠ institution-in-use)	Yes
	Void (missing policy intent)	N/A
	Void (missing institution-in-use)	No

7.1.2.1 Discrepancy between policy intent and institution-in-form

A misalignment occurs when a policy intent is explicitly articulated, but the corresponding institution-in-form does not reflect that intent. In such cases, the formal institution fails to operationalise what the policymaker intended to achieve. Such a misalignment has not been found in this research.

A void occurs when a policy intent is articulated, but no corresponding institution-in-form exists. This indicates that a policy objective is acknowledged at the level of intent, but has not been translated into concrete rules, leaving the issue insufficiently addressed. This type of void was identified twice in the action situation of mobility agenda (section 5.2.3, p.43). Conversely, the presence of an institution-in-form without a clearly identifiable underlying policy intent may indicate that a rule lacks clear normative grounding. However, this type of void was not observed in this study.

7.1.2.2 Discrepancy between policy intent and institution-in-use

Discrepancies between policy intent and institutions-in-use can also be identified. A misalignment occurs when articulated policy objectives are not realised in practice. In such cases, observed outcomes do not reflect the intended effect of policy. It may suggest that the institutions-in-form governing behaviour may be ineffective or insufficiently designed to achieve the intended outcomes. This type of misalignment was identified twice in the mobility agenda (section 5.2.3, p.43).

A void between policy intent and institutions-in-use would occur when it is unclear whether an articulated policy intent has translated into practice at all. However, this type of void was not observed in this study and therefore remains relevant for future applications of the method.

At the in-use level, we do not consider voids when a policy intent is missing. Policy intent statements articulate the rationale underlying institutions-in-form and institutions-in-use when produced by a policymaker. However, at the in-use level, we do not consider voids when a policy intent is missing. Institutions-in-use reflect observed behaviour in practice, which can exist without an articulated policy intent. Therefore, the absence of policy intent does not constitute a discrepancy at this level.

7.1.3 Applicability of the methodological extension

The methodological extension proposed here is particularly valuable in policy-heavy and transition-oriented domains, where long-term objectives are explicitly articulated and institutions are still evolving. In such contexts, analysing policy intent provides insight into the underlying direction of institutional change and helps explain why certain rules may fail. The approach is especially valuable when the environment in question does not follow a fixed process, such as in the case of EV adoption. Conversely, in domains characterised by highly standardised procedures or rigid process phases, incorporating policy intent may offer limited additional explanatory value.

By explicitly distinguishing policy intent as a separate type of institutional statement, this study extends the INA's capacity to trace underlying dynamics in the institutional environment, rather than analysing only the alignment between rules and outcomes. This contributes to a more nuanced understanding of institutional development. In addition, it provides a methodological basis for analysing why institutions-in-form may fail to support policy goals in complex societal transitions.

7.2 Reflection on the research

As part of the discussion, I reflect on the choices I made in the research and how they affected the outcomes. Section 7.2.1 reflects on the complexity and depth of results, section 7.2.2 on the representativity of the data, section 7.2.3 reflects on the three statement types, and section 7.2.4 reflects on the generalizability of the research.

7.2.1 Reflecting on complexity and depth of results

There is a clear difference in depth and meaning between the two discrepancy themes discussed in Chapter 6. The discrepancies related to charging costs are relatively standalone issues and were therefore more straightforward to interpret. They primarily indicated whether EU-level institutions-in-form were aligned with national institutions-in-use. Because of this, we could formulate policy recommendations addressing each discrepancy individually.

In contrast, the four discrepancies related to car taxation are more intertwined. Their interdependencies made them more difficult to capture, yet they also provided deeper insight into national policy dynamics as they concern discrepancies at the level of policy intent. These discrepancies appear to reflect broader structural tensions within the policy domain. Because of this, it was not feasible to formulate separate policy recommendations for each discrepancy individually.

The comparison reveals an inherent trade-off in analysing institutional discrepancies: the more complex an action situation, the greater its potential insight, but also the more difficult it becomes to clearly define discrepancies and translate them into concrete policy recommendations.

The difference in depth between the two themes may be explained by the types of institutional statements to which the identified discrepancies relate. The discrepancies concerning charging costs are only between institutions-in-form and institutions-in-use, whereas the discrepancies concerning car taxation also involve policy intent. On the one hand, we could argue that including the policy intent inherently makes the INA more complex. On the other hand, this research is the first to include the policy intent in the INA and the relative lack of established methodological guidance may explain why such discrepancies are more difficult to identify and to translate into policy recommendations systematically.

7.2.2 Reflecting on representativity of the data on EV drivers

This research relied on written data sources to analyse the institutions governing EV adoption. To capture user behaviour, we used the NLO, which provided valuable insight into the behaviour of current EV drivers. However, the current EV driver population is not representative of the broader Dutch population.

The differences are substantial. Following the data of the NLO, we see that 67% of EV drivers can park on their own property, compared to 27% of all Dutch households. Similarly, 79% of EV drivers have solar panels, against roughly 35% of Dutch households overall. This reflects that current EV drivers tend to have higher incomes and higher education levels, placing them firmly in the innovator and early adopter categories of Rogers' diffusion curve (2003). Their behaviour, preferences, and responses to policy measures likely differ from those of later adopters.

This raises a question about the representativity of the findings. However, the institutional discrepancies identified are unlikely to fundamentally change with a more representative dataset. Several behavioural patterns observed in this research, such as the sensitivity to financial incentives, are likely to hold across income groups. If anything, these effects may be stronger for lower-income households, reinforcing rather than contradicting the findings.

When thinking about ways that we could have addressed this, we could have undertaken interviews or surveys to target potential adopters. However, responses from non-EV users about hypothetical adoption scenarios would carry their own limitations, as stated preferences do not always reflect actual behaviour. In that sense, the limitation may be difficult to fully resolve within the scope of this type of research.

What this does mean is that the findings should be interpreted with this boundary in mind. The institutional discrepancies identified are real, but their relevance and impact may differ across user groups in ways this research could not fully capture.

7.2.3 Reflecting on the three statement types

This research included three statement types: institutions-in-form, institutions-in-use, and policy intent. The institutions-in-use captured a broad range of behaviour, from EV drivers' charging preferences to policymakers implementing policy. In hindsight, this raises a question about conceptual consistency.

Institutions-in-use are defined as observed behaviour in practice. However, the behaviour of an EV driver selecting a payment method for charging and the behaviour of a policymaker implementing a climate agenda operate on different governance levels. By capturing both under the same statement type, the category becomes stretched. This is not necessarily incorrect, but it does complicate the relationship between institutions-in-use and policy intent. This is because policy intent can articulate the rationale underlying a policymaker's institutions-in-use, but it cannot do the same for an EV driver's behaviour. This asymmetry sits somewhat awkward within a single statement type.

What if policymaker behaviour and user behaviour had been coded as separate statement types? Would this have changed the findings? Most likely not. The discrepancies identified in this research were based on relationships between institutions-in-form, policy intent, and observed outcomes. Splitting institutions-in-use into two subtypes would not have altered those relationships. It may, however, have made the framework more precise and the relationship with policy intent cleaner.

This reflection is worth noting for future applications of the method, where a finer distinction between actor types within the institutions-in-use category could improve conceptual clarity without changing the substance of the analysis.

7.2.4 Reflecting on generalizability of the research

The findings of this research are specific to the Dutch institutional environment of EV adoption. The identified discrepancies follow from Dutch and EU legislation, national policy documents, and data on Dutch EV drivers. As such, the conclusions cannot be directly transferred to other countries.

However, the methodological approach is generalizable. The application of the INA extended with policy intent can be applied to other countries or policy domains to identify institutional discrepancies in a systematic way. The types of discrepancies found in this research, such as misalignments between EU regulation and national implementation, or between policy intent and formal rules, may also occur in other contexts. In that sense, the findings offer analytical value beyond the Dutch case, even if the specific conclusions do not.

7.3 Limitations of the research

This section reflects on the limitations of this research. For structure, we divided the limitations per method step of the INA.

7.3.1 Limitations to the data collection

Regarding data collection, four limitations are identified.

A. <u>Written sources only</u>

This research relies exclusively on written sources. The *Nationaal Laadonderzoek* provided a reliable basis for identifying institutions-in-use that reflect EV user behaviour, which would have been difficult to capture through interviews within the limited timeframe of this research. However, this approach indirectly constrains our study to the scope of the NLO, meaning we cannot get additional insights. In addition, it was not possible to examine actors' reasoning, contextual interpretations, or the mechanisms through which informal rules emerge, which would have been possible through interviews.

B. <u>Governance layers</u>

The analysis focused on institutions on the national and EU level. However, several aspects of EV adoption in the Netherlands are governed at regional and local levels. For example, the rollout of public charging infrastructure is largely governed at the regional level, and municipalities have formal authority to implement environmental zones and zero-emission zones to discourage ICE vehicles in cities. These instruments are documented in provincial and municipal policy documents, which fell outside of the scope of this research. As a result, such measures were not included in the dataset. Including regional and municipal policies would have provided a more complete picture of the institutions governing EV adoption.

C. <u>Representation of actors</u>

A third limitation of the data collection concerns the representation of actors in the institutional dataset. Most statements are undertaken by or targeted at policymakers and EV drivers. This reflects the nature of the sources: legal and policy documents are authored by governmental actors, while behavioural research on EV adoption focuses primarily on EV users. Consequently, actors in the charging infrastructure and energy market were limitedly included. This is a relevant gap, given that grid expansion and public charging availability are major bottlenecks in the Dutch EV transition.

