

EU, Sweden and Renewable Energy

A case study of Sweden's implementation of the Renewable
Energy Directive 2

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Abstract

In 2018, the European Union (EU) adopted a revised version of the Renewable Energy Directive (RED 2). The directive introduced new objectives for the EU's renewable energy sector and aimed to support the provision of renewable energy in the EU. After its adoption, the directive would be implemented in each EU member state. This thesis analyzes Sweden's implementation of the RED 2 and applies a theoretical framework of institutionalism and Europeanization to describe and explain the implementation process. The analysis uses empirical material which consists of policy documents and semi-structured interviews with public and private actors involved in renewable energy in Sweden. The thesis concludes that Sweden has both adopted legislative amendments as well as new legislation to implement the RED 2. These measures cover different legislation and different energy sectors. Furthermore, the thesis suggests that formal and informal institutions have been applied in order to implement the directive. These findings have implications for how future research can understand domestic institutions and their importance during implementation processes.

Key words: Renewable Energy Directive 2, Sweden, Implementation, Institutionalism, Europeanization

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1 Introduction

1.1 Research problem

In recent decades, the European Union (EU) has adopted legislative packages in order to reduce its greenhouse gas emissions. Importantly, the EU has focused on phasing out unsustainable energy sources such as coal and oil in favor of renewable energy sources such as bioenergy, hydropower, solar power and wind power. One important legislation in this area is the Renewable Energy Directive (RED) which initially was adopted in 2009 and later revised in 2018 and 2023. The RED offers guidelines for the EU's renewable energy objectives and aims to promote the use of renewable energy in sectors such as transport, industry and heating. The directive comes with general objectives for the EU which in turn have to be implemented in each member state by national measures (European Commission n.d. a).

The RED from 2009 (RED 1) set guidelines for compulsory national targets regarding use of renewable energy and aimed for a 20 percent share of renewable energy by 2020 (Directive 2009/28/EC). In the revised document from 2018 (RED 2), the EU adopted a binding target of 32 percent of renewable energy use by 2030 at EU wide level (Directive (EU) 2018/2001). By the adoption of the RED 2, a shift was made from national to EU wide targets regarding use of renewable energy in the EU member states. The directive set a target of 14 percent use of renewable energy in the transport sector by 2030 and provided new definitions regarding criteria for biofuels to be classified as sustainable. Furthermore, the directive included guidelines for energy communities which aim to support local and collective production and transition of renewable energy (European Commission n.d. b; European Commission n.d. c).

Scholars of European politics have investigated the conditions for EU member states to implement EU directives and observed similarities and differences during the implementation processes. Scholars have considered the potential adaptation pressure that may arise as EU directives are adopted at the EU level. Literature have formulated the hypothesis that the implementation of an EU directive can be understood by the domestic institutional framework and its fit with the EU legislation. The hypothesis is based on the assumption that an EU directive is likely to be implemented in national context if the directive is converged with domestic legislation, policy instruments and policy ideas (Risse et al. 2001; Börzel & Risse 2003).

This outset is especially interesting with respect to the implementation of the RED 2 as there is a heterogeneity among the EU member states with respect to renewable energy use. Sweden stands out in the EU with a relatively high use of renewable energy and since the RED was adopted at the EU level, Sweden has been the EU member state with the highest share of renewable energy in the total energy consumption (Eurostat 2024a).¹ Furthermore, Sweden has also been identified as a forerunner in environmental policy and technological development (Kronsell 2002; Jänicke 2005) and has historically practiced domestic and international capacity to promote environmental objectives (Lundqvist 1997). Sweden has also been understood as an EU member state which is relatively converged with EU energy and environmental policy (Nilsson 2011).

This illustration makes Sweden a particularly interesting case with respect to the RED 2 and a set of relevant questions can be formulated with respect to the case. Firstly, it is central for political science research to understand what makes EU member states to implement EU directives and its domestic effects (Sverdrup 2008). More specifically, to implement an EU legislation in a national context is a political process that may enhance or hinder domestic policies relating to technological, economic and environmental objectives (Treib 2014: 5–6). Secondly, as noted Sweden has over time had a high share of renewable energy in its total energy mix and it is relevant to investigate how the EU directive has been implemented with respect to existing renewable energy systems. In sum, therefore, it is relevant for political science inquiry to understand Sweden's implementation of the RED 2 with respect to both EU legislation and the country's energy and climate politics.

1.2 Purpose and research questions

The purpose of this thesis is to understand Sweden's implementation of the RED 2. The study focuses on Sweden as a special case in terms of relatively high share of renewable energy in its energy mix and aims to analyze the implementation of the directive by focusing on the domestic institutional framework. In this respect the thesis aims to comprehend the research problems stated above and to answer the following research questions:

- 1) *How has the Renewable Energy Directive 2 been implemented in Sweden?*
- 2) *To what extent can the implementation process be explained by Sweden's institutional framework within renewable energy?*

By answering these research questions the thesis holds both descriptive and explanatory ambitions. The first research question focuses on describing the

¹ These statistics calculate the share of renewable energy based on four indicators: transport, heating and cooling, electricity, and overall share of energy from renewable sources (Eurostat 2024b).

implementation and identifies central legislative processes. In this way the study aims to analyze what measures that has been adopted to implement the directive and what sectors that have been covered. The second research question aims to explain the implementation process as dependent on the Sweden's institutional framework. In this thesis, I suggest that the implementation can be explained by Sweden's domestic institutional framework where I distinguish between formal and informal institutions. I conceptualize formal institutions as legislation and policy instruments, and informal institutions as organizational work and Sweden's renewable energy norm. The text draws upon theoretical insights from institutionalism and Europeanization and applies a qualitative case study analysis. The analysis uses empirical material from policy documents and semi-structured interviews with representatives from government agencies, regional energy offices and interest organizations.

This thesis aims to comprehend how an EU directive is implemented in domestic context and analyze factors that explains the process. In this respect the study is of relevance also for actors outside of the academia. First, the thesis investigates Sweden's implementation of an EU directive which makes the study of relevance for domestic policy actors in Sweden, particularly those involved in energy and climate policy in both the public and private sector. Secondly, the thesis is also of relevance for policy makers at the EU level who formulate and negotiate renewable energy legislation. Lastly, as the thesis investigates institutions and legislation regarding renewable energy, which is a central factor for the green transition, the study can also be relevant for the general debate regarding measures in sustainable development. Altogether these are contributions which aim to strengthen the external relevance of the study (Peters et al. 2010: 327–328).

1.3 Structure of the text

The next section presents a background which describes climate and energy policy in the EU and Sweden. In section 3, I present a literature review which summarizes previous research on implementation of EU directives as well as renewable energy in Sweden. Here I also identify a research gap and position the thesis to the previous literature. In section 4, I present the theoretical framework which draws upon literature from institutionalism and Europeanization. I end this section by presenting the theoretical model and hypotheses which are tested in the analysis. In section 5, I present the methodical framework with an overview of the case study as well as the empirical material. This section is concluded with a discussion on ethical and methodological reflections. Section 6 presents the analysis where the theoretical framework is applied on the empirical material. Next, in section 7 I discuss the findings in the analysis by evaluating the hypotheses and discuss broader implications of the study. Lastly, section 8 concludes the thesis by providing a summary of the study and suggestions for future research.

2 Background

This section provides a background on the topic of renewable energy in the EU and Sweden. The first part describes the development of EU legislation in renewable energy including the RED and related directives. The second part describes Sweden's conditions in renewable energy and its relation to Sweden's energy provision.

2.1 Renewable energy governance in the EU

Solorio Sandoval & Morata (2012) argue that energy governance has been one of the key drivers for EU integration. The authors describe that the EU's energy governance has circulated around three pillars which have defined the energy policy. These pillars are to 1) ensure sufficient energy supplies, 2) produce competitive energy at low prices, and 3) produce sustainable energy that supports the green transition (Solorio Sandoval & Morata 2012: 2).

In the nexus between security, economic and environmental perspectives, the use of renewable energy systems (RES) has gained attention and sparked a political debate in the EU. In 2001, the EU adopted the RES-E Directive which formulated an EU wide target of 22 percent electricity generated from renewable energy sources by 2010. This was also the first policy to formulate specific targets for the use of renewable energy in the EU (Monti & Martinez Romera 2020: 229). However, after the adoption of the RES-E directive it became evident that the EU would not be able to meet its objectives. This also generated a new debate about re-defined and more ambitious targets in the EU which resulted in the adoption of the RED 1 in 2009 (Knudsen 2012: 54).

2.2 The adoption of the RED 1 and RED 2

When the RED 1 was adopted, the EU introduced a member state target of 20 percent renewable energy used in final energy consumption by 2020. Additionally, compared to the previous RES-E Directive which focused on electricity, the RED 1 called member states to promote renewable energy in also cooling, heating and transport. Moreover, articles in the directive called for measures in infrastructure regarding distribution and electricity systems as well as sustainability criteria in bioenergy sources. The directive also introduced new methods for the member states to report their contribution which were formulated

by the National Renewable Energy Action Plans. In these plans, the member states would describe how they planned to achieve and implement the new renewable energy targets (Dekanozishvili 2023: 144–145).

