The Surge for Electric Vehicles in the Netherlands and the United Kingdom: Will They Reach Their Goal in 2020?

Electric Vehicle Policies from the Netherlands and the United Kingdom between 2009 and 2015

Why is there a difference between electric vehicles in capita between the Netherlands and the United Kingdom and can government decisions, and how consumers respond to these decisions explain this discrepancy?

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1 Introduction

Nowadays, the support of Electric Vehicles (EVs) has taken a high-profile role by many governments worldwide because this so-called vehicle of the future is becoming more and more a better alternative to fossil fuel-powered vehicles. With every year that passes by, it becomes more pleasant for a consumer to own an electric vehicle. The range of electric vehicles grows, they become cheaper to buy, and the required infrastructure around electric vehicles becomes more available such as enough charging points. Rising awareness through the years of climate change made more and more governments around the world commit to action. Global commitment to act on climate change prevention by many government was taken on December the 12th of 2015. At that moment, at the 21st United National Climate Change conference in Paris, 195 countries agreed to a new climate treaty that should reduce greenhouse gas emissions (European Commission, 2015). This treaty is supposed to be binding if a country signs it, and therefore, a country is obliged to comply with it.

The reason that governments chose this direction does not vary much from each other. The main argument seems to find a way to proceed to greener means of transportation for the climate and the welfare of its people. High oil prices and growing concerns over polluting emissions raised the viability of electric vehicles in 2008. In the year after 2009, where the oil prices massively declined, and the worldwide recession did not stop car manufacturers and governments from diminishing their efforts to pursue the uptake of electric vehicles IA-HEV, 2010: 62. Sales for electric vehicles even raised during the recession due to government policies and laws (IA-HEV, 2010: 83). The International Energy Agency: Hybrid and Electric Vehicle (IA-HEV) is a technology collaboration program that keeps track of global development and the rollout of electric vehicles. The IA-HEV noted the trend that countries have given a higher national priority to the electrification of vehicles between 2009 and 2010 (IA-HEV, 2011: 85). In the existing vehicle market, which has been dominated for more than a century by fossil fuel-powered vehicles, electric vehicles became more widely available in the market of passenger vehicles since the year 2009. Efforts in the form of new policies are being created by governments to promote electric vehicles in making them the mainstream vehicle in their country. Countries such as the Netherlands, the United Kingdom, France, Norway, and India have even gone so far that at a certain point in the future, ranging from the year 2025 to 2040. They decided to ban the use of fossil fuel-powered vehicles in favour of cleaner vehicles Petroff, 2017). Meanwhile, many governments have already made and pledged to set up policies to encourage the sales of electric vehicles.

1.1 Research Question

The question of how sustainable these policies are in increasing the number of electric vehicles in a country is interesting because, as mentioned before, many nations are trying to raise the acceptance

and usage of electricity. Fossil fuel-powered vehicles are at present the principal used vehicle. Many countries have made it explicitly clear that electric vehicles are the future and, therefore, will likely become the primary mean of transportation. Several countries have already come up with different kinds of policies to promote the usage of electric vehicles. Many countries already have their own set of policies regarding the promotion of electric vehicles, while each country is aiming for the same shared goal, which is the electrification of vehicles as the primary mean of transportation for its inhabitants. However, it is eventually the customer that will decide if fossil fuel-powered cars will substitute with electric vehicles. The most significant hurdles to overtake is the fear of consumers about charging the vehicles, and the distance that one charge will allow them to drive (Joint Research Centre, 2013). These concerns by the consumers can be taken away if investments follow in vital infrastructures such as an extensive network of electric charging points and a wide range of incentives for electric vehicles (Joint Research Centre, 2013).

According to reports of the International Energy Agency: Hybrid and Electric Vehicles, it is unknown how many electric vehicles in the Netherlands and the United Kingdom had in 2009. However, the Netherlands possessed 50 electric vehicles, and the United Kingdom 1405 electric vehicles in 2008 (see Table 1). At the end of 2015, the Netherlands had 87,531 electric vehicles, and the United Kingdom had 29,963 Electric Vehicles. This means that for every 1,000 inhabitants, there were 5,14 electric vehicles available in the Netherlands. The twist in this story lies in the fact that the United Kingdom only managed to achieve a ratio of having 0,46 electric vehicles for every 1,000 inhabitants. The difference between 5,14 (Netherlands) and 0,46 (United Kingdom) electric vehicles for every 1,000 inhabitants is an interesting question. It raises the question of why the Netherlands seems to be further ahead than the United Kingdom. Therefore, this study investigates the discrepancy between the Netherlands and the United Kingdom regarding the share of electric vehicles per 1,000 inhabitants. This case makes it interesting for the public administration spectrum because these two countries formally have a different way of ruling, for more information, see chapter 1.5.

The Netherlands managed to sell its 100.000th EDV in November 2016 (NOS, 2016). The United Kingdom managed to do this in May 2017. The Dutch government set a goal to have 200.000 electric vehicles in the Netherlands, and the United Kingdom set as their goal that five percent of all the cars on the road will be electric in 2020. This five percent means that 1.700.000 electric vehicles on the British Roads will have to be electric in 2020 (Office for Low Emission Vehicles, 2016). The population in the Netherlands counted 17,1 million people and eight million vehicles at the end of 2015. The Netherlands thus already managed that 1,25% of all the eight million vehicles were electric in November 2016. The United Kingdom is nowhere near this number of 1,25% in their own country. The

United Kingdom had a population of 65,1 million people and 31,7 million vehicles by the end of 2016. The United Kingdom managed to sell its 100.000th electric vehicles in May 2017 (Pod Point, 2017. It was then that the total amount of electric vehicles in the United Kingdom represented 0,003% of the total fleet of vehicles. The numbers show that the Netherlands reached 50% of its goal in November 2016, representing 100.000 electric vehicles. The United Kingdom reached 5,9% of its goal in May 2017. This 5,9% means that 100.300 electric vehicles were on the road in May 2017.

The goal of this research is to analyse the development trajectory of electric vehicle policies and their effect on the sales regarding electric vehicles. This study also takes a closer look into the desired effect, which is an increase of electric vehicles by a set date. This goalsetting would mean if the Dutch or British government is content or not with the increase of electric vehicles. The idea is to investigate the policies related to electric vehicles and if they led to a direct result of the growth of electric vehicles in these two countries. Examining these policies and their effect on the sales of electric vehicles per capita might explain why there is a discrepancy in electric vehicles per capita between the UK and the Netherlands.

It is interesting to find out what the effect of the policies before the era of the Paris Agreement was upon the sales of electric vehicles. A pre documentation analysis search shows that since 2009, there has been a steady increase in policies related to the promotional purpose of electric vehicles. Therefore, this study puts effort towards the search for the effect of policies related to electric vehicles and the increase in the share of electric vehicles per 1,000 capita between the years 2009 and 2015. Therefore, the research question of this study is:

Why is there a difference between electric vehicles in capita between the Netherlands and the United Kingdom and can government decisions, and how consumers respond to these decisions explain this discrepancy?

Scholars have been exploring the field of electric vehicle policy and the differences between countries. These studies are used by governments to take measurements to promote the growth of their national electric vehicle market. Jin et al., from the International Council on Clean Transportation (ICCT), for instance, did a literature review of electric vehicle consumer awareness and outreach activities (2017). This article reviewed information coming from governments and directly involved actors to determine the best cases on how to promote electric vehicles. Another study focused on comparing the government's policy strategy patterns towards supporting the introduction of electric vehicles(Steen et al., 2015). Research has been conducted on the influence of financial incentives and other socio-

economic factors on the adaptation of electric vehicles (Sierzchula et al., 2014). The topic of policy for electric vehicles already led to researches that states that providing financial benefits to electric vehicle owners with taxpayer's money is not a sustainable option for the long run. Other scholars say, on the other hand, that taxpayer's money is well spent for the cause of attaining better public health and reducing atmospheric pollution (Prud' homme et al., 2016; Funk et al., 1999). The goal of this study is to understand why the Netherlands and the United Kingdom have chosen for a different policy framework for electric vehicles that are supposed to help grow the electric vehicle market share in their country. The goal is clear for both countries, but it is interesting to know how come the policy framework for promoting electric vehicles became so different through time.

1.2 Theory

The path dependency and critical juncture theory from Mahoney and Schensul (2006), and Capoccia and Keleman (2007), and the multiple stream theory from Kingdon (1984) shall help to use to explain the institutional development process for electric vehicle policy in the Netherlands and the United Kingdom for electric vehicle policy. These two theories are known to be used in the subfield of comparative politics of the social science field (Capoccia et al., 2007: 345). The idea is that the path dependence theory helps to explain how actors, the government, structured and influenced their path and processes to reach the goals set by the government.

The multiple stream model describes that at certain critical moments, the streams of problems, policies, and politics come together, which creates opportunities for actors to push for change on the governmental agenda. This opportunity is known as a policy window. Having a policy window goes in line with critical junctures and thus helps to explain how policy creates through the policy window model.

Understanding and explaining the development of the Dutch and British electric vehicle policy approach requires the analysis of policy change. Describing the policy change is done with the multiple stream model that includes the (1) problem, (2) policy, and (3) politics streams. Each stream is seen as independent from one another. Each stream has its separate dynamics and rules. The idea behind the multiple stream model is that the three streams are linked together by policy entrepreneurs when a critical juncture occurs.

The theory of path dependency and the multiple stream model is combined with critical junctures to explain under which circumstances why and how the developmental trajectory of the policy process took place for electric vehicles in the Netherlands and the United Kingdom. This study argues that previous decisions made have an effect on decisions made in the future and that the context in which a country lies in also affects the decision-making process. The Kingdon Model helps to explain the

decision-making process and the critical juncture theory that affects the bounded rationality of policymakers. Therefore, the purpose of this study is to provide insight into whether critical junctures can explain the difference in the policy of electric vehicles and, partly because of this, also the difference in electric vehicles per 1000 capita. This notion helps to find out why one country is doing better in selling electric vehicles than other countries.

1.3 Research Design

This study aims to find out if the path-dependent process and critical junctures that may occur can explain the policymaking process from the Netherlands and the United Kingdom related to electric vehicles. Both the Netherlands and the United Kingdom set the goal to obtain a higher outcome in sales of electric vehicles year after year starting from 2009. This study investigates the polices made from 2009 until 2015 in the Netherlands and the United Kingdom. This period is chosen due to the Paris agreement in 2015, and because pre-research stage documentation showed that there was a plan made by both countries regarding the upsell of electric vehicles until the end of 2015. This information makes it a good project for further research upon the effect of policies on sales of electric vehicles. The reason that there is a discrepancy of electric vehicles per capita between the Netherlands and the United Kingdom at the end of 2015 makes it an interesting comparative case study because both governments of the countries stated that they are willing to make an effort of increasing the number of electric vehicles in their country. Both countries created a framework between 2009 and 2015 as the sole purpose of increasing the share of electric vehicles (Butcher et al., 2018). In this study, we investigate this framework and divide the policies related to electric vehicles into three categories which are (1) communicative policies, (2) financial incentive policies, and (3) legislative policies. These policies are assessed by the theoretical concepts (1) reactive sequences, the (2) lock-in effect, and (3) critical junctures to examine the impact of these national policy instruments for the promotion of electric vehicles. The primary purpose of these policies is to increase the share of electric vehicles in their country.

The results of this study are afterward taken from the qualitative analysis of reports that have examined the importance of the created policies related to electric vehicles. In addition to the results, relevant news articles, documents drawn up from the Dutch and British government and public sources are used as a supplement for this research to analyse if the created policy have the desired effect upon the goals that are set by the government for electric vehicles. Performing a qualitative substantive document analysis, therefore, helps to analyse the impact of the change in the share of electric vehicles per capita between 2009 and 2015.

Therefore the analysis is done with the path-dependent process theory along with the critical junctures concept and the reaction due to bounded rationality of official and non-official actors how it affected

the policy process for electric vehicles in the Netherlands and the United Kingdom. Therefore, this study takes an active approach in search of finding an explanation in how much attention is allocated by the government on increasing the share of electric vehicles per 1,000 inhabitants and, therefore, might give insight on why one country is doing better than another country.

1.4 Societal Relevance

What this study tries to do is to create more awareness amongst governments and consumers about which policies are effective in increasing the sales of electric vehicles. The societal relevance of this research is that it contributes to other studies that already investigated the effect of policies specific to the promotion of electric vehicles from the Netherlands and the United Kingdom on the growth of electric vehicles in countries. The public should know information on policies that focus on increasing the sales of electric vehicles since it is the consumer who will eventually decide to get an electric vehicle or not. Providing consumers information about the policy instruments and the incentives that come with it gives them the ability to make a rational decision if an electric vehicle would be a better fitting option for them than fossil fuel-powered vehicles. For governments, it helps to create more awareness by being open about the used policy instruments that promote the use of electric vehicles. The information then becomes accessible to other countries in which one country can see how other countries make do with their own set of policies to increase the share of electric vehicles. Comparing countries with their electric vehicle policies in this study can give insight into which country is more effective in promoting, and thus increasing the share of electric vehicles in its country. Governments can imitate specific policies that they deem useful for their own country, and it might motivate them to build further upon those policies that would make them more useful to promote the sales of electric vehicles. The IA-HEV has been gathering legislation and policies related to the promotion of electric vehicles since 2004 (2018). This study uses the information gathered from the IA-HEV to see why the Netherlands seems to be doing better than the United Kingdom regarding the number of electric vehicles per capita.

1.5 Academic Relevance

This research contributes to the public administration field by testing the path dependency and critical juncture theory. Describing events and how they influence the development of policy on the national level helps to understand how actors react to structures and institutions, which is generally known for not making rapid changes in a short period. Considering the circumstances around the increased attention for electric vehicle policies helps explain why there were or were not fundamental changes in policy. Furthermore, it is interesting to find out if the used theory is useful in explaining why a specific set of policies has been chosen to promote the uptake of electric vehicles. However, this is not the only goal of the policies. The policies are meant to indirectly reach climate goals set by the EU and by the

United Nations. The aim of this research is that the design of this research will also apply to other countries to find out the effectiveness of their policy regarding the promotion of electric vehicles. The way a cabinet is created in the Netherlands and the United Kingdom differ a lot from each other. In the United Kingdom, the political party with the most votes usually makes up the cabinet, which is different in how cabinets take shape in the Netherlands. A cabinet usually consists of two or more parties in the Netherlands. Using the insights coming from the stance of the cabinets and their influence on the political agenda can be used as an example of looking further into the influence of cabinets on policy in general. Therefore, insights coming out of this research can contribute to getting to know why some countries, due to their past, are more successful in implementing more effective policies for electric vehicles and maybe policies in general than any other country.