D. *Temporal boundaries of data*

The relevance of the findings is bounded by time. The findings of the INA reflect the policy landscape as it existed during the period of data collection. Given the rapid evolution of EV-related policies, fiscal instruments, and charging infrastructure governance, institutional arrangements may change over time. For example, regulations concerning MRB and BPM have already changed between the data collection phase (October 2025) and the completion of this thesis (January 2026). Nevertheless, the findings remain valuable, as they reveal structural bottlenecks and misalignments in policy and legal frameworks and highlight points for improvement.

7.3.2 Limitations related to extracting and coding statements

For extracting and coding statements, I found two key limitations.

A. *Risk of researcher bias*

The identification and coding of institutional statements were conducted by a single researcher (me). Given the interpretative nature of institutional coding, a risk of interpretative bias exists. Although I verified my findings often with my supervisor, I mostly interpreted the statements on my own. In further research on the institutions governing EV adoption, it would be valuable to involve more analysts to strengthen the reliability of the dataset and reduce sensitivity to individual judgement.

B. *Impossible to eliminate all ambiguity*

Although IG 2.0 provides a structured approach for deconstructing institutional statements, the Grammar of Institutions cannot fully eliminate ambiguity (Crawford & Ostrom, 1995). This became clear during the extraction and coding phase, as some institutional statements allowed for different plausible interpretations. Given the size of the dataset, maintaining consistent judgement over time was challenging. To mitigate this, I made the extraction process as traceable as possible by including the unit of observation in the preliminary version of the dataset. In this way, every time an inconsistency came up, I could easily trace them back and adjust the statement if needed.

7.3.3 Limitations related to clustering statements and constructing INDs

One main limitation arose during the clustering of statements and the construction of the INDs.

Action situations emerged from the dataset

Action situations were identified inductively from the dataset rather than through a predefined theoretical framework. This means that the delineation of action situations is strongly dependent on the scope and composition of the collected data. Unlike approaches that define action situations in advance, this made it difficult to assess dataset completeness during the analysis. The absence of statements could not be systematically detected, as there were no predefined categories to flag as empty or underrepresented.

Furthermore, because the dataset is largely centred on policymakers and EV users, the identified action situations primarily reflect interactions involving these actors. Including data on charging infrastructure or energy market actors would likely have introduced additional action situations. This data dependency limits the replicability of the research.

7.4 Further research

Based on our reflection and the identified limitations, we give five key recommendations for further research.

First, further research could broaden the empirical scope by including institutions from regional and local governance levels to capture a more complete view of the institutional environment governing EV adoption. By focussing on specific provinces, regions, or municipalities as case studies, the research could analyse institutions to identify best practices across contexts. For example, when it comes to charging infrastructure rollout or zero-emission zones in cities.

Second, we would suggest shifting the focus of the study on the electricity grid see whether institutional discrepancies exist within the institutional environment governing the grid. Charging infrastructure for EVs is only one of many technologies or products dependent of the grid. Shifting the focus could reveal additional institutional discrepancies within the energy domain itself.

A third recommendation for future research concerns EU legislation. This study included one EU regulation, from which two strongly institutionalised topics emerged: ad hoc charging and price transparency. In both cases, the analysis revealed misalignments between EU rules and how these are implemented or experienced in practice in the Netherlands. This raises the question whether similar discrepancies between EU legislation and national implementation also occur in other policy domains. Investigating this could provide valuable insights into how EU regulations translate into national institutional contexts and whether context dependent adjustments are required to achieve their intended policy outcomes.

The fourth recommendation is about the methodological contribution of this thesis. Future research should further evaluate how incorporating policy intents into the INA affects the depth, complexity, and operationalisation of identified discrepancies. Also, it would be valuable to test the relevance of policy intent in different domains, such as climate adaptation.

Finally, some policy recommendations formulated in this thesis could be evaluated through simulation-based approaches. For example, agent-based modelling could be used to explore the potential effectiveness of awareness campaigns related to ad hoc charging.

8 Conclusion

The objective of this research is to identify institutional discrepancies that hinder the large-scale EV adoption in the Netherlands. To achieve this research objective, we first wanted to get an understanding of the stakeholders involved in the institutional environment of EV adoption, which we did through a stakeholder map as presented in Chapter 2. Then, we applied the Institutional Network Analysis to examine the institutions that govern EV adoption in the Netherlands. For this, we extracted institutions-in-form, institutions-in-use and policy intents from various legal and policy documents, as well as from research reports, as described in section 4.2. With the institutional statements, we created Institutional Network Diagrams that capture action situations from which discrepancies arose, as detailed in Chapter 5. We found discrepancies related to charging costs and car taxation, and in Chapter 6 we examined why these discrepancies occur, whether they were expected, and what alternative explanations may exist. Based on this interpretation, we formulated policy recommendations aimed at mitigating the identified discrepancies. Chapter 7 discussed and reflected on the research and acknowledged the limitations of this research as well as give recommendations for further research.

To round up this thesis, this chapter answers the sub-questions that guided the research (section 8.1) as well as the main research question that followed from the research objective (section 8.2).

8.1 Answers to the sub-research questions

This section answers the three sub-questions of this research.

SQ1. What stakeholders are involved in the institutional environment of EV adoption?
The landscape of passenger EV adoption in the Netherlands is characterised by a complex institutional environment where five stakeholder groups interact: **policymakers**, **energy market players**, **charging infrastructure market players**, **researchers**, and **car users**. These interactions are structured by formal rules, policies, and behaviour, and together they shape how EVs are promoted, implemented, and ultimately adopted in practice.

Policymakers operate at different governance levels. The **EU** defines the overarching strategic direction through climate targets and legislation, which establishes obligations and constraints that directly affect EV adoption across Europe. The **Dutch national government** acts as an intermediary, translating EU legislation into national law while also defining its own policy objectives and instruments. Within the national government, different ministries fulfil interdependent roles, and they need to collaborate closely to create cohesive policy. The **Ministry of IenW** is responsible for mobility policy, including the transition to electric mobility. The **Ministry of KGG** oversees climate objectives that frame electrification as a pathway to decarbonisation. The **Ministry of Finance** designs financial incentives that strongly influence EV adoption. **Provinces and municipalities** are responsible for translating national policy into regional and local implementation. They coordinate regional mobility strategies and charging infrastructure roll-out.

We identified two groups of market players: those in the **energy market** and those in the **charging infrastructure market**. In the energy market we can distinct between actors that produce and sell electricity, and those that provide the distribution of electricity. The **energy retailers** sell the electricity consumed during charging, interacting both with CPOs and private households. Energy retailers and **energy producers** can be the same company. Responsibilities for distributing electricity is divided over the **TSO**, who manages the high-voltage grid, and the **DSOs**, who manage the middle- and low voltage grids. All players within the energy market are heavily subject to regulation and monitoring. The state places strong importance on maintaining fair prices in the energy market and preventing advantages resulting from monopoly positions.

The stakeholders in the charging market depend on a connection to the grid, facilitated by a DSO. **CPOs** manage and operate public charging stations and sell electricity directly to EV users, while **E-MSPs** act as intermediaries by enabling access, authentication, and payment through charging cards.

At the centre of the system are car users, who ultimately decide to adopt an EV or not. Car users are not a homogeneous group. Differences exist between **BEV** and **PHEV** users, between **private owners** and **lease drivers**, and between **private** and **business** cars. These distinctions shape how users interact with fiscal rules and charging infrastructure. While car users have limited direct influence over institutional design, they are directly affected by the costs, accessibility, and reliability of EVs resulting from decisions made elsewhere in the institutional environment.

Lastly, **research institutions**, such as PBL and TNO play an advisory role by producing independent analyses on mobility, climate policy and energy systems. Although they do not directly regulate or implement EV-related measures, their studies inform agenda-setting and policymaking.

SQ2. What institutions govern EV adoption?
EV adoption in the Netherlands is governed by a set of **institutions-in-form**, **institutions-in-use**, and **policy objectives**. Together, they define climate objectives, fiscal incentives, and charging infrastructure rollout.

The **institutions-in-form** follow from Dutch and EU legislation. The core legal frameworks include the *Klimaatwet*, the *Wet op de belasting van personenauto's en motorrijwielen* (Wet op BPM), the *Wet op de motorrijtuigenbelasting* (Wet op MRB), the *Wet op Accijns* and the *Alternative Fuels Infrastructure Regulation* (AFIR). The laws specify obligations for car users and market players. While the Dutch legislation is formulated at the national scope, the EU-level legislation is across all member states and is aimed at improving interoperability

The **institutions-in-use** show the actual actions by stakeholders. They capture the policy implemented by policymakers based on the institutions-in-form, described in the *Klimaatplan 2025-2035* and the *Klimaat- en Energieverkenning 2025,* which translates the objectives of the Klimaatwet into policy measures. They institutions-in-use also capture behaviour of EV drivers, which is described in the *Nationaal Laadonderzoek 2025*. This gives insight in charging behaviour of EV drivers, including recurring charging practices and preferences. These institutions-in-use govern EV adoption as they show how EV drivers react to policy and legislation.

The third type of institution that governs EV adoption are **policy intents** articulated by policymakers. They are the underlying reason for created an institution-in-form. They are articulated mostly in policy documents and sometimes in legal documents.

