Environmental policy-making in the EU: Member state behavior towards the Fit for 55 Package

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Contents

1. Introduction

Climate change is at the top of the agenda of almost all countries and people of the world. Highlighted by the recent global summit on climate change, the COP26 in Glasgow, where almost 200 countries negotiated over a period of two weeks on the reaffirmation of the Paris Agreement and even went further in their calls for action. Contested issues of reducing fossil fuels were addressed, more financial assistance by developed countries was achieved, deforestation is tried to be haltered by more rules, and more progressive deals have been made at COP26 (United Nations Climate Action, n.d.). This increased attention to global environmental policy is highly needed, the somber prospects of the new IPCC report showed this, it stated, for example, that it is highly likely that between 2041 and 2060 global land temperature will increase by 2 degrees Celsius (Intergovernmental Panel on Climate Change [IPCC], 2021).

As a result of these somber prospects, environmental policymaking within the European Union is very relevant right now. With most recent attention to how the EU can move from fossil fuels to renewable energy sources even quicker than anticipated due to Russia's invasion of Ukraine. Because the EU wants to reduce its reliance on Russian energy by two-thirds this year and completely before 2030, it will need to make more investments in renewable energy sources (Hockenos, 2022). And before this, the EU was already pushing towards a more greener future, as shown in the EU's Green Deal (European Commission, n.d.) and the subsequent proposals and legislation to achieve these targets in the EU's Fit for 55 Package (European Commission, 2021). However, currently no research has been done on the policymaking behind the Fit for 55 Package. Therefore, this thesis aims to fill this gap by examining how differences between EU member states can shape their behavior towards the package. It is an interesting puzzle to find out how different member states in an international organization like the EU try to balance their national interests with the interests of the international organization and whether they can force the policies of the international organization to be more similar to their own. The states chosen to compare in this thesis are the Netherlands, Italy, Germany, and the Czech Republic. With this puzzle in mind, this thesis will look at the research question *How does a 'pusher' country, based on high ecological vulnerability and low abatement costs, behave towards influencing the European Commissions Fit for 55 Package?* For this research question, an interest-based explanation is used which is supported by liberal institutionalist theory. By solving this research question, this thesis will enhance the currently available literature on environmental policymaking in international organizations and, further, will offer background

and direction to use in subsequent research on compliance with international environmental policies.

To achieve this aim this thesis will proceed as follows. First of all, the current literature on EU environmental policymaking will be reviewed and put into relation with each other and the topic of this thesis, the EU Commissions Fit for 55 Package. By examining the literature the need for this thesis is highlighted and this addresses the gap that has to be filled, which will lead to the research question that this thesis employs to fill the mentioned gap. After the research question, the theoretical background used to support the research is explained, which helps to inform the hypothesis. Thirdly, the methodology used in this thesis is explained, including how the cases are chosen. Based on an explanation of the Fit for 55 Package the coding frame follows. After that, the results from the analysis are presented, which will be supported by the documents in the included appendix. And finally, this thesis will conclude and offer suggestions for further research directions.

2. State of the art

2.1 Literature review

There has been a diverse set of literature on how environmental policy in the EU is made, who is involved and influences it, and what it looks like. Especially with the increase of more delegated policymaking to the European level, in all different policy fields (The Economists, 2021), this topic has seen an increase in interest from various authors.

One of the most comprehensive works is by Christoph Knill and Duncan Liefferink (2007) who wrote a book on all aspects of EU environmental policy. The first chapter of interest for this thesis talks about the interplay between national governments, the EU community institutions (the Commission, the EP, and the ECJ), and the EU institutions that reflect national interests (the European Council and the Council of Ministers). They argue that a tension exists between the national interests of EU member states and the interests of the EU community as a whole. These tensions are reflected in all parts of the policymaking process, in the problem definition and agenda-setting phase, policy proposals going to the Commission, and the decision-making phase (Knill & Liefferink, 2007, pp. 78-92) In regard to environmental policymaking, Knill and Liefferink (2007) argue that in contradiction to the right the Commission has for setting the agenda, it doesn't take the initiative to set the agenda. It seems that the Commission lets national interests dictate the agenda of environmental policy. This is

mostly because the member states will have the eventual say in the decision-making, so an initiative by those member states with the support of the Commission is more likely to pass. Besides the influence of national governments, social interest groups and associations also try to lobby the Commission in adopting their initiatives. Other external developments and treaties will also affect the environmental policy agenda of the EU (Knill & Liefferink, 2007, pp. 78-83). In the subsequent phase of the policy proposals being drafted in the Commission, the Commission has more autonomy to act according to its own interests. But other (national) interests are still represented in the working groups, due to the time and financial restraints the Commission faces (Knill & Liefferink, 2007, pp. 83-86). The last phase of decision-making is the tensest and also shows the differences in interests between national governments, with bargains being made and alliances formed between governments with similar interests.

Alliances can be made between what Knill and Liefferink call 'green' member states who push for more stringent environmental policies, mostly comprised of Nordic and Western European countries. Or on the other side between the 'laggard' member states who oppose more EU environmental policies, primarily Southern member states. Then there are also member states who don't take a particular side and let their position shift according to the specific policy at stake. In this last phase, the members' states have the final say in what policy is decided, however, the Commission still tries to advocate for its own communal interests (Knill & Liefferink, 2007, pp. 87-101). In the next chapter, the authors do offer some more explanations on the specific reasons states may adopt for pursuing a certain environmental policy position. Additionally, the authors argue that two factors are particularly important: institutional/economic interests of the member state and the strategic advantages states expect to gain by moving first in environmental policy. They argue for a difference in the first factor between rich and poor countries. However, the authors argue that these tensions don't mean that are no possibilities for cooperation and compromise (Knill & Liefferink, 2007, pp. 102-120). A gap Knill and Liefferink don't address is a comparison between a country's national environmental program and the European level program that the country mediates for.

Besides this book, there is some more literature on the topic of EU environmental policymaking. Knill and Lenschow (2005) argue that not only do national governments affect EU environmental policy, but the process also works in the other direction. And that dependent on the underlying rationality of national bureaucracies (either persistence driven, legitimacy driven, or outcome driven) EU environmental measures will affect domestic institutional change and cross-national convergence. This underlying rationality is based on the governance

pattern of a country towards EU policies adaptation, this could be: 1) prescriptive governance, which is that the country strictly follows the EU rules; 2) communicative governance, in this governance adaptation type information exchange is key to create non-binding, 'best-practice' suggestions for countries to implement; and 3) competitive governance, this means that change happens more indirect, through the interdependence of the EU (market) and the need to meet objectives requirements for adaptation are made. This article highlights how the European Commission can also influence national environmental policymaking but neglects how much influence national interests have on a European level.