1.6 Chapter Outline

This study consists of six chapters. The first chapter outlines the different trajectories that the two countries have chosen to pursue in order to increase the sales of electric vehicles in their country with the help of policies. The second chapter introduces the theories of path dependency, critical juncture, and the political decision-making process with the help of the multiple stream model. These theories help to explain how the decisions were made to update and make new policies for the promotional purpose of electric vehicles in the Netherlands and the United Kingdom. The path dependence theory and the multiple stream model helps to clarify the different path, thus the process that occurred in making policies for electric vehicles. The multiple stream model, in particular, helps to describe what is happening in a path sequence, how certain problem situations come on the agenda of a government, and why a specific policy is chosen to solve a problem of policymaking. Based on the theoretical framework from chapter two, the third chapter operationalizes a qualitative method based on a comparative study of the Netherlands and the United Kingdom. This setup explains the development process of policies for electric vehicles. The fourth chapter covers the path-dependent sequence of the Netherlands and the United Kingdom between 2009 and 2015 and discusses the variation in the results. The fifth chapter provides insight into the various outcome of the Netherlands and the United Kingdom in this research. The last chapter provides a conclusion that answers the research question and is followed by a discussion about the findings of this research and practical recommendations.

2 Literature Review

Public policies have always been relevant to the sales of vehicles. Governments have used all sorts of policies, such as fiscal policy, safety rules, and financial regulation, to influence the sales of vehicles (Jetin and Ramirez, 2019). In the year 2008 and 2009, many states decided to put more attention towards the promotion of electric vehicles with a renewal of public policies and regulations only intended for electric vehicles. This change towards the creations of policies for electric is impressive. With the help of a theoretical framework, this study would like to find out if policies intended for electric vehicles do have a fruitful effect on the uptake of electric vehicles or not.

The literature in this chapter sets out a general policy development process in the public administration field. The assumption in this chapter is that the more policies related to a specific cause can lead to reaching the desired objective. Using already existing theory can help to explain in this research how the developmental policy path for electric vehicles in the Netherlands and the United Kingdom came to differ from each other. The theoretical framework also helps in explaining a taken policy path by looking into the fact if a lock-in effect and or critical junctures played a role in the policy development process.

2.1 The Multiple Stream Model

What Kingdon was particularly curious about in his book is how issues can end up on a policy agenda at all (1995: 2). In determining how issues end up on a policy agenda, Kingdon uses the model of three streams; (1) a stream of political problems, (2) a stream of policy alternatives, and (3) a stream of political-administrative developments (1995: 16). The three streams act independently from each other, and each has its own set of dynamics and rules. Hence, the arguments with this model are that in the public policy agenda-setting process some policy ideas are chosen above others due to the influence of the urge of the political problem, and how the politics respond to the issue. According to Kingdon, all decisions made by policymakers are unique, because every decision involves a window of opportunity, which arises when all three streams come together at a given moment (1995: 16). A policymaker who takes the initiative takes entrepreneurship and has a good sense of timing, can link the three streams to implement his own (best) window of opportunity that can result in the new policy.

According to Kingdon, the flow of political problems in this model always needs a trigger to be a problem; this is where the part of critical junctures comes into play. A critical juncture can be the reason to realize policy changes and or create new policies that come out of the mix of political problems, policy alternatives, and political developments. The second stream contains the possibilities of policy alternatives that Kingdon sees as a range of possibilities, in which all kinds of existing ideas and solutions find a way out that can be carried out (1995: 17). Such an idea or solution is preferable if technically feasible, and if it fits with the value patterns of associated experts and anticipates future

problems that it may entail (Kingdon, 1995: 17). In the alternative policy stream, being rational is essential, because the best solution must be the best for an existing problem. The rationality behind the alternative policy stream contrasts with the political-administrative flow, where the forming of a compromise is central (Kingdon, 1995: 18). By forming a compromise, one wants to achieve a suitable solution in the political-administrative stream. The window of opportunity is where all the three streams come together to establish a new policy. According to Kingdon, the third stream is the political-administrative flow that is built up of three characteristics (1995: 18). The political-administrative stream consists of public opinion that exerts a great deal of influence on the political agenda. A second characteristic is the influence of interest groups. Policymakers look at how much impression and influence different interest groups make and exert. By this information, policymakers determine which ideas and solutions are best at a specific time. The third characteristic is having politicians and civil servants in certain key positions (Kingdon, 1995: 18). The policymakers in the relevant key positions can have a direct influence on the direction of the three streams, whereby there can also be a battle between the principal persons in who is more right upon a certain issue. In his model, Kingdon also discusses the role of unofficial actors such as researchers, the media, public opinion, consultants, and interest groups (Kingdon, 1995: 67). If non-official actors have resources in the electoral, economic, or organizational domain, they can influence the direction in determining new policy (Kingdon, 1995: 67). The official actors, as discussed above, are bodies that have decision-making tasks (Kingdon, 1995: 45-46). The means of the power of non-official actors are always limited in all cases when it comes to policy decision-making. A marginal note here is that researchers, consultants, and interest groups are the most important group of actors outside the official actors (Kingdon, 1995: 68). In describing the processes that precede the determination of a new policy, Kingdon learned that policy initiatives have three characteristics (1995: 71-77). The first point is that the establishment of a policy initiative is not possible, because policy initiatives come from everywhere. The second point is that there is an infinite stream of policy alternatives, and the third point is one, or a few actors do not create policy initiatives, but by all official and non-official actors. Which policy initiative ultimately gets chosen is difficult to determine. Kingdon, however, states that problems at some point connect to solutions. Those solutions come from policy streams by actors with expertise in each policy area (1995:68). When a policy window becomes available, and the three streams politics, problems, and policies come together, "the chances of a given subject rising on the agenda is markedly enhanced" (Kingdon, 1995: 198). There are two conditions for a policy window to happen. The first is that there is political attention paid to the problem and that there is a connection between the problem that is recognized and the proposed policy solution. It is at this moment that involved actors come together because of the opportunity and participate together even though they have different interests and strategies.

2.2 Path dependence and Critical Juncture

In studies with the topic of historical institutionalism, the unit of analysis usually is an institution in which the decision of actors is limited during more extended phases of stability and being freer during short phases of change. This process is what underlines the effectiveness of path-dependent institutions by saying that path dependence slows down radical shifts in institutional changes. The phases of change are known to happen under the influence of critical junctures during which substantial changes in policies are made possible. Thus, the non-predictable occurrence that takes place during a critical juncture can lead to political doubt in which different radical options for institutional change becomes available. The options derive from the preexisting situation upon which a better option is selected by decision-makers that can create a long phase of stability again that is difficult to reverse (Capoccia et al., 2007: 348-349). The institutional setting can be related to a (1) single organization such as a political party, a union, or a corporation, (2) or a structured organization between organizations such as a party system or relationships between branches of government, (3) it can be related to public policies, (4) or a political regime.

This study thus uses the historical institutionalism approach to find sequences of political behaviour and change across time on the institutional level. This method is also known to be used by many scholars as to the path dependence concept that describes the process of how earlier taken actions in political processes can affect the outcome drastically in later phases (Mahoney et al., 2006). For example, the QWERTY keyboard format that at the present day is widely used. This format got chosen because this arrangement of letters made sure that it would stop the type-bar jamming in early model typewriters. The decision to use the QWERTY keyboard format is thus seen as a small event that acted as a critical juncture that could not be predicted by the theory. It was only due to the efficient arrangement of letters that this system got adopted and so eventually became the default option for many keyboards (Mahoney et al., 2006: 462). Therefore, the concept of critical junctures is a useful concept in this study that helps to explain why specific paths are taken (Vermeulen, 2013: 49). Path dependent processes are known to be very influenceable in its early stages. When a path is set out, then it becomes difficult to change its direction by actors. Feasible political alternatives are in this process not seen as proper alternatives because of the self-reinforcing dynamics. The events or processes around a critical juncture adhere as a crucial factor for changing the path of a particular institution (Pierson et al., 2002: 6).

The idea of path dependency is that events in the past can be decisive for operations in the future. These events may not be noticed of its importance when it occurs but are at a later point in the future appointed as a critical juncture. The authors Mahoney and Schensul described six concepts of how path dependency sequences can be detected. The following concepts are (1) how the past affects the

future, (2) how initial conditions are causally relevant, (3) how contingent events are causally relevant, (4), how historical lock-in occurs, (5) how a self-reproducing sequence occurs, and (6) how a reactive sequence occurs (Mahoney et al., 2006: 459).

1. The past affects future conditions relates to the basic definition of path dependence. This approach is "what happened at an earlier point in time will affect the possible outcomes of a sequence of events occurring at a later point in time" (Sewell, 1996: 263). The problem with only analysing path dependency sequences with this condition is that the conceptualization of any causal path could be a path dependence sequence. This because every outcome in the world is an explanation for every outcome. The past affects the future condition does not provide a distinctive specification on how to operationalize why the past affects the present. When other concepts accompany this condition, then this could provide more specific insights and becomes a helpful analytical tool. For instance, the scholar Sewell sees path dependence as one component of an eventful temporality. This eventful temporality assumes that social relations feature path dependency, temporally different causalities, and global contingency (1996: 264). In short, the condition that the past affects the future is something on which many scholars agree on but that it needs other concepts to thoroughly analyze path-dependent sequences (Mahoney et al., 2006: 459).
2. The next concept is the causal importance of initial conditions. Initial conditions are the historically specific set of variables that starts with a critical juncture at the beginning of a path-dependent sequence. The questions remain if these initial conditions help determine the outcome of a path-dependent sequence. The scholar Somers proved that initial conditions could be noted as causal factors (1998: 768). However, Somers also mentioned that other conditions were also used to explain the causal factor in a path-dependent sequence. The initial conditions are not constructive enough on its own to explain path-dependent sequences. The events that follow the initial conditions are also important. The concept "critical juncture" is often used because this characterizes the period when causal processes are initiated. A critical juncture defines itself by choosing an option from a range of alternatives in a certain period. Choosing this option leads to guiding all future movement into a specific direction and therefore limiting other possible future outcomes. Only a new critical juncture can alter the change of the path (Mahoney et al., 2006: 460). Many studies have focused on critical junctures when doing comparative historical analysis. The idea is that when a critical juncture occurs, it leads to a change in the initial conditions, therefore, leading it to a certain kind of outcome than other expected.

3. The next concept contingency, unforeseen events, is a necessary condition because it argues that initial conditions cannot foretell or explain outcomes. Contingency thus means that only randomness can explain the relationship between initial conditions and outcomes. Therefore, this concept is seen by many scholars as related to critical junctures because the argument goes that a critical juncture is, by definition, contingent. Not all scholars agree with this view (Arthur, 1994). Selecting an option during a critical juncture represents the randomness of it in critical moments. However, with a contingency, it is so that a theoretical framework can not even explain it because of the randomness of it. Hence, scholars use contingency in studies to explain path-dependent sequences, but other scholars have also argued that contingency is not a necessary condition to have for path dependence. When analysing political trajectories, studies have also shown that a first contingent event did not launch many of them. Seeing contingency events at the beginning of path dependence sequences is also not helpful because the randomness of it does not help in determining the initial conditions of institutional outcomes (Mahoney et al., 2006: 462). However, the argument goes that contingent events do play a role in path-dependent sequences because they relate to the unpredictability of the sequence by the initial conditions, random factors that affect the sequence, and inefficiency. After all, contingency can lead to an unfavoured outcome.
4. The historical lock-in concept is the counter argument for contingency. This because the event that starts a path-dependent sequence is characterized by subsequent events on the path-dependent sequence and not by contingency. The idea of this concept is that a unit cannot escape from its path because previous events determine it. This is defined so because of previous events related to the definition of path dependency. Scholars do not generally support this causal relationship because of the causal determinism by previous events. This idea of historical lock-in is not essential to path dependence sequences. Units can change from paths under path-dependent circumstances, as is already shown due to critical junctures and contingency (Mahoney et al., 2006: 463). Critical junctures are a mean which causes actors to break out of historical lock-in.

   Nevertheless, historical lock-in does provide an answer when researching path-dependent sequences. Incremental small changes can eventually lead to an outcome that is different from the initial outcome over an extended period. The changes were gradual, but taking a long historical look displayed the pattern of change eventually (Mahoney et al., 2006: 464-465). When analysing long time intervals, it makes sense to include the historical lock-in concept as part of the definition of path dependency.
5. When an outcome strengthens over time, then this condition can be conceptualized as a self-reproducing sequence. This concept closely relates to the economic model of increasing

returns, which means that every step taken in one direction leads the movement of that idea in the same direction (Arthur, 1994). The self-reproducing sequence is actively used in the world of social science because path dependence defines itself as increasing returns. It has two possible end stages meaning that the increasing return will be forever or eventually will reach an equilibrium. The mechanism of these two possibilities that drive the self-reproducing sequences are differently motivated. Staying on the current path can be profitable and is therefore driven by the high rewards of it (Mahoney et al., 2006: 464). The moves made towards the one chosen direction increases the benefits of staying off the course but also makes it costlier of shifting direction for rational actors. It becomes more irrational to switch from the path. However, the other mechanism helps to make sure to follow the current path, such as functional, power, and or legitimation mechanisms.

6. Scholars also use reactive concept sequences to explain path dependence. The main problem with this concept is that every event can act as a legitimate event that can explain the path of any given sequence (Mahoney et al., 2006: 467). The idea is that an event in the sequence is a reaction caused by earlier events, and acts as a cause of following events. The outcome is thus dependent on each event that happened before, which makes an overall path eventually. Thus, the mechanisms from the first event A until the last event Z in a sequence is seen as a link, but that does not mean that every event that happened in between has a direct causal link with them. Those events in between that causally link A to Z are variables on their own that may or may not have their mechanism that links them together. In addition to this, it is often the case that policymakers choose the reactive sequence path because of the higher opportunity costs of alternative paths that come with it. Because of the many possibilities, one also needs to analyse each step of the process to maintain the direct causal connection in the sequence. The argument that events are contingent beforehand shows that path-dependent sequences are not something that is explained quickly. Thus, taking reactive sequences into account, along with other concepts of path dependency, will eventually fit the criteria to explain such sequences. This is necessary because if only when analysing a sequence with reactive sequences is done, and just one of the arguments seems not valid anymore, the whole chain of causality will not seem logical anymore. Therefore, it is necessary to analyse the discourse of the events to understand causality (Mahoney et al., 2006: 467-468).

In the latter part of this chapter, it will be discussed which concepts of the path dependency trajectory is a good fit for the theoretical framework and which are not.

2.2.1 The critical juncture framework

Scholars like Capoccia and Kelemen (2007), Pierson (2001), and Mahoney and Schensul (2006) argue that institutional development takes place via a defined dual model routine. The first part of the model is that path-dependent institutional stability is characterized as long periods of stability. The second part is that an institutional development path from time to time can dramatically change in a short phase. These short stages are addressed as critical junctures in this study and are also known as turning points, crises, and uncertain times. The argument is that a critical juncture can give an understanding of the forces and processes that formed a specific outcome. During a critical juncture, the path of public policy can gain new objectives, establish new priorities, and new political and administrative alliances can evolve to support those new policies. Thus, whenever a critical juncture occurs, this can indicate that on an institutional level, the chosen path can change drastically or reinforce the chosen path (Capoccia et al., 2007: 431).