It should be noted that this research focused on institutions at the national and EU level. Many EV-related policies are also implemented at regional and municipal levels, such as the rollout of charging infrastructure, but these fall outside the scope of this research. Including them in future research would provide a more complete view of the institutional environment governing EV adoption.

SQ3. What discrepancies exist within the institutions governing EV adoption?
The analysis reveals several discrepancies within the institutional framework governing EV adoption in the Netherlands. These discrepancies arise both between governance levels and within national policy design.

First, discrepancies appear between **EU regulation and its practical implementation or outcomes in the Netherlands**. EU legislation establishes clear requirements regarding public charging infrastructure, particularly in relation to ad hoc charging and price transparency. However, the analysis shows that these rules are not always fully adhered to by market actors, and the technologies and mechanisms introduced by the regulation are not widely used by EV drivers. This indicates that the existence of EU regulation alone is not sufficient to ensure that the intended benefits materialise for EV users. Although EU regulations formally apply directly within member states, their effectiveness depends on how national governments support these rules with policies that translate them into the specific user context. As a result, compliance with formal requirements does not automatically lead to effective outcomes in practice.

Second, discrepancies exist **within the national mobility agenda**. Policymakers articulate different policy objectives, such as stimulating EV adoption while maintaining stable tax revenues. However, when creating policy, policymakers always have to make **trade-offs** as it is often not possible to harmonize these objectives completely with policy. If no clear rules or guidelines exist that define how the trade-offs between these objectives should be managed, policy has the risk to be ineffective in achieving those goals. In addition, in societal transitions, such as the transition toward EVs, citizens need consistent and predictable policy to take the chance of transitioning themselves.

Taken together, these findings show that discrepancies arise both between governance levels and within national policy frameworks. Such misalignments weaken the coherence of the institutional environment and can reduce the effectiveness of policies aimed at stimulating EV adoption.

8.2 Answer to the main research question

Now the three sub-questions have been answered, we can answer the main research question.

How do discrepancies within the institutional environment influence the potential uptake of electric passenger vehicles in the Netherlands in the coming 5 years?

The institutional environment governing EV adoption in the Netherlands is characterised by discrepancies that collectively reduce the coherence and predictability of the framework that potential adopters depend on. These discrepancies create uncertainty, weaken policy signals, and leave intended benefits unrealised in practice.

The discrepancies related to public charging costs most directly affect potential adopters who rely on public charging infrastructure. EU regulation establishes clear requirements for ad hoc charging and price transparency, yet these benefits are not fully experienced by EV users in practice. Ad hoc charging remains largely unknown or unused, and price transparency at public charging stations is inconsistently applied. For potential adopters without the possibility to charge at home, this increases uncertainty about the total cost and convenience of EV ownership. Given that this group is already underrepresented among current EV adopters, complications during public charging are likely to negatively impact the perceived ease of use of EV drivers. Ultimately, this will slow adoption in this group.

The discrepancies related to car taxation affect the perceived long-term financial attractiveness of EVs. Policy intent articulates both the stimulation of EV adoption and the maintenance of stable tax revenues. However, these objectives are not reconciled in the current policy design. Financial incentives are being phased out while EV adoption still depends on them, and policy intents that aim to support the mobility transition are not translated into concrete institutions-in-form that would give these objectives binding force. For potential adopters, this creates instability in financial expectations. Purchasing an EV requires a long-term financial commitment, and inconsistent or unclear policy signals increase the risk perceived by potential buyers.

Together, these discrepancies shape EV adoption by limiting certainty across three dimensions: the accessibility and price transparency of public charging, the financial attractiveness of EVs over time, and the direction of future policy.

To conclude, over the coming five years, EV adoption in the Netherlands will likely continue to grow, but not at the pace envisioned by policymakers. The discrepancies identified in this research do not halt the transition, but they weaken the institutional framework that is meant to support it. Addressing these discrepancies requires a holistic approach to policy design. No single measure will close the gap between ambition and reality. Instead, policymakers need to assess the institutional environment as a whole and ensure that policy measures are coherently aligned with each other. The recommendations formulated in this research provide concrete starting points for this. The goal is not a quick fix, but a stronger, more coherent institutional framework that can support a broader and more inclusive uptake of EVs in the Netherlands.

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Appendix A Overview of consulted legal documents and legislative status

The legal documents collected in this research are subject to change over time. Therefore, this appendix specifies in Table 9 the legal versions consulted and indicates whether legislative amendments had been announced at the time of consultation.

Table 9: Overview of consulted legal documents, applicable versions, and announced amendments

Law	Version in force as of	Date of consultation	Next announced legislative amendment
KW	22-07-2023	24-10-2025	None
BPM	01-01-2025	14-10-2025	01-01-2026
MRB	01-01-2025	15-10-2025	01-01-2026
WA	01-01-2025	14-10-2025	01-01-2026
AFIR	14-04-2025	22-01-2026	None

Appendix B Overview of standardised terms used in the dataset

This appendix presents the tables that document the terminology standardisation applied in preparing the dataset for the INA.

B1. Attributes and animate objects

The documents we analysed for the INA often use different names to refer to the same people and organisations. These references were standardised to ensure consistency in the coding of institutional statements. For every actor, we carefully considered the aggregated term to preserving the meaning of the statements. Table 10 provides an overview of all Dutch terms encountered in the documents and the aggregated terms used in the analysis. We will briefly explain some important considerations.

Table 10: Standardized terms of attributes and animate objects

Stakeholder field	Aggregated term	Specific persons or organisations from document
Policymakers	De EU	De Europese Unie, De EC, De Europese Commissie, Europa
	De staat	De overheid, het kabinet, Eerste Kamer, Tweede Kamer, ACM, Belastingdienst, de Nederlandse staat, Nederland, Minister van Financiën, Ministerie van Financiën, Ministers, Ministeries, Onze Ministers, de regering, Minister**, uitvoeringsinstanties, De vakministers, Onze Ministers, Ministerie van Economische Zaken
	Minister van IenW	Ministerie van IenW, Minister van Infrastructuur en Waterstaat, Staatssecretaris voor Openbaar Vervoer en Milieu,
	Minister van K&GG	Ministerie van Klimaat en Groene Groei, Ministerie van Economische Zaken en Klimaat*, Ministerie van EZK, Onze Minister**, Minister**
Car users	Nederlandse burger	Burgers, Nederlandse burgers, Nederlander, Nederlanders
	EV-rijder	EV-eigenaar, EV-eigenaren, eigenaar elektrische auto, rijder elektrische auto, EV-rijders, EV-rijders die de auto hebben gekocht (zakelijk of privé), Privé EV-rijders, Zakelijke EV-rijder, Zakelijke leaserijder (als werknemer), Thuisladers
	Auto-eigenaar	Autobezitter, iemand met een eigen auto, iemand met een privé gekochte auto, auto-eigenaren
	Werkgever	Werkgevers
	Werknemer	Werknemers
Energy and charging infrastructure market	CPO	CPOs, charge point operators, charge point operator, Laadpuntbeheerder, Laadpaalexploitant, Laadpaalaanbieder
	Netbeheerder	TSO, DSO, netbeheerders, regionale netbeheerders, TenneT, Stedin, Liander
	e-MSP	e-MSPs, e-mobility service providers, mobility service providers, laadpasaanbieder
Researchers	PBL	Planbureau voor de Leefomgeving

For policymakers, we have two main governance levels: the EU level and the national level. For the EU, we could aggregate all actors under one term. For the national government we did not do this. Most actors could be aggregated under *de staat* (the state). However, Ministerie van IenW and the Ministerie van K&GG, were retained as distinct attributes because of their central roles within the institutional landscape of EV adoption. If we would aggregate those, the interpretation of the findings could be affected.

In several legal documents, the Ministry of EZK was referenced. However, this name is no longer accurate, as EZK was split in 2024 into K&GG and EZ. Depending on the context, references to EZK were replaced by K&GG when the statement related to climate or energy policy, or by the state when it referred to economic governance, as EZ was aggregated under the state.

In Dutch legislation, references are often made to *de Minister* or *Onze Minister* (singular), which denotes the minister responsible for implementing the relevant law. In these cases, the reference was replaced by the specific minister implied by the context to clarify the institutional statement. In contrast, *Onze Ministers* (plural) refers to all ministers forming the government and was therefore aggregated under the state.

Lastly, no distinction was made between ministries and executive agencies. The analysis focuses on ministries as the primary decision-making actors, and further differentiation between policymaking and executive bodies was found not to add analytical value to the institutional landscape. Therefore, all executive agencies were aggregated under the state.

B2. Inanimate objects

In the analysed documents, inanimate things are frequently referred to using different terms to describe the same concept. They can appear as direct or indirect objects, or in action conditions and execution constraints. To ensure consistency in the coding of institutional statements, these references were standardised. Table 11 provides an overview of all Dutch terms encountered in the documents and the aggregated terms used in the analysis.