After the introduction of the RED 1, new policy discussions focused on a more holistic view on energy and climate practices in the EU. In December 2018, a revised directive was adopted which is named the RED 2. As noted in section 1, the RED 2 introduced an EU wide target of 32 percent share of renewable energy in the EU's total energy consumption by 2030 (Dekanozishvili 2023: 201). This objective allows member states to adopt measures which are cost-effective and consistent with domestic conditions. Furthermore, by the adoption of the RED 2 the former National Renewable Energy Action Plans were replaced with new reporting methods such as the National Energy and Climate Plan. This new method served as ways for the member states to report their planned strategies to reach the objectives in the RED 2 (Monti & Martinez Romera 2020: 226–227).

The RED 2 introduced detailed targets and definitions for specific renewable energy sources. Focusing on bioenergy, the RED 2 formulated sustainability and greenhouse gas emission criteria for bioenergy products. Importantly, the directive presented new criteria for solid and gaseous biomass as well as forestry products. By these criteria, the EU acknowledged that an increased use of biofuels may have negative impact on the carbon stock, which fills an important role in the EU's objective to reduce greenhouse gas emissions. Hence, the directive applied sustainability criteria to assess and confirm that biofuels did not negatively impact the use of carbon stock (European Commission n.d. b).

Lastly, the RED 2 covered guidelines for renewable energy communities in the EU. Energy communities aim to generate locally produced and shared renewable energy, which is a method to increase the overall use of renewable energy in the society (Lowitzsch et al. 2020). The RED 2 set specific guidelines for the promotion of energy communities in the EU by encouraging member states to evaluate conditions for energy communities and support them in relation to other established producers on the market. The directive also introduced certain criteria for energy communities which included definitions on their governance and eligibility (Lowitzsch et al. 2020: 6–7).

While the RED 2 introduced important frameworks for renewable energy, it was also presented as part of the Clean Energy For All Europeans package (Dekanozishvili 2023: 156–157). Other EU legislation in the same package include the amended Energy Efficiency Directive, adopted in December 2018, which aimed to generate more efficient energy provision and reduce the EU's energy consumption by 32.5 percent by 2030 (European Commission n.d. d). Another directive in the same package was the Electricity Market Directive which set common rules for the internal market and promoted free and effective movement of electricity in the power grid (European Commission n.d. e). It is therefore important to consider the RED 2 as part of a broader energy governance in the EU.

2.3 Renewable energy in Sweden

The RED 2 would be implemented in each member state by necessary measures to live up to the targets and objectives in the directive. In Sweden the conditions for renewable energy are favorable, especially in the field of hydropower and bioenergy where water and forest areas favors production in these energy sources (Johansson 2022: 1158). In 2018, the same year as the RED 2 was adopted, the total share of renewable energy in Sweden was 54,6 percent which was used in both heating, cooling, electricity and transports. Furthermore, 55 percent of this share was accounted by bioenergy (Swedish Energy Agency 2020: 16–18).

Traditionally the bioenergy sector has played an important role for Sweden's industry and district heating system (Swedish Energy Agency 2020: 18). The district heating is a central part in Sweden's energy provision which initially was introduced in regional municipalities to integrate heat and power systems. Since the beginning of the 21st century, the use of fossil fuels have largely been abandoned in district heating. Instead, the use of renewable energy sources in district heating has increased, particularly by the use of forestry products and waste incineration. For instance, a majority of household waste is classified as renewable and re-used for energy production (Swedish Energy Agency 2020: 19, 27). The use of bioenergy is also important in the transport sector. When using the calculation method in the RED, domestic transports were using approximately 30 percent renewable energy in 2018. This share includes biofuels such as biodiesel and biogas (Swedish Energy Agency 2020: 31–34).

Table 1 below illustrates the supply from four renewable energy sources in Sweden between 2009 and 2022. As illustrated, biofuel stands for the highest level of energy supply followed by hydropower. The table also shows that solar and wind power provide relatively lower supply. At the same time the production of both solar and wind power has been increasing in Sweden, which can be explained by technological development and reduced production costs (Swedish Energy Agency 2020: 23).

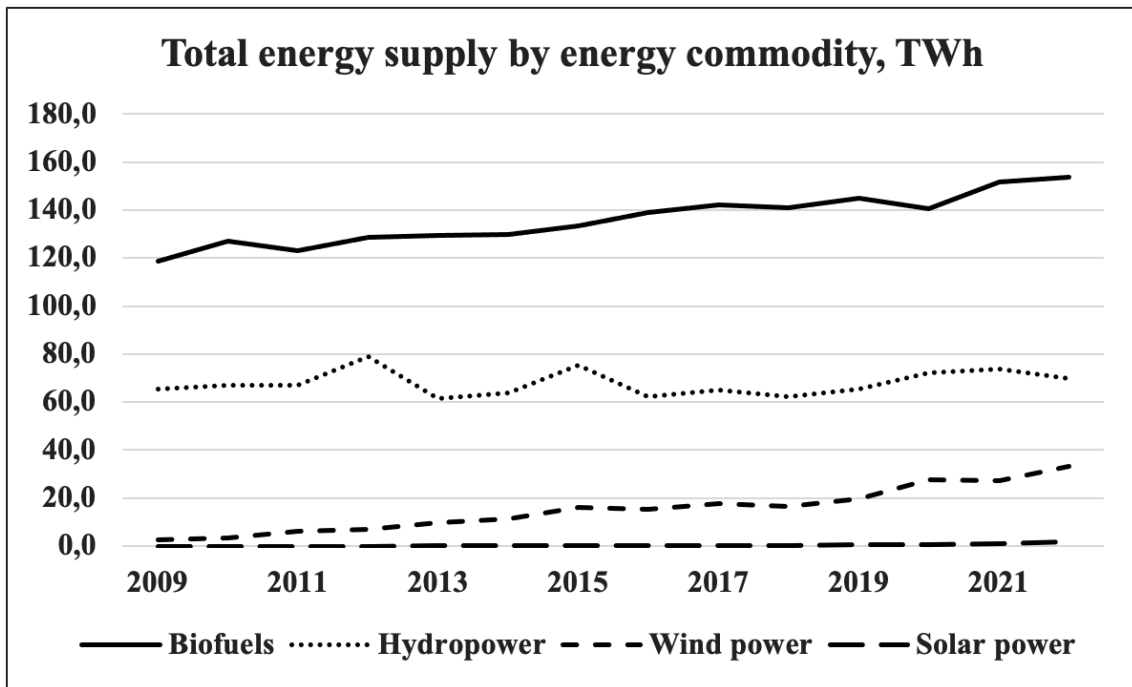


Table 1. Total energy supply in Sweden by energy commodity counted in Terawatt hours. Source: Swedish Energy Agency (2023).

3 Literature review

This section presents a literature review which summarizes two fields of literature. The first part discusses literature which have analyzed implementation by different methodological and theoretical frameworks. The second part presents previous literature on Sweden's energy policy and its relation to the EU. The section is then concluded where I highlight the research gap and position this thesis to previous literature.

3.1 Implementation of EU directives

Scholars of European and domestic politics have debated the conditions for implementation in the EU member states. This debate departs from the governance problem that the EU lacks a central polity that manages implementation processes. Instead, each member state holds competence and authority to implement and comply with the EU directive according to national conditions (Treib 2014: 6). Previous literature have concerned the different aspects of implementation and compliance, asking both why and how EU legislation is implemented in national contexts. This literature have focused on both the domestic transposition, application and enforcement of an EU legislation which observes different aspects (Treib 2014: 17). In this way the process has been analyzed from different phases which has also resulted in different methodological perspectives. For instance, studies have relied on quantitative data to find general patterns of explanation regarding when and how member states implement EU legislation (Lampinen & Uusikylä 1998; Toshkov 2007; König & Luetgert 2009). Other studies rely on qualitative analysis built on either a single case study focusing on a specific member state (Hartlapp 2009) or cross-comparison between different member states (Falkner et al. 2004; Liefferink et al. 2011).

There is also a variation how literature have analyzed implementation in different sectors, where social and environmental legislation have gained relatively high attention (Treib 2014: 16–17). However, certain focus has also been on the implementation of EU energy policy. Michalena & Hills (2012) argue that implementation regarding renewable energy in the EU faces obstacles, particularly in local contexts and circumstances. Also Peeters (2014) observers obstacles in the implementation of renewable energy policies. The author highlights the increasing complexity between energy and climate governance as well as the division of competences and legal instruments. This is also related to more general research on EU governance, where literature have found that climate

and energy governance in the EU links both different thematic and decision making levels (Szulecki et al. 2016; Solorio & Jörgens 2020; Oberthür & von Homeyer 2023).