A critical juncture such as a crisis and or disaster, a powerful symbol, or a personal experience of a policymaker can bring attention to a problem. The case stays that a critical juncture is always brief by nature. This because people can only be excited for only so long. An example of a crisis can be the collapse of a railroad that can threaten the economy of a nation. An event like this demands that direct action is to be taken. Symbols, on the other hand, tend to act as reinforcement for something that is already taking place. A symbol, therefore, focuses the attention of people on a subject. An example of this is that technology contributes to higher costs for medical care. The CAT scanner became the symbol in the 1970s as an expensive technology that was not yet recognized as a helpful tool in healthcare but did raise the costs of medical care significantly. Sometimes also the personal experience of a policymaker can play a role in bringing attention to a subject. For instance, lobbyists of the biomedical industry in the United States tend to know how to play on Members of Congress because they know who has health problems themselves or someone in their family. (Kingdon, 1984: 96-100). Junctures are critical because they act as a starting point for new path-dependent processes. Thus, the causal logic with a critical juncture is that it has a lasting impact throughout history. The choices made during a critical juncture blocks off alternative options and can lead to drastic changes in the formation of institutions and so leading once again to a new cycle of self-reinforcing path-dependent processes. It is due to the self-reinforcing processes characteristic that acts as a mechanism that causes prolonged periods of stability of an institution. Therefore, the causal logic within the path dependency theory is that it analyses causal processes that are responsive to critical junctures and or events at the beginning of a path-dependent sequence and so explains the chosen path of institutions. A critical juncture is thus a short period during which there is a substantial heightened probability that choices of involved

actors all with their options can affect the outcome of interest and that their choices are most probably be more productive.

2.3 Bounded Rationality

Policy agenda formation is a concept that designates the "collection of issues that are subject to decision-making and debate within a particular political system at a given moment" (Baumgartner & Jones, 2005). Bounded rationality can, therefore, explain the process of how policymakers deal with a significant number of problems every day and still manage to make decisions about different issues. The argument goes that it is due to bounded rationality that helps to decide whether an issue appears on the policy agenda. A significant amount of information is available to policymakers coming from all kinds of actors and institutions, and the question is how they deal with all this information to make funded decisions. Policymakers, advocates, media, governmental and non-governmental organizations all have their ideas, interests, attention span, and intrinsic motivation for the creation of public policy. The question now is how policymakers interpret this amount of information from the various actors and respond upon it. This political process is thus not seen as an objective process because of the involvement of many actors (Baumgartner & Jones, 2005: 15). Establishing the political agenda refers to the allocation of attention to various policy topics, which concern both the selection and the prioritization of topics. Every political system has a limited capacity to handle many agenda items. It should always be taken into account how much attention should be paid to a point on a policy agenda because too much attention on one agenda item will always be at the expense of other agenda items (Baumgartner & Jones, 2005: 26). Therefore the bounded rationality model argues that the attention of policymakers is scarce and limited so that their focus can only be on a small number of issues at a time (Baumgartner & Jones, 2005: 20).

For this reason, policymakers tend to ignore information if possible or overreact to them by disproportionate attention to one or more agenda items. The pattern that usually follows upon an issue can receive relatively little attention for the long-term, alternating with sudden attention peaks. The release of information can explain the sudden attention spikes, for example, reports that can be published or setting out targets by institutions (Baumgartner & Jones, 2005: 12).

When information is released, decisions are to be made about which items on the agenda have a priority. The prioritization of the agenda is nevertheless always under the accompany of bounded rationality. According to Baumgartner and Jones, when prioritizing a point on the policy agenda, policymakers first must look at how policymakers respond to information from different sources. The allocation of attention upon a policy point is a critical component of agenda-setting studies (2005: 14). Policymakers have to weigh information relating to different points on a policy agenda. When weighing all the information, policymakers look at what information can solve a point on the policy agenda now.

Only then will it be decided to give priority to the point on the policy agenda. So, policy outcomes are decided by periods of stability or incremental adjustments until the information is released that can lead to periods of rapid change. The problem here is that in most cases, there is so much information available on every point on the policy agenda that not each point can receive equal priority. This is the essence of what the bounded rationality model points out. Individuals and organizations are not equipped to expect to handle all information coming in rationally. However, when a disproportionate amount of information comes in and has ignored the current condition of any given situation they are in, then there is no alternative left. A reaction must come, which often is seen as an overreaction. (Baumgartner & Jones, 2005: 15). Thus, new information, which is released by critical junctures, can lead to direct action in as short a time as possible, known as a window of opportunity, should be given priority (2005: 15).

2.4 Theoretical Framework

The theoretical framework in this study consists of the concepts of the path dependency theory and the multiple stream model that helps to explain the different developmental paths of electric vehicle policies that are taken by the Netherlands and the United Kingdom. The path dependence theory is an applicable theory that can account for the stability of policies and change in electric vehicle policy development. The output of new policies is due to the combination of the multiple streams that open a policy window.

Many studies in the social science and political history field, about moments of rapid changes and longer phases of stability in political and institutional development, have been conducted. For example, the scholars Lipset and Rokkan did a study on tracing the beginning of West European party systems, which led to finding three crucial critical junctures in the history of each nation that explained this phenomenon that still lasts until this very day (1967). The focus of this and other studies has been on the critical juncture framework and involved mechanisms of reproduction that could explain path dependence. Especially actors are important when researching development patterns because it is, they who have the power to make decisions during critical junctures that can commit institutions to long-term developments (Capoccia et al., 2007: 347). The Multiple Stream Model is, therefore, helpful in this study because this model helps to explain the relevancy of actors on how policy takes form.

The path-dependent sequence from the Netherlands and the United Kingdom explained by the concepts of (1) reactive sequences, (2) the lock-in effect, and or (3) critical junctures are used as a three-stage process to explain the policy path development for electric vehicles. These three concepts are combined with the bounded rationality theory and the multiple stream model. The bounded rationality theory argues that the most rational way of creating policies goes via an incremental way. It is the bounded rationality of policymakers that make sure that every policy follows a branch-method

procedure. This method means that every new problem is taken step-by-step and under scrutiny because it is a new issue on their agenda. Using this method is not efficient because of the number of resources it would take to work on every problem policymakers face. Whenever there is a peak in the attention of an existing problem due to a critical juncture, then it becomes more likely that a new set of policies can come out of the situation.

This means that policymakers always consider the multiple stream model but usually tend to choose the path of least resistance. All three concept finds its way with the bounded rationality theory because it is the policymaker that eventually creates the policy. In addition to this, the policymakers go through the multiple stream model and pick out in the problems, politics, and policies streams the options that are most relevant to the existing situation and tweaks existing policy to solve problems. It is so that at critical moments, the multiple streams can come together where stakeholders can push for their solution for a problem. A moment like this is known as a policy window (Kingdon, 1994). During this policy window of opportunity is when the critical decision is made, which holds in that the three streams come together and generate a policy solution.

In this study, when policymakers work on policy changes via the incremental way, then this process is explained in this study by the concept of reactive sequence. Whenever a critical juncture occurs, then policymakers might decide that they increase resources towards an existing policy. This path development is explained by the second concept, the lock-in effect. The second stage of the process is to explain the transition to another sequence of the chosen path. They are thus going from reactive sequences to either the lock-in effect or critical juncture path development. The reactive sequence path also acts as a learning process. The errors discovered in this learning process lies in the bounded rationality of the policymakers when the decision is made to follow the first path. The policymakers discover that the path taken is not that lucrative anymore. The increasing returns decrease, the growth of the output declined, and therefore, the chosen path becomes harder to maintain and might become an unattractive opportunity. It is by this rationale that policymakers discover that the situation needs to change. However, those earlier made decisions that led to the path-dependent sequence can be hard to break even though the policymaker becomes to support the finding that the existing policy needs to be adjusted. It is due to the historical context that makes it difficult to alter the path to a better strategy. This phenomenon is known as the lock-in effect, which means that the existing policy will remain, and thus, the situation will stay in an undesirable situation.

The causal logic within the path dependency theory is that it analyses causal processes that are responsive to critical junctures and or events at the beginning of a path-dependent sequence and so explains the chosen path of institutions. Thus, what can happen is that a critical juncture can trigger

policymakers to the creation of a new policy or a set of new policies and can thus, in some cases, break an undesirable chosen path. The idea in this study is to set out the path development of the policy-path for electric vehicle development. During the descriptive part of this study, it will become clear whether the arrival of a critical juncture can explain path dependency by measuring its effect on the path sequence of electric vehicles in the Netherlands and the United Kingdom. The third stage is where the multiple stream model can further explain the developmental path of the electric vehicle policies. A new sequence might start with a new policy decision making when the three policy flows come together in a window of opportunity that is created by a critical juncture. The concept of a critical juncture serves to describe drastic changes in development. In other words, a specific policy is chosen, amongst other policy alternatives. The third concept of critical junctures explains this. Thus, by integrating the different concepts of how a path sequence is developed, and the concept of the coupling of streams under the influence of bounded rational might help to explain the creation of either new or changes in the current policy path.

This combined model describes a way to explain the developmental trajectory for policies related to electric vehicles between 2009 and 2015 (see Table 1). Therefore, the concepts of the path dependency theory bounded rationality theory, and multiple stream model is used in this study to explain the development of electric vehicle policies. The effect of these policies is measured by looking into how people respond to the policy by looking at the sales of electric vehicles per year and the share of electric vehicles per 1,000 inhabitants. Also, looking into consumer sales and statements of the government will decide if the action plan is going well or not. By assessing the statements if the government is content with the development of the share of electric vehicles per capita will put the situation in the perspective of the set goals by the government. For example, the goal that the Netherlands wants to have 200.000 electric vehicles in 2020. Reports coming from the government and independent organizations, along with statements from politicians and other policy entrepreneurs, will provide an outlook of how well each country is doing between 2009 and 2015.

The theoretical expectation for this study is that the tremendous growth in electric vehicles for the Netherlands is due to a different path process meaning that the Netherlands is not bound much by the lock-in effect that can occur in the path-dependent process. This might be explained by the progressive rational of the involved actors around the Dutch government. For the British government, the expectation is that the involved actors are not that willingly in comparison with the Dutch government to support the growth of policies for electric vehicles. For example, this might be due to that the rationale of the British government is more focused on other topics and or stakeholders that do not support the promotion of electric vehicles. Thus, the expectation for the United Kingdom is that the main argumentation that the share of electric vehicles per capita did not raise due to the lock-in effect.

The argument could be, in this case, that the United Kingdom is well-known for its automotive industry. The United Kingdom is one of the largest exporting countries of vehicles in the world. The bounded rationality theory and the alternative policy concept from the Kingdon model state that a factor described as this forms the output of how policymakers do their work. The Netherlands, on the other hand, lacks an automotive industry and thus does not have to consider the interest of the automotive industry whatsoever in the policymaking process for electric vehicles. However, this does not explain why Sweden, for example, also known as a car-producing country although not as big as in the United Kingdom, still is known for doing well in increasing its market share of electric vehicles. Following the theoretical framework, this might be so because Sweden does not follow the lock-in path and, therefore, might be more open to change its policies in favour of the better promotion of electric vehicles resulting in more sales. Thus, in other words, Sweden might follow a similar path to the Netherlands. With such kind of information, it can become more apparent that finding out if the motivation of a country contributes to why it is doing well or not in increasing their share of electric vehicles per 1,000 inhabitants. The context shows that the Netherlands and the United Kingdom have a different approach on how to handle an increase in the share of electric vehicles per capita. Therefore, it is interesting to find out what motivates these countries to shape their policies for what they believe will have a maximum effect on the increase of electric vehicles. The Netherlands aims to have 200.000 electric vehicles on the road by 2020, and the United Kingdom is aiming for 1.7 million electric vehicles.

Path dependence is what prevents radical institutional changes is what the theory argues. Moreover, it also depends on which political parties lead the government. This combination creates a synergy that sets the path for a prosperous or not path for the uptake of electric vehicles. In short, the argument is that policy changes occur in favour of electric vehicles first need a change in the policy stream with a possible window of opportunity that can be seen as a critical juncture that is picked up by experienced policy entrepreneurs. Table 1 sets out the path of each three types of policy changes that are under research in this study.

Table 1 The: Three stages that lead to policy changes for electric vehicles. A Combination of Path Dependency theory and Kingdon Model (Mahoney, 2006; Kingdon, 1994).

	Path development via a reactive sequence	Path development via lock-in effect	Path development via critical junctures
Policy change	Policy changes via reactive sequences that drive the course of a path into the same direction that is pursued and likely to see	The existing policy faces further investment and or development at critical moments to make sure	Policy changes in a drastic way because of at least one triggering event

	incremental changes in the foresee future	that the current goal will be reached. It becomes clear that, in this way, the set goal will be reached.	
Kind of policy change	Incremental due to reactive sequences and learnings from current policy	Instrumental due to the lock-in effect	Fundamental due to critical junctures
What is changed	Either goal remains the same, or the goal changes incrementally. The policy can, therefore, remain the same or can face incremental changes. adjustments of current policy or no change at all	Adjustment of the existing policy when the set goal is changed. May see a new change in policy instruments	The new set of policies and or policy instruments change radically due to change in goal.

3 Research Design

3.1 Research Method

This study only investigates policies that are related to passenger vehicles. These passenger vehicles are called electric vehicles in this study and contain all passenger vehicles that have an electrified drivetrain. The drivetrains consist of (1) hybrid electric vehicles (HEV), (2) plug-in hybrid electric vehicles (PHEV), and (3) battery electric vehicles (BEV). Hydrogen-powered vehicles and policies related to such vehicles are not taken into consideration in this study because the stock of these vehicles reached 8000 units in 2017. The United States and Japan account for nearly 90% of the global fleet. There is increasingly more focus set on hydrogen from many countries and companies about its potential role in the car market and for the future of low carbon energy systems. However, for this study, the current availability of hydrogen vehicles is still limited, and the required infrastructure for such vehicles are not as well developed as that for electric vehicles between 2009 and 2015 (IEA, 2018).

The number of electric vehicles only began to increase significantly after 2009 (IEA, 2016). Therefore, this study attempts to identify if the government had a significant influence on the growth of the electric vehicle market in the Netherlands and the United Kingdom between 2009 and 2015. The comparative case study method is chosen because a comparison can provide better insight into the context and the events that led to single-best policies that led to a specific result (Yin, 2003). Furthermore, a cross-country analysis also helps to understand the influences of a country itself on the electric vehicle adaptation process. Thus, a comparative case study offers more depth and detail of the material. Such a study helps to make statements with more validity and reliability about the processes, mechanisms, and links between variables that are under investigation. A limitation, on the other hand, is that the results of the research are not very comparable with other countries. A factor that is taken into account in setting up this research is that the political system is different between the Netherlands and the United Kingdom. This does not directly mean that the results of the research can be generalized, but that the difference in the research helps to explain via partially the difference in the political system (Yin, 2003). The comparative case study design is, therefore, a good fit for this research because its design helps to look at why countries made their decisions on how to promote electric vehicles by looking into the stance of the cabinets of the two countries on how they look upon the future and development of electric vehicles and therefore helps to understand the strategy. The policy formation process of electric vehicle policy from the Netherlands and the United Kingdom, we also see differences in the composition of the cabinet in these two countries. In the Netherlands, there usually is a cabinet that consists of two or more political parties. The political system of the United Kingdom,

on the other hand, promotes a strong position of large parties. Therefore, as a rule in the winner of elections in the United Kingdom can directly form the cabinet with their party leader becoming the prime minister. Occasionally there is a parliament in which no party has a majority as in the 2010 elections.