Table 11: Standardized terms of inanimate objects

Inanimate objects	Specific things from document
Laadtarief	Laadprijs, prijs van het laden, tarief van het laden,
Laadkosten	Laadprijs, prijs van het laden, kosten van het thuisladen
EV	EVs, elektrisch voertuig, elektrische voertuigen, elektrische auto, elektrische auto's
Auto	Voertuig, voertuigen
Brandstof auto	ICE, auto's met CO2 uitstoot
Benzineauto	Benzinevoertuig, benzinevoertuigen, benzineauto's
Dieselauto	Dieselvoertuig, dieselvoertuigen, dieselauto's,
Emissievrije auto	emissievrije voertuigen, zero-emissie voertuigen, BEV
Hybride	Hybride auto, hybride auto's, hybride voertuig, hybride voertuigen, PHEV, PHEV's, PEV, PEV's
Openbare laadpaal	openbare laadpalen
het klimaatplan	het klimaatplan 2025 -2030
BPM of MRB	Vastgestelde belastingbedrag, belastingbedrag

Appendix C Institutional statements in the dataset

This appendix presents a comprehensive overview of all 211 institutional statements included in the dataset. For each statement, the corresponding ID and statement type are specified. In addition, the syntactic components of each institutional statement are indicated in brackets, following the IG 2.0.

Table 12: Overview of all institutional statements included in the dataset

ID	type	Institutional statement
AFIR01	in-form	omdat de EU standaarden heeft vastgesteld voor ad-hoc laden (Cac) CPO (A) must (D) faciliteren (I) ad hoc charging (Bdir) bij elk nieuw publiek laadpunt (Bind)
AFIR02	in-form	omdat de EU standaarden heeft vastgesteld voor ad-hoc laden (Cac) CPO (A) must (D) faciliteren (I) ad hoc charging (Bdir) bij elk bestaand publiek laadpunt met een vermogen >50 kW (Bind) vóór 2027 (Cex)
AFIR03	in-form	wanneer ad hoc charging is gefaciliteerd bij publieke laadpaal (Cac) CPO (A) must (D) communiceren (I) de mogelijkheid om ad hoc te laden (Bdir) duidelijk (Cex)
AFIR04	in-form	bij een publieke laadpaal die valt onder de AFIR (Cac) EV-rijder (A) may (D) kiezen (I) betaalmethode (Bdir) altijd (Cex)
AFIR05	in-form	bij publieke laadpaal met vermogen > 50kW (Cac) CPO (A) shall (D) baseren (I) laadprijs ad hoc charging (Bdir) op de prijs per kWh van elektriciteit (Cex)
AFIR06	in-form	bij publieke laadpaal met vermogen > 50kW (Cac) CPO (A) may (D) vragen (I) occupancy fee per minuut laden (Bdir) bovenop ad hoc laadprijs (Cex)
AFIR07	in-form	bij publieke laadpaal met vermogen > 50kW (Cac) CPO (A) shall (D) communiceren (I) de totale prijs van ad hoc laden (Bdir) aan EV driver (Bind) met alle prijscomponenten AND voorafgaand aan het starten van de laadsessie AND mogelijkmakend om de prijs te vergelijken (Cex)
AFIR08	in-form	bij publieke laadpaal (Cac) CPO (A) must (D) communiceren (I) alle prijscomponenten (Bdir) aan EV driver (Bind) voorafgaand aan laden AND mogelijkmakend om de prijs te vergelijken (Cex)
AFIR09	in-form	bij publieke laadpaal met vermogen < 50kW (Cac) CPO (A) shall (D) communiceren (I) de totale prijs van ad hoc laden (Bdir) aan EV driver (Bind) met alle prijscomponenten AND voorafgaand aan het starten van de laadsessie AND mogelijkmakend om de prijs te vergelijken (Cex)
AFIR10	in-form	voor de start van een laadsessie van een EV-driver (Cac) MSP (A) shall (D) communiceren (I) alle relevante prijsinformatie (Bdir) aan EV driver (Bind) through accessible applications AND distinguishing all price components (Cex)
AFIR11	in-form	de staat (A) shall (D) monitoren (I) charging infrastructuur markt (Bdir) conform de standaarden van de AFIR (Cex)
AFIR12	in-form	bij de uitrol van publieke laadinfrastructuur (Cac) de EU (A) vaststellen (I) normen rondom ad hoc laden (Bdir) aan CPOs (Bind)
AFIR13	in-form	wanneer ad hoc charging is gefaciliteerd (Cac) CPO (A) must (D) communiceren (I) mogelijkheid om ad hoc te laden (Bdir) aan EV driver (Bind) duidelijk op station (Cex)
AFIR14	intent	wanneer ad hoc charging gebruikt wordt (Cac) EV-rijder (A) hebben (I) meer inzicht en toegang (Bdir) in prijs van laadsessie (Bind)
BPM01	in-form	bij inschrijving van een auto (Cac) de staat (A) heffen (I) belasting (Bdir) auto-eigenaar (Bind)
BPM02	in-form	Om belasting te heffen over aankoop van auto (Cac) de staat (A) berekenen (I) BPM-tarief (Bdir) auto-eigenaar (Bind) o.b.v. CO2 uitstoot auto EN dieseltoeslag (Cex)

BPM03	in-form	om BPM tarief te berekenen bij aanschaf van een zero-emissie auto (Cac) auto-eigenaar (A) must (D) betalen (I) laag BPM-tarief (Bdir) staat (Bind) conform tarief van zero-emissie auto (Cex)
BPM04	in-form	om BPM tarief te berekenen bij aanschaf van een auto met CO2-uitstoot (Cac) auto-eigenaar (A) must (D) betalen (I) BPM-tarief (Bdir) staat (Bind) conform tarief van uitstootcategorie van auto (Cex)
BPM05	in-form	Om BPM-tarief te berekenen bij aanschaf dieselauto (Cac) auto-eigenaar (A) must (D) betalen (I) dieseltoeslag (Bdir) staat (Bind) bovenop BPM tarief (Cex)
BPM06	in-form	indien auto gebruikt aangeschaft (Cac) de staat (A) verlagen (I) BPM-tarief (Bdir) auto-eigenaar (Bind) met inachtneming van afschrijving (Cex)
BPM07	in-form	indien gebruikte auto aangeschaft (Cac) auto-eigenaar (A) must (D) betalen (I) basis BPM-tarief (Bdir) staat (Bind) o.b.v. afgeschreven tarief (Cex)
BPM08	in-form	na het toepassen van het bestaande BPM tarief (Cac) de staat (A) may (D) aanpassen (I) BPM-tarief (Bdir) via ministeriële regeling (Cex)
BPM09	in-form	om BPM tarief te berekenen bij aanschaf van een hybride auto (Cac) auto-eigenaar (A) must (D) betalen (I) laag BPM-tarief (Bdir) staat (Bind) conform tarief van uitstootcategorie van auto (Cex)
KEV01	in-use	als korting op MRB wordt verlaagd (Cac) EV-rijder (A) betalen (I) meer belasting (Bdir) aan staat (Bind)
KEV02	in-use	tussen 2025 en 2030 (Cac) de staat (A) versoberen (I) korting op MRB (Bdir) voor EV-rijder (Bind)
KEV03	in-use	als olieprijs daalt (Cac) brandstofauto-eigenaar (A) betalen (I) lagere prijs (Bdir) om te rijden (Cex)
KEV04	in-use	als olieprijs daalt (Cac) brandstofauto-eigenaar (A) rijden (I) kilometers (Bdir) meer (Cex)
KEV05	in-use	als laadtarieven voor openbaar laden stijgen (Cac) EV-rijder (A) betalen (I) hogere prijs (Bdir) om te rijden (Cex)
KEV06	in-use	de staat (A) must (D) behalen (I) reductiedoel (Bdir) emissies door mobiliteit sector (Bind) conform ESR (Cex)
KEV07	in-use	Beleidsmakers en bedrijven (A) promoten (I) slimme apparaten, aanpassing van nettarieven en netbewust bouwen (Bdir) om overload op laagspanningsnet te voorkomen (Cex)
KEV08	in-use	als netcongestie aanhoudt (Cac) DSO (A) cannot (D) faciliteren (I) aansluiting voor publieke laadpaal (Bdir) aan CPO (Bind)
KEV09	in-use	zonder toegang tot een aanlsuiting (Cac) CPO (A) cannot (D) installeren (I) publieke laadpaal (Bdir)
KEV10	in-use	als netcongestie aanhoudt (Cac) gemeente (A) cannot (D) uitvoeren (I) beleid rondom de uitrol van laadinfrastructuur (Bdir)
KEV11	in-use	als beperkte toegang tot laadpaal (Cac) auto-eigenaar (A) may (D) overstappen (I) EV (Bdir) niet (Cex)
KEV12	in-use	als er financiele voordelen zijn voor het hebben van een EV t.o.v. ICE vehicle (Cac) auto-eigenaar (A) may (D) overstappen (I) EV (Bdir) van brandstofauto (Bind)
KEV13	in-use	als werkgever de werknemer verplicht om elektrisch te rijden (Cac) werknemer (A) must (D) rijden (I) elektrisch (Cex)
KEV14	in-use	werkgever (A) may (D) verplichten (I) werknemer (Bdir) om elektrisch te rijden (Cex)
KEV15	in-use	als laadtarief stijgt (Cac) EV-rijder (A) may (D) rijden (I) minder elektrische kilometers (Bdir)
KEV16	in-use	vanaf 2035 (Cac) autofabrikant (A) cannot (D) produceren (I) brandstofauto (Bdir) conform EU wetgeving (Cex)
KEV17	in-use	wanneer autofabrikanten enkel zero-emissie auto's produceren (Cac) auto-eigenaar (A) kopen (I) zero-emissieauto (Bdir) sneller (Cex)
KP01	in-use	zoals beschreven in het klimaatplan (Cac) de staat (A) must (D) maken (I) besluiten (Bdir) over nieuwe beleidsrichtingen (Bind) komende jaren (Cex)
KP02	intent	Om richting te geven aan de transitie naar een klimaatneutrale samenleving in 2050 (Cac) de staat (A) wil faciliteren (I) een lange termijn visie (Bdir) met het klimaatplan (Bind) dat de komende jaren de basis biedt een voor consistent beleid (Cex)
KP03	intent	de staat (A) wil bouwen (I) een economie die groene groei voortbrengt (Bdir) met ondernemers en kennisinstituten (Cex)
KP04	intent	de staat (A) wil reduceren (I) 90% van de broeikasgassen (Bdir) voor 2040 (Cex)