Research have focused on assessing different instruments and explanatory factors for the implementation of EU directives. Importantly, literature have examined the goodness of fit hypothesis for explaining member states' implementation of EU directives. Scholars have put forward the hypothesis that “successful compliance depends on the fit between European policy requirements and existing institutions at the national level” (Mastenbroek 2005: 1109). The goodness of fit hypothesis has gained attention among scholars and also generated a debate. This debate concerns especially how to understand the dynamics of implementation and its effects in domestic politics, where the empirical findings regarding the hypothesis also remain inconclusive. Some studies have found support for the argument (Duina 1997; Knill & Lenschow 1998; Börzel 2000). Other studies, on the other hand, seek to improve the model by focusing on the role of domestic conditions and politics (Haverland 2000; Knill & Lehmkuhl 2002; Mastenbroek & Kaeding 2006; Falkner et al. 2007). These scholars have developed other approaches for the hypothesis and provided more in depth analysis regarding the theoretical explanation for when and how EU legislation is implemented at national level. Especially, literature have considered additional theoretical approaches from rational choice and sociological perspectives which take into account domestic politics such as actors' preferences and beliefs, which are understood as mediating factors during the implementation process (Mastenbroek & Kaeding 2006).

It can be concluded that the empirical findings on EU implementation are diverse and scholars have found support for different aspects of implementation and its different phases. Hence it has been noted that future research on implementation should consider and control for specific conditions to gain further understanding regarding why and how EU member states implement EU legislation (Treib 2014: 31–32). Furthermore, it has been noted that there are differences regarding what member states that have been selected for research. When summarizing previous literature, both qualitative and quantitative research tend to overlook the Nordic countries which include Sweden (Treib 2014: 16).

3.2 Energy governance in Sweden

Scholars have paid attention to Sweden's energy governance and explained the development from various perspectives. Johansson (2022) characterizes Sweden as a country with a diverse energy mix which can be explained by domestic factors such as political negotiations and the country's geography. Furthermore, in terms of governance characteristics, the country has been a supporter of market operations which rely on economic instruments such as electricity certificates and the EU Emission Trading System (EU ETS) (Johansson 2022: 1158–1159). Similar to other EU member states, Sweden has over time liberalized and

deregulated domestic energy markets which have involved both public and private actors as well as different decision-making levels (Midttun 2001; Wang 2006; Högselius & Kaijser 2010). Wang (2006: 1212–1213) notes that the country has implemented policy instruments such as investment subsidies and favorable tax systems which have generated investments in the country's renewable energy sector. Nilsson (2005) analyzes the development of Sweden's energy governance and identifies three frames under which energy has been governed; risk, infrastructure and market perspective. Each frame has enabled a set of policy priorities to be adopted where, for instance, the market perspective has focused on social and economic efficiency in domestic energy markets (Nilsson 2005: 213–214). In the political discourse, the energy markets and renewable energy technology have also been promoted as important sectors for the country's climate policy (Sarasini 2009). Lastly, it has been observed that these governance systems have evolved as a result of strategic interaction between different actors, such as civil servants and government agencies (Uba 2010) or business representatives (Sarasini 2013).

Other scholars have particularly focused on Sweden's energy policy in relation to the EU, where the literature are divided when analyzing the EU's influence and external pressure on Sweden's energy policy. Lerum Boasson et al. (2021) provide an overview of Sweden's electricity certificate scheme and explain Sweden's energy and policy mix as a result of domestic factors, such as increasing politization of energy sources. The authors discuss the overall impact of the EU on Sweden's energy mix and conclude that the impact has been mixed. For instance, the implementation of RED 1 influenced particular political agreements regarding Sweden's national energy targets (Lerum Boasson et al. 2021: 181). Similar explanations are found in other studies which focus on specific energy sectors such as bioenergy (Skjærseth et al. 2022) and wind power (Skjærseth et al. 2023), where the authors focus on the role of technological and financial costs as well as coalitions in domestic politics. Also Westholm & Beland Lindahl (2012) provide a domestic perspective where it is argued that Sweden's renewable energy sector and implementation of the RED 1 can be explained by the Swedish welfare model. Especially, the authors analyze the development and influence of public governance and state operations.

Findings from others studies nuance this view and suggest there have been influence from the EU regarding Sweden's energy governance. Ericsson et al. (2011) note there has partly been an EU influence in Sweden's pulp and paper industry and the industrial organization, mostly with respect to the introduction of the EU ETS. Nilsson (2011) investigates to what extent the EU influences the decision making in the Swedish energy sector. The author concludes that Sweden over time has been relatively converged with the EU energy and environmental legislation. However, Nilsson (2011) also finds that there has been an influence of the EU in Sweden's decision space, particularly by the form of shaping ideas, beliefs and expectations regarding future energy opportunities. This is also elaborated by Åstrand (2005) who analyzes EU's influence on Sweden's green certificate trading scheme in the energy sector. Åstrand (2005: 121) concludes that

the EU “influenced the selection process through shaping and strengthening beliefs and expectations about the future support scheme”.

Additionally, some scholars have provided more in depth analysis regarding the RED and its implementation in Sweden. Hansson & Nerhagen (2019) study Sweden’s implementation of the RED 1 and evaluate how cost-benefit assessment has been incorporated in the decision making process during the implementation of the directive. Furthermore, Palm (2021) reviews proposed legislation for implementing energy communities in Sweden as part of the RED 2 and the Electricity Market Directive. The author analyzes responses from referral bodies in Sweden and finds both positive reactions as well as critique for how the energy communities were proposed to be implemented.

3.3 Research gap

This section has provided an overview of relevant literature from two distinct fields of literature. As noted, previous research have focused on EU legislation and its implementation in national context and called for more in depth research regarding national characteristics, particularly in the case of Sweden and how EU legislation is implemented in the country. Additionally, focusing on Sweden’s domestic energy governance, literature have analyzed the developments and characteristics for energy systems. In this field, however, the results are divided regarding to what extent and in what forms EU legislation seem to affect the domestic energy governance, particularly regarding renewable energy systems.

By conducting a case study of Sweden’s implementation of the RED 2, this thesis aims to contribute to the two fields of literature above and fill current research gaps in the field. The study considers and assesses the goodness of fit hypothesis to understand Sweden’s implementation of the directive, which contributes to the implementation literature with further evidence on how and why EU directives are implemented. Furthermore, by considering this hypothesis the thesis also aims to understand how energy governance is practiced in Sweden with respect to EU legislation. Thus the thesis aims to provide insights regarding practices in the renewable energy sector and how these are influenced by EU legislation. By considering these points the text aims to contribute to the previous literature and thus to strengthen its internal relevance (King et al. 1994: 15–17).

4 Theoretical framework

This thesis draws upon insights from institutionalism and Europeanization which are applied to describe and explain Sweden's implementation of the RED 2. This section describes the theoretical framework and begins with an overview of institutionalism. Then an overview of Europeanization and the goodness of fit model is presented. Lastly, the section is concluded with a summary of the theoretical framework as well as the hypotheses and how these are applied during the analysis.

4.1 Institutionalism

Institutionalism is a theory that focuses on how institutions shape, constrain and enable political behavior. DiMaggio & Powell (1991: 10) explain that institutions overall “constrain individual behavior by rendering some choices unviable, precluding particular courses of action, and restraining certain patterns of resource allocation”. In this respect, the theory acknowledges that institutions set frameworks for how different political interests and outcomes are formed in a society. By constraining these outcomes it is assumed that institutions create continuity and certainty in the political life (March & Olsen 2008: 4–5). Scholars of institutionalism is thereby interested to assess how institutions form political behavior and in what ways they are applied over time (Héritier 2007).

Institutions cover many aspects of political life which has made scholars to conceptualize institutions differently. March & Olsen (2009: 4) describes that institutions “are collections of structures, rules, and standard operating procedures that have a partly autonomous role in political life”. This understanding highlights that an institution constitutes different forms of governance over different political domains. A more nuanced description can also be made by making a distinction between formal and informal institutions, which highlights the different spheres in which they influence political outcomes.

4.1.1 Formal institutions

A first conceptualization can be made which understands institutions as formalized ways to organize society and political behavior. Lowndes & Roberts (2013: 53–54) describe that formal institutions are defined by written-down rules such as formalized policy requirements and legislation. Peters (2012: 7) adds that institutionalism over time has focused and studied legislation as the central form

of politics. These formal institutions are established by legislative bodies and constitute the conditions for how actors are allowed to operate in certain policy fields and what is required to live up laws. Together the formal institutions steer political behavior by their formalized authority which actors adhere to. In this respect, formal institutions are also applied as regulative practices which generate and promote certain political activities, which also defines what actions that are prohibited but also supported in society (Lowndes & Roberts 2013: 53–57, 90).

4.1.2 Informal institutions

Scholars have extended this view by also analyzing the informal aspect of institutions. Turning to informal institutions, these are understood as informal practices that are not formally decided by political decisions or written in text, but operate through practices and routines (Lowndes & Roberts 2013: 57–58). The informal institutions are practiced by collective understandings of how things ought to operate and suggests that individuals follow behavioral patterns. This can also be associated with the rules in society which form and define governance systems and expectations (March & Olsen 2009). These include ideational aspects such as ideas and code of conduct and it is assumed that political behavior is confirmed and generated by these informal practices. Moreover, it is suggested that informal practices enable and constrain activities as they can be institutionalized over time, which then relates to specific policy contexts and actors (Lowndes & Roberts 2013: 60–61).