The composition of these cabinets is relevant for this study because looking into why both countries adopted electric vehicle policy, and their way is also determined by the motives of the cabinets of the two countries. Other studies might then be used to find out whether the cabinets of other countries and their stance on electric vehicles influenced the output of electric vehicles in their country. The United Kingdom and the Netherlands are chosen for study because both countries were close to zero for having electric vehicles in 2009. At the end of 2015, the output of electric vehicles differed by a factor of two. Fiscal, communicative, and legislative policies were created with a purpose to increase the share of electric vehicles per capita as measured in this study. This study compares the similar policies of the two countries, and with the help of these dependent variables and the theory, try to figure out why the outcome is different between the subjects. The starting point for both countries is the same, which means that this study follows the most similar research design.

This study aims to explore the path of policy development for electric vehicles and measure the effectiveness of these policy changes. Therefore, the qualitative research design helps this study to investigate the possible explanations of electric vehicle policy development by gathering multiple variables that form a strategy in increasing the share of electric vehicles per 1,000 inhabitants. Because there are so many variables that can explain why something occurred, it is not possible to put all the concepts in the framework. This study selected concepts that come as close to help this study in answering the research question. (Yin, 2003; Gerring, 2006; Flyfbjerg, 2006).

Therefore the framework exists of the following concepts (1) reactive sequences, the (2) lock-in effect, and (3) critical junctures. These three concepts make it possible to explain the research question with many possible explanatory variables. These three concepts form the path dependence theory are used in this research to focus on explaining the developmental path of the strategic choices of the Netherlands and the United Kingdom (see table 1). These three concepts are deemed fit for this study because they are involved in providing an answer in why development trajectories remained the same and or either changed. These three concepts add value to the Kingdon model that tries to explain how issues end up on a policy agenda. These three concepts also help to analyse the electric vehicle policy development by testing out their relevance to explaining the electric vehicle policy development.

The first concept reactive sequence (increasing returns) is in this study, seen as incrementally adjusting the current policy. This mechanism stands at the core of the path dependence theory. It includes the two indicators to establish a reactive sequence.

The first indicator is (1) coordination over time refers to the efficiency progress of human interactions or organizational operations and procedures. The goal of these institutions and involved actors is to formulate and follow up on shared objectives. If an establishment or an overarching institution is created to formulate and follow up on common objectives indicates that coordination took place. An example of this is the formula E-team that represents members of the government, companies, and institutions that are important for a successful introduction of electric vehicles in the Netherlands and to link up with developments abroad and with opportunities for green growth (2019). The United Kingdom has a similar institution called the Office for Low Emission Vehicles (OLEV). This is an institution that works across government to support the new market for ultra-low emission vehicles that also consists of electric vehicles in 2019.

The second indicator is the (2) complementarity effect. This effect is measured by looking into the combination from a bundle of resources, rules, or practices that are used instead of using each element of the bundle independently while pursuing an objective (Pierson, 2002: 6). An example of this is the case of VHS cassettes and Hollywood movies, making VHS the leading platform to watch movies on (Sydow et al., 2012: 161). The effects that can come out of bundling different elements create a synergy that is responsible for creating momentum for alternative options while taking away attention from other alternatives (Sydow et al., 2012: 159-161).

This concept thus keeps the current path in regard. It is being characterized by the positive feedback that sets out the course of the path and proceeds on pursuing this direction, albeit under the influence of reactive sequences (Mahoney, 1996: 468).

The second concept is the lock-in effect that is seen as an adjustment of the current policy that does not necessarily have to be efficient. Subsequent developments are predictable is what locked-in indicates. Sydow et al. define that lock-in occurs in a situation or is an outcome where the course of the path will only lead to one single solution (2012: 159-161).

New policy instruments are added to make sure that to obtain the set goal, including having 200.000 electric vehicles on the road in 2020. Thus, the lock-in effect takes place when, in a situation, another development path may seem more useful. However, other mechanisms like sunk costs and routine of the existing path make it impossible to choose the better path alternative (Mahoney et al., 1996: 463).

Indicators for lock-in are (1) investments are stable in one single-best solution or are increased about the current policy option. These so-called single-best solutions are often without discussion evaluated as an appropriate fit. A second indicator is that (2) investments in alternative policy options are reduced. The third indicator is that (3) alternative options are not viable enough to improve the current situation (Sydow et al, 2012: 159). The first and second indicator takes place when in the structuring of inter-organizational or personal relationships ideas and thoughts become aligned. Therefore a current policy can become a natural target of extending its longevity and, as a result, become the only single option that remains or appears legitimate (Sydow et al, 2012: 159-161).

The third concept of critical juncture is seen as a fundamental change in the setting of policy and instruments. A critical juncture is a triggering event that can cause an incident that can alter the current and or future course of a path. Thus, a critical juncture can initiate a path process (Sydow et al., 2012: 159-160). It is essential to keep in mind, though, that when actors and or observers act on a critical juncture, it might not be immediately known by them that they are dealing with a critical event. A critical juncture can, now, itself be regarded as a "small" event. When a path sequence is reviewed in the long-term, then it may turn out that a critical juncture occurred that was not typified as a critical juncture first. A critical juncture may then only played a small and or innocent role when it happened. However, in retrospect, it turned out that this event played a significant role because it altered the path of a sequence. Thus, it is not always directly evident that actors and or observers know that they are dealing with a critical juncture. Hence only can speak of a critical juncture when the actions that come out of such an event prompts to remodel the course of the path in the long run (Sydow et al., 2012: 160).

This study uses six indicators to investigate three independent variables. Reactive sequence, lock-in effect, and critical juncture that also identified as concepts. The three identified dependent variables are known as a type of policy change. These are the communicative policies, financial incentive policies, and legislative policies

3.2 Process matching and tracing

Process matching helps to determine the policy process because, with the help of the theory, it helps to keep track of what is and is not useful information in a study. Matching the concepts from the theory with the actual event can help to explain because it is testing the theory to see if it matches the actual data. Using the process-tracing method is useful because it forces researchers to investigate what happened. Thus, the process-tracing method helps to explain if the chosen theory in this study can explain if the set-out conditions can factor in for explaining the situation as it is or that other conditions played a role in the policy process for electric vehicles.

This study aims to explain the process of how the developmental path of electric vehicle policies influenced the output of electric vehicles. This is why process tracing is chosen as an appropriate method of examination because it focuses on setting out the process of how an outcome occurs. The approach of laying out the configuration of the policymaking process makes the method reliable because it focuses on explaining all the involved factors, the different ways to track the outcome of a policy, and the impact of the same cause that is reached for which can vary in different contexts. The process tracing also makes it possible to detect causal chains where one variable can lead to another variable at which at the end, one variable can explain the outcome of the dependent variable.

Hence, process tracing does not focus on the impact of the independent variable, in this study (1) reactive sequences, (2) the lock-in effect, or (3) critical junctures can all affect the dependent variable the policy outcome, but instead shows the process of how an initial event leads to another one and through an incremental process it produced an outcome. This strategy suits a purpose because it helps to explain why policies are formed, how they are formed, and what the impact of each policy is on the output of electric vehicles per capita. The multiple stream model is used in this study to help explain the formation and developmental path of policies. The concept window of opportunity this model provides is used to explain why and in what way policy is shaped through time.

The independent variables in this study are the (1) reactive sequences, (2) the lock-in effect, and (3) critical juncture. The multiple stream model that includes the three streams: (1) a stream of political problems, (2) a stream of policy alternatives and (3) a stream of political-administrative developments along with the window of opportunity that can occur provides an answer in why and how policy is formed through the years. The multiple stream model will help to determine whether a lock-in effect or a critical juncture has occurred between 2009 and 2015. If the outcome of the multiple stream model will say a change to a policy occurs, then this automatically will mean that policy change has occurred. All these concepts are combined and make the composition of different variables that hang under one concept, which is to measure policy changes. The process tracing is used in this study to narrate the developmental path of electric vehicle policy. The dependent variables in this study are the legislative, communicative, and financial policies. These policies are then explained with the help of the independent variables.

3.3 Method of Analysis

The primary objective of this study is to explain and evaluate the impact of policies for electric vehicles implemented in the Netherlands and the United Kingdom from 2009 until 2015 that stimulated the demand for electric vehicles for its inhabitants. By using data of new electric vehicles registrations and putting this in relation to how many electric vehicles are owned per 1,000 inhabitants of a country demonstrates the change in demand for electric vehicles throughout the years. This outcome is thus

linked to policy inputs, which can help to form a relationship between the output of electric vehicles and the effect of policies. In other words, if the share of electric vehicles per 1,000 inhabitants shows a positive effect throughout the years, then this could mean that the policies for electric vehicles affected increasing the demand for such vehicles.

Therefore, it is essential to know how policy is created because this will tell us the developmental path of it. Getting to know the development policy path towards the promotion of electric vehicles and comparing that with the sales of electric vehicles might lead to results that can show if there are significant factors that can explain the differences in electric vehicle market share per capita of a country. These constraints are in line with the bounded rational of policymakers and the involved stakeholders that directly influence the policymaking progress for electric vehicles.

The dependent variables in this study are divided into three categories. The first one is (1) the communicative policies, the second one (2) the financial incentive policies, and the last one (3 the legislative policies. Also, the share of electric vehicles per capita as a percentage of all vehicle registrations is measured. The data comes from 2009 until the end of 2015 that is given out by the RVO and the OLEV. The main explanatory variables are all the policies related to the promotion of electric vehicles. See table 4, 6, 8, 10, 12, 14, 16 for the policies from the Netherlands and the United Kingdom. The policies are divided into categories which are (1) communicative policies, (2) financial incentive policies, and (3) legislative policies. **Furthermore, including the concepts (1) reactive sequences, the (2) lock-in effect and (3) critical junctures as explanatory variables enables this study to examine the impact of national policy instruments for the promotion of electric vehicles**

Public policy is known as being a pragmatic instrument. Thus it is seen as a political and technical approach to solve problems via instruments. These instruments are seen as “at our disposal,” and the main question that should be answered here is if the policy is the best possible one for meeting the set goals by the government (Lascoumes et al., 2007: 2-3).

Economic and fiscal instruments are close to legislative and regulatory instruments, since they follow the same route, deriving their force and their legitimacy from having been developed on a legal basis. However, they are perceived regarding their economic and social efficiency. Their peculiar feature is that they use monetary techniques and tools, either to use resources intended to redistribute (taxes, fees) or to nudge the behaviours of actors through subsidies or to allow deduction of expenses (Lascoumes et al., 2007: 9-11).

The communicative policy is seen as a type of instrument that is referred to as a type of "new public policy instrument" (Lascoumes et al., 2007: 13). The communicative policy has in common the fact that they offer fewer interventionist forms of public regulation, considering the recurrent criticisms directed at instruments of the "command and control" type. In this sense, they lend themselves to organising a different kind of political relations, based on communication and consultation, and they help to renew the foundations of legitimacy.

Capturing the time dimension of electric vehicle policies before the Paris agreement can give insight into how policies related to the promotion of electric vehicles affect the adaption of electric vehicles between 2009 and 2015. Comparing this between countries gives insight into the distribution of non-electric vehicles and electric vehicles. The share of electric vehicle sales of every year is also used as a dependent variable instead of the electric vehicle sales per capita because the first method provides the ability to relate this data with external factors on the vehicle market. External factors such as an economic crisis can affect the level of economic activity in the society, which in turn can affect the sales of all vehicles in general in a country.

3.4 Data Collection

This study collects its primary data from national policy documents from the Dutch and British government, the International Energy Agency, and from media statements by policymakers that from 2008 until 2015. This helps to deepen the understanding of the economic and political conditions that shaped electric vehicle policies and to identify additional conditions. The secondary data used in this study backs up the relation of the rise in electric vehicle policy and the electric vehicle output per capita for the Netherlands and the United Kingdom. Such as articles published by the media, think tanks, research groups that set out the sales of electric vehicles for the Netherlands and the United Kingdom. The data used in this research comes from a national level and does not take in mind all the policies on the local and regional level. Due to the lack of this information, the results of this study must be interpreted carefully.

The research span of this study goes from 2009 until 2015. Both countries set out specific action plans for electric vehicles in this period. Primary data and secondary data are both analysed simultaneously. This form of triangulation of data helps to explain how intensely attention was allocated towards making policy for electric vehicles and what the policy has been for the long term. Not all data is easy to gather. Therefore, by using primary and secondary data in this study, an effort is made to complement missing values in this study. Reports on existing policy and quotes from policymakers and concerned officials can show whether the development of the policy is going in the right direction.

This study does not conduct a multivariate analysis. The data is coming from two countries, the Netherlands, and the United Kingdom. These two countries are put under scrutiny in this study, making it fit the classic characteristic of how many researchers studied national policies. Doing a qualitative content analysis of the rational from the made policies helps to understand the motivation behind the condition of polices set between 2009 and 2015.

4 Electric Vehicle Policy Development in the Netherlands and the United Kingdom

This chapter takes a closer look into specific moments and processes that may help to explain the governmental decision-making process and thus give an answer to how it led to policies dedicated to promoting the increase of electric vehicles in the Netherlands and the United Kingdom. The effectiveness of these policies can be measured by looking into how many electric vehicles are sold each year. Both the Netherlands and the United Kingdom decided to pursue the transition from fossil fuel-powered vehicles to electric vehicles. This chapter explores the strategic programs and initiatives of the Netherlands and the United Kingdom to display the current policies that promote electric vehicles on the national level.

4.1 The Netherlands and its Governments

The Netherlands plans on having 200.000 electric vehicles, and the United Kingdom 1.700.000 electric vehicles at the end of the year in 2020. It seems that the Netherlands' is well on its way to reaching its target, but this is not the case for the United Kingdom at the end of 2015. The reason why the Netherlands seems to be on the right track of reaching their goal in comparison with the United Kingdom may be found in because of the variance in their policy formulation and policy implementing processes towards the promotion of electric vehicles. Comparing the policy formulation is done by comparing the legislation and planning process. Thus, for policy implementation, the incentives to promote electric vehicles are measured.