KP05	intent	met het klimaatbeleid (Cac) de staat (A) wil bereiken (I) rechtvaardige uitkomsten (Bdir) in de komende jaren (Cex)
KP06	intent	met het klimaatbeleid (Cac) de staat (A) wil bieden (I) economisch perspectief (Bdir) in de komende jaren (Cex)
KP07	intent	met het klimaatbeleid (Cac) de staat (A) wil bieden (I) ruimte (Bdir) aan maatshappelijk initiatief (Bind) in de komende jaren (Cex)
KP08	intent	om klimaatneutraliteit te bereiken (Cac) de staat (A) wil ontwikkelen (I) maatschappelijk gedragen klimaatbeleid (Bdir)
KP09	in-use	Het Nationaal Klimaatplatform (A) faciliteren (I) gesprekken (Bdir) met door klimaatbeleid geraakte personen en organisaties waarvan weinig bekend is (Bind)
KP10	in-use	om het klimaatplan te schrijven (Cac) Minister KGG (A) voeren (I) gesprekken (Bdir) met door klimaatbeleid geraakte personen en organisaties waarvan weinig bekend is (Bind) gefaciliteerd door het Nationaal Klimaatplatform (Cex)
KP11	in-use	met het klimaatbeleid (Cac) Minister KGG (A) may (D) raken (I) personen en organisaties waarvan weinig bekend is (Bdir)
KP12	in-use	om doelstellingen te halen (Cac) Nederlandse burger (A) must (D) participeren (I) in de energietransitie (Bdir)
KP13	in-use	om energiekosten te verlagen (Cac) Nederlandse burger (A) may (D) participeren (I) in de energietransitie (Bdir)
KP14	in-use	omdat er kansen zijn voor duurzame investeringen die zich later terugverdienen (Cac) Nederlandse burger (A) may (D) participeren (I) in de energietransitie (Bdir)
KP15	in-use	als zij niet de middelen hebben (Cac) Nederlandse burger (A) cannot (D) participeren (I) de energietransitie (Bdir)
KP16	intent	de staat (A) wil ontwikkelen (I) klimaatbeleid (Bdir) dat alle Nederlanders helpt ongeacht financiele middelen (Cex)
KP17	in-use	bij klimaatbeleid (Cac) Nederlandse burger (A) hechten (I) het meeste waarde (Bdir) aan rechtvaardigheid (Bind)
KP18	in-use	de staat (A) must (D) nemen (I) verantwoordelijkheid (Bdir) voor uitstoot van broeikasgassen (Bind) om uiterlijk in 2050 klimaatneutraal te zijn (Cex)
KP19	in-use	de staat (A) shall (D) aansporen (I) grootste broeikasgas-uitstoters van G20 (Bdir) om uiterlijk in 2050 te verminderen (Cex)
KP20	in-use	de staat (A) faciliteren (I) het maken van keuzes (Bdir) aan de burger (Bind) in de juiste richting (Cex)
KP21	in-use	wanneer noodzakelijk (Cac) de staat (A) inzetten (I) subsidies (Bdir) voor particulieren en bedrijven (Bind)
KP22	in-use	Nederlandsers met hoge inkomens (A) hebben (I) meer capaciteit (Bdir) om te verduurzamen (Cex)
KP23	intent	zodat er voor iedereen handelingsperspectief is (Cac) de staat (A) wil ondersteunen (I) mensen en bedrijven die niet kunnen verduurzamen (Bdir) actief (Cex)
KP24	in-use	wanneer zij geen financiele middelen hebben (Cac) particulieren, maatschappelijke organisaties en bedrijven (A) cannot (D) verduurzamen (I) activiteiten (Bdir)
KP25	intent	de staat (A) wil creeren (I) beleid (Bdir) dat de maatschappelijke kosten van uitstoot eerlijk verdeeld (Cex)
KP26	intent	de staat (A) wil creeren (I) beleid (Bdir) dat duurzaam gedrag aanmoedigt (Cex)
KP27	intent	de staat (A) wil creeren (I) speelveld met eerlijke concurrentie (Bdir) voor bedrijven (Bind) door in Europees verband te opereren (Cex)
KP28	in-use	Nederlandsers met lage inkomens (A) uitstoten (I) minste emissies (Bdir) vaak (Cex)
KP29	in-use	in het voorjaar van 2025 (Cac) de staat (A) onderzoeken (I) invulling en indiening van het Social Climate Fund (Bdir) bij de Europese Commissie (Bind)
KP30	intent	om kwetsbare weggebruikers te ondersteunen (Cac) de staat (A) wil gebruiken (I) het Social Climate Fund (Bdir)
KP31	intent	de staat (A) wil bouwen (I) nieuwe elektriciteitsinfrastructuur (Bdir) met het Landelijk Actieprogramma Netcongestie (Bind) sneller (Cex)
KP32	intent	de staat (A) wil benutten (I) bestaande capaciteit (Bdir) met het Landelijk Actieprogramma Netcongestie (Bind) beter (Cex)
KP33	intent	de staat (A) wil inzicht (I) in de bestaande situatie (Bdir) met het Landelijk Actieprogramma Netcongestie (Bind) slimmer (Cex)

KP34	in-use	om infrastructuurprojecten zo snel mogelijk te realiseren (Cac) beleidsmakers en marktpartijen (A) must (D) samenwerken (I)
KP35	in-use	om meer uit het bestaande elektriciteitsnet te halen (Cac) energieproducenten (A) must (D) benutten (I) het elektriciteitsnet (Bdir) optimaal (Cex)
KP36	in-use	voor betere benutting van bestaande capaciteit elektriciteitsnet (Cac) de staat (A) aanscherpen (I) regels (Bdir) over benutten van elektriciteitsnet (Cex)
KP37	in-use	voor betere benutting van bestaande capaciteit elektriciteitsnet (Cac) particulieren en bedrijven (A) must (D) gebruiken (I) elektriciteit (Bdir) flexibel (Cex)
KP38	in-use	om EV the laden (Cac) EV-rijder (A) may (D) gebruiken (I) het elektriciteitsnet (Bdir) flexibel (Cex)
KP39	in-use	de komende periode (Cac) de staat (A) inzetten (I) geïdentificeerde maatregelen tegen congestie (Bdir) waar relevant en mogelijk breder toe te passen in alle regio's met congestie (Cex)
KP40	in-use	om de business case van klimaatinvesteringen te verbeteren en duurzame projecten financierbaar voor private partijen te maken (Cac) de staat (A) must (D) afbouwen (I) fossiele subsidies (Bdir)
KP41	in-use	met als doel om financieringen en beleggingen in lijn te brengen met het Parijsakkoord. (Cac) de staat (A) stimuleren (I) inzet van private financiering (Bdir) via vertegenwoordiging van het Min Fin en Min KGG (Cex)
KP42	in-use	voor de aanleg van nieuwe laadpalen voor EVs (Cac) de staat (A) must (D) stimuleren (I) werving (Bdir) van technische vakmensen (Bind)
KP43	in-use	voor de aanleg van het elektriciteitsnet (Cac) de staat (A) must (D) stimuleren (I) werving (Bdir) van technische vakmensen (Bind)
KP44	in-use	binnen de energietransitie (Cac) de staat (A) bepalen (I) transitietempo (Bdir) in sectoren (Bind) door tijdige opschaling van energie en energie-infrastructuur (Cex)
KP45	in-use	de staat (A) may (D) beinvloeden (I) randvoorwaarden (Bdir) voor de ontwikkeling van tijdige opschaling van het elektriciteitsnet (Bind)
KP46	in-use	vanwege klimaatverandering (Cac) Nederlandse burger (A) zien (I) belang (Bdir) van anders leven (Bind)
KP47	in-use	wanneer burgers het belang inzien van anders leven omwille van klimaatverandering (Cac) Nederlandse burger (A) veranderen (I) hun manier van leven (Bdir) niet automatisch (Cex)
KP48	in-use	in 2035 (Cac) autofabrikant (A) must (D) verkopen (I) emissievrije auto (Bdir) aan kopers (Bind)
KP49	in-use	vanaf 2027 (Cac) brandstofleverancier (A) must (D) kopen (I) emissierechten (Bdir) voor de verkoop van fossiele brandstoffen (Bind) coform ETS2 (Cex)
KP50	in-use	om in 2044 de totale rechten tot 0 afgebouwd te hebben (Cac) de EU (A) verlaagt (I) het emissieplafond (Bdir) van emissierechten (Bind) jaarlijks (Cex)
KP51	in-use	binnen het nationale klimaat- en energiebeleid (Cac) de staat (A) beschouwen (I) EV (Bdir) als onderdeel van het energiesysteem (Bind)
KP52	intent	de staat (A) wil mogelijk maken (I) bidirectioneel laden (Bdir) voor vraagsturing, tijdelijk opslag, en teruglevering (Bind) via de batterijen van miljoenen EVs (Cex)
KP53	in-use	gemeente (A) instellen (I) zero-emissiezones (Bdir) in steden (Bind) conform de ambitie van het kabinet dat de binnensteden voor ondernemers bereikbaar blijven (Cex)
KP54	in-use	om het huidige reductiedoel voor 2030 te halen EN zicht te blijven houden op klimaatneutraliteit in 2050 (Cac) de staat (A) must (D) invoeren (I) stevige aanvullende beleidsinzet (Bdir) in aanvulling op de huidige nationale instrumentenmix (Bind)
KP55	in-use	door beprijzing van emissies (Cac) de staat (A) maken (I) emissievrije auto (Bdir) voor mensen, maatschappelijke organsiaties en bedrijven (Bind) financieel aantrekkelijk (Cex)
KP56	intent	om EU-tussendoel voor 2040 op weg naar 2050 te halen (Cac) de staat (A) wil reduceren (I) uitstoot van broeikasgassen (Bdir) met Europese oplossingen (Cex)