There is an analytical distinction between the formal and informal institutions where the two observes different domains of political activities. They share, however, the characteristic of explaining political processes and can thus be seen as complementary. Analytically it is therefore of interest to view how the two forms of institutions support or constrain each other (Lowndes & Roberts 2013: 55–57).

4.1.3 Sweden's institutions in climate and energy

Previous paragraphs introduced the notion of institutions and their function in society. Applying this notion in this thesis, it is relevant to discuss how formal and informal practices have evolved in Sweden regarding climate and energy policy. Focusing on formal institutions, Sweden has over time adopted legislation in the fields of electricity, environmental assessment, and building construction which together have influenced the energy sector (Johansson 2022: 1167). With respect to specific policy instruments, Sweden has since 1991 applied a carbon tax which since its adoption gradually has increased taxation on fossil fuels and thus favored renewable energy (Hildingsson & Knaggård 2022). Furthermore, Sweden adopted the electricity certificate scheme in 2003 which constitutes a certificate market for electricity produced by renewable energy sources (Lerum Boasson et al. 2021). Sweden has also applied the emission reduction obligations which were

introduced in 2018 and has required transport fuels to be blended with renewable energy sources (Johansson 2022: 1176). Together, these are market based policy instruments which have been applied to reduce greenhouse gas emissions and support the use of climate friendly technologies. These have also been complemented with the EU ETS which was adopted at EU level in 2005. This policy instrument creates a market for trading of carbon emission allowances in the EU, and aims thereby to reduce EU's consumption of fossil fuels (Johansson 2022: 1159, 1173).

These formal practices have also been complemented with informal institutions which are part of Sweden's energy governance. First, it has been noted that climate and energy policy in Sweden are discussed in different organizational settings. Johansson (2022: 1168) calls this an "institutionalized collaboration" which involves dialogues between both public and private actors. Kronsell et al. (2019) find that these dialogues have been especially prominent during policy formation for the green transition which have included a collaboration on both technological, environmental and economic developments. Another informal institution refer to research and development practices, where Johansson (2022) describes that research and development in general have been a driver for sustainable energy systems in Sweden. This is also the case in the bioenergy sector, where research programs have considered the balance between energy and sustainability practices (Johansson 2022: 1169, 1179). Another informal institution is Sweden's renewable energy norm, which includes Sweden's relatively high use of renewable energy as well as its history of being a forerunner in climate policy (Johansson 2022: 1158–1159, 1169).

Altogether this provides a theoretical understanding of formal and informal institutions and also how these have been developed and applied in Sweden with respect to climate and renewable energy. In the next section, I discuss the concept of Europeanization and how this, in turn, relates to formal and informal institutions during Sweden's implementation of the RED 2.

4.2 Europeanization

Scholars have discussed how EU directives are implemented in the EU member states and its influence on domestic politics. Using the concept of Europeanization, scholars have conceptualized these processes to understand the influence and developments by EU related legislation. This thesis understands Europeanization "as a process by which domestic policy areas become increasingly subject to European policy-making" (Börzel 1999: 574). According to this notion, Europeanization refers to a process when domestic policy is influenced by EU legislation. Börzel & Risse (2003) elaborate that the EU and its institutional development affects conditions in the member states and influences domestic policy and organizations. Europeanization is thus viewed as a top-down process where the EU legislation is applied and transferred to the member state context (Börzel & Risse 2003).

Europeanization is a particularly useful concept when analyzing the implementation of an EU directive. An EU directive set overall guidelines and principles for the EU's political, economic, environmental and social objectives which in turn have to be implemented by each member state. In this respect it is up to the member states to adopt appropriate measures and methods to implement the EU directive (Sverdrup 2008). Thus an EU directive is also separated from an EU regulation, which instead is directly transformed into national legislation (Falkner et al. 2004: 452–453). Implementation has been understood as “the processes through which European norms are transposed, adhered to and enforced at the domestic level” (Sverdrup 2008: 197). This process is primarily understood by shared rules on the EU level which then, in turn, are practiced in the member states. These mechanisms are central for the EU's thematic development and enables a social, economic and political order in the EU (Sverdrup 2008: 199). It has been suggested that Europeanization and implementation of EU directives should be understood as a processes that runs over time, including both the formal measures made in order to reach the requirements in EU legislation as well as its long term effects in domestic politics (Radaelli & Pasquier 2008: 37–38, 44).

4.2.1 The goodness of fit hypothesis

As described in section 3, scholars have analyzed the implementation of EU directives by using the goodness of fit hypothesis. The hypothesis assumes that high convergence between the EU directive and national conditions results in an effective implementation process (Haverland 2000: 84). Duina (1997) suggests that the implementation of an EU directive is associated with a cost that, depending on the nature of the directive, may confront domestic social, economic and organizational institutions. When an EU directive is inconsistent with established national policies it is then assumed to raise an adaptation pressure on domestic routines and guidelines, which can result in a prolonged implementation process (Duina 1997: 156–158). Hence, actors are assumed to conform to the EU directive by finding solutions within already established institutional arrangements which compromises EU and domestic policy ideas (Sverdrup 2008: 205).

Following Börzel & Risse (2003), the goodness of fit hypothesis can be assessed by making a distinction between policy and institutional misfit. The authors explain that there is a policy misfit when EU legislation “challenge national policy goals, regulatory standards, the instruments or techniques used to achieve policy goals” (Börzel & Risse 2003: 61). Furthermore, this misfit generates an adaptation pressure which makes policymakers to adjust or abandon domestic legislation or policy instruments (Börzel & Risse 2003: 61). Furthermore it has been highlighted that this adaptation pressure can challenge the “core patterns of the regulatory style and structure” (Knill 1998: 5).

Secondly, there can be an institutional misfit which refers to a broader understanding of EU influences in domestic politics. Börzel & Risse suggest that institutional misfit occurs when EU legislation confronts “domestic rules and

procedures and the collective understandings attached to them” (2003: 62). Institutional misfit thus observes a broader aspect of adjustment between EU and national legislation and includes ideational aspects such as ideas and code of conduct. Olsen (2002: 933) argues that EU legislation is “interpreted and responded to through existing institutional frameworks, including existing causal and normative beliefs about legitimate institutions”. Moreover, the implementation of an EU directive can confront domestic normative structures. As suggested by Knill & Lehmkuhl (2002), EU legislation may influence expectations in a policy area which can either hinder or support policy ideas.

The policy and institutional misfit is associated with formal and informal institutions which are derived from the institutionalist literature (Grünhut 2017: 162–163). This creates an explanatory framework to understand how and why an EU directive is implemented in domestic context. The policy misfit highlights the formal and legal aspects of the implementation and is thus associated with the domestic formal institutions. The institutional misfit, on the other hand, is associated with informal institutions and views the potential difference between EU legislation and domestic ideational aspects such as ideas and code of conduct. By departing from both institutionalism and Europeanization it is thus possible to create a theoretical framework which can describe and explain Sweden’s implementation of the RED 2.

4.3 Theoretical model and hypotheses

This thesis applies the goodness of fit hypothesis to describe and explain Sweden’s implementation of the RED 2. The goodness of fit hypothesis has, however, been criticized for not considering all domestic conditions. For instance, scholars suggest that that implementation is influenced by number of veto points in the policy formation (Haverland 2000). Others have suggested that the implementation process can be explained as a result of an interaction between norm entrepreneurs (Mastenbroek & Kaeding 2006: 345–346). This critique is also shared by Falkner et al. (2007) who conduct an evaluation regarding the empirical findings of the goodness of fit hypothesis. The authors suggest that the hypothesis should be evaluated with respect to member states’ regulatory traditions and its relation to EU legislation. The authors also present a typology where Sweden is categorized into “world of law observance”, which suggests that Sweden traditionally prioritizes compliance with EU legislation (Falkner et al. 2007: 405). For this categorization, the authors explain that “[n]on-compliance typically occurs only rarely and only when fundamental domestic traditions or basic regulatory philosophies are at stake” (Falkner et al. 2007: 405). According to Falkner et al. (2007), Sweden is thereby understood as a member state in which both the political and administrative officials traditionally respect EU legislation. This is also in line with the understanding that Sweden is relatively converged with EU legislation, especially in the field of environment and energy (Nilsson 2011).

Drawing upon this understanding of Sweden’s legislative tradition and convergence with EU legislation, this thesis assumes that there has been a fit between the RED 2 and Sweden’s policy and institutional framework. Departing from the notion of misfit as proposed by Börzel & Risse (2003), the assumption is that there has been a fit between the RED 2 and Sweden’s policy and institutional framework. Thus the two following hypotheses are formulated for the analysis:

H1: *The RED 2 has been implemented in Sweden consistent with a policy fit.*

H2: *The RED 2 has been implemented in Sweden consistent with an institutional fit.*

The framework considers the RED 2 as the independent variable while the implementation of the RED 2 in Sweden is understood as the dependent variable. Furthermore, policy and institutional fit are applied as mediating variables to describe and explain Sweden’s implementation of the directive (George & Bennet 2005: 80–81). This theoretical model is also illustrated in Table 2 below. To clarify the hypotheses, H1 analyzes the formal institutions in Sweden with respect to the implementation of the RED 2. For H2 instead, the analysis focuses on informal institutions which have been applied with respect to the implementation. Together these points constitute the first aspects of the research design, which is also described more in detail in the next section.