The electric vehicle policy framework that comes out of this will help to explain why the adoption rate for electric vehicles are at a different pace between the Netherlands and the United Kingdom. Both the Netherlands and the United Kingdom are subjective to the EU New Car CO2 Regulation No 443/2009, adopted in April 2009. This regulation set outs a framework for the car industry to develop more fuel-efficient vehicles. The Dutch and British government supports this regulation because it ensures compliance with financial sanctions that are backed up by the monitoring process. Meaning that the EU registers if the automotive industry is producing more fuel-efficient vehicles (IA-HEV, 2009).

Considering the array of policies that are meant to promote the growth of electric vehicles per capita in the Netherlands formed under the cabinets of Balkenende IV, Rutte I, and Rutte II, all being coalition governments. The first cabinet configuration started with the Balkenende IV government in February 2007. In this cabinet, the political parties The Christen Democratic Appeal (CDA), considered a centre party, The Labour Party (PvdA), considered a centre-left party, and the Christian Union (CU), considered a left party regarding the topic of environmental policy, formed the new government. In

the timespan of this research, there has been an exception regarding the type of government for the Netherlands. From 2010 until 2012, there was a minority government formed by the People's Party for Freedom and Democracy (VVD), considered a centre right Party, CDA, and the Party of Freedom considered a right-wing party (PVV). This type of government got formed through a support agreement with the PVV. The Rutte I government lasted for two years and then fell apart due to a conflict between the parties in the coalition. They could not agree upon the total package of austerity measures to reduce the deficit of the Dutch government and tackling the financial and economic problems. Elections were held in September 2012, and a new coalition formed in November 2012. This government consisted of the political parties VVD and PvdA and is known as the Rutte II cabinet. The Netherlands is known as being a multiparty democracy. This means that the different political parties that form the coalition government wrote down a coalition agreement that settled out the political plans for electric vehicles. These three governments all had their agenda during their formation, and it is interesting to see how they are presenting and implemented their views between 2009 and 2015 on how to increase the growth of electric vehicles.

The Netherlands has, in comparison with the United Kingdom, more progressive political green parties. The parties (1) Greenleft (GroenLinks), (2) the Labour Party (Partij van de Arbeid) were the two parties where their party manifestos met the European objectives for sustainable energy and ranked the highest in the election year 2012 (De Nederlandse Klimaatbeweging, 2017). Also that same year the party manifestos of the People's Party for Freedom and Democracy (), (2) Democrats 66 (D66), (3) Christian Union (ChristenUnie), (4) Socialist Party (De Nederlandse Socialistische Partij and (5) The Reformed Political Party (De Staatkundig Gereformeerde Partij) met the European objectives for sustainable energy (Visser and Schipper, 2012). The formation of the Dutch cabinet is part of the explanation of why the Netherlands has more momentum in obtaining their objectives regarding the growth of electric vehicles. Looking into the stance of the political parties in the cabinet gives a view of their take regarding the deployment of electric vehicles. The agreement is that 14% of the total energy consumption in the Netherlands must come from renewable sources. The latest prospect from the Ministry of Economic Affairs indicates that they will reach this goal. The latest prospect even indicates that not 14%, but 23% of its energy consumption will be coming from renewable sources (Nederlandse Omroep Stichting, 2017).

The Netherland is a country that always has been mainly dependent on non-sustainable fuels for its energy, such as oil and coal (statistics Netherlands, 2017). The primary source of energy in 2013 came from fossil fuels, with 82% (statistics Netherlands, 2017). In 2009 a national action plan was launched for renewable energy under the directive 2009/28/EG European Parliament et al, 2009. Plans were made to improve the use of renewable energy sources, which led to a total of 12% in 2013 Statistics

Netherlands, 2015: 15. Also, the dense infrastructure in the Netherlands was the central argument to promote their country as an international laboratory field for electric vehicles. This also means that investments in the infrastructure do not have to be as high as other countries because distances driven in the Netherlands are relatively short.

4.1.1 Dutch Policies and Legislations

In 2007, the Ministry of Infrastructure and Water Management started making plans towards the transition of clean energy. The program "New energy for the climate: working program clean and economical" was launched in which the plan was presented on what the Netherlands can do to counter climate change and how to adapt to climate change (Ministry of Infrastructure and Water Management, 2007). The report stated an action plan that tells what can be done to make the Netherlands in 2020 one of the most efficient and clean energy facilitators in Europe. Special attention was given in this report that ambitious goals can be achieved if everyone works together. The Dutch also already had before 2009 an awareness camping on "economical driving" for drivers of all vehicle types and since 2006 a special tax rule for electric vehicles and hybrid vehicles. Electric vehicles became since 2006 eligible for a fiscal registration grant when bought new. The financial bonus and registration tax are dependent on the energy efficiency label of the vehicle and is meant to encourage sales.

The bonus is dependent on the energy efficiency label of the car, which is divided into two labels. A (1) label A vehicle owner would get €5000, and a (2) label B owner would get €2,500. If the vehicle is very energy efficient, then the car also becomes eligible for a tax registration deduction. This depends on the CO2 emissions in grams per kilometre. Any other fuel-powered vehicle that is not energy efficient is penalized with an additional registration tax (IA-HEV, 2009: 217.). The awareness campaign is meant to reduce emissions and improve air quality by promoting the concept of economical driving to save fuel. In general, the government support programs that focus on environmental policy objectives of reducing emissions and improving air quality. The government promotes the concept of "economical driving" for drivers of all vehicle types. The primary goal of this program is to emphasise fuel-efficient driving behaviour. This is incorporated into the training course when obtaining a vehicle license. Fuel economy can be improved by up to 20%. Thus, economical driving also plays a role in extending the range of electric vehicles.

Then mid-2009, the Dutch government launched a National Action Plan for Electric Driving with the principal ambition to make the Netherlands an international laboratory for electric driving. The program is the start of actively promoting the use of electric vehicles by the government. The primary objective of this plan is to make the Netherlands a guide and international laboratory for electric driving in 2009-2011. The idea is that market players and social organisations will be the ones to realise the plan. The government is there to support these actors (IA-HEV, 2010: 226, Ministry of

Infrastructure and Water Management et al., 2009: 10). The government set aside 65 million euros to support the efforts by market parties, social organisations, and local and regional authorities. The idea behind this is that it will act as a multiplier to stimulate around 500 million euros in expenditure to promote the use of electric vehicles.

The National Action Plan for electric driving consists of three parts:
1) Establishing a so-called formula E-team that represents members from the government, companies, and institutions that are important for a successful introduction of electric vehicles. The main task of this team is to stimulate the market for the development of electric vehicles and remove obstacles. Prince Maurits van Oranje, a member of the Royal Family in the Netherlands, was appointed as the chairman of this team. This illustrates the ambition of the Dutch government on how to make sure to get international recognition on becoming an international laboratory for electric vehicles (Groen7, 2012).

2) Initiate the following activities in 2009-2011. a) practical testing and demonstration projects; (b) acting as a launching customer; (c) charging, energy, and other infrastructure; (d) research, development, and production of electric vehicles and/or components; (e) formation of consortiums and coalitions; and (f) supporting fiscal policy.

3) a market introduction of electric vehicles facilitated, coordinated, and phased-in by the Formula-E team based on the National Action Plan for Electric Driving and other studies.

The government also set out a four-program stage linked to healthy market development of electric vehicles in the period 2009-2020, see table 2.

Table 2 Four program Stage 2009-2020

Period	Market Development	Expected Number of Electric Vehicles	Program Stage
2009-2011	Laboratories	<100 to <1000	Program Start-up
2012-2015	Scale-up	15.000 to 20.000	Program Implementation
2015-2020	Continued roll-out	200.000	Program consolidation
After 2020	Mature market	1.000.000 electric vehicles in 2025	Program scaled down

In 2010 further progress was made with the national plan launched in 2009. The government launched on 1 January 2010 the following fiscal policies applicable to electric vehicles: (1) exemption from

additional purchase tax on new passenger electric vehicles until 2018, (2) exemption from road tax until 2018, (3) exemption from income tax surcharge for lease cars until 2014, (3) fiscal grants for companies that invest in electric vehicles for commercial transport, and (4) fiscal grants for companies that invest in charging stations (IA-HEV, 2010: 228). The (3) exemption from income tax surcharge for lease vehicles is a measure that makes electric vehicles more attractive as a lease vehicle. Driving a zero-emission vehicle means that zero percent of the new car value is added to the yearly income tax. When driving an electric vehicle that is not entirely emission-free, consumers pay 14% instead of 20%. This legislation is valid until 2018. The expectation is that with all these policies, there will be an increase in demand for electric vehicles. Therefore, as described earlier, the special Formula E-team agreed with car manufacturers to make 4000 electric vehicles available for the Dutch market in the year 2011. This was done to promote the electric mobility plan and let the consumers know that electric vehicles were available for sale (IA-HEV, 2010: 228).

What was also important is that a standard plug has been unanimously chosen to charge electric vehicles in the Netherlands. This standard plug was chosen by the Formula E-team and the market parties Eneco, Essent, Nuon, Enexis, Stichting E-lead, Better Place, 365 Energy Group, Mistergreen, and UNESCO VNI. All these parties chose the standard plug unanimously for the Netherlands (Ministry of Economic Affairs, 2010). Germany and Sweden also chose this plug. The Dutch government also managed to get an agreement from the suppliers of charging stations that one type of charging pass can be used at all charging stations in the Netherlands (IA-HEV, 2010: 227).

In 2011 a second national plan was launched to promote the growth of electric vehicles in the Netherlands (IA-HEV, 2011: 129). This second national plan is named the Action Plan for Electric Driving 2011-2015 and is supposed to get the electric mobility up to speed. According to this plan, this could be best done by a) reinforcing the economic position of the Netherlands. This made it clear that the Dutch government sees potential in the economic advantages that come with expanding the fleet of electric vehicles in its country. b) Conserving the energy reserves, and c) contributing to national, European, and international environmental goals (IA-HEV, 2011: 129). The Dutch government stated that electro-mobility is part of the transition to a "*truly sustainable energy system*" (IA-HEV, 2010: 135). Therefore, the Dutch government wants to have demonstrated in 2015 that electromobility, thus the usage of electric vehicles, is already a viable choice of transport in the Netherlands that year.

In the year 2012, the Dutch government put its focus on the public charging infrastructure since this is a crucial part of making the use of electric vehicles sustainable. A policy tool called the "Green Deal" facilitates the government and market parties to consider several business options where the public charging infrastructure is market driven. This means that eventually, the market will take over the

public charging infrastructure, and the financial support of the government is no longer needed. These "Green Deals" are made to overcome financial barriers and barriers that are set out by existing laws and regulations (IA-HEV, 2013: 135-136). Such "Green Deals" are, therefore, to help local authorities, citizens, market parties, and non-governmental organisations to facilitate environmental initiatives (IA-HEV, 2013: 235-236). The year 2013 saw a rapid growth of electric vehicles and their infrastructure in the Netherlands. The same goes for the cooperation of companies, non-governmental organisations, knowledge institutions, and governments working together to increase the use of electric vehicles (IA-HEV, 2013: 167). In September 2013, over 40 organisations signed the Energy Agreement for Sustainable Growth. The goal of this agreement is to reach a yearly saving in the energy use of 1.5% and to stimulate the use of sustainable economic growth. The vision of this agreement is to realise a 100% zero-emission of passenger transport in 2050 (IA-HEV, 2013: 211). This year alone also saw a rapid growth in quick-charging stations, which resulted in nationwide coverage. More than 250 of these stations along Dutch highways were installed.

Also, in 2013, the all-electric vehicle manufacturer Tesla decided to choose Amsterdam as its European headquarter and Tilburg as its European assembly and distribution centre (Jessayan, 2017). Tesla opened a second assembly line in 2015. On that same day, the Minister of economic affairs and the CEO of Tesla launched a new partnership between the Netherlands and Tesla. This partnership aims to improve sustainable mobility and further development of the storage of renewable energy (Ministry of Economic Affairs and Climate Policy, 2015). This partnership comes from the ambition "Global Challenges, Dutch Solutions" from the Rutte II Cabinet, which is executed by the Ministry of Economic Affairs. This ambition aims to provide solutions in Europe and globally for different kinds of societal changes, one of them being building and maintaining an efficient and sustainable transport system. The Dutch government, therefore, aims to connect Dutch businesses, knowledge institutions, and non-governmental organisations with parties outside the Netherlands to strengthen its economic position further (Ministry of Economic Affairs and Climate Policy et al., 2014). Another car manufacturer launched its first electric vehicle, the BMW i3, in the Netherlands, which further strengthens its set goal of positioning itself as taking the lead role in electric mobility (IA-HEV, 2013: 168).

Further, plans were made in 2014 that are motivated by the Energy Agreement for Sustainable Growth. More than 100 experts and stakeholders developed their vision on how to realise a sustainable transport system in the Netherlands. The Social and Economic Council of the Netherlands (SER) brought all these visions in the report "A vision on sustainable fuels for transport". The SER stated that this report started the official transition to a sustainable future for the Netherlands. This means that the Energy Agreement also takes mobility and transport measures to make traffic and transport more efficient and sustainable. Especially for the promotion of electric vehicles, the agreement led to on

creating specific policy and to set out specific plans for the public infrastructure for charging electric vehicles (Social and Economic Council of the Netherlands, 2013: 10).

In 2015 the target of 15,000 to 20,000 electric vehicles was easily surpassed with having over 90,000 electric vehicles on the road. The Netherlands actively stimulates the use of electric vehicles because it helps to reach climate goals, ease the energy transition from fossil fuels to more sustainable sources of energy, it improves the quality of life in most cities. The Dutch economy also benefits from the development of the electric mobility sector because it strengthens the economic position of the Netherlands (IA-HEV, 2015: 233). The Dutch government actively supports these developments since 2009 with various action plans and policies to stimulate the acceptance of electric vehicles in the Netherlands. The report "A vision on sustainable fuels for transport" stated that all vehicles sold in 2035 must be emission-free. Therefore, the government starts on 1 January 2015 to focus more on emission-free vehicles. Thus, meaning that only fully electric vehicles, not plug-in electric vehicles, will only benefit from financial and fiscal incentives in 2020 (IA-HEV, 2015: 234). Also, see tables 4, 6, 8, 10, 12, 14, and 16 for an overview of the policies from the Netherlands and the United Kingdom between 2009 and 2015.

4.2 The United Kingdom and its Governments

From 2009 until 2015, the Brown Ministry, the Cameron-Clegg Coalition, and the Second Cameron Ministry were responsible for the output of policies to increase the number of electric vehicles in the UK. They were interested in knowing why these three governments from the UK ought to use their array of policies feasible for the growth of electric vehicles per capita.