KP57	intent	in toekomstig EU klimaatbeleid (Cac) de staat (A) wil waarborgen (I) dat alle sectoren een kosteneffectieve en eerlijke bijdrage leveren (Bdir)
KP58	in-use	in toekomstig EU klimaatbeleid volgens Nederland (Cac) spelers in de transport sector (A) must (D) leveren (I) kosteneffectieve en eerlijke bijdrage (Bdir) aan de energietransitie (Bind)
KP59	in-use	in toekomstig EU klimaatbeleid volgens Nederland (Cac) lage- en middeninkomens, maatschappelijke organisaties en bedrijven met minder draagkracht (A) must (D) kunnen participeren (I) transitie (Bdir)
KP60	in-use	in toekomstig EU klimaatbeleid volgens Nederland (Cac) de EU (A) must (D) sturen (I) op afbouwen van fossiele subsidies (Bdir)
KP61	intent	om te borgen dat de benodigde emissiereductie daadwerkelijk tijdig plaatsvindt (Cac) de staat (A) wil creeren (I) instrumentenmix van het klimaatbeleid (Bdir) bestaande uit normerende, subsidiërende en beprijzende maatregelen voor alle sectoren (Cex)
KP62	intent	om te zorgen dat alle Nederlanders weten waar ze aan toe zijn tijdens de transitie (Cac) de staat (A) wil creeren (I) balans in instrumentenmix van het klimaatbeleid (Bdir) beleidsstabiliteit (Bind)
KP63	intent	om te zorgen dat alle Nederlanders weten waar ze aan toe zijn tijdens de transitie (Cac) de staat (A) wil creeren (I) voldoende ondersteuning in het klimaatbeleid (Bdir) voor burgers en bedrijven (Bind)
KP64	in-use	de staat (A) onderzoeken (I) het effect van de prijsprikkel van het ETS (Bdir) op het behalen van de nationale klimaatdoelen (Bind)
KP65	in-use	om de nationale klimaatdoelen te behalen (Cac) de staat (A) onderzoeken (I) de optimale nationale instrumentenmix en de bepijzingshoogte per (deel)sector (Bdir)
KP66	intent	om elektriciteitsinfrastructuur aan te leggen (Cac) de staat (A) wil vergroten (I) technisch personeel (Bdir) voor de klimaat- en energiesectoren (Bind) via Actieplan Groene en Digitale banen (Cex)
KP67	intent	de staat (A) wil versnellen (I) besluitvorming (Bdir) over de aanleg van de benodigde energie- infrastructuurprojecten (Bind) Met het Meerjarenprogramma Infrastructuur Energie en Klimaat (MIEK) (Cex)
KP68	intent	in de investeringsplannen van de netbeheerders (Cac) de staat (A) wil prioritiseren (I) bepaalde projecten (Bdir) voor de aanleg van de benodigde energie- infrastructuurprojecten (Bind) Met het Meerjarenprogramma Infrastructuur Energie en Klimaat (MIEK) (Cex)
KP69	intent	de staat (A) wil wegnemen (I) knelpunten (Bdir) bij de realisatie van projecten (Bind) Met het Meerjarenprogramma Infrastructuur Energie en Klimaat (MIEK) (Cex)
KP70	intent	om een versnelling in de realisatie en uitvoering energiesysteem te creeren (Cac) de staat (A) wil versterken (I) de coordinatie van besluitvorming (Bdir)
KP71	intent	om een versnelling in de realisatie en uitvoering energiesysteem te creeren (Cac) de staat (A) wil vereenvoudigen (I) vergunningverlening (Bdir) voor projecten (Bind)
KP72	intent	om een versnelling in de realisatie en uitvoering energiesysteem te creeren (Cac) de staat (A) wil versnellen (I) vergunningverlening (Bdir) voor projecten (Bind)
KP73	intent	om autorijden betaalbaar te houden EN de EV voldoende te ondersteunen (Cac) de staat (A) wil verdelen (I) kosten (Bdir) over EV rijders en ICE rijders (Bind) eerlijk (Cex)
KP74	intent	om de afgesproken klimaatdoelen te halen (Cac) de staat (A) wil ondersteunen (I) EV-gebruik (Bdir) in voldoende maten (Cex)
KP75	intent	wanneer mobiliteitsbeleid wordt gemaakt (Cac) de staat (A) wil krijgen (I) stabiele opbrengst op de lange termijn (Bdir) van autobelasting (Bind)
KP76	in-use	door de geleidelijke toename van elektrische auto's (Cac) de staat (A) zal niet krijgen (I) stabiele opbrengst op de middenlange termijn (Bdir) van autobelasting (Bind) met het huidige autobelastingstelsel (Cex)
KP77	intent	om een stabiele opbrengst van autobelasting op de lange termijn te krijgen (Cac) de staat (A) wil vragen (I) eerlijke bijdrage (Bdir) EV-rijder (Bind) in de vorm van autobelasting (Cex)
KP78	in-use	omdat de staat een eerlijke bijdrage wil vragen aan EV-rijders (Cac) EV-rijder (A) must (D) betalen (I) autobelasting (Bdir) aan staat (Bind)

KP79	intent	de staat (A) wil onderzoeken (I) toekomstbestendige balans (Bdir) tussen verduurzaming, betaalbaarheid, overheidsinkomsten en bereikbaarheid (Bind) komende jaren (Cex)
KP80	intent	om de CO_2-impact van woon-werkverkeer en zakelijk verkeer te verminderen (Cac) de staat (A) wil vasthouden (I) aan de mogelijkheid voor CO_2-normering (Bdir) werkgevers en werknemers (Bind) op werkgebonden mobiliteit (Cex)
KP81	in-use	Minister KGG (A) dragen (I) de eindverantwoordelijkheid (Bdir) voor het bereiken van de doelen in de Klimaatwet (Bind)
KP82	in-use	in het klimaatbeleid (Cac) Minister IenW (A) dragen (I) de verantwoordelijkheid (Bdir) voor het behalen van het sectorale aandeel transport en mobiliteit (Bind)
KP83	in-use	Minister KGG (A) dragen (I) de verantwoordelijkheid (Bdir) voor de sectoropgave elektriciteit en (regie op) het energiebeleid (Bind)
KP84	in-use	Minister IenW (A) dragen (I) de verantwoordelijkheid (Bdir) voor de sectoropgave mobiliteit (Bind)
KP85	in-use	medeoverheden (A) must (D) nemen (I) verantwoordelijkheid (Bdir) voor de lokale uitwerking van een rechtvaardig klimaatbeleid (Bind)
KP86	in-use	om een overzicht te geven van geraliseerde emissies en het effect van maatregelen (Cac) het PBL (A) publiceren (I) KEV (Bdir) jaarlijks (Cex)
KP87	intent	om inzicht te krijgen waarom mensen bepaalde keuzes maken (Cac) de staat (A) wil monitoren (I) duurzaam gedrag (Bdir) van burgers (Bind) rondom EV laden (Cex)
KP88	intent	wanneer mobiliteitsbeleid wordt gemaakt (Cac) de staat (A) wil behouden (I) betaalbaar autorijden (Bdir) for all drivers (Bind)
KW01	intent	n.a.v. de Europese klimaatwet (Cac) de staat (A) reduceren (I) netto-uitstoot van broeikasgassen (Bdir) uiterlijk in 2050 tot nul (Cex)
KW02	intent	n.a.v. de Europese klimaatwet (Cac) de staat (A) willen bereiken (I) negatieve emissies van broeikasgassen (Bdir) vanaf 2050 (Cex)
KW03	intent	Teneinde deze doelstellingen voor 2050 te bereiken (Cac) de staat (A) willen reduceren (I) emissies van broeikasgassen (Bdir) met 55% in 2030 ten opzichte van broeikasgassen in 1990 (Cex)
KW04	intent	Teneinde deze doelstellingen voor 2050 te bereiken (Cac) de staat (A) willen bereiken (I) volledig CO2-neutraal elektriciteitsproductie (Bdir) vanaf 2050 (Cex)
KW05	in-form	om de tussentijdse doelstelling te bereiken (Cac) de staat (A) treffen (I) passende maatregelen (Bdir) eerstevolgende 10 jaar zoals beschreven in het Klimaatplan (Cex)
KW06	in-form	zodra het Klimaatplan is geschreven (Cac) de staat (A) uitvoeren (I) klimaatbeleid (Bdir) eerstevolgende 10 jaar zoals beschreven in het Klimaatplan (Cex)
KW07	in-form	zoals beschreven in het Klimaatplan (Cac) de staat (A) treffen (I) maatregelen (Bdir)
KW08	in-form	voor de eerste keer in 2019; met betrekking op de periode van 2021 tot en met 2030 (Cac) Minister KGG (A) vaststellen (I) het klimaatplan (Bdir) in overeenstemming met het gevoelen van de ministerraad en nadat het is overgelegd aan beide kamers der Staten-Generaal (Cex)
KW09	in-form	elke 5 jaar na de eerste keer in 2019 (Cac) de staat (A) herzien (I) het klimaatplan (Bdir) opnieuw (Cex)
KW10	in-form	elke 2 jaar na het vaststellen van het klimaatplan (Cac) Onze Ministers (A) rapporteren (I) de voortgang van de uitvoering van het klimaatplan (Bdir)
KW11	in-form	als rapportage aanleiding geeft in het licht van de doelstellingen (Cac) Onze Ministers (A) nemen (I) maatregelen (Bdir) voor het bereiken van de doelstellingen (Cex)
KW12	in-form	ter verantwoording van het gevoerde klimaatbeleid (Cac) het PBL (A) uitbrengen (I) KEV (Bdir) aan Onze Minister (Bind) jaarlijks (Cex)
KW13	in-form	ter publicatie van het KEV (Cac) het PBL (A) rapporteren (I) de gevolgen van het gevoerde klimaatbeleid (Bdir)
KW14	in-form	ter publicatie van het KEV (Cac) het PBL (A) rapporteren (I) de emissies van broeikasgassen per sector (Bdir)