Another article by Liefferink and Andersen (1998), argues that countries that want more EU pro-environmental policies aren't all equal, there are pushers and forerunners. Both positions have different strategies of trying to influence EU environmental policy, dependent on whether the policies were purposeful or incremental, and whether the push was direct or more indirect (through internal market policies). This will lead to strategies of 'pusher-by-example', 'constructive pusher', 'defensive forerunner', or 'opt-outer'. These differences are argued to influence the effectiveness of common European environmental policies because they are the drivers of the common policies. These 'green' member states have two main goals with their leadership role, first of all, the EU-wide measures would help them obtain national environmental policy goals, and second of all removes some of the disadvantages of their pioneering industry. Their differences make it also more difficult to build alliances between 'green' member states, which leads most alliances to only be built on specific issues (Liefferink & Andersen, 1998).

Two other articles talk about how the EU hasn't been that successful in recent years in regard to environmental policy. Steinebach and Knill (2017) observe, after research, inactivity by the European Union in proposing environmental policies, the EU rather shows signs of passive policy dismantling. The authors argue that this can be attributed to the changed role of the European Commission. Engels, Hisschemöller, and Moltke (2006) review the inability of scientific institutions to help the EU in formulating environmental policy. Not only is environmental policy not always adopted, but the environmental policy that comes out of the negotiations is also shaped by different national interests. Dyrhauge (2014) argues that we have been able to observe this in the environmental protection policies for the transport sector. Especially the economic crisis seems to have contributed to economic incentives trumping environmental preferences. However, the EU has been involved in a lot of environmental

policymaking, especially in comparison to other (supra)international organizations (Vogler, 2005).

The concept of environmental policymaking in the EU is closely related to the concept of environmental policy integration (EPI), which means that environmental concerns need to come back in all policy domains. This integration could help the EU to reach its sustainability goals because when making decisions on all issues politicians now have to consider how this would affect the environment. Later, more extensive policy integration was added with climate policy integration (CPI), this has as its goal to reduce greenhouse gas emissions in all policy domains, both at the European and national level. Whilst these two policy integrations approaches are different from the Fit for 55 Package and specific environmental policy programs, all have in common that they want to save the environment and need cooperation between the EU and its member states (Mullally & Dunphy, 2015). So EPI and CPI show that EU-led environmental policymaking between different countries can be successful. It is interesting to see if we can observe a replication of this success in the Fit for 55 Package.

2.2 Contribution thesis

The main contribution this thesis will make is expanding the literature on EU environmental policymaking to a policy that hasn't been addressed yet the EU Commissions Fit for 55 Package. Since the academic literature on (EU) environmental policymaking has so far not addressed this newest environmental policy package of the European Union.

This thesis aims to bridge the gap between theory on environmental policymaking and a recent case the Fit for 55 Package, by doing this the thesis tests if the theory holds. The Fit for 55 Package is the newest environmental policy the EU Commission has implemented. A problem with the current literature on past policies in the European Union is that there is no clear classification of member states' interests on how environmental policy is made, this makes it hard to compare the influence of different member states. Knill and Lieferink (2007) do make a distinction between 'green' and 'laggard' member states, as well as between economically dominant and smaller member states, and in addition (in both categories) countries that don't take a position. But they don't necessarily combine these two categorizations on a theoretical basis. Therefore this thesis will employ an interests-based explanation, built on liberal institutionalism and economic incentives, to place EU member states into categories. These categories will then be used to study the Fit for 55 Package to see which of these like-minded member state categories and their governmental goals show the most similarities to the EU's Fit for 55 Package and its targets. Or that rather these categories aren't able to predict how states

will behave towards the policymaking behind the package and therefore don't share many similarities between them and the package. This all leads to the research question: *How does a 'pusher' country, based on high ecological vulnerability and low abatement costs, behave towards influencing the European Commissions Fit for 55 Package?*

3. Theoretical background

To address this research question we have to look at a theory that explains why states participate in international organizations since the research question wants to address the role of states in the EU, an international organization. Liberal institutionalism is such a theory. Axelrod and Keohane (1985) argue that international regimes and organizations between powerful actors are constructed to reduce transaction costs and thus increase efficiency, they call this mutuality of interest. In agreement with realists, (neo)liberal institutionalists agree that states are still the main actors in the international arena and would try to maximize their gains according to rational logic. However cooperation, although difficulties can happen due to cheating and noncompliance, between states is possible with the help of international organizations and regimes (Saryal, 2015, p. 3). This is in contrast with the central argument of realists, that there is a state of anarchy in the world and states are therefore only self-seeking in a self-help regime, which makes cooperation in international organizations impossible (Eckstein, n.d.). But according to the theory of liberal institutionalism, the EU member states would try to make sure that the Fit for 55 Package succeeds in reducing their own costs and maximizing their gains. The costs of states would be reduced if the Fit for 55 Package is more in line with their own environmental programs because this would mean fewer requirements for changing their own program. Adaptation costs to the own society and industry would be lower and will have already been put in motion. Therefore, states would make a cost-benefit analysis (CBA) first before trying to steer the package in a certain direction.

CBA explains how the utility or well-being of the implementation of an environmental policy can be translated into monetary value, the utility gain can be expressed in either someone's willingness to accept (WTA) or someone's willingness to pay (WTP). The maximum amount someone is willing to accept or pay is equal to the improved quality of the environment, these things signal someone's preferences (Organization for Economic Co-operation and Development [OECD], 2006, pp. 41-46). These preferences can be used to decide whether or not to influence and support a policy. For a policy to be accepted the discounted benefits should be higher than the discounted costs (OECD, 2006, pp. 67-73). According to

liberal institutionalism, this is how countries are expected to make their decisions. This rational choice-based logic leads states to want mutual cooperation, argued to be especially relevant in the environmental area. In this area not only states are actors, but also non-state actors are important, for example, supranational organizations. Especially the EU has been very involved in international environmental politics and therefore disproves the realists' assumptions (Saryal, 2015, pp. 4-6).

4. Argument

The theory of liberal institutionalism is applicable to studying international organizations and their policymaking (Saryal, 2015) and, therefore, will be used in this thesis to support the interest-based explanation. The interest-based explanation is put forward by D. Sprinz and T. Vaahtoranta (1994), they argue that this explanation looks at how the domestic level can impact the way a country behaves in international negotiations, in this case, they examine how a country behaves on environmental policy. Sprinz and Vaahtoranta (1994, p. 78) identify two main factors that influence a country's position towards environmental policy, namely "a country's ecological vulnerability towards pollution and the economic costs of pollution abatement". For this, they assume that a country is a rational, self-interested actor. The degree (low or high) of the factors ecological vulnerability and abatement costs helps the authors to classify countries in a table. Countries that score low on both are 'bystanders', low abatement costs and high vulnerability makes them 'pushers', the reverse makes them 'draggers', and if a country has both high vulnerability and abatement costs it is called an 'intermediate'. This position in the table is then expected to be the stance a country takes in global environmental policy negotiations.

Behavior towards influencing by member states in the European Union will in this thesis be described by the degree of similarities that one country shows in its own environmental program in regard to the European Commissions Fit for 55 Package. This is explained by the bureaucratic response of an international organization to member state contestation by adaptation. The international organization, in this case, the EU Commission, will adept its own position toward the countries that asserted the most influence (Hirschmann, 2021).

The combination of liberal institutionalism theory (Axelrod and Keohane, 1985) and the way this theory expresses itself in global environmental policymaking (Sprinz and Vaahtoranta, 1994), will be used in this thesis to test the following hypothesis: *Countries with*

low abatement costs and high ecological vulnerability ('pushers') exhibit most similarities with the international organization's environmental policy and are, therefore, drivers of the policy.

5. Methodology

5.1 Conceptualization

As the countries chosen are put into categories that Sprinz and Vaahtoranta (1994) expect them to behave like, this thesis will quickly outline what the authors mean by these categories. Sprinz and Vaahtoranta (1994, pp. 80-81) describe them as follows, "pushers strive for stringent international regulation, while draggers oppose international environmental regulation. The intermediate countries find themselves in a particularly precarious situation. On the one hand, they have ecological incentives to participate in international environmental regulation, while on the other hand, they may not be willing to shoulder the substantial costs involved. Finally, bystanders should have little ecological interest in international regulations, but they are likely to make more ambitious positions than draggers because of the low costs associated with their negotiation position" (pp. 80-81).

5.2 Research design

To test this hypothesis, this thesis will conduct a comparative research study. Comparison can help to explain the differences and similarities that countries show towards the Fit for 55 Package and each other. This type of research is one of the best ways of studying a political phenomenon, as it allows comparing different countries on certain aspects and for the research to single out specificities of the individual countries. As well as highlighting things that certain countries have in common (Hopkin, 2010). As for case selection, this thesis will use a small-N study. One country of each of the four categories mentioned by Sprinz and Vaahtoranta (1994) is chosen to be compared and the selection of these countries is done by using the Most Similar Systems Design (MSSD). MSSD is chosen because this allows for the research to differentiate on the most important element, namely the behavior of EU member state governments towards European environmental policymaking (Halperin & Heath, 2020, pp. 231-247). All countries selected will share the most important characteristics, like being an EU member, being a member of the International Energy Agency (IEA), having a democratically elected government, having adopted an environmental program, and having representatives in the European Commission. The crucial aspect these countries will differ on is their expected and theorized behavior towards the European Union in environmental policy-

making. For this aspect, this thesis will make use of the four categories from Sprinz and Vaahtoranta (1994), 'pushers', 'draggers', 'intermediaries', and 'bystanders'. Preferably this thesis would research and analyze all 27 member states of the EU. However, considering the scope and time for this thesis this will not be possible. Therefore, there is chosen to select one country for each of the four categories. Each of these four countries will be argued to be the best, or one of the best, representative of the category, while also making sure that these countries have the needed reports available in English.

To ensure that there is no selection bias these four countries will be chosen according to the classifications Sprinz and Vaahtoranta (1994) argue for, the degree of ecological vulnerability (high or low) and the abatement costs (high and low) of a country. This does classify the countries into four categories but doesn't necessarily mean that we will observe the behavior of this category. A 'pusher' country therefore will not necessarily exhibit 'pusher' behavior, it is merely used as a name of the category. This alienates the risk of a self-fulfilling prophecy. With a comparison of their national programs with the Fit for 55 Package, this thesis will analyze how the countries actually behaved and if this is comparable to the way Sprinz and Vaahtoranta hypothesize.

The type of analysis performed in this thesis is a qualitative content analysis (QCA). Qualitative content analysis allows this thesis to analyze whole government reports on their environmental policy program (Halperin & Heath, 2020, pp. 376-388). These government reports are made sure to have been written and implemented right before the implementation of the 2021 Fit for 55 Package. So that it is the relevant environmental policy program at that time to compare to the Fit for 55 Package. Some of the targets that are analyzed are found directly in government programs, others are mentioned in reports by for example the International Energy Agency. Preferably this thesis would use grounded coding to construct the coding frame. First, the Fit for 55 Package will be read and, in this package, sections will be highlighted/coded that are deemed as important benchmarks/requirements in the package. Due to limited time and space, only two important goals are chosen to be compared, the net greenhouse gas (GHG) emissions reduction and the percentage of renewable energy in a country's energy mix. These two goals will then be put into a coding frame, with this created coding frame this thesis will then analyze the reports of the selected countries and code them to see to what extent they match the Fit for 55 Package goals. After that, this thesis can compare the extent of resemblances between each country's report and the Fit for 55 Package.

5.3 Case selection

As mentioned, to choose the countries to be studied this thesis will make use of the factors of ecological vulnerability and abatement costs mentioned by Sprinz and Vaahtoranta (1994), to put the countries into the categories. This thesis will use the most recent Intergovernmental Panel on Climate Change (IPCC) report (2022) to assess both of these factors. According to the IPCC report, Western European coastal countries and Southern European countries are the most at risk of the effects of global warming. In Southern European countries water scarcity will be one of the main problems, one-third of the population in these countries is expected to be exposed to water scarcity if global warming levels increase by 3°C. Along the coasts, risks of extreme flooding will increase, and people affected by this may double with an above 3°C global warming level increase. Therefore, the Netherlands and Italy are chosen as countries that have relatively high levels of ecological vulnerability. As more Central/Northern European countries are less at risk from global warming and therefore have lower levels of ecological vulnerability, Germany and the Czech Republic are chosen (IPCC, 2022, pp. 2360-2502). Besides ecological vulnerability, this thesis also differentiates the countries regarding the levels of abatement costs, to be able to fit them in the table of Sprinz and Vaahtoranta (1994). For the definition of abatement costs, this thesis looks at the adaptation capacity a country has according to the IPCC report. This is done because abatement costs in relation to the environment are the costs a country has to endure to prevent the effects of climate change and so matter for a country's capacity to adapt to climate change (Organization for Economic Co-operation and Development [OECD], 2013). The IPCC uses GDP per capita to measure a country's adaptive capacity, this means that Northern and Western European countries tend to have a higher adaptive capacity (IPCC, 2022, p. 2367). Countries with high levels of GDP and adaptive capacity, therefore, have low levels of abatement costs. So now this thesis can categorize all four countries according to the table of Sprinz and Vaahtoranta (1994. If we differentiate between the countries that have high levels of ecological vulnerability, the Netherlands and Italy, the Netherlands can be placed into the category of 'pushers' with its low levels of abatement costs. This is in contrast to Italy with high levels of abatement costs and ecological vulnerability it is placed into the category of 'intermediate'. Regarding the countries that have relatively low levels of ecological vulnerability, Germany and the Czech Republic, we can place Germany into the category of 'bystanders' with its high levels of GDP and thus low abatement costs and the Czech Republic into the category of 'draggers' because it has high levels of abatement costs. Of all four countries, reports are chosen and are carefully selected on the basis that they have (just) been implemented before the 2021 Fit for 55 Package.

5.4 Research operationalization

The name for the Fit for 55 Package comes from the target to reduce the net emissions of the EU by at least 55% by 2030 compared to 1990. And subsequently, the EU wants to be the first climate-neutral continent by 2050. This would mean that we have to proceed with a huge change in our economy, society, and industry. This change needs to happen by everyone and for everyone. The Fit for 55 Package is a set of interconnected proposals, all with these goals in mind (European Commission, 2021).

The 55% net greenhouse gas (GHG) emissions reduction by 2030 in comparison to 1990 levels is then also chosen as the first important goal to be evaluated in this thesis (European Commission, 2021, p. 1). This would be an important step towards the goal of Europe becoming the first climate-neutral continent by 2050. The EU already aims to reach climate neutrality in the land use, forestry, and agriculture sectors by 2035, as well as cutting down the average emissions of new cars by 100% in the same year (European Commission Press release, 2021).

The second goal that is evaluated and compared in this thesis is the percentage of renewable energy in the EU and a country's energy mix. This is one of the most impactful ways the EU can move towards a more sustainable future since 75% of the EU's emissions come from the energy sector. And a move from fossil energy sources to renewable and green energy sources would greatly help the EU achieve the 55% net emissions reduction. One clear number is indicated in the Fit for 55 Package that countries minimally need to reach 40% of renewable energy sources in the energy mix by 2030, this is called the Renewable Energy Directive. Before this, the binding goal set by the EU was 32% (European Commission, 2021, p. 9).

Two other important concepts in the research are greenhouse gas emissions and renewable energy. With greenhouse gas emissions this thesis uses the definition from the Intergovernmental Panel on Climate Change (2019), "greenhouse gases are gases in the atmosphere such as water vapour, carbon dioxide, methane and nitrous oxide that can absorb infrared radiation, trapping heat in the atmosphere". For the definition of renewable energy, this thesis refers to the one also used by the International Energy Agency, "renewable energy resources as those derived from natural processes and replenished at a faster rate than they are consumed. The IEA definition of renewable energy includes the following sources: electricity and heat derived from solar, wind, ocean, hydropower, biomass, geothermal resources, and biofuels and hydrogen derived from renewable sources" (Sustainable Energy For All, 2013, p. 194).

5.5 Coding frame

Category	Description	Indicator
Greenhouse gas emissions	The percentage of greenhouse gas emissions reduction compared to 1990 levels of a country. ➢ Target EU: 2030 = 55%; 2050 = (almost) climate-neutral	Mentioning of greenhouse gas emissions (GHG), more specific: emissions such as water vapour, carbon dioxide, methane and nitrous oxide.
Renewable energy	The percentage of renewable energy in a country's gross final energy consumption	Mentioning renewable energy, coming from sources such as solar, wind, hydropower, biomass, geothermal resources, biofuels, and hydrogen.

(European Commission, 2021)

6. Results

After having read relevant government reports and proposals from all countries on both GHG emissions and renewable energy, this section will give an overview and analysis of what the main findings are.

First of all the Netherlands (Appendix A), a country with high ecological vulnerability and low abatement costs and therefore, according to the theory of Sprinz and Vaahtoranta (1994), is probably a 'pusher' of stringent environmental policies. In the Climate Agreement by the Ministry of Economic Affairs and Climate Policy (2019), the main target for the reduction of greenhouse gas (GHG) emissions is set at a 49% reduction in national levels in 2030 compared to emission levels in 1990. However, the Dutch government is already calling for an increase in these goals on an European level to a reduction of 55% by 2030 (Ministry of Economic Affairs and Climate Policy [EZK], 2019, p. 6). Furthermore, the Climate Act of the Netherlands entails a reduction of CO2 emissions of 49% by 2030 and 95% by 2050, in order to meet the mentioned reduction of GHG emissions (EZK, 2019, p. 10). These goals of 49% and 95% also come back in the energy policy review of the Netherlands in 2020 by the International Energy Agency (2020, p. 11). More specific reduction targets are also highlighted, a target in 2030 of 30% reduction of CO2 emissions in transport is set (EZK, 2019, p. 72). And an emissions reduction of 59% in the industry sector, both compared to 1990 levels (EZK, 2019, p. 88). The best way to reach these goals, especially in the industry sector is by switching from fossil fuel energy to renewable energy sources (EZK, 2019, pp. 96-97). The targets for renewable energy are highlighted in the International Energy Agency (IEA) report. This observes that, so far, the Netherlands has a relatively low level of energy from renewable

sources, only 7.4% of its total final energy consumption (TFEC) in 2018 comes from renewable sources. This percentage ranks the third-lowest among IEA members. However, this percentage is already a steady increase for the Netherlands, which was just half in 2008 (IEA, 2020, p. 12). Regarding the targets set by the Dutch government for electricity generation from renewable sources, this has been set at at least 70% by 2030, which would mainly come from wind and the sun. Additionally, the Dutch government pushes for a ban on coal-fired energy generation by 2030 and the increase of zero-emission vehicles (IEA, 2020, pp. 13-15). Other targets have been set for energy consumption in the Netherlands of a renewable energy share of 16% by 2023 and 27% by 2030. By 2050 the Netherlands wants to be completely CO2 neutral in its electricity production (IEA, 2020, pp. 116-117).

Secondly, Italy (Appendix B), also has high ecological vulnerability but has high abatement costs, which would make them a 'bystander' country. In Italy's national air pollution control programme it stated the goal to reduce its GHG emissions with 33% by 2030, however, this level of reduction is in comparison to 2005 levels (Translation Services of the European Commission, 2019, p. 30). Italy wants to reach this reduction by phasing out its usage of coal in electricity generation by 2025, achieving a share of 55% renewables in electricity generation by 2030, and increasing the sale of electric vehicles and other more sustainable methods of transport (Translation Services of the European Commission, 2019, p. 104). The goal of Italy to achieve a 33% reduction of greenhouse gas emissions by 2030 is expected to be reached according to the Italian NECP. Besides the mentioned 55% share of renewables in electricity, mostly from solar and wind, Italy aims to achieve a share of 30% in its gross final energy consumption to come from renewable sources (Lombardini, 2021, p. 2). Regarding the percentage of renewable transport, Italy has set the target at 22% (Lombardini, 2021, p. 3). By 2050 Italy's goal is to reduce its GHG emission with 64% (Lombardini, 2021, p. 4).

Thirdly Germany (Appendix C), which in opposite to Italy has low ecological vulnerability and low abatement costs, which would make them an 'intermediate' country. In a reflection report on the sustainable development goals by the German government, a target is set for the reduction in emissions of the five major air pollutants sulphur dioxide, nitrogen oxides, ammonia, volatile organic compounds, and particulate matters. These five air pollutants should be reduced with 45% by 2030 compared to 2005 (Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety [BMU], 2020, p 14). In accordance with the 2015 Paris Agreement, the German government at least wants to keep global warming under 2°C and try to keep it at 1.5°C, to obtain this Germany aims to be climate-neutral by 2050. A first step towards this goal is the target to reduce its greenhouse gas emissions with 55% by 2030

compared to 1990 levels (BMU, 2020, pp. 43-44). More specific targets for GHG emissions reduction are also set, 40% by 2020, 70% by 2040, and 80-95% by 2050 (or almost climate-neutral), all of these targets are in comparison to 1990 GHG levels. However, Germany is expected to miss the 40% target in 2020, which calls for the government to take more action (International Energy Agency [IEA], 2020, pp. 11-12). One important way to reach these GHG reduction targets is to increase the share of renewable energy and electricity. The first target for the year 2020 is set at 35% renewables in gross electricity consumption, which Germany actually met and even went further with 44% in the first half of 2019. In the beginning, the targets for renewables in electricity by the German government were 50% by 2030, 65% by 2040, and 80% by 2050, but recently the target for 2030 was already increased to be 65%. Another way Germany wants to reduce its GHG emissions is by aiming to be coal-fired power generation free as soon as possible (IEA, 2020, pp. 12-14). Although Germany has set ambitious goals regarding renewable energy, it still depends mostly on fossil fuels, primarily oil and gas. A large part of the recent new renewable energy sources has been used to replace nuclear energy, which is due to their nuclear phase-out (IEA, 2020, pp. 19-20). Regarding energy consumption, Germany has set targets of a share of gross final energy consumption of 18% by 2020, 30% by 2030, 45% by 2040, and 60% by 2050. The main sources for this increase in renewable energy consumption come from building more solar panels and wind turbines (IEA, 2020, p. 29).

And finally the Czech Republic (Appendix D), a country that has low ecological vulnerability and high abatement costs, according to Sprinz and Vaahtoranta (1994) this would make them a ‘dragger’ in environmental policies. In the climate protection policy program of the Czech Republic measures are taken in order to reduce its greenhouse gas emissions. The projected scenario, with existing measures taken by the Czech government, is that GHG emissions will fall by 39% in 2020 and by 47% in 2030 both compared to levels in 1990. If additional measures are taken to achieve the optimized scenario, the GHG reduction would be 42% by 2020 and 49% by 2030. In 2050 the GHG emissions will then have decreased with 80% compared to 1990 (Ministry of the Environment of the Czech Republic, 2017, p. 8). If we use the comparison by the Czech Republic on greenhouse gas emissions reduction to 2005, they have set the target at 20% by 2020 and 30% by 2030. The targets for the share of renewable energy sources in the gross final consumption of the Czech Republic have been set at 13% in 2020 and 22% in 2030 (Ministry of Industry and Commerce [MPO], 2019, p. 12). The target in 2040 for the share of renewable and secondary energy sources in total primary energy sources (excluding electricity) is 17-22%. And the target in regard to gross electricity generation is set

at between 18 and 25% for renewable and secondary energy sources in 2040 (MPO, 2019, p. 14). It has to be mentioned that while this 22% is the government's target, the Senate of the Czech Republic pushed for a higher target (MPO, 2019, p. 19). The 22% target would be an increase of 9% compared to the target for 2020. More specifically the Czech Republic aims to achieve the following targets towards reaching the 22% in 2030, 16.87% in 2025, and 18.85% in 2027 (MPO, 2019, p. 29).

7. Discussion

After having analyzed all the targets set by the four countries on greenhouse gas emissions reduction and energy from renewable sources, this thesis can compare them with the targets put forward by the European Commission in the Fit for 55 Package.

The main goal of the Fit for 55 Package is to reduce GHG emissions with 55% by 2030 compared to 1990 (European Commission, 2021). The Netherlands set the goal for a reduction of 49% in this year (EZK, 2019, p. 10). This would indicate that they wouldn't fit into the 'pusher' category of Sprinz and Vaahtoranta (1994). However in the report, it is also mentioned that the Dutch government actually wanted to push for the 55% target on a European level (EZK, 2019, p. 6), this, in contrast, would mean that they could be considered as one of the countries that wanted and were able to influence the European target. This position is explained by their relatively high ecological vulnerability and the good state of their economy which gives them low levels of abatement costs (IPCC, 2022). Regarding energy consumption from renewable sources the Netherlands actually falls behind in relation to the target of 40% by 2030 set by the European Commission (European Commission, 2021), the target from the Dutch government is only 27% (IEA, 2020, pp. 116-117). The difficulty with comparing Italy is that it hasn't set targets in comparison to 1990 levels but only to 2005 levels, with a targeted reduction of 33% by 2030 (Translation Services of the European Commission, 2019, p. 30). Which is lower than the target of 55%, but they might have a higher percentage if it is compared to 1990 levels. However, if we consider that the EU wants to be climate-neutral in 2050, Italy's targets aren't enough for this with only 64% GHG emissions reduction (Lombardini, 2021, pp. 4-5). The percentage of Italy's gross final energy consumption to come from renewable sources also falls behind the EU target with only reaching 30% by 2030 (Lombardini, 2021, p. 2). Taking into account that in both cases Italy hasn't set the same height of targets as the European Commission, Italy partly falls into the category of 'intermediaries', however, Italy could also be considered to be more of a 'dragger' (Sprinz & Vaahtoranta, 1994). Their lower economic

ability and therefore higher abatement costs are more important for their behavior toward more stringent policies than their relatively high levels of ecological vulnerability (IPCC, 2022). If high levels of abatement costs would mean that a country's targets less resemble the EU targets then the Czech Republic would show the same behavior as Italy towards EU-wide environmental policies. The GHG emissions reduction target of the Czech Republic is 49% by 2030 compared to 1990 (Ministry of the Environment of the Czech Republic, 2017, p. 8) and 30% compared to 2005. The Czech Republic's target for the share of renewables in their gross final energy consumption is 22% by 2030 (MPO, 2019, p. 12), Both indicators are below the targets set out in the Fit for 55 Package. Would the contrary in regard to high GDP and low levels of abatement costs and therefore more favorable behavior towards more stringent EU-wide environmental policies also work? If we look at Germany's targets, we can see that they have the same target as the EU with a 55% reduction of GHG emissions by 2030 compared to 1990 and that they also want to be climate-neutral by 2050 (BMU, 2022, pp. 43-44). Regarding Germany's targets for the share of renewables in their gross final energy consumption, we can see that with 30% (IEA, 2020, p. 29) they do still fall behind in comparison to the 40% the European Commission aims for in the Fit for 55 Package.

So low levels of abatement costs do seem to be an important factor for a country's behavior towards global environmental policy, especially in regard to targets for GHG emissions reduction, highlighted by the similarities of Dutch and German national programs to the European program of the Fit for 55 Package. In contrast to the two countries with high levels of abatement costs, Italy and the Czech Republic, which both don't meet the EU targets. In contrast, the factor of ecological vulnerability doesn't seem to make a difference. As seen in the difference between the Netherlands and Italy with both relatively high levels of ecological vulnerability and in the difference between Germany and the Czech Republic with both relatively low levels of ecological vulnerability.

8. Conclusion

8.1 Summary

This thesis has set out to address the lack of literature and research on the latest environmental policy of the European Union, the Fit for 55 Package. Especially attention has been paid to the gap that exists between supported theories on global environmental policy making in international organizations and specific cases. To fill this gap this thesis has unfolded in two ways. First, the theoretical basis was laid by using an interest-based explanation by

Sprinz and Vaahtoranta (1994), which is supported by liberal institutionalist theory as explained by Axelrod and Keohane (1985). Subsequently, this theory was applied to a specific case, by analyzing reports and laid out targets of four countries (the Netherlands, Italy, Germany, and the Czech Republic), these were then compared to each other and the Fit for 55 Package. The countries were selected on the basis of two factors (ecological vulnerability and abatement costs) which would place them into a certain category of behavior towards influencing global environmental policy making, according to Sprinz and Vaahtoranta (1994). Two targets, greenhouse gas emissions reduction and the share of renewables in a country's gross final energy consumption were chosen to be compared and see how similar they were to the targets of the EU.

8.2 Conclusions

From the results and discussion, there can be concluded that the countries that were best able to adapt their societies and economies towards a more sustainable future, because of their relatively better economic situation, illustrated by their higher GDP (IPCC, 2022, p. 2367), had the most resemblance or had the exact same targets like the ones in the Fit for 55 Package. This was the case for the Netherlands and Germany, especially their targets regarding GHG emissions reduction by 2030 compared to 1990 levels are the same as the EU's. In renewable energy these countries do still lack behind the targets set out by the European Commission, however, the targets of the Netherlands and Germany are still higher than those of Italy and the Czech Republic. Therefore, this thesis would conclude that one of the factors mentioned by Sprinz and Vaahtoranta (1994), abatement costs, can be a good predictor of a country's behavior towards influencing global environmental policy-making in an international organization. Where low levels of abatement costs will make countries 'pushers' of more stringent environmental policies and higher levels will make countries 'draggers'. The other factor of ecological vulnerability, however, doesn't seem to make a difference. Explained by the fact that, the two countries with low levels of abatement costs, the Netherlands and Germany, but with different levels of ecological vulnerability showed no differences in in similarities in their national targets towards the targets in the Fit for 55 Package. And the same is the case for Italy and the Czech Republic with both high levels of abatement costs but also with different levels of ecological vulnerability. Therefore, the hypothesis that *countries with low abatement costs and high ecological vulnerability ('pushers') exhibit most similarities with the international organization's environmental policy and are, therefore, drivers of the policy,* can partly be confirmed.

8.3 Strengths and limitations

The main strength of this thesis has been to bridge the gap between categories of countries on global environmental policymaking based on theory and application to a specific (recent) case. An extensive review of national programs and comparison with the Fit for 55 Package was provided. This comparison can help explain to readers which countries behaved in a certain way towards influencing the package. As well as, providing readers with reasons why these countries were put into certain categories that would predict their behavior.

However, this thesis hasn't explored the depth of national environmental programs and the Fit for 55 Package. Due to time and word limitations, this thesis has chosen to only address two aspects of the Fit for 55 Package, the targets for GHG emissions reduction and the share of renewable energy. While at least the first might be considered to be the most important aspect of the Fit for 55 Package, these two don't cover the entire range of topics covered in the Fit for 55 Package. And countries might show different behavior when one would look at one of these topics. Another shortcoming of this thesis is that it is highly dependent on the time that it looks at. This thesis has looked at national programs that were adopted and relevant just before the implementation of the Fit for 55 Package in 2021. But that makes the comparison of these national programs dependent on the programs of the national governments of that time. After a new election a country might get a completely new government, which could be either more or less in favor of more stringent European environmental policies.

8.4 Future research

Since the first part of the IPCC report (2021) showed how disastrous the consequences will be if global temperatures continue to increase in the same way as is predicted with 1.5°C or even worse with 2°C, there is an urgent need to do something about this. Some good measures to address global warming have been made in the Fit for 55 Package by the European Commission and this thesis has tried to explain the behavior of individual EU member states towards this EU-wide environmental policy making. But for global warming to be haltered we need to be sure that these measures are actually implemented by both the individual member states and assured that they are complied with by the European Union. Compliance by individual nation-states is an interesting topic that can be a continuation of this research. The categories of countries in this research and the actual behavior they showed towards the EU's environmental policy could be used to measure the compliance these categories of countries show towards the implementation of the Fit for 55 Package.

9. References

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10.1 Appendix A

1. Ministry of Economic Affairs and Climate Policy. (2019, June 28). *Climate agreement*. Retrieved from https://www.government.nl/documents/reports/2019/06/28/climate-agreement

p. 6 = The main goal of the National Climate Agreement is to achieve a 49% reduction in national greenhouse gas emissions by 2030 compared to 1990 levels.

The government has requested that the participants of the Climate Agreement make a cost efficiency-based reduction contribution resulting in total emissions reduction amounting to 49% by 2030 in respect of 1990 levels. However, it is conceivable that, by 2030, the Netherlands will be required to achieve further reduction than -49%, as envisaged by this Climate Agreement, within its territory. This depends on a European decision on raising the European carbon dioxide reduction target, which is expected in 2020. Within an international context, the government is calling for an increase of the European target to 55% by 2030.

p. 10 = The private members' bill on the gradual reduction of greenhouse gases to combat climate change (Climate Act) will embed a reduction target of -49% in CO2 by 2030 and -95% in CO2 by 2050 in the Act.

p. 72 = In order to realise 30% reduction of carbon dioxide emissions, there will be efforts to strengthen European source policy up to 2030 in addition to logistical efficiency improvements.

p. 88 = By 2050, we envisage the Netherlands to be a country with a thriving, circular and globally leading manufacturing industry,23 where greenhouse gas emissions are almost zero.

With an indicative target of 14.3 Mt in carbon dioxide reduction to be achieved on top of existing policy in the baseline trajectory of the PBL, the emissions reduction for industry comes down to approximately 59% compared to 1990.

2. International Energy Agency. (2020, September). *The Netherlands 2020: Energy policy review*. Retrieved from https://www.iea.org/reports/the-netherlands-2020

p. 11 = The 2019 Climate Act sets targets to reduce GHG emissions by 49% by 2030 and by 95% by 2050 (versus 1990 levels).

In 2018, GHG emissions were down 15% from 1990 levels. The Netherlands is home to a large concentration of energy and emission-intensive industries and remains heavily reliant on fossil fuels. From 2008 to 2018, the share of fossil fuels in total primary energy supply (TPES) declined only slightly, from 92% to 90%. As a result, a recent increase in economic activity has

caused emissions reductions to stall. In 2018, energy-related GHG emissions were slightly higher than in 2014.

p. 12 = In 2018, TPES came from natural gas (42%), oil (37%), coal (11%), biofuels and waste (5%), and small shares from nuclear, wind, solar, hydropower and geothermal.

In 2018, electricity generation came primarily from gas (52%) and coal (27%). Fossil fuels also dominate Dutch energy demand. In 2018, oil and gas covered 77% of total final consumption (TFC), while electricity covered just 16%, the second-lowest share among IEA member countries. The dominance of oil and gas and the low level of electrification are driven by the large industry sector concentrated on refining and chemicals production and the high level of natural gas heating. In 2018, oil and gas covered 80% of industry demand, while natural gas covered 71% of residential demand and 48% of service sector demand, mainly for heating. Greenhouses in the large agricultural sector are also a major source of gas demand for heating.

Energy from renewable sources accounted for only 7.4% of total final energy consumption (TFEC) in 2018, the third-lowest share among IEA member countries and well below the IEA median of 12.1%. However, renewable energy deployment is progressing rapidly. The renewable contribution to TFEC increased by 50% between 2008 and 2018.

pp. 13-15 = The largest electricity emissions reductions are expected to come from a ban on coalfired generation, which requires coal plants to cease operating, or convert to alternative fuels, by 2030.

To ensure reduced emissions from natural gas while maintaining energy security, the Netherlands is executing a broad policy agenda to reduce natural gas demand and accelerate the production and use of low-carbon gases.

Implementation of the 2019 Climate Agreement measures would result in at least 70% of electricity generation coming from renewables (mainly variable wind and PV) by 2030.

pp. 116-117 = The Dutch 2013 Energy Agreement set a 2023 target requiring a 16% share of renewable energy in final energy consumption.

The Dutch NECP, submitted at the end of 2019, indicated that the country would reach a renewable share of at least 27% by 2030.

The PBL's analysis shows that if all of these measures are fully implemented, renewable energy consumption would double and its share would reach 30-32% of gross final energy consumption by 2030 (MEACP, 2019b; PBL, 2019). Meeting the Climate Agreement emissions reduction targets will require the share of renewables in electricity generation to reach around 70% by 2030.

The Climate Act includes a target for 100% CO2-neutral electricity production by 2050, which will require clear long-term policies to sustain robust deployment of renewable generation beyond 2030

10.2 Appendix B

1. Translation Services of the European Commission. (2019, March). *National air pollution control programme, 2019, Italy*. Retrieved from https://ec.europa.eu/environment/air/pdf/reduction_napcp/IT%20Final%20NAPCP%2022Sept21%20EN.pdf

p. 30 = A detailed description of these targets can be found in the Strategy document; some key objectives include phasing out the use of coal in electricity generation by 2025, reaching a 55 % share of renewables in electricity generation, the spread of about 5 million electric vehicles, the spread of methane-powered freight transport by road and by sea, reducing GHG emissions by the non-ETS sectors by 33 % compared to 2005 levels.

p. 104 = These objectives are pursued, in particular, by phasing out the use of coal in electricity generation by 2025, reaching a 55 % share of renewables in electricity generation, the sale of about 5 million electric vehicles, the spread of methane-powered freight transport by road and by sea, and by reducing GHG emissions from the non-ETS sectors by 33 % compared to 2005 levels.

2. Lombardini, M. (2021). Italy's energy and climate policies in the post COVID-19 recovery. *Ifri Center for Energy & Climate*, 1-5.

p. 2 = According to the Italian NECP, the country is on track for its 2030 objectives. The implementation of the plan will result in a 33% reduction of GHG gas emissions not covered by the emission trading system such as transport, residential, agriculture and waste.

The greatest contribution to the growth of renewables will come from the electricity sector, with a generation of 187 terawatt-hours (TWh) by 2030, that will provide 55% of the total consumption of 340 TWh. 5 To achieve this ambitious goal, solar capacity will increase from 19 to 52 gigawatts (GW) and wind from 10 to 19 GW, mostly onshore. This impressive growth reflects a general increase of renewables deployment on a global scale, which is a consequence of considerable cost reduction in these technologies in the past few years.

p. 3 = Italy plans to overachieve it, aiming at 22% renewables, to be obtained by a mandatory quota for advanced biofuel, alongside 4 million electric and two million hybrid vehicles.

pp. 4-5 = It indicates however that the measures and initiatives included will lead to a 64% emission reduction by 2050. Although substantial, this amount is below the EU objective of climate neutrality by 2050 and therefore additional efforts would be needed.

10.3 Appendix C

1. Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. (2020, September). *Environmental policy for a sustainable society: Sustainable development report by the Federal Environment Ministry on the implementation of the United Nations 2030 agenda*. Retrieved from https://www.bmuv.de/fileadmin/Daten_BMU/Pools/Broschueren/umwelt_nachhaltige_gesellschaft_en_bf.pdf

p. 14 = Emissions of air pollutants: Mean value of the index of national emissions of sulphur dioxide (SO2), nitrogen oxides (NOx), ammonia (NH3), volatile organic compounds (VOC) and particulate matter (PM2.5). To be reduced by 45 per cent by 2030 compared to 2005.
Emissions of these five air pollutants fell by around 18 per cent on average up to 2016 in comparison to 2005. However, a linear continuation of this decrease is not sufficient; on the contrary, the trend must be accelerated in order to achieve the target set.
If the assumptions made in the programme about the economic trajectory and the effectiveness of measures are correct, the projected pathway for emissions reductions can be achieved by 2030.

p. 43-44 = For the Federal Government, the benchmark for the German national climate targets is the goal set in the 2015 Paris Agreement, namely to keep global warming well below 2°C and to pursue efforts to limit it to a maximum of 1.5°C. Germany therefore aims to achieve climate neutrality by 2050. The indicator is an important criterion for measuring the success of the Federal Government's climate policy. However, Germany is likely to miss its 2020 target, which calls for a minimum 40 per cent reduction in emissions compared with 1990; additional measures are therefore required to ensure that the target is achieved as swiftly as possible.
The target for 2030 is enshrined in law in the Federal Climate Change Act (Bundes-Klimaschutzgesetz), which requires Germany's greenhouse gas emissions to be reduced by at least 55 per cent compared with the 1990 level.
Mandatory climate targets and a statutory commitment to climate neutrality by 2050 are set forth in the Federal Climate Change Act. The medium-term target is to reduce Germany's greenhouse gas emissions by 55 per cent compared with the 1990 level no later than 2030. In keeping with the Climate Action Plan 2050, the Act includes, for the first time, mandatory limits on the quantities of CO2 that the individual sectors may emit annually and thus defines binding annual reduction targets for the sectors to 2030.

2. International Energy Agency. (2020, September). *Germany 2020: Energy policy review*. Retrieved from https://www.iea.org/reports/germany-2020

pp. 11-12 = Germany's national climate change strategy is defined in the Climate Action Plan 2050, which sets out a longer-term pathway for sector-specific emissions reductions, as part of the Energiewende. Compared with the base year of 1990, the key goals are to achieve at least a 40% cut in greenhouse gas (GHG) emissions by 2020, 55% by 2030, 70% by 2040 and 80-95% by 2050, at which point the country expects to be mostly GHG-neutral.

Despite progress on lowering overall emissions, Germany is struggling to meet its nearterm targets, in large part due to uneven progress across sectors, with notable challenges in transport and heating. Even with a rapid increase in renewable electricity generation, Germany's total emissions have not experienced commensurate reductions. As of 2018, Germany had reduced its total GHG emissions by around 31% compared with 1990. So Germany remains far off its 2020 emissions target of a 40% reduction. As such, Germany needs to expand and prepare new policies and measures that can help it reach its national GHG emissions reduction targets in a cost-effective and sustainable way. Notwithstanding the nuclear phase-out, Germany's focus on renewable power and a planned coal phase-out (along with its participation in the EU ETS) will help ensure progress in the power sector. However, additional policies are needed to support emissions reductions outside of the power sector, notably in transport and heating.

pp. 12-14 = To date, Germany's Energiewende is clearly visible in electricity generation, where it has been effective in increasing renewable electricity generation. While coal (mainly lignite) remains the largest source of electricity, renewables have mainly replaced a large share of nuclear over the last decade. In 2017, wind power surpassed both nuclear and natural gas to become the second-largest source of electricity generation. Continued growth in renewables in line with Germany's energy and climate targets will require a number of measures for advancing electrification and system integration of renewables, including improvements to taxation and market regulation, and expansion of the transmission and distribution infrastructure, including improving its functionality. As a core plank of the Energiewende, Germany plans to further expand the role of renewables in electricity generation. Specifically, in the 2010 Energy Concept, the country aimed for renewables to account for 35% of gross electricity consumption by 2020 and overachieved this with 38% in 2018 and 44% in the first half of 2019. The German government initially planned to further increase the share of renewables in electricity to 50% by 2030, 65% by 2040 and 80% by 2050. But according to the

new coalition agreement of March 2018, as affirmed by the climate cabinet, the government is now planning to speed up the growth, to reach a share of 65% renewable electricity by 2030 (contingent on a corresponding expansion in grid capacity).

Beyond nuclear, the government also has a strategy to phase out the use of coal-fired power generation to help meet emissions targets.

pp. 19-20 = Despite a recent surge in renewable energy sources, Germany's energy system still depends largely on fossil fuels.

The trend of more renewables entering the energy system will continue in line with Germany's energy transition targets. Nuclear energy will be completely phased out of the energy mix by 2022 and replaced by more renewables. Furthermore, coal used in electricity generation, which represents around 80% of all coal in TPES, is planned to be phased out by 2038. The shift from conventional sources to wind and solar power leads to lower thermal losses in the energy transformation, reflected in a decline in TPES in the last decade. This decline has not taken place in final energy consumption. So far, the growth in renewable energy has mainly replaced nuclear power, another lowcarbon energy source. The share of fossil fuels has remained stable at around 80% in the last decade, albeit fell in absolute terms in 2018. Compared with other IEA member countries, Germany's share of fossil fuels is around the median (Figure 2.4).

p. 29 = The 2010 Energy Concept sets out targets for renewable energy in power generation and total energy supply in Germany. By 2020, the target for renewable energy as a share of gross final energy consumption is 18%, consistent with the EU target. Beyond 2020, the German government will seek to increase the share of renewables to 30% by 2030, 45% by 2040 and 60% by 2050. Wind and solar are expected to be the major sources of renewable energy, followed by biomass and hydropower. For electricity generation, Germany has a target for renewables to account for at least 35% of gross electricity consumption by 2020. In 2018, this share already rose to approximately 38%. The German government has set long-term targets for increasing the share of renewables in electricity to at least 50% by 2030, 65% by 2040 and 80% by 2050. Moreover, the March 2018 coalition agreement states the government's intention to increase the 2030 target to a share of 65% for renewable electricity, contingent on a corresponding expansion in grid capacity. The climate cabinet also reaffirmed the more ambitious target.

10.4 Appendix D

1. Ministry of the Environment of the Czech Republic. (2017). *Climate protection policy of the Czech Republic: Executive summary 2017*. Retrieved from https://unfccc.int/files/na/application/pdf/cze_climate_protection_policy_summary.pdf p. 8 = The scenario with the existing measures assumes that greenhouse gas emissions will be reduced in 2020 by 39% and in 2030 by 47% compared to 1990. The scenario with the additional measures assumes that greenhouse gas emissions will be reduced in 2020 by 42% and in 2030 by 49% compared to 1990. The emission trajectory required to achieve the indicative target of reducing greenhouse gas emissions by 80% by 2050 is close to the scenario with additional measures.

2. Ministry of Industry and Commerce. (2019, November). *National energy and climate plan of the Czech Republic.* Retrieved from https://ec.europa.eu/energy/sites/default/files/documents/cs_final_necp_main_en.pdf p. 12 =

Table 3: *Overview table of GHG reduction targets (compared to 2005)*

	2020	2030
Absolute terms	32 Mt CO_2eq.	44 Mt CO_2eq.
Relative terms	20 %	30 %

Source: Prepared by MIT for the purposes of the National Plan

Table 4: *Overview table of RES targets (share of RES in gross final consumption)*

	2020	2030
RES share	13.0 %	22.0 %

Source: Prepared by MIT for the purposes of the National Plan

p. 14 =

Table 7: *Share of individual fuels in total primary energy sources (excluding electricity)*

	2016 level	2040 target level
Coal and other solid non-renewable fuels	40 %	11–17 %
Oil and petroleum products	20 %	14–17 %
Gaseous fuels	16 %	18–25 %
Nuclear energy	15 %	25–33 %
Renewable and secondary energy sources	10 %	17–22 %

Source: State Energy Policy of the Czech Republic (2015)

Table 8: *Share of individual fuels in gross electricity generation*

	2016 level	2040 target level
Coal and other solid non-renewable fuels	50 %	11–21 %
Nuclear energy	29 %	46–58 %
Natural gas	8 %	5–15 %
Renewable and secondary energy sources	13 %	18–25 %

Source: State Energy Policy of the Czech Republic (2015)

p. 19 = the Senate respects the government's decision to submit a compromise target for the 22 % share of renewable energy in the final version of the Czech National Plan, but recommends that the Czech Government continuously negotiate with stakeholders and look for ways to more significantly increase the share of renewable energy sources (RES) within the energy mix of the Czech Republic in the 2023–2024 Plan Update.

p. 29 = The Czech Republic plans to achieve the RES share in gross final consumption at 22 % by 2030, which is an increase of 9 percentage points compared to the national target of 13.0 % for 2020.

By 2022, the Czech Republic commits to achieve a share of 14.62 % under Article 4(2) of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, and to achieve 16.87 % by 2025 and 18.85 % by 2027, or to identify and implement additional policies if these interim values are not achieved.