In 2005 there was the all Labour, Tony Blair Ministry, who served from May 1997 until May 2007. Prime Minister Tony Blair resigned this year because he was accused of misleading the parliament with incomplete information that misled the United Kingdom into the United States-led war on Iraq. After this, Gordon Brown, from the Labour Party, formed the Brown Ministry on 27 June 2007. The Brown ministry got succeeded by the First Cameron Ministry that was formed by Prime Minister David Cameron. This Cameron Ministry was not a typical majority government. This Ministry was a coalition government. The coalition consisted of members of the Conservatives, with 306 seats in the House of Commons, and the Liberal Democrats, with 57 seats in the House of Commons, from 2010 until May 2015. This was a unique event, and the last time this happened was with the Churchill war ministry from 1940 until 1945. The First Cameron Ministry was a coalition government composed by members of the Conservatives and Liberal Democrats from 2010 until May 2015. This ministry, therefore, set-up a coalition agreement that is taken in the analysis. In this coalition agreement, the First Cameron Ministry set out a five-year program about the main policy issues on the government's agenda in May

2010. After this term, the Conservative Party managed to win the elections again and become known as the second Cameron Ministry.

The UK had in 2009 only one party that firmly stands for sustainable energy and to reduce the effects of climate change; this is the Green Party (Carrington, 2015). This party got their first and only seat in the elections of 2010 and managed to hold onto their seat in the elections in 2015. Their influence on policy regarding electric vehicles is therefore insignificant. The three main parties, Liberal-Democrats, Labour Party, and Conservative Party pledged in 2013 to tackle climate change together. This pledge got through because the main argument in this agreement was that they must act against climate change. Otherwise, if no actions are taken, then this will lead to an adverse effect on national and economic security (Carrington, 2015). Tracking polls indicated that in 2015, an election year, all the three-party manifestos from the parties have less in common with tackling climate change than in 2010 (Carrington, 2015). Also, a report published by the European Commission's statistical body, "Eurostat," showed that Britain is the third-lowest producer of renewable energy in the EU. Only 4.2% of its energy consumption is generated from green sources (Pitt-Brooke, 2014). The deal is that the UK needs to produce 15% of the total energy consumption from renewable sources in 2020 9 Harvey, 2016b). At this rate, the prospects are that the UK will not meet this goal. The most recent report on the development of renewable energy stated that this is due to the government's 'non-committal approach' (Harvey, 2016a). This is in contrast with what the First Cameron Ministry explicitly committed itself to, and that is to be "the greenest government ever". A reaction upon this came from the spokesmen of the Department of Energy and Climate Change. They stated that the government is committed to reducing emissions but only via the route of the most cost-effective way for households and businesses (Harvey, 2016a). This statement is contradictory to the committee that came with this plan to reduce emission by 50% in 2023-2027 because in order to meet this target an additional investment of £16 billion is needed every year to meet this target and that the government needs to get their short-term policies right (Helm et al., 2011 and Harvey et al., 2011).

The UK has been fortunate enough to have oil fields that are used to produce energy. This also explains this being their dominant source of energy supply that accounts for 81.5% of its country in 2017. This was the lowest percentage ever for the UK of being dependent on fossil fuels. The energy supply coming from renewable sources was in this year, 8.9% (Department for Business, Energy & Industrial Strategy, 2017: 11).

4.2.1 British Policies and Legislations

Already in 2006, the Stern Review got published out on behalf of the government of the United Kingdom on the Economics of Climate Change. This is a 700-page report that discusses the effect of global warming on the world economy. This landmark review is the largest and most widely known

and discussed report of its kind (The Guardian, 2011). Gordon Brown commissioned this report, then UK Chancellor of the Exchequer, Ministry of Economic and Financial Affairs, of the third Blair Ministry, 2005-2007. This report examined "*the economic impacts of climate change itself*" and "the economics of stabilising greenhouse gases in the atmosphere" – plus the policy challenges of creating a low-carbon economy and managing adaption to a changing climate. The report concluded that:

"The evidence shows that ignoring climate change will eventually damage economic growth. Our actions over the coming few decades could create risks of major disruption to economic and social activity, later in this century and the next, on a scale like those associated with the great wars and the economic depression of the first half of the 20th century. Moreover, it will be difficult or impossible to reverse these changes. Tackling climate change is the pro-growth strategy for the longer term, and it can be done in a way that does not cap the aspirations for growth of rich or developing countries. The earlier effective action is taken, the less costly it will be."

This report stated that it would be far costlier if the world would ignore climate change than fixing it. The recommendation in this report was that the world should spend 1% of Global Gross Domestic Product (GDP) each year to stop the decline of the world's GDP by 20% by the end of the century. In 2008 the author of the report, Nicholas Stern chairman of the Centre for Climate Change and Economic Policy, said that he underestimated the impact of climate change and that the world should be spending 2% of global GDP on tackling climate change.

After the Stern Review, in 2008, British Prime Minister Gordon Brown announced that the United Kingdom plans on taking the lead role of a "green car revolution". He stated that by 2020, all new vehicles sold in the United Kingdom would produce less than 100 grams of CO2 per kilometer (British Broadcasting Corporation, 2008). 2008 was also the year that the Parliament of the United Kingdom legislated the Climate Change Act. This act supports the government's commitment to take appropriate measures to make sure that for the year 2050, the greenhouse gasses are at least 80% lower than in 1990. This Climate Change Act also introduced a long-term framework to reduce greenhouse gas emissions (British Broadcasting Corporation, 2008). The goal of this Climate Change Act is to reduce these emissions of at least 80% below 1990 levels by 2050 (IA-HEV, 2009: 285 and Committee on Climate Chane, 2008ab).

The Department of Energy and Climate Change published in 2009 a report that set out the development of policies for electric vehicles in the United Kingdom. These policies set out the UK's transition plan to 2020 for becoming a low carbon country. This report states that it wants to transform the transport of the country by cutting carbon dioxide emissions from new vehicles by 40 percent on

2007 levels and increase the support for electric cars (Department of Energy and Climate Change, 2009).

In April 2009, a new plan of £250 million got out that is supposed to orient towards a shift of ultralow carbon vehicles. This plan offers motorists a subsidy of up to £5000 for those that buy an electric vehicle (British Broadcasting Corporation, 2009). This was announced by the UK Secretary of State for Transport and Business. The UK government believes that reducing the environmental impact of transport is of importance because 19% of the CO2 emission in the UK comes from road vehicles in 2009 (IA-HEV, 2009: 284). This strategy set in 2008 is underlined by five goals that set out how supply and demand for ultra-low carbon vehicles are to be achieved in the next few critical years. The five goals set out by the UK government to actively promote the usage under-consumers of ultra-low carbon solutions, their development, and their manufacture are:

1. Supporting the automotive industry through the downturn for a successful transition to a low carbon future.
2. Securing the future competitiveness of the UK industry by enhancing its reputation as a leading location for research, development, and demonstration of ultra-low carbon vehicle technology.
3. Creating a viable environment and infrastructure to support the adoption of ultra-low carbon vehicles in lead cities and regions, including investments in the skills base.
4. Making ultra-low carbon vehicle solutions more attractive to consumers by helping to reduce the upfront costs of these vehicles.
5. Clear and strategic leadership by Government and smarter coordination of public sector activity

The goal of the United Kingdom is to have 1,700,000 electric vehicles on their roads by 2020. This number of electric vehicles is then supposed to be equal to five percent of all the vehicles on the road in the United Kingdom. This would also mean that 16% of all new vehicles should be electric (IA-HEV, 2010: 323).

A new body, the Office for Low Emission Vehicles (OLEV) was instigated in the UK by the Department for Transport, Business, and Energy and Climate change. The OLEV an organisational instrument to promote the sales of electric vehicles, which is like the Formula E-team of the Netherlands. The OLEV oversees bringing together existing policy and funding streams to create a policy to deliver the growth of electric vehicles in the UK. It is also their responsibility to help in creating the infrastructure to ease the transition of electric vehicles (IA-HEV, 2009: 289). The UK government also expects that local authorities will take their role in using their policy levers to stimulate the growth of electric vehicles.

Local authorities can use measurements such as providing parking discounts, access to priority lanes, and exemptions from congestion charge or any other traffic measures. Local authorities decide for themselves which policies are helping to stimulate the growth of electric vehicles in their municipality (IA-HEV, 2009: 288). This raises the question if only the national government is best suited to govern the sustainable switch to sustainable transport or that the help of the local government is needed to realise the switch to full-on the usage of electric vehicles in the future. The involvement of the local government is a constraint or as a beneficiary for realising growth in the number of electric vehicles. This because the local authority can influence the choice of a consumer when buying a new electric vehicle with incentives such as mentioned earlier.

In 2010 the first coalition government Cameron Ministry continued the path of "green growth" of the previous government, the Brown Ministry. Thus, the path continues to promote the growth of electric vehicles. The first Cameron Ministry decided to launch a packet worth £400 million in measures to promote the growth of electric vehicles. This includes the already set out Plug-In Car Grant of £230 million. The government decided to increase the financial support for electric vehicles as well as investing in the infrastructure of these vehicles, for instance, the charging network. In May 2011, the government partly honoured the advice of the Committee on Climate Change's Fourth Carbon Budget. This new measurement arose from the realisation that steps must be taken now to meet emission reduction set goals in 2020 (IA-HEV, 2009: 323). The Committee recommended that the government should set aside £800 million in total to support the scenario whereby 5% of the total UK car fleet and 16% of all new cars on UK roads in 2020 will be an electric vehicle. If the government would not do this, the expenditure could go up to £5 billion five years later, instead of the now recommended £800 million (IA-HEV, 2009: 323).

The First Cameron ministry shows that it is committed to accelerating the switch to emission-free vehicles. However, the government also finds it essential to improve the country's finances (IA-HEV, 2009: 323). The Exchequer mentioned in October 2010 that as part of their austere overall fiscal strategy, each governmental department would experience a budget cut of 19% over the next four years. Keeping this in mind, the government still announced a measurement package of £400 million to stimulate the growth of electric vehicles.

In June 2011, the Department for Transport published a new charging infrastructure strategy for a fuller acceptance of electric vehicles. The reason behind this new strategy is that the charging infrastructure is the main reason to increase the acceptance of electric vehicles. This strategy contains new measurements to support the electric vehicle infrastructure, see Table 2011 UK (IA-HEV, 2009: 177). Then in February 2013, the Department for Transport's Secretary of State announced a £37

million package of measures to support further the development of the recharging infrastructure for electric vehicles, see Table 2013 UK (IA-HEV, 2012: 172).

In September 2013, the first Cameron Ministry announced a new ambitious strategy to steer the development and usage of electric vehicles in the right direction (Baker, 2013). The strategy is called "Driving the future today – a strategy for ultra-low emission vehicles in the UK" (Office for Low Emission Vehicles, 2013). The UK government invited parties, under the supervision of OLEV, involved with the environmental goals to come up with evidence on their own on what would be the best way to invest a further £500 million in motivating the use and growth of ultra-low carbon vehicles. This was eventually making the UK the primary market for such vehicles (IA-HEV, 2013: 220-221). This £500 million package is announced to start midway in 2015 and will last until 2020 (IA-HEV, 2013: 221). This initiative is a commitment by the UK government in how vehicles will be powered in the future. This investment came with a strategy that set out the UK government's main goals: 1) support the market for ultra-low emission vehicles, 2) shaping the necessary infrastructure, 3) securing the right regulatory and fiscal measures, 4) investing in the UK automotive capability, and 5) preparing the energy sector. The government expects of this package that this will plot the way to exit of subsidy given by the government for everything related to ultra-low emission vehicles (Office for Low Emission Vehicles, 2013).

In April 2014, the UK's Deputy Prime Minister announced the plans of the £500 million package for ultra-low emission vehicles. The call for evidence set out in 2013 was used to form the framework of this package. The primary goal of this package is to make the UK a global leader in both the production and use of low emission vehicles (IA-HEV, 2013: 263. £200 million of this package will be used for the further continuation of the Plug-In Car Grant with a cap of £5000 per vehicle. The package also consists of supporting the manufacturing of low emission vehicles, supporting local incentives such as free parking, new infrastructure such as quick-charging stations, and investing in the national network of charge points on the strategic roads in the UK (IA-HEV, 2013: 263-264).

In January 2014, the government also started a campaign together with the electric mobility industry. The campaign pointed out, for example, the financial benefits and the range of electric vehicles (IA-HEV, 2013: 267). In 2015 the new UK government set out a new goal formed by the Conservative Party. They stated that by 2040, almost every car needs to be a zero-emission vehicle and that they will invest £600 million in the upcoming five years to achieve this goal. The UK was in 2014 the second-largest buyer of electric vehicles, after the Netherlands, in the European Union. The numbers show that the electric vehicle market is growing, which is vital for the government because they see this as the effect of their policy and as an ongoing solution for reducing the emission by 80% in 2050 in comparison with

1990 (see table 3 for a complete overview of the United Kingdom) (IA-HEV, 2013: 290). Also, see tables 4, 6, 8, 10, 12, 14, and 16 for an overview of the policies from the Netherlands and the United Kingdom between 2009 and 2015.

5 Explaining Dutch and British electric vehicle trajectories

In this chapter, the collected documents will be analysed with the help of the theory concerning the development of policy for electric vehicles. The aim is to explain the relationship of either reactive sequences, lock-in effect, and critical junction sequences that have any influence on the dependent variable, the policies. Which, in turn, might help in explaining the trajectory path of either the Netherlands and of the United Kingdom. The outcome, as in the increase in numbers of electric vehicles, shall be used to measure the effectiveness of the policy. In the following chapter, the discussion will be then about if path dependency is a proper divisor between the effect of policies on the outcome in the increase of electric vehicles. First, the differences between legislative, fiscal, and communicative policies will be discussed. It is necessary to check if each policy falls under one of these types of policy. This will be checked with a setlist of indicators. After that, various documents are discussed that help explain how useful each type of policy has been. Next, it will be discussed whether the three different types of policy have mainly followed a path sequence of reactive sequences, a lock-in effect, or a critical juncture path.

The data suggests that it is the type of policy that matters on increasing the demand for electric vehicles. This research shows that in the period 2009-2015, policies especially made for electric vehicles had a drastic effect in the Netherlands. The ratio for electric vehicles went from 0,01 in 2010 to 5,14 electric vehicles per 1000 inhabitants in 2015. The UK, on the other hand, went from 0,02 in 2010 to a mere 0,46 electric vehicles per 1000 inhabitants. The primary goal of this research was to examine why the Netherlands has more electric vehicles per capita than the United Kingdom. The conceptual model for this research question was that it is due to critical junctures and reactive sequences that led to the Netherlands having more vehicles per capita than the United Kingdom. The Netherlands had a more intensive and broader range in focus for policies to increase the demand for electric vehicles. The United Kingdom focused more on developing the automotive industry. This is understandable because their economy is dependent on the output of this industry. The Netherlands decided to choose for an approach that stimulates the consumer sales for electric vehicles, and the United Kingdom chose to stimulate the innovation process for electric vehicles for its domestic automotive industry. Both goals do increase the environmental benefits for countries, which is the main instigator for both countries to make policies to promote the sales of electric vehicles. To understand policy differences, this research used the path dependency theory that helped to set out the events and decisions that were of relevance that led to 87,531 electric vehicles in the Netherland and 29,963 electric vehicles for the United Kingdom at the end of 2015.