KW15	in-form	ter publicatie van het KEV (Cac) het PBL (A) rapporteren (I) invloedrijke ontwikkelingen en maatregelen per sector (Bdir)
KW16	in-form	zoals dit is opgenomen in het klimaatplan (Cac) de staat (A) opstellen (I) klimaatnota (Bdir) jaarlijks (Cex)
KW17	in-form	Ten behoeve van de uitvoering van de Klimaatwet (Cac) de staat (A) overleggen (I) met bestuursorganen van provincies, waterschappen, gemeenten en overige relevante partijen (Bdir)
KW18	in-form	gericht op het bereiken van de doelstellingen (Cac) de staat (A) bevorderen (I) het sluiten van overeenkomsten (Bdir) met partijen (Bind)
MRB01	in-form	elke drie maanden (Cac) de staat (A) heffen (I) belasting (Bdir) auto-eigenaar (Bind) over het houden van een personenauto (Cex)
MRB02	in-form	om belasting te heffen over het houden van auto (Cac) de staat (A) berekenen (I) MRB-tarief (Bdir) auto-eigenaar (Bind) obv eigen massa auto EN dieseltoeslag EN fijnstoftoeslag EN EV-korting (Cex)
MRB03	in-form	om MRB-tarief te berekenen bij het houden van hybride elektrische-dieselauto (Cac) auto-eigenaar (A) must (D) betalen (I) dieseltoeslag berekend a.d.h.v. eigen massa auto (Bdir) staat (Bind) bovenop MRB-tarief (Cex)
MRB04	in-form	om MRB-tarief te berekenen bij het houden van auto met hoge fijnstofuitstoot (Cac) auto-eigenaar (A) must (D) betalen (I) fijnstoftoeslag (Bdir) staat (Bind) bovenop MRB-tarief (Cex)
MRB05	in-form	om MRB-tarief te berekenen bij het houden van een zero-emissie auto (Cac) auto-eigenaar (A) must (D) betalen (I) 25% van reguliere MRB-tarief (Bdir) staat (Bind)
MRB06	in-form	om MRB-tarief te berekenen bij het houden van een hybride (Cac) auto-eigenaar (A) must (D) betalen (I) 75% van reguliere MRB-tarief (Bdir) staat (Bind)
MRB07	in-form	om MRB-tarief te berekenen bij het houden van een auto (Cac) auto-eigenaar (A) must (D) betalen (I) MRB-tarief (Bdir) staat (Bind) conform tarief van gewichtscategorie van auto (Cex)
MRB08	in-form	om MRB-tarief te berekenen bij het houden van dieselauto (Cac) auto-eigenaar (A) must (D) betalen (I) dieseltoeslag berekend a.d.h.v. eigen massa auto (Bdir) staat (Bind) bovenop MRB-tarief (Cex)
NLO01	in-use	Nationale Agenda Laadinfrastructuur (A) coordineren (I) ontwikkeling van laadinfrastructuur (Bdir) ter uitrol van het elektrisch vervoer (Cex)
NLO02	in-use	als in het bezit van prive laadmogelijkheid EN zonnepanelen (Cac) EV-rijder (A) laden (I) EV (Bdir) op tijden waarop zonne-energie beschikbaar is (Cex)
NLO03	in-use	wanneer onderweg (Cac) EV-rijder (A) laden (I) EV (Bdir) vaker met snellader (Cex)
NLO04	in-use	als thuis laden financieel interesant is (Cac) EV-rijder (A) laden (I) EV (Bdir) vaak thuis (Cex)
NLO05	in-use	wanneer EV prive gekocht of geleased (Cac) EV-rijder (A) laden (I) EV (Bdir) relatief vaak op de eigen aansluiting (Cex)
NLO06	in-use	wanneer laadmogelijkheid op werk (Cac) EV-rijder (A) may (D) laden (I) EV (Bdir) op werk (Cex)
NLO07	in-use	wanneer wordt geladen in de openbare ruimte (Cac) EV-rijder (A) may (D) gebruiken (I) snelladers (Bdir)
NLO08	in-use	when charging publicly (Cac) EV-rijder (A) gebruiken (I) ad hoc charging (Bdir) bijna nooit als default optie (Cex)
NLO09	in-use	in the future (Cac) EV-rijder (A) verwachten (I) snellere snelladers (Bdir)
NLO10	in-use	in the future (Cac) EV-rijder (A) verwachten (I) goedkoper laadtarief (Bdir)
NLO11	in-use	Wanneer thuis wordt geladen (Cac) EV-rijder (A) starten (I) laadsessie van EV (Bdir) vaak op vast moment (Cex)
NLO12	in-use	Wanneer thuis wordt geladen (Cac) EV-rijder (A) eindigen (I) laadsessie van EV (Bdir) vaak op vast moment (Cex)
NLO13	in-use	wanneer thuis wordt geladen EN wanneer dynamisch stroomcontract (Cac) EV-rijder (A) may (D) laden (I) EV (Bdir) o.b.v. dynamische tarieven (Cex)
NLO14	in-use	bij openbare laadpaal (Cac) EV-rijder (A) may (D) betalen (I) laadtarief (Bdir) met laadpas of laadapp (Cex)
NLO15	in-use	wanneer met laadpas wordt betaald bij openbare laadpaal (Cac) EV-rijder (A) hebben (I) minder inzicht (Bdir) laadtarief (Bind)
NLO16	in-use	als ad hoc laden is gefaciliteerd door CPO (Cac) EV-rijder (A) may (D) gebruiken (I) ad hoc charging (Bdir) om te betalen bij publieke laadpaal (Cex)
NLO17	in-use	wanneer ad hoc charging gebruikt wordt (Cac) EV-rijder (A) hebben (I) meer inzicht (Bdir) in prijs van laadsessie (Bind)