Table 2. Theoretical model.

5 Methodology

This section introduces the methodological framework which is used for the analysis. The section begins with describing the case study, case selection and data collection which is then followed by a discussion about the operationalizations of policy and institutional fit. The section is concluded with a discussion on ethical, ontological and epistemological considerations.

5.1 Single case study and case selection

This thesis conducts a qualitative single case study of Sweden's implementation of the RED 2. Gerring (2004: 342) understands a single case study as the "intensive study of a single unit for the purpose of understanding a larger class of (similar) units". Furthermore, George & Bennet (2005: 27) explains that case studies are focusing on specific categories of theoretical events. In this thesis I view Sweden's implementation of the RED 2 as an event of implementation. This event is linked to the theoretical understanding that an EU member state adopts measures to fulfill an EU directive. For this particular case, it is also viewed as an event where Sweden implement EU legislation in renewable energy governance.

The analysis focuses on the period between 2018 and 2023 which is the period between the adoption of RED 2 and RED 3 at EU level (European Commission n.d. a). The period between the two adoptions is thereby understood as the implementation period of the RED 2 in Sweden. The level of analysis focuses on the domestic context in Sweden, which allows to analyze domestic institutions and renewable energy sectors with respect to the implementation process. The study therefore analyzes sectoral variation over different renewable energy sources which include bioenergy, hydropower, solar power and wind power. By identifying the time period and level of analysis that is studied, the aim is to provide an analytical setting for the study (Hancké 2010: 240). Following this outset the ambition is to present a more focused analysis which tests the variables of policy and institutional fit (George & Bennet 2005: 71–72). By considering both a limited time period and controlling for country specific conditions, the research design also aims to strengthen the internal validity (Blatter & Haverland 2012: 20). Altogether the single case study approach is suggested to be the most appropriate method for answering the research questions.

The single case study provides an outset to test theoretical insights, which is also considered as a strength with the method. It can, however, be criticized for being biased in terms of case selection which may affect the analysis negatively (George & Bennet 2005: 30–31; Levy 2008: 8). The case selection has been made

strategically based on Sweden's tradition of respecting EU directives (Falkner et al. 2007) and its relatively high convergence with EU legislation (Nilsson 2011). The case selection has thus been made dependent on the two variables of policy and institutional fit. The case selection has been made according to a most-likely case, where it is expected that the analysis will strengthen the theoretical hypotheses (Levy 2008: 12). When conducting a most-likely case study, it is necessary to test the hypotheses in a transparent manner (Levy 2008: 12). Therefore, the hypotheses guide the analysis and are tested with respect to the empirical material to evaluate whether these are strengthened or weakened.

5.2 Empirical material

This study uses two types of material to answer the research questions. Firstly, the study analyzes policy documents which are gathered from public sources. These data aim to provide a description of how the Swedish government and government agencies reasoned regarding the implementation of the RED 2. Secondly, the study collects empirical material from 13 semi-structured interviews. These two data sources are used to complement each other and aim to provide more nuanced answers to the two research questions.

5.2.1 Semi-structured interviews and sampling method

The interviews have been conducted as qualitative semi-structured interviews. The semi-structured approach means that the interviews covered questions which are important for answering the research questions. At the same time, the interviews have used open-ended questions where the interviewees have been able to develop answers depending on their experience and knowledge (Meuser & Nagel 2009: 31). Furthermore, the approach has made it possible to ask additional questions to gain further insights and clarify potential misunderstandings (King et al. 2019: 69).

It has been necessary to select interviewees strategically depending on their role and knowledge. This technique which is noted as purposive sampling has also been used to increase the diversity in the sample (King et al. 2019: 57). The purposive sampling has focused on interviewees which are assumed to have experience and knowledge regarding Sweden's implementation of the RED 2. When sending invitations, I have contacted government agencies, regional energy offices and interest organizations which are involved in renewable energy in Sweden. The interviewees thus represent both the public and private domain and hold experience in either renewable energy in general or specific renewable energy sectors. A summary of the interviewees is presented in Appendix 1 which includes information about their role as well as the date for the interview.

The purposive sampling has been useful to create a relatively diverse sample of interviewees with different roles and knowledge. It should be noted, however,

that the persons invited for interviews are dependent on my knowledge and personal judgement which can constitute a selection bias (Meuser & Nagel 2009: 18). To reduce this bias, I have asked the interviewees for other persons and organizations that are relevant for the thesis. This technique is noted as snowball sampling and has aimed to increase the diversity in the sample and to reduce the potential selection bias (King et al. 2019: 62). It has not been possible to contact all recommended persons for an interview, mainly due to limited time. Still, the technique has led to an increased and more diverse sample.

When the interview was booked, an interview guide was sent to the interviewee including code of conduct and questionnaire. The interview guide is also provided in Appendix 2. The interviews have been conducted via telephone or Teams and after consent of the interviewee recorded. After the interview, the data was transcribed manually and analyzed using a thematic analysis.

It is important to reflect upon the methodological shortcomings with semi-structured interviews. Firstly, when conducting interviews personal biases may appear in the responses. To handle this bias, the analysis aims to illustrate and discuss when similarities and differences are expressed among the interviewees. Secondly, when transcribing the interviews I have interpreted audio recordings which may result in misinterpretations and biased results. I have strived to overcome this bias by using respondent feedback, which means that the paraphrases and quotes have been sent to the corresponding interviewee for confirmation and consent. This has thereby been used as a quality criteria for the thematic analysis which aims to improve the validity and reliability of the interpretations (King et al. 2019: 216).²

5.2.2 Semi-structured questionnaire

The semi-structured interviews have been based on a questionnaire with questions that were derived from the theoretical framework (King et al. 2019: 222). The interview was divided in three sections which included introduction, main part and conclusion. The introduction presented the interview guide and covered ethical aspects, such as pseudonym, consent for recording and questions. The main part focused on questions regarding the implementation of the RED 2 and was divided in three subsections. The first subsection covered general aspects of the organization and their relation to EU legislation. The second focused more in depth on the implementation and different aspects of the process. The third focused on the RED 3 and its similarities and differences compared to the RED 2. The last section summarized the interview and discussed contact information and questions.

The interview structure has been the same for all interviews. However, as my knowledge about the RED 2 and the implementation process developed it has

² The interviews have been held and transcribed in Swedish and then translated into English. When using the respondent feedback the interviewees have approved the English version.

been appropriate to re-formulate questions depending on the interviewee. This is also a useful technique in semi-structured interviews to get as comprehensive account and material on the subject as possible (King et al. 2019: 66).

5.3 Thematic analysis

This study uses a thematic analysis to analyze the interviews. This is a useful method as it makes it possible to structure and systematically analyze the responses. I follow the structure presented by King et al. (2019: 203–209) and have conducted the thematic analysis in three steps by using the software program NVivo. Firstly, when the interviews were transcribed I read through the transcripts and highlighted important sections with descriptive codes. These aimed to identify answers that were assumed to be useful for the analysis. Next I categorized the descriptive codes into interpretive codes which made it possible to structure the answers more generally. Lastly, the interpretive codes were categorized into themes which aim to capsule reoccurring answers in the interviews. Table 3 below presents the four themes used in the analysis with its interpretive codes. The four themes are related to the research questions and the operationalization of formal and informal institutions.

Theme	Interpretive code
1. Renewable energy in Sweden	Climate targets, New legislation in the RED 2, Varieties in the EU, Sweden’s energy mix, Renewable energy norm
2. Legislation in Sweden	Other EU-legislation, Implementation of the RED 2, Contrasting EU-legislation, Legislation in Sweden
3. Policy instruments in Sweden	Policy instruments in Sweden (Carbon tax, Electricity certificate scheme, EU ETS)
4. Routines in Sweden	Dialogue, Control system, Praxis and research

Table 3. Table over themes and interpretive codes used for the analysis.

5.4 Operationalizations

The thematic analysis is a way to move from nominal to operational definition of the theoretical concepts. In this thesis the policy and institutional fit are two central concepts that need to be operationalized to increase the validity. King et al. (1994: 25) describes validity as “measuring what we think we are measuring” and explain that there should be a link between the theoretical and analytical concepts. The next subsections describe the operationalizations of the policy and institutional fit which are applied in the analysis.

5.4.1 Operationalization of policy fit

Policy fit is operationalized by observing the formal institutions that were applied in Sweden with respect to the implementation of the RED 2. I use two operationalizations of policy fit where I look at *legislation* and *policy instruments*. Legislation refers to the energy and environmental legislation in Sweden which were applied with respect to the implementation of the directive. Policy instruments instead refer to formal steering instruments which were applied. From a Swedish context, the policy instruments include the Swedish carbon tax (Hildingsson & Knaggård 2022), electricity certificate scheme (Boasson et al. 2021) and the reduction obligation (Johansson 2022: 1176). The analysis also considers the EU ETS as a policy instrument which is implemented in Sweden (Johansson 2022: 1159, 1173).