The Netherlands had a deliberate plan with how many electric vehicles they wanted to have on the road. Their goal to have 20,000 electric vehicles on the road at the end of 2015 was well exceeded (IA-HEV, 2016: 244). The United Kingdom did not have such a clear goal in 2009. It was in 2016 that the United Kingdom set out that they are aiming to have 1,700,000 million electric vehicles on the road, which should be equal to 5% of all the vehicles on the road (NewMotion, 2016). The findings support the theory in that critical junctures, and due to reactive sequences, both the Netherlands and the United Kingdom continued their effort with policies to increase the output of electric vehicles. The approach was only different because the Netherlands lacked an automotive industry, and the United Kingdom decided to prioritize developing this industry to produce electric vehicles. Their goal is to become the global leader in the production and use of electric vehicles (IA-HEV, 2015: 263).

Results show that the policies were made under the influence of the political and economic conditions of the country. Contingency does lead to sudden policy changes, but the socio-economic conditions of the country is a decisive factor in how a country decides to shape its policy for reaching their goals. The Netherlands made clear goals on how many electric vehicles they wanted to have on the road. They wanted to be the forerunner in the world and therefore decided to become the testing playground for electric vehicles, gain knowledge on such vehicles and capitalise on it and saw this as one of the better ways to reduce CO2 emissions. It would also help, for instance, to reduce noise pollutions in cities. The United Kingdom favoured to prep their automotive industry because of their economic dependence on its countries GDP and also set out a few policies to reduce the total cost of ownership for an electric vehicle and financial benefits for lease owners and entrepreneurs. The Netherlands had better coverage with more extensive coverage that kept the total cost of ownership exceptionally low for entrepreneurs and their employees. This group is almost solely responsible for the tremendous increase in the use of electric vehicles. Having more financial incentives thus explains why the Netherlands has more electric vehicles per capita than the United Kingdom. The thing is that the automotive industry is not only developing electric vehicles but also other alternative drive systems. If it turns out that another drive train becomes a better alternative, than that would mean that the Netherlands allocated their finances to non-viable means of transportation. The United Kingdom, on the other hand, has been developing its industry for electric vehicles and other alternative drivetrains. So as the conceptual model suggests, it is due to critical junctures and reactive sequences that the adoption of electric vehicles could also become very costly for the Netherlands when it turns out that electric vehicles will not become the primary means of transport of the future.

5.1 Analysis of the Dutch electric vehicle policy

The first step is to analyse the trajectory path of the Netherlands and the United Kingdom separately. Then the similarities and differences of the policies of the two countries are examined. After this, the

theoretical framework consisting of path dependency and critical junctures and the multiple stream framework is used to analyse how created policies shaped the path of electric vehicle promotion between 2009 and 2015. The multiple stream model is useful in this analysis because this model helps to abstract why and how decisions were made towards a path for the set of policies related to electric vehicles between 2009 and 2015.

The Netherlands would like to have all passenger vehicles be electric in 2035 and for the UK in 2040. The numbers show that the sales of electric vehicles really took off in 2009 and had been growing fast ever since. The year 2015 was a big year for electric vehicles because in the Netherlands, the number of electric vehicles grew by 100% and in the United Kingdom with 112%. 2015 is the first year that the number of electric vehicles grew to a three-digit percentage.

Answers are found in the distinct way the Netherlands setup their plans towards the actual realisation of increasing the share of electric vehicles in the total passenger vehicle fleet. Both countries use a wide array of policies to increase the share of electric vehicles in the total fleet of passenger vehicles. These policies contain (1) financial and non-financial incentives, (2) expansion of the charging infrastructure, (3) ensuring the availability of electric vehicles through investments and pledges, and (4) making an effort to increase awareness in the benefits of electric vehicles. These promotion action policies are both shared by the Netherlands and the UK and seem to be vital features to increase the market of electric vehicles.

Such policies are thus needed to realise a sustainable transition towards electric vehicles. The government supports both the demand and supply side of electric vehicles to increase the share of electric vehicles per capita. However, the critical difference is how these two countries formed their strategic plans and policy to reach their goals. The focus of the UK government was not as strong as that of the Netherlands. The results of the policies show that stable and specific signals from national and European Union policy works. Overall, the demand for reliable and specific policies remains to realise that all new passenger vehicles bought will be an electric vehicle. The non-political commitment of the UK government and political clashes between the parties and with stakeholders seems to be part of the reason besides not wanting to pass policies that will end up harming the economic growth of the country.

The political commitment in the Netherlands is higher than that of the United Kingdom, which partly explains why the Netherlands has more electric vehicles than the United Kingdom on December 31st of 2015. We also see that the Netherlands has had a more extensive policy regarding the promotion of electric vehicles that mostly benefits lease owners. Results show that having many policies for the promotion of electric vehicles also has a downside for the treasury of the Dutch government. Most of

these policies are funded with the idea that the government needs to spend to encourage sales and, therefore, the usage of electric cars. Calculations show that €6 billion has been given out as financial incentives for electric vehicles (IA-HEV, 2016: 233). The target of the Netherlands to have 20,000 electric vehicles on the road was easily met. The Netherlands had at the end of 2015 131,011 electric vehicles on the road and is one of the global leaders in electric vehicle sales (IA-HEV, 2016: 238-239). The number of electric vehicles doubled in 2015. This also happened thanks to the end of fiscal incentives for Plug-In Hybrid Vehicles at the end of 2015. PHEVs were the most sold electric vehicle in 2015. Only 11% of the 87,531 electric vehicles sold were zero-emission vehicles. The Dutch government chose to allocate funds more to the direct benefits of consumers. This explains why the Netherlands has a higher ratio of the electric vehicle per capita.

The Netherlands put their attention on zero-emission electric vehicles since January 2015. This means that Plug-In Hybrid Electric vehicles were taken out of the equation. It was thanks to the fast growth of PHEVs that helped in increasing the number of public charging points (IA-HEV, 2016: 238). The focus after 2015 will be more on battery electric vehicles. PHEVs will be excluded from many financial incentives gradually, which already started since 2014. The expectation is that this will affect the sales of PHEVs because the cost of ownership will increase without these incentives (IA-HEV, 2016: 242). Most of the electric vehicles in the Netherlands are sold to companies or are leased due to the fiscal benefits that company or lease owners get when they opt for an electric vehicle (IA-HEV, 2016: 137-138). Many actors said that the government could not continue to keep giving financial benefits to mostly this group even though that these incentives do lead to the desired climate goals of the government (Luttikhuis, 2016). Because when the lease of such an electric vehicle is over, these cars will still be too expensive for consumers as a private car owner.

The outcome of the Dutch electric vehicle trajectory from 2010 until 2015

Overall, the policy of the Netherlands for electric vehicles seems to focus on keeping the Total Cost of Ownership (TOC) lower over the life of the vehicle. In comparison, the UK only set aside in the same timespan roughly £940 million on stimulating the usage of electric vehicles. This means that not all the money that has been set aside for promoting electric vehicles has been used for this purpose. This resulted in the desired growth of electric vehicles in the Netherlands, which eventually led to surpassing more than 70,000 electric vehicles, the set goal of 20,000 electric vehicles in 2015.

An interest group that influences the output of electric vehicles

The Formula-E team of the Netherlands is a critical factor that works together with the government and other public and private institutions to support electric mobility. These stakeholders within the formula e-team contributed to support the adaption of electric vehicles because of the direct line.

This fits the reactive sequence part in the sense that the market will take over the public support of the government until it is no longer needed. The fact that they also operate outside their country and are actively looking for expansion in other countries, such as selling their knowledge and organizing events to support the adoption of electric vehicles. This part corresponds with the Kingdon model that an active interest group can contribute to the desired change outcome. They are even considered as one of the essential influential groups outside the official actors that are involved in the policy-making process. The United Kingdom has the OLEV, an institution that works across government to support the new market for ultra-low emission vehicles that also consists of electric vehicles (OLEV, 2019). However, they do not have the same function as the Formula-E team. The job of OLEV is indeed to promote the sales of electric vehicles, as set by the British government in policies. This OLEV does not organise extra activities to increase the sales of electric vehicles.

The outcome of the Dutch electric vehicle trajectory from 2010 until 2015

Abrupt policy changes the numbers did show between the end of 2013 and 2014 of the Netherlands that abrupt policy changes did lead to a change in the uptake of electric vehicles. Nevertheless, due to these policy changes, there was a decline of 307,5% percent point in the growth of electric vehicles. This indicates that abrupt changes in the policy should be avoided or be better managed because it has a direct effect on the outcome in the sales of electric vehicles. It was in the year 2014 that the Dutch government decided to come up with a new policy for when leasing a vehicle. Before 2014 there were no financial charges for when leasing any kind of an electric vehicle. However, the financial policy incentive for battery electric vehicles for private use lease owners came in, which meant that lease car owners would start to pay an income surcharge of 4% and Plug-In Hybrid owners 7%. This led to a direct effect on a decline in sales of electric vehicles. Such an event, therefore, fits the concept of a critical juncture. The reason why this happened was that the Dutch government realised that many lease car owners were making use of the zero percent lease tariff for electric vehicles, which led to a problem: the income of the government itself. The financial incentive to increase the sales of electric vehicles became too popular and soon became a financial hurdle for the Dutch government.

5.2 Analysis of the British electric vehicle policy trajectory

The UK decided to invest in the growth of electric vehicles since 2009, but this decision was made under the strategy of the same government that the country's fiscal finances need to be in check again. The economic recession was the reason for many governments at that time to keep their spending in check. The primary goal of the government has been from the beginning that every action they take must support to make the economy better and greener. The UK Government's policy framework aims to both stimulate and accommodate the expected substantial growth in plug-in vehicles in the UK in

the next few years. The Automotive Council UK, an organisation created in 2009 to promote UK-based manufacturers and technologies, to strengthen the supply chain and to position the UK as a leader in developing ultra-low carbon technologies (IA-HEV, 2012: 330). Three government departments, the Department for Business, Skills, and Innovation, the Department of Energy and Climate Change and the Department for Environment, Food, and Rural Affairs worked together on a new plan called "*a ned Roadmap to the Green Economy"*. The focus of this document was on transforming the automotive sector.

The UK coalition government pledged 400 million through 2010 to support the purchase, use, and manufacture of ultra-low emission vehicles. The funding is supposed to go to install recharging points for electric vehicles, and £82 million - €95million – to research and development and procurement programs to encourage the UK car industry to benefit from commercial opportunities and develop their industry for electric vehicles. There were 3021 claims made at the end of 2012 for the Plug-in Car Grant. The OLEV noted that the uptake of electric vehicles is going slower than expected. The new expectation is that the new less expensive electric vehicles coming, which are also eligible for the Plug-in Car Grant, will be leading to an increase in the sales of such vehicles. When looked at the policies rolled out by the UK, we see that their plans are more on assisting in the production of electric vehicles than on the use of vehicles. The central policy is to grant owners a subsidy of £5000 when opting for an electric vehicle. 15,416 Plug-in Car grants were made in 2014. The reason for this is that there are more electric vehicles on the market, the technology is becoming normalised, and thanks to competitive pricing with the help of the grant (IA-HEV, 2012: 263-268).

The outcome of the British electric vehicle trajectory from 2010 until 2015

The coalition government made the deliberate choice to make the road transport sector greener, which holds in that the car manufacturers are also preparing to support the production of electric vehicles. They also agreed on stricter emission standards for passenger vehicles and investing in transport technologies. The OLEV stated that the United Kingdom wants to realise a "green-motoring paradigm shift" (IA-HEV, 2012: 172). This is done with a mix of government policies and dynamic private enterprise, both funded partially by the government via subsidies. The 400 million government funding pledge is to support policies until the end of 2015. The expectation from the government is that after 2011 the electric vehicle market penetration will rise due to an increase of more electric vehicles coming to the market and the continuation of installing the necessary infrastructure across the UK. The UK, therefore, launched the plug-in vehicle infrastructure strategy in June 2011. This is mainly done to increase the acceptance of plug-in vehicles.

Their primary objective has been since then until 2015 to give the customer of an electric vehicle a financial benefit by reducing the upfront costs of the electric vehicle. In the UK, additional benefits are provided for employees who have a leased electric vehicle. For the Netherlands, we see that similar policy actions have been taken, but these have a more extensive in-depth impact. Buying an electric vehicle in the Netherlands means that the owners of an electric vehicle have lower upfront costs and lower fixed yearly costs for an electric vehicle. It is also the case that drivers who lease an electric vehicle benefit extra when chosen for an electric vehicle. In general, the policy instruments show that they focus more on the electric vehicle itself and on the infrastructure than more on the infrastructure itself and less on financial incentives to increase the accessibility of electric vehicles in the UK. This is also seen in the fact the Netherlands had 18,251 public charging points and the UK 9,874 public charging points. Dutch companies that install charging points are also operating internationally, thus exporting their knowledge, expertise, and products also to the UK to supply charging points because they see business chances (Netherlands Enterprise Agency, 2016).

This study investigated the influence of critical junctures and reactive sequences that lead to how the policy is shaped for the promotion of electric vehicles. It has become clear that the national government plays an essential factor in the adoption of electric vehicles by consumers. Further research could take a further look into what kind of role local government played into the adaptation process of electric vehicles on a national level. Electric vehicles still do have a limited range, and it could also be that the local policies in the Netherlands because the Netherlands is a smaller country, have played an important role in why they have more electric vehicles per capita than the United Kingdom.

6 Conclusion

This chapter combines the insights of this comparative case study to reach conclusions about the Dutch and British path trajectory for electric vehicle policy. An effort is made in this study to research specific electric vehicle policy affected the sales of electric vehicles in each country, and what can be stated about the influence of critical junctures that can lead to different policies, and the influence of actors in how they shape policy.

The goal of this study is to find out if government decisions and as well as the responses to these decisions, can account for the discrepancy of electric vehicles by a factor of two between the Netherlands and the United Kingdom from 2009 until 2015. The path dependency theory and multiple stream framework are used to find out if how policies are created and the way each policy has followed its path from 2009 until 2015 can explain the increase in sales of electric vehicles of each country. Furthermore, it can be said that a country that managed to raise its uptake of electric vehicles, in this case, the Netherlands, can be deemed more successful in managing the task that is set by many more countries than researched in this study. The Netherlands can thanks to its success at least partially due to governmental policies and the incentives that follow out of it.

Policies and law measurements are put under scrutiny and analysed in this study. Research is conducted to find out their place in the uptake in sales of electric vehicles between 2009 and 2015 for the Netherlands and the United Kingdom. Qualitative document analysis is conducted in this thesis to find out about the positive and negative influences of the uptake of electric vehicles by looking into the influence of policy and law measures on the increase of electric vehicles per 1,000 inhabitants of each country. Both the Netherlands and the United Kingdom still have a low percentage of electric vehicles at the end of 2015. The Netherlands is leading with 1,25% electric vehicles from its total fleet of vehicles. The United Kingdom only managed to reach 0,003% of its total fleet of vehicles of being electric. The percentage of electric vehicles in relation to its total fleet of vehicles makes it difficult to say if any policy truly worked and which policies did not work to increase the uptake of electric vehicles. If we take a look at the numbers from year to year, one can, fortunately, see that some policies such as the policy were electric vehicles are exempt from income tax surcharge for lease cars in the Netherlands in the year 2010 already.