NLO18	in-use	EV-rijder (A) may (D) kiezen (I) laadpas (Bdir)
NLO19	in-use	als werkgever laadkosten vergoed van werknemer (Cac) werkgever (A) may (D) verstrekken (I) laadpas (Bdir) aan werknemer met EV (Bind) om laadkosten te vergoeden (Cex)
NLO20	in-use	als de laadpas is gefaciliteerd door werkgever (Cac) EV-rijder (A) gebruiken (I) laadpas (Bdir)
NLO21	in-use	EV-rijder (A) may (D) kiezen (I) laadpas (Bdir) o.b.v. dekkingstarief (Cex)
NLO22	in-use	EV-rijder (A) may (D) kiezen (I) laadpas (Bdir) o.b.v. goedkoper laadtarief (Cex)
NLO23	in-use	EV-rijder (A) may (D) overstappen (I) laadpas (Bdir) snel o.b.v. goedkoper laadtarief (Cex)
NLO24	in-use	EV-rijder (A) kennen (I) ad hoc charging (Bdir) niet altijd (Cex)
NLO25	in-use	als ad hoc charging prijs duidelijk en/of goedkoper is dan laadpas-prijs (Cac) EV-rijder (A) may (D) gebruiken (I) ad hoc charging (Bdir)
NLO26	in-use	wanneer wordt geladen bij openbare laadpaal (Cac) EV-rijder (A) willen inzicht hebben (I) laadtarief (Bdir) voorafgaand aan laden (Cex)
NLO27	in-use	als werknemer zakelijk elektrisch rijdt (Cac) werkgever (A) may (D) vergoeden (I) laadkosten (Bdir) werknemer (Bind)
NLO28	in-use	wanneer EV prive gekocht of geleased (Cac) EV-rijder (A) betalen (I) laadkosten (Bdir) vaak zelf (Cex)
NLO29	in-use	wanneer EV-rijder inzicht wil hebben in de laadprijs van een publieke laadpaal (Cac) EV-rijder (A) weten (I) laadtarief (Bdir) niet altijd (Cex)
NLO30	in-use	als in het bezit van prive laadmogelijkheid (Cac) EV-rijder (A) laden (I) EV (Bdir) vaak thuis (Cex)
NLO31	in-use	als niet in het bezit van prive laadmogelijkheid (Cac) EV-rijder (A) laden (I) EV (Bdir) bij publiek oplaadpunt (Cex)
NLO32	in-use	als in het bezit van eigen parkeergelegenheid (Cac) EV-rijder (A) laden (I) EV (Bdir) via de eigen aansluiting (Cex)
NLO33	in-use	wanneer thuis wordt geladen (Cac) EV-rijder (A) laden (I) EV (Bdir) vaak o.b.v. dynamische tarieven (Cex)
NLO34	in-use	Nederlandse burger (A) hebben (I) een dynamische energiecontract (Bdir) bijna nooit (Cex)
NLO35	in-use	zonder eigen parkeergelegenheid AND met eigen zonnepanelen (Cac) EV-rijder (A) laden (I) EV (Bdir) via de eigen aansluiting (Cex)
NLO36	in-use	als toegang tot eigen aansluiting (Cac) auto-eigenaar (A) may (D) overstappen (I) EV (Bdir) van ICE-vehicle (Bind) vaak (Cex)
NLO37	in-use	als werknemer thuis laadt (Cac) werkgever (A) vergoeden (I) laadkosten (Bdir) van werknemer (Bind) conform mogelijke vergoedingsconstructies (Cex)
NLO38	in-use	als werkgever niet thuislaadkosten vergoed (Cac) EV-rijder (A) must (D) betalen (I) kosten van thuisladen (Bdir) zelf (Cex)
NLO39	in-use	tijdens het openbaar laden in de buurt van de woning (Cac) EV-rijder (A) may (D) ervaren (I) knelpunten (Bdir) die hinder veroorzaken (Cex)
NLO40	in-use	wanneer laadpaal in de openbare ruimte bezet is (Cac) EV-rijder (A) cannot (D) gebruiken (I) laadpaal (Bdir) ongeachte reden van bezetting (Cex)
NLO41	in-use	EV-rijder (A) kennen (I) slim laden (Bdir) vaker (Cex)
NLO42	in-use	als EV-rijder bekend is met het concept slim laden (Cac) EV-rijder (A) may (D) toepassen (I) slim laden (Bdir) thuis (Cex)
NLO43	in-use	wanneer thuis wordt geladen o.b.v. dynamische tarieven (Cac) EV-rijder (A) hebben (I) positieve ervaring (Bdir) thuisladen (Bind)
NLO44	in-use	wanneer thuis wordt geladen o.b.v. duurzame opwek (Cac) EV-rijder (A) hebben (I) positieve ervaring (Bdir) thuisladen (Bind)
NLO45	in-use	wanneer thuis wordt geladen o.b.v. netcapaciteit (Cac) EV-rijder (A) hebben (I) positieve ervaring (Bdir) thuisladen (Bind)
NLO46	in-use	wanneer in het bezit van een slimme laadpaal (Cac) EV-rijder (A) may (D) gebruiken (I) slim laden (Bdir) om EV te laden (Cex)
NLO47	in-use	wanneer thuis wordt geladen (Cac) EV-rijder (A) hebben (I) een slimme laadpaal (Bdir) vaak (Cex)

NLO48	in-use	wanneer niet automatisch slim laden wordt gebruikt (Cac) EV-rijder (A) laden (I) EV (Bdir) handmatig op een energiebewuste manier (Cex)
NLO49	in-use	wanneer thuis wordt geladen (Cac) EV-rijder (A) hebben (I) zonnepanelen (Bdir) vaak (Cex)
NLO50	in-use	wanneer slim laden niet wordt gebruikt (Cac) EV-rijder (A) willen gebruiken (I) slim laden (Bdir) met dynamische stroomtarieven (Cex)
NLO51	in-use	wanneer slim laden niet wordt gebruikt (Cac) EV-rijder (A) willen gebruiken (I) slim laden (Bdir) aan de openbare laadpaal o.b.v. netcapaciteit (Cex)
WA01	in-form	de staat (A) heffen (I) belasting (Bdir) minerale olien (Bind) onder de naam accijns (Cex)
WA02	in-form	voor toepassing accijnstarieven (Cac) de staat (A) categoriseert (I) typen brandstoffen (Bdir) volgens wettelijke categorieen (Cex)
WA03	in-form	bij aankoop brandstof (Cac) de staat (A) bepaalt (I) hoogteaccijnsbelasting (Bdir) voor auto-eigenaar (Bind) o.b.v. verbruik EN accijnstarief (Cex)
WA04	in-form	bij aankoop brandstof (Cac) auto-eigenaar (A) must (D) betalen (I) accijnsbelasting (Bdir) aan de staat (Bind) o.b.v. verbruik EN accijnstarief (Cex)
WA05	in-form	de staat (A) must (D) vaststellen (I) regels voor berekening van accijnshoeveelheden (Bdir) voor auto-eigenaar (Bind) bij toepassing van tarieven voor benzine en diesel (Cex)
WA06	in-form	de staat (A) verlagen (I) accijnstarief van diesel en bezine (Bdir) tot 31 december 2025 (Cex)

Appendix D Descriptives of institutional statements

This appendix includes descriptives of the institutional statements included in the dataset.

Attributes

Table 13 presents an overview of the stakeholder groups that appear as attributes in the dataset of institutional statements. The table reports the frequency with which each stakeholder group is addressed and the corresponding share of the total number of attributes. Subcategories specify how attributes are distributed within each stakeholder group.

Table 13: Distribution of stakeholder groups coded as attributes in the statements

Attributes	Times attribute appears in statement	Stakeholder group coded as attribute
Policymakers	**98**	47,3%
The EU	3	
The state	81	
Minister IenW & KGG	7	
Regional authorities	3	
Other	4	
Energy market players	**3**	1,5%
DSO	1	
Energy providers	1	
Fuel supplier	1	
Charging infrstructure market player	**12**	5,8%
CPO	9	
MSP	1	
Car manufacturer	2	
Car users	**88**	42,5%
EV driver	51	
fossil-fuel car owner	2	
car owner	15	
Dutch citizens	8	
Other	12	
Research	**6**	2,9%
PBL	5	
Other	1	

Appendix E Additional INDs

This appendix includes two additional network diagrams.

Action situation: Monitoring climate agenda

Figure 15 presents the IND that shows how Dutch climate policy is monitored and how the outcome of this monitoring is used in policymaking.

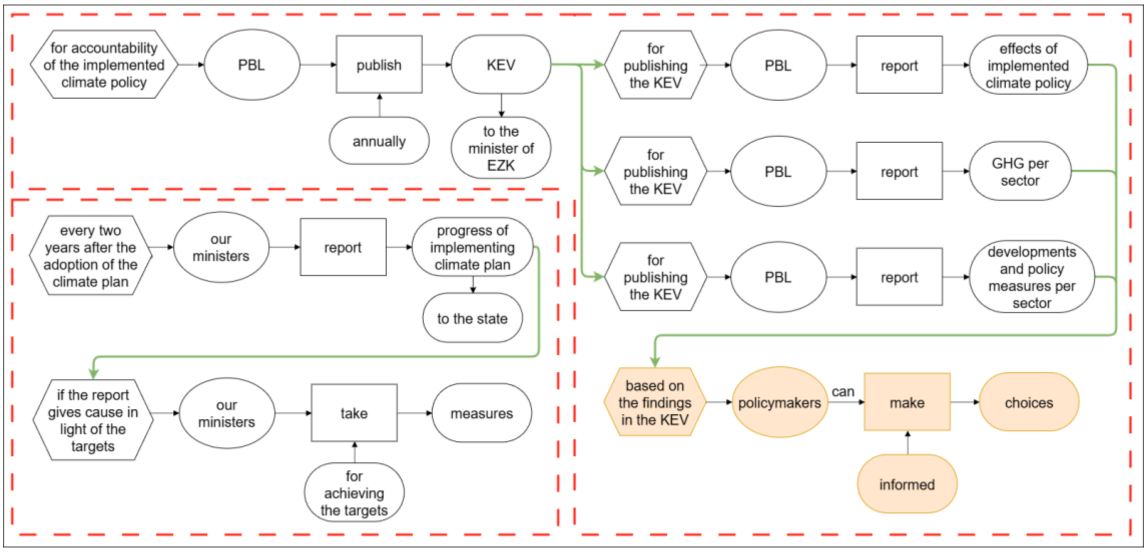

Figure 15: IND of action situation "Monitoring climate agenda"

The diagram shows two monitoring mechanisms: the KEV and the ministerial monitoring reports. The KEV is published by the PBL. This publication is mandated for accountability of implemented climate policy in the KW. The KEV is published annually by PBL and submitted to the Minister of KGG. For its publication, the PBL reports on three elements: the effects of implemented climate policy, greenhouse gas emissions per sector, and the influential developments and policy measures per sector. Together, these reporting obligations constitute a comprehensive, recurring monitoring mechanism focused on evaluating policy performance and sectoral developments. Based on the KEV, policymakers can make more informed decisions on climate policy. This last statement is highlighted in orange in the diagram as it captures what policymakers can do in reality. However, no statements, neither in form nor in use, govern to what extent these findings should be used by policymakers.

The second monitoring mechanism are the progress reports written by the ministers that evaluate the progress of implementing the climate policy. Every two years, ministries are required to report to the State on the progress of implementing the Climate Plan. If the progress reports indicate that targets are at risk, ministries are required to take measures aimed at achieving the climate targets. This creates a legally binding feedback loop between monitoring outcomes and policy action.