5.4.2 Operationalization of institutional fit

In contrast to the policy fit, institutional fit focuses on the informal aspects of renewable energy governance. The institutional fit is observed by analyzing *organizational work* and *renewable energy norm*. Organizational work departs from the notion of “institutionalized collaboration” and analyzes how actors integrate with respect to renewable energy in Sweden (Johansson 2022: 1168). In the analysis, this is observed by looking at collaboration between public and private actors and how government agencies support actors with guidance. It also includes research and development programs with respect to renewable energy (Johansson 2022: 1169, 1179). The renewable energy norm instead considers Sweden’s renewable energy mix as well as the country’s climate and energy targets (Johansson 2022: 1158–1159, 1169). This factor thereby comprehends use and reliance on different renewable energy sources and the norms attached to these.

5.5 Ethical considerations

While the interviews are useful sources which complement the text based material, they also have to follow ethical considerations (King et al. 2019: 33–35, 45–48). Hence, I have made ethical considerations with respect to the interviewees and their participation in the study. During the process I have aimed to be transparent regarding the purpose of thesis and its publicity. Each participant has also been informed about my contact information to ask questions or to withdraw their participation. These points were also summarized in the code of conduct that was provided and discussed before the interview. Furthermore, I have aimed to handle the data with caution as it contains information about the interviewees and their organizations.

In this thesis all interviewees have been provided anonymity. This means that no names are published with respect to the interviewee and the organization. Instead each interviewee is named with an pseudonym that informs what type of organization and renewable energy sector the participant is involved in. This decision also aims to improve the confidentiality of the data (King et al. 2019: 45–46). Furthermore, as noted previously the study uses respondent feedback. While this aims to improve the validity and reliability in the analysis, it is also used as an ethical consideration as it enables the interviewees to view and confirm their participation in the thesis. Altogether these decisions have been made in order to consider the ethical aspects of the research design.

5.6 Ontological and epistemological considerations

This thesis applies a research design where Sweden is considered as a certain case in terms of EU implementation and renewable energy governance. Thus the thesis departs from a foundationalist ontology and suggests that the results can be generalized to a broader population of theoretical cases (Furlong & Marsh 2010: 189–190). In this respect the thesis also aims to contribute to current state of the art regarding the implementation of EU directives.

In terms of epistemology the study departs from a realist standpoint which acknowledges that there are limitations regarding the level of generalizability inherent in the research design (Furlong & Marsh 2010: 190). Firstly, neither the interviewees nor the researcher can be fully objective when conducting interviews which can also lead to biased results in the analysis (King et al. 2019: 21–22). Secondly, it should be recognized that other empirical material, such as other policy documents or a larger sample of interviewees, could provide other results. However, following the methodological choices that have been made, such as snowball sampling and respondent feedback, I suggest that the research design provides an outset for testing the hypotheses and contribute to the understanding regarding Sweden's implementation of the RED 2.

6 Analysis

This section presents the analysis of Sweden's implementation of the RED 2. The analysis is structured in two parts where the first cover legislative processes that have been made in Sweden with respect to the implementation of the directive. This part is divided into section 6.1 to 6.3 and identifies legislative processes regarding sustainability criteria, contact point and time limits for permitting processes, and lastly guarantees of origin. In each of these processes I analyze the report from the responsible government agency as well as the final government bill. The second part of the analysis consists of section 6.4 which presents the semi-structured interviews. In this section, the interview responses are structured in subsections according to the thematic analysis discussed in section 5. For all sections in the analysis I analyze the empirics by the theoretical framework introduced in section 4 which corresponds to policy and institutional fit.

6.1 Legislative amendments regarding sustainability criteria

When the RED 2 was adopted at EU level, the Swedish government commissioned government agencies to investigate specific articles in the directive and the conditions to implement them in Sweden. In May 2019, the Swedish government commissioned the Swedish Energy Agency (SEA) to investigate the conditions for implementing Article 30 which concerned sustainability criteria and criteria for reduced greenhouse gas emissions.³ The government agency also investigated whether it was required to adopt new control systems for particular energy sources and biofuels (Swedish Government 2019a). After the SEA presented its report, the Swedish government presented a bill on the use of sustainability criteria for biofuels which then was adopted by the Swedish parliament in June 2021 (SFS 2021a).

³ In the RED 2, Article 30 was titled *Verification of compliance with the sustainability and greenhouse gas emissions saving criteria*. In the directive, sustainability criteria were defined in Article 29 and described, for instance, that biofuels, liquid biofuel and biomass fuel were not allowed to negatively affect soil quality or biodiversity in order to be counted as sustainable and contribute to the renewable energy targets (Directive (EU) 2018/2001: 48–50, 53).

6.1.1 Report from the Swedish Energy Agency

In December 2019, the SEA published its report on the implementation of Article 30 in Sweden. In the report the SEA suggested an expansion of the current legislation which included sustainability criteria for solid and gaseous biofuels used for fuels, electricity, heating and cooling. Furthermore, it was described that the expanded legislation would cover new actors on the energy market with new requirements when documenting the use of biofuels (Swedish Energy Agency 2019: 7–10).

When the SEA made its suggestions, the government agency considered established legislation and control systems in Sweden. The SEA informed that there were legislation in Sweden which regulated the use of sustainability criteria, requirements for reporting, control systems as well as its supervision. Importantly, as also mentioned by the SEA, this legislation was adopted in Sweden in 2010 by the implementation of the RED 1. It was also recognized that the requirements on control systems were similar to the ones presented in the RED 1. Additionally, the report referred to the Swedish legislation regarding sustainability criteria for biofuels, adopted in 2011, which provided more detailed descriptions regarding requirements for reporting and definitions for residual products. Lastly, the SEA highlighted that the government agency published legally binding provisions to relevant actors which described how the sustainability criteria would be applied (Swedish Energy Agency 2019: 36, 47).

By the report, the SEA aimed to implement the RED 2 by applying already established legislation and control systems which initially had been implemented by the RED 1. This is also an expected approach when implementing an EU directive as this would be assumed to reduce the implementation costs (Duina 1997). This description also highlights that there were formal institutions in Sweden, here conceptualized as legislation, which were consistent with Article 30 in the RED 2 (Lowndes & Roberts 2013). Focusing on the use of sustainability criteria, this also suggests that there was a policy fit between the RED 2 and Sweden's legislation (Börzel & Risse 2003).

It is also relevant here to consider other legislation which were associated with Article 30. The SEA informed that the use of sustainability criteria was regulated in the law regarding electricity certificates, the law regarding reduction obligation as well as within the EU ETS at EU level (Swedish Energy Agency 2019: 48). While these laws share the characteristics of being formal institutions, they differ from the legislation above by being applied as policy instruments to promote the use of renewable energy (Boasson et al. 2021; Johansson 2022: 1159, 1173, 1176). In this respect it was a synergy between the requirements in the RED 2 and the policy instruments used in Sweden applied to increase the use of renewable energy. For this case, the synergy was established as the policy instruments involved regulation regarding the use of sustainability criteria.

Additionally, the SEA informed that that the government agency published supporting documents for relevant actors. These guidelines, however, were not legally binding but aimed to support actors to apply reporting systems for biofuels and thus complement the legislation above (Swedish Energy Agency 2019: 36–

37). As these guidelines were not formally decided, it can be viewed as an informal institution, conceptualized as organizational work, which supported relevant actors to follow the legislation regarding sustainability criteria (Lowndes & Roberts 2013). Another informal aspect includes the reporting system within the Swedish forestry sector. In the report, the SEA explained that forestry products constituted the largest share of the solid biofuels which also was used in industry, district heating system and electricity production. The SEA described that control systems in this supply chain often was administrated by the economic association Biometria in which producers and consumers in the forestry sector were represented. For instance, Biometria measured forestry products in volume and weight which helped to document products in the supply chain (Swedish Energy Agency 2019: 26–28, 31).

This description provides examples of how organizational work enabled a control system in the use of bioenergy in Sweden. Both the published guidelines from the SEA as well as Biometria's administrative services can be viewed as informal practices which were applied to support practices the forestry sector. This can be associated with informal institutions which supported the implementation of the sustainability criteria (Lowndes & Roberts 2013). Altogether these perspectives are also associated with an institutional fit for the implementation of the RED 2 (Börzel & Risse 2003).

6.1.2 Government bill regarding sustainability criteria

In April 2021, the Swedish government presented a bill on legislative amendments regarding the use of sustainability criteria in Sweden. The bill proceeded from the SEA report and suggested among other an expanded use of sustainability criteria which would cover solid and gaseous biofuels used for fuels, electricity, heating and cooling. This was also described as the most significant changes introduced with the RED 2. Furthermore, the sustainability criteria covered both land criteria and requirements for reduced greenhouse gas emissions which aimed to ensure a sustainable production of bioenergy (Bill 2020/21:185: 24). By the adoption of the bill, the government suggested that Article 28 to 31 in the RED 2 would be implemented in Sweden (Bill 2020/21:185: 22).⁴

Focusing on the land criteria, the government described that the RED 2 had introduced these sustainability criteria to protect nature areas which contributed to biodiversity as well as carbon storage. Furthermore, the bioenergy production which negatively affected these areas were not allowed to be counted as sustainable and included in the renewable energy targets in the RED 2 (Bill 2020/21:185: 29–30). The bill therefore suggested legislative amendments

⁴ In addition to Article 30 described above, the other articles were titled: Article 28 *Other provisions on renewable energy in the transport sector*; Article 29 *Sustainability and greenhouse gas emissions saving criteria for biofuels, bioliquids and biomass fuels*; Article 31 *Calculation of the greenhouse gas impact of biofuels, bioliquids and biomass fuels* (Directive (EU) 2018/2001).

regarding sustainability criteria for forestry biomass used in biofuels. The government paid attention to Article 29.6 to 29.9 which built upon a risk-based assessment for the use of forestry biomass, which also categorized the EU member states into A or B alternatives. The assessment aimed to develop sustainable practices in the EU forestry sector and required the member states to document the production of forestry biomass. To be categorized as an A alternative, the member state would demonstrate how and where the biomass had been produced according to the sustainability criteria. If a member state could not live up to these conditions, the country was categorized as a B alternative instead by referring to relevant management systems and thus describe how the biomass was produced and lived up the same criteria (Bill 2020/21:185: 31–32).

The government explained that Sweden primarily used Swedish biomass for production of electricity, heating and cooling which also was regulated according to domestic forestry legislation and control systems. Therefore, the government suggested that Sweden lived up to the criteria in the RED 2 and would be categorized as an A alternative. Focusing on forestry legislation, the government highlighted that both the Swedish Forestry Act as well as provisions published by the Swedish Forest Agency regulated logging, reforestation and considerations for nature areas which were important for the biodiversity. As described in the bill, these laws were supervised by government agencies such as the Swedish Forest Agency and County administrative boards (Bill 2020/21:185: 32–34). In addition, the government highlighted administrative systems which helped to monitor practices in the Swedish forestry sector. The government referred to the Swedish University of Agricultural Sciences which since the beginning of the 20th century had done annual assessments of the Swedish forest. During these assessments, both land areas and forestry practices were documented and used in Sweden's official statistics to assess land conditions, productivity and other relevant conditions in the Swedish forestry sector (Bill 2020/21:185: 35). These empirics are related to what Johansson (2022: 1179) discusses regarding the research and development programs for bioenergy use in Sweden. In this particular case, these practices were held as ways to document and control Sweden's forestry sector and thus to fulfill the requirements in Article 29.6 to 29.9 in the RED 2.

The Swedish government held that the biofuels used for electricity, heating and cooling lived up to the sustainability criteria in the RED 2 and suggested an expansion of the current legislation according with the new formulations in the directive. Linking this discussion to the theoretical framework, we find that these sustainability criteria were explained by both formal and informal institutions (Lowndes & Roberts 2013). This suggests there was both a policy and institutional fit for Sweden's implementation of the RED 2 which also supports both hypothesis 1 and 2 (Börzel & Risse 2003).

6.2 Legislation regarding contact point and time limits for renewable energy

As part of Sweden's implementation of the RED 2, a new legislation was adopted which covered contact point and time limits for permitting processes for renewable energy. This process was initiated in May 2019, as the Swedish government commissioned the Swedish Environmental Protection Agency (SEPA) to investigate the conditions to implement Article 16 in the RED 2.⁵ The article focused on the permitting processes for production of renewable energy and the task included to investigate relevant contact points for these applications as well as time limits for the processes (Swedish Government 2019b). When the SEPA had presented its report, the government presented a bill on legislation regarding contact point and time limits for the permitting processes which then was adopted in the Swedish parliament in June 2021 (SFS 2021b).

6.2.1 Report from the Swedish Environmental Protection Agency

In the SEPA report it was suggested that Sweden would adopt new legislation regarding contact points to fulfil Article 16 in the RED 2. According to the SEPA, it was possible to implement Article 16 by establishing websites where administrative services would be provided for applications. It was suggested that these websites could facilitate digital applications as well as providing information and guidance in the permitting processes (Bill 2020/21:181: 23–24).

The government agency noted that different renewable energy sources and facilities were relevant for the Article 16 which, in turn, included different legislations for permitting processes such as environmental assessments and building permit. Additionally, it was suggested that different government agencies at municipality, regional and national level would be involved in these processes and therefore relevant as contact point depending on the renewable energy facility (Bill 2020/21:181: 23–24). Therefore the SEPA suggested that the contact point would be categorized according to the following areas of responsibility: technology, information, and operations. The first categorization included the government agency which was responsible for the digital and overall coordination of the permitting processes. The second included relevant government agencies which provided information and services during the process. The last categorization included the government agencies which assessed and eventually decided on the permitting application (Bill 2020/21:181: 25).

⁵ In the RED 2, Article 16 was titled *Organisation and duration of the permit-granting process* and covered the permitting of renewable energy projects in the EU member states. This article included references to accessible and simplified permitting processes for production of renewable energy, for instance by the use of time limits and contact points which should administrate and simplify the application procedures (Directive (EU) 2018/2001: 34–35).

Other aspects in the report focused on the time limits for the permitting processes. The SEPA noted that the RED 2 introduced time limits for permitting processes between one and two years and suggested it was relevant to decide upon plans for these time limits, especially for relevant government agencies which were responsible for handling the applications (Bill 2020/21:181: 26–27).⁶ The government agency suggested that it was appropriate with a general sectoral legislation which would inform about the contact point, its responsibilities as well as time limits for the permitting process. It was described that the legislative changes could bring more accessible and effective application procedures which would be beneficial for smaller actors and potentially lead to an increased number of applications (Bill 2020/21:181: 27–28). This is a relevant notion from an institutional fit perspective, as it was discussed that the implementation of the Article 16 would therefore benefit the production of renewable energy. This can be associated with Knill & Lehmkuhl (2002) who suggest that the implementation of an EU directive can influence domestic normative structures. For this particular case, it can be suggested that the RED 2 introduced positive influence on the expansion of renewable energy facilities, particularly for smaller actors.

At the same time, however, the SEPA suggested that other aspects already were fulfilled in Sweden with respect to Article 16. This was the case for simplified application procedures for small scale renewable energy facilities, for example with respect to solar and wind power plants. It was suggested that these facilities required permission according to the Swedish Planning and Building Act which according to the SEPA covered and fulfilled the requirements for simplified application processes (Bill 2020/21:181: 27). With respect to small scale renewable energy facilities we can therefore find support for a policy fit between the formal institutions in Sweden and time limits for permitting processes in the RED 2 (Börzel & Risse 2003).

6.2.2 Government bill regarding contact point and time limits for permitting processes

In April 2021, the Swedish government presented a bill which suggested new legislation regarding contact point and time limits for permitting processes for renewable energy in Sweden. In the bill, it was suggested that the government would be authorized to share provisions regarding the contact point and time limits for permitting processes. Thus the government followed the suggestion from the SEPA and supported a general sectoral legislation to implement Article 16. Importantly, the bill focused on provisions for municipalities regarding their involvement in the establishment of a contact point, mainly in terms of a website (Bill 2020/21:181: 8–9, 12–13).

⁶ In the RED 2, the time limit for permitting processes was one year for renewable energy facilities with production capacity below 150 kW, while the time limit was two years for facilities with higher production capacity (Bill 2020/21:181: 8).

One important aspect in the bill concerned time limits for permitting processes of production of renewable energy. In the text, the government discussed how administrative procedures could be shortened and thus make the time limits for applications more efficient. It was highlighted that shortened time limits were applied in Sweden, mainly in environmental assessments and building permit applications. It was also suggested that time limits for one respectively two years, depending on the renewable energy facility as also formulated in the RED 2, should be implemented in Sweden (Bill 2020/21:181: 10).

At the same time, however, the government held that it was not appropriate to adopt even shorter time limits, although this could have improved the implementation of the RED 2. With respect to time limits in the permitting processes, the government reasoned that there were other policy instruments that were potentially more efficient for increasing the production of renewable energy and help Sweden to reach its objectives in this area. For instance, it was highlighted that effective permitting processes were dependent on factors such as knowledge during the application process. Moreover, it was held that shortened time limits could challenge the economic competition as well as potentially lead to inefficient use of resources. Lastly, the government reasoned regarding the potential trade-off between shortened permitting processes, on the one hand, and environmental protection on the other. The government described that public inquiries were in place which investigated the conditions for effective permitting processes while also considering environmental values (Bill 2020/21:181: 10–11).

Focusing on the time limits, Sweden decided to implement Article 16 by one respectively two years as also formulated in the RED 2. However, it is relevant to note that there was a discussion regarding even shorter time limits and its effects. As presented in the bill, the government provided perspectives on the time limits used to increase the production of renewable energy and it was suggested to await the findings from public inquiries before implementing shorter time limits (Bill 2020/21:181: 11). This discussion can be associated with an implementation cost (Duina 1997), where the government evaluated different strategies and effects when implementing shortened time limits, for instance by discussing the market competition and effective use of resources.

By the government bill, a new legislation regarding contact point and time limits were adopted in Sweden which was formulated on the basis of the SEPA report. It is relevant to highlight that compared to the legislative amendments in section 6.1, this government bill introduced a new form of legislation with respect to renewable energy. This can be viewed as an event of Europeanization as discussed by Börzel (1999), where for this case the RED 2 led to new legislation in the field of climate and energy governance. This implementation is also associated with both a policy and institutional fit, as both the SEPA and the government supported the legislation with references to Sweden's legislation and its assumed positive effects for permitting processes (Börzel & Risse 2003).

6.3 Legislative amendments regarding guarantees of origin

In March 2022, a third bill was initiated by the Swedish government as a result of the RED 2 which focused on the use of guarantees of origin in the production of gas, cooling and heating.⁷ The bill proceeded partly from the same commission to the SEA presented in section 6.1., where the SEA also was commissioned to evaluate whether it was required to adopt new legislation for the provision of guarantees of origin. More specifically, the government agency was commissioned to evaluate the provision of guarantees of origin for the production of electricity and for non-renewable energy sources (Swedish Government 2019a). After the SEA published its report and the government bill was presented, legislative amendments regarding the provision of guarantees of origin were adopted by the Swedish parliament in May 2022 (SFS 2022).

6.3.1 Report from the Swedish Energy Agency

The SEA report suggested that guarantees of origin for production of electricity, gas, cooling and heating would be structured in the same administrative system (Swedish Government 2021: 37). Furthermore, it was suggested that guarantees of origin would be revised to align with the energy standard EN16325 at EU level. According to the SEA, these amendments would enable electricity which was produced in Sweden to be recognized by international actors (Swedish Government 2021: 38).

The SEA explained that since August 2019, regional blockades had been applied in the Belgian region Flanders where specific guarantees of origin for electricity produced in Sweden were not allowed in the power grid. The government agency highlighted that Sweden deviated from other EU countries in terms of guarantees of origin, which was explained by Sweden's energy norms. The government agency explained that it was a common practice for large scale electricity consumers in Sweden, such as in pulp and paper industry, to consume electricity where it also was produced. This led Sweden to apply a distinct form of guarantees of origin which were relevant for these actors. However, the SEA highlighted that without making amendments regarding these guarantees, both Swedish electricity producers as well as the overall confidence in the system could be affected negatively. Therefore the government agency suggested that Sweden would adjust its use of guarantees of origin according to Article 19 in the

⁷ In the RED 2, guarantees of origin were defined as an electronic document used for buyers and sellers to inform how much of energy that had been produced from renewable energy sources (Directive (EU) 2018/2001: 21).

RED 2 and thus align with energy standards at EU level (Swedish Government 2021: 38–39).⁸

This description highlights a relevant notation with respect to institutional fit between Sweden’s energy systems and the RED 2. First, we can view the Swedish guarantees of origin as a result of a domestic energy norm which was applied for domestic production and consumption of electricity which, in turn, can be associated with an informal institution (Lowndes & Roberts 2013). Secondly, when focusing on the implementation of the RED 2 we can observe an adaption pressure between Sweden’s guarantees in domestic electricity production and its recognition on the EU electricity market (Börzel & Risse 2003). This reasoning is also supported since the SEA recommended legislative amendments to not jeopardize the domestic electricity market. This also highlights an event of Europeanization, where Sweden’s production and consumption of electricity was redefined with respect to EU energy standards (Börzel 1999). In this respect, the RED 2 introduced an Europeanization regarding the provision of guarantees of origin in Sweden.

6.3.2 Government bill regarding guarantees of origin

In March 2022, the Swedish government presented a bill with respect to the legislation regarding guarantees of origin in Sweden. The bill aimed to implement Article 19 in the RED 2 and introduced legislative amendments regarding guarantees of origin for gas, cooling and heating. In the bill it was suggested that producers of gas, cooling and heating would be granted guarantees of origin similar to other producers of electricity in Sweden (Bill 2021/22:147: 1). The government concluded that these amendments could enable a more efficient control system for the guarantees and thus potentially lead to an increased demand for renewable energy (Bill 2021/22:147: 22).

While the RED 2 in general terms aimed to increase the use of renewable energy in the EU, the government bill regarding guarantees of origin included gas, cooling and heating from non-renewable energy sources. The government highlighted that Article 19.2 in the RED 2 required an expansion of the current system, where guarantees of origin would include producers of gas, cooling and heating using both renewable and non-renewable energy sources. Additionally, it was informed that guarantees of origin previously had been provided for non-renewable energy, such as nuclear energy. The government informed that a large share of the Swedish energy mix, such as the district heating system, was using bioenergy which was classified as a renewable energy source. Furthermore, during the time there was also import and use of non-renewable energies, mainly

⁸ In the RED 2, Article 19 was named *Guarantees of origin for energy from renewable sources* and aimed to regulate the provision of renewable energy in the EU and set rules for how energy was calculated and documented as renewable. The article also referred specifically to the energy standard EN16325 and required the member states to adapt policies which conformed to the standard (Directive (EU) 2018/2001: 36–38).

in the form of natural gas. The government therefore suggested to implement the article by including also gas, cooling and heating which used non-renewable energy (Bill 2021/22:147: 11–12).

When suggesting the legislative amendments for the guarantees of origin, the government referred to both domestic and EU legislation. First, it was described that guarantees of origin were regulated in the Swedish Electricity Act as well as the law regarding guarantees of origin for electricity. Secondly, the government referred to both the RED 1 from 2009 and the Energy Efficiency Directive from 2012, which both had been implemented in Sweden and regulated the use of guarantees of origin (Bill 2021/22:147: 9). In this respect it is found that Sweden applied both domestic and other EU legislation which were consistent with the use of guarantees of origin, which also suggests there was a policy fit in the implementation of Article 19 in the RED 2 (Börzel & Risse 2003). Here we also find a similarity with section 6.1 since both bills introduced legislative amendments for already established legislation.

In the government bill it was highlighted that guarantees of origin were used on both national and international markets. For instance, the government noted that internationally recognized guarantees were controlled and documented by the European Energy Certificate System and were transferred to members in the Association of Issuing Bodies, which consisted of companies and government agencies in the EU (Bill 2021/22:147: 13). Another relevant aspect is how the guarantees of origin were standardized at EU level. The government highlighted that Article 19 in the RED 2 introduced the energy standard EN16325, which aimed to standardize the guarantees of origin for electricity in the EU. The standard had been active from 2013 and with the adoption of the RED 2 it was mandatory to follow the regulation which also covered gas, cooling and heating. However, the government described that there were ongoing discussions in the EU regarding how the standard would be defined and what technical aspects it would include, for instance regarding measurement, registration and transfers. During the time of the bill, it was still undecided on these aspects and it was uncertain when the standard would be formally decided (Bill 2021/22:147: 10).

The standardization process regarding the EN16325 suggests that Sweden's implementation of the RED 2 was dependent on additional negotiations at EU level. As noted above, during the adoption of the government bill it was still undecided how this standard would be adopted which suggests that the implementation process became prolonged. These empirics also relates to Europeanization as a top-down process (Börzel 1999; Börzel & Risse 2003), where the content in the RED 2 was discussed on technical level in the EU after its adoption. Altogether this nuances the assessment of policy and institutional fit as it indicates that the implementation depended on policy implementation at both national and EU level.

6.4 Sweden's renewable energy sector and the implementation of the RED 2

Previous sections have accounted for the legislative amendments that were implemented in Sweden with respect to the RED 2. The sections have provided both descriptive and explanatory perspectives on the implementation as well as its connection to policy and institutional fit. In this section I analyze the interview responses which are structured in subsections according to the thematic analysis described in section 5. The subsections cover different aspects of the implementation process including Sweden's renewable energy mix, legislation, policy instruments and routines which are analyzed by the theoretical framework of policy and institutional fit.

6.4.1 Renewable energy in Sweden

When discussing Sweden's implementation of the RED 2 it is first relevant to cover Sweden's general climate and renewable energy targets. Some interviewees highlight that Sweden over time has pursued ambitious targets in its climate and renewable energy policy. One interviewee describes that around 2018 when the RED 2 was adopted at EU level, Sweden was a forerunner in the area of climate policy (IP 2). At the same time, it is noted that the EU in recent years has adopted sharpened climate legislation which have required Sweden to aim for more ambitious policies in renewable energy (IP 2, 4, 5, 6, 13).

Relating this to Sweden's implementation of the RED 2, interviewees describe that Sweden's ambitions on a general level were similar to the ones formulated in the directive. One representative from a government agency in Sweden explains that "the Renewable Energy Directive has not pushed for [...] something different compared to the Swedish ambitions and targets" (IP 7). In this case the climate and energy targets constitute a renewable energy norm and thus informal institution which was consistent with the targets in the RED 2 (Lowndes & Roberts 2013). This also implies that there was an overall institutional fit between the RED 2 and Sweden's climate and energy targets (Börzel & Risse 2003).

This reasoning is also supported when observing climate and renewable energy targets at regional level. IP 3 explains that renewable energy targets at regional and municipality level have aimed to be more concrete and ambitious than the one stated in EU directives and national targets. Furthermore, IP 13 explains that regional authorities have decided to have even higher climate targets compared to the ones in the RED, for instance by increasing the use of solar power. This suggests that there was an institutional fit at both regional and national level in Sweden which also strengthens hypothesis 2 (Börzel & Risse 2