All in all, according to the data the conclusion can be made that governmental incentive policies do play a significant role in the uptake of electric vehicles and therefore directly influence the sales of electric vehicles in favour of the consumer which explains the sales of electric vehicles per 1,000 inhabitants for both the Netherlands and the United Kingdom. The difference in governmental incentive policies lies mostly in the financial benefit a consumer gets and in how strong the indirect

policies are related to electric vehicles such as unique parking spots to charge an electric vehicle (Zhou et al., 2015).

Theoretical conclusion

The finding of this study, if the role of governments upon making electric vehicle policy has a direct link with the uptake of electric vehicles, depends on three factors, which are reactive sequences, the lock-in effect, and critical junctures. This study examined the path sequence of electric vehicle policies from the Netherlands and the United Kingdom. Analysis partly showed that each of these concepts helped to scrutinize the data and therefore managed to see links in the path sequences of specific financial, legislative, and communicative policies in contributing to the uptake of electric vehicles. Nevertheless, certain policies are set out in this study, too, to be more effective than other policies.

Many policies made by the two countries fall under the category of being path-dependent and have seen to show incremental changes between 2009 and 2015. When more significant and or radical changes were made policy-wise, then the lock-in effect and the critical juncture concept could fill in the gap of how this can be explained. The pressure of each country to reach its goals did lead to new and or changes in policies. This study found links that interest groups and the media played an essential role in keeping the government woke, and thus keep them active to pursue their set goal for the Netherlands to have 200.000 electric vehicles and for the United Kingdom that five percent of all vehicles must be electric in 2020. Especially the critical juncture moments that explain radical changes in the path sequence of each country were helpful towards reaching their goals because such changes come with the power to change existing institutions and or the way policymakers make policies due to external shocks and or the influence of policy entrepreneurs.

Further Research

For further research, one could consider other policies and fields to investigate besides fiscal, legislative, and communicative policies on the national level upon the uptake of electric vehicles between 2009 and 2015. There is a broader range of policies and other instruments available for the promotion of electric vehicles. A few examples are local policies, such as free parking for electric vehicles near shopping malls (Parool, 2019). Alternatively, there are also local and or national communities that help owners to justify the usage of their electric vehicles (EV-Rijders, 2019). The impact of such policies is not measured in this study, and one could argue that these measurements and or communities also take their part in the uptake of electric vehicles and propels consumer to buy an electric vehicle. The qualitative comparative analysis of the two countries cannot be deemed representative of Europe, let alone with another country beside this continent. It does give a view of how two countries with the same starting point of having close to zero electric vehicles grew so far

apart in a mere six years. Future studies can explore in more detail the specific forms of policy measurements for electric vehicles that act as the most effective incentives for the uptake of electric vehicles. This study put their focus on policies for electric vehicles between 2009 and 2015. In new studies, one can take this range of time, even broader and or even a smaller period. For both can be argued about why this is a good idea. Choosing a smaller timespan to research the effect of policies because it can give a chance to find out the implicit effects of all policies related to the promotion of electric vehicles and might give an answer in why some policies have been continued and others discontinued. A broader timespan could set out what kind of policies have ultimately been more effective and or which policies are still held and why specific policies do not exist anymore. They are of governmental incentives, and the market for electric vehicles is still changing and makes it, therefore, an exciting topic to study on future developments in order to find out which policies are most useful to increase the uptake of electric vehicles. Because in the end, this is what matters the most for states to realize. Keeping in mind still, though that the costs must stay in check while realising an increase in the sales of electric vehicles.

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Appendices

Table 2 Total overview of the total British fleet of EDVs and its yearly growth percentage from 2009 until 2015 (IA-HEV, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016).

The United Kingdom	BEV	PHEV	Total EDVs	% growth	EV per Capita	Electric vehicle per 1,000 inhabitants	% Market Share of electric vehicles
2008	1405	n.a.	1405	n.a.	n.a.	n.a.	n.a.
2009	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2010	1478	20	1498	n.a.	0,000024	0,02	0,005107%
2011	2504	24	2528	68,7%	0,000040	0,04	0,008604%
2012	3600	784	4384	73,4%	0,000068	0,07	0,014789%
2013	n.a.	n.a.	8346	90,3%	0,000129	0,13	0,02776%
2014	10,500	6318	14,118	69,1%	0,000217	0,21	0,05620%
2015	n.a.	n.a.	29,963	112,2%	0,000456	0,46	0,09560%

Table 3 Total overview of the total Dutch fleet of EDVs and its yearly growth percentage from 2009 until 2015 (IA-HEV, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016).

The Netherlands	BEV	PHEV	Total EDVs	% growth	Electric vehicle per capita	Electric vehicle(s) per 1,000 inhabitants	Market Share of electric vehicles
2008	50	n.a.	50	n.a.	n.a.	n.a.	n.a.
2009	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2010	238	n.a.	238		0,000014	0,01	0,003061%
2011	1124	n.a.	1124	372,2%	0,000067	0,07	0,014045%
2012	1910	4348	6258	456,7%	0,000372	0,37	0,077260%
2013	4161	24,512	28,763	359,6%	0,001705	1,71	0,353267%
2014	6825	36,937	43,762	52,1%	0,002583	2,58	0,536667%
2015	9368	78,163	87,531	100%	0,005143	5,14	1,068363%

Table 4 Netherlands: Four Program Stage 2009-2020

Period	Market Development	Expected Number of Electric Vehicles	Program Stage
2009-2011	Laboratories	<100 to <1000	Program Start-up
2012-2015	Scale-up	15.000 to 20.000	Program Implementation
2015-2020	Continued roll-out	200.000	Program consolidation
After 2020	Mature market	1.000.000 electric vehicles in 2025	Program scaled down

Table 5 Overview Electric Vehicle Policy: the Netherlands and the United Kingdom, 2009.

Policy Instrument	The Netherlands[1]	Policy Instrument	The United Kingdom[2]
Communication	Awareness Campaign on Economical Driving, including the promotion of electric vehicles.	Financial Incentive	Electric vehicles are exempt from the Vehicle Excise Duty (annual circulation tax)—a tax paid by the owner of the vehicle that is either driven or parked on public roads.
Financial Incentive	Registration tax reduction of €5000 or €2500 based on the emissions of a vehicle to encourage the sales of energy-efficient vehicles.	Financial Incentive	Electric vehicles employees and employers are exempt from company car tax.
Financial Incentive	Electric vehicles are exempt from yearly road tax until at least 2016.	Financial Incentive	Lower rate of value-added tax of 5% instead of 17,5% for domestic electricity for electric vehicles. This means lower electric vehicle operation costs.

[1] IA-HEV, 2010: 217.
[2] IA-HEV, 2010: 284-286.

		Public Program	£30 million Plugged-In Place scheme provides the critical mass of charging infrastructure in 6 regions to support the early market for electric vehicles.
		Public Program	Local authorities can use a mixed policy to stimulate the usage of electric vehicles such as parking discounts, access to priority lanes, and exemption from congestion charging.
Number of new policies initiated in 2009	3		5

Table 6 2009 Presence of Electric Vehicles in the Netherlands and the United Kingdom

	Netherlands	United Kingdom
Electric vehicles per capita	n.a.	n.a.
Electric vehicles per 1000 inhabitants	n.a.	n.a.
Market share electric vehicles	n.a.	n.a.

Table 7 Overview Electric Vehicle Policy: Netherlands and the United Kingdom, 2010.

Policy Instrument	The Netherlands[3]	Policy Instrument	The United Kingdom[4]
Financial Incentive	Electric vehicles are exempt from additional purchase tax until 2018.	Financial Incentive	Plug-In Car Grant. 25% grant for an ultra-low emission vehicle up to a maximum of £5000. Until 50.000 grants or 2017.[5]
Financial Incentive	Electric vehicles are exempt from income tax surcharge for lease cars until 2018.	Financial Incentive	
Legislation	To improve air quality in cities so-called "environmental zones" can be established to enforce owners of vehicles entering the city. This entry rule measurement in cities can influence the choice of a consumer when buying a new vehicle.		
Communication	The digital platform launched for electric vehicle owners to share their experience and knowledge. This is also used as a tool to identify and solve problems of the transition process towards electric mobility.		
Legislation	The national government decided that municipalities can introduce designated environmental zones to improve air quality. The entry of the city is allowed based on emission characteristics.		

[3] IA-HEV, 2011: 226-229.
[4] IA-HEV, 2011: 324-327.
[5] IA-HEV, 2015: 263.

Number of new policies initiated in 2010	5	Number of new policies initiated in 2010	1

Table 8 2010 Presence of Electric Vehicles in the Netherlands and the United Kingdom

	Netherlands	United Kingdom
Electric vehicles per capita	0,000014	0,000024
Electric vehicles per 1000 inhabitants	0,01	0,02
Market share electric vehicles	0,003061%	0,005107%

Table 9 Electric Vehicle Policy: the Netherlands and the United Kingdom, 2011.

Policy Instrument	The Netherlands[6]	Policy Instrument	The United Kingdom[7]
Financial Incentive	Plug-In hybrid electric vehicles that are leased are treated the same as full electric battery vehicles. This rule only applies to vehicles that emit less than 50 grams of CO2 per kilometer.	Financial Incentive	Plug-In Car Grant, with a maximum of £5000, gets further support from the government until 2015.
Financial incentive	Fiscal grants for companies that invest in public charging stations.	Communication	Launched strategy to support for plug-in vehicle infrastructure.
Number of new policies initiated in 2010	2	Number of new policies initiated in 2010	2

Table 10 2011 Presence of Electric Vehicles in the Netherlands and the United Kingdom

	Netherlands	United Kingdom
Electric vehicles per capita	0,000067	0,000040
Electric vehicles per 1000 inhabitants	0,07	0,04
Market share electric vehicles	0,014045%	0,008604%

[6] IA-HEV, 2012: 129.
[7] IA-HEV, 2012: 173-178.

Table 11 Electric Vehicle Policy: the Netherlands and the United Kingdom, 2012.

Policy Instrument	The Netherlands[8]	Policy Instrument	The United Kingdom[9]
Financial Incentive	Tax-deductible investment for environmentally friendly equipment of up to 19% of the investment for employers and employees.		
Number of new policies initiated in 2012	1	Number of new policies initiated in 2012	No new policy measures were presented for consumers by the UK government in the year 2012.

Table 12 2012 Presence of Electric Vehicles in the Netherlands and the United Kingdom

	Netherlands	United Kingdom
Electric vehicles per capita	0,00372	0,000068
Electric vehicles per 1000 inhabitants	0,37	0,07
Market share electric vehicles	0,077260%	0,014789%

Table 13 Electric Vehicle Policy: the Netherlands and the United Kingdom, 2013.

Policy Instrument	The Netherlands	Policy Instruments	The United Kingdom[10]
		Financial Incentive	£13,5 million made available for a 75% grant for UK homeowners for the cost of a charge point and its installation, available until March 2015.
		Financial Incentive	£11 million made available for a fund for local authorities in England that offers these options. Authorities can apply for 1) up to 75% of the cost of charge points and their installation on the street charging for

[8] IA-HEV, 2013: 137.
[9] IA-HEV, 2013: 172-173.
[10] IA-HEV, 2014: 226-227.

			residents who own an electric vehicle, and that do not have off-street parking, and 2) up to 75% of the cost of installing rapid charge points in areas around the strategic road network.
		Financial incentive	£9 million available to fund the cost of charge points at railway stations.
		Financial incentive	£3 million available to support the cost of charge points on government and public estates
Number of new policies initiated in 2013	No new policy measures were presented for consumers by the Dutch government in the year 2013	Number of new policies initiated in 2013	4

Table 14 2013 Presence of Electric Vehicles in the Netherlands and the United Kingdom

	Netherlands	United Kingdom
Electric vehicles per capita	0,001705	0,000129
Electric vehicles per 1000 inhabitants	1,71	0,13
Market share electric vehicles	0,353267%	0,02776%

Table 15 Electric Vehicle Policy: the Netherlands and the United Kingdom, 2014.

Policy Instruments	The Netherlands[11]	Policy Instruments	The United Kingdom
Financial Incentive	Battery Electric Vehicle for private use lease owners must pay an income surcharge of 4% and Plug-In Hybrid owners 7%.		
Financial Incentive	Employers and employees get a tax relief of no more than		

[11] IA-HEV, 2015: 213.

	€50,000 per vehicle when investing in electric vehicles.		
Number of new policies initiated in 2014	2	Number of new policies initiated in 2014	No new policy measures were presented for consumers by the UK government in the year 2014.

Table 16 2014 Presence of Electric Vehicles in the Netherlands and the United Kingdom

	Netherlands	United Kingdom
Electric vehicles per capita	0,002583	0,000217
Electric vehicles per 1000 inhabitants	2,58	0,21
Market share electric vehicles	0,536667%	0,05620%

Table 17 Electric Vehicle Policy: the Netherlands and the United Kingdom, 2015.

Policy Instruments	The Netherlands[12]	Policy Instrument	The United Kingdom[13][14]
Financial Incentive	Only zero-emission cars are exempt from paying registration tax. Plug-In Hybrid vehicles are progressively categorized based on their emission level, which amounts to the registration tax.	Financial Incentive	Plug-In Car Grant offers a grant of up to 35%, which is divided into three CO2 categories. This was before 25% of the catalogue price. The grant is capped with a maximum of £5000.
Financial Incentive	Electric vehicles emitting less than 51 grams of CO2/km are exempt from paying road taxes.	Financial Incentive	£32 million on new infrastructure for electric vehicles
Financial Incentive	Businesses that invest in clean technology, such as electric vehicles and charging points,	Financial Incentive	£15 million for a national network of charge points for electric vehicles on the Strategic Road Network.

[12] IA-HEV, 2016: 234-235.
[13] IA-HEV, 2015: 263-264.
[14] IA-HEV, 2016: 292.

	can deduct investments from corporate and income taxes.		
Financial Incentive	€5,7 million pledged by the national government to install public charging points until 2018.	Financial Incentive	£35 million for cities to introduce local incentives such as free parking, and access to bus lanes.
Number of new policies initiated in 2015	4	Number of new policies initiated in 2015	No new policy measures were presented for consumers by the UK government in the year 2014.

Table 18 2015 Presence of Electric Vehicles in the Netherlands and the United Kingdom

	Netherlands	United Kingdom
Electric vehicles per capita	0,005143	0,000456
Electric vehicles per 1000 inhabitants	5,14	0,46
Market share electric vehicles	1,068363%	0,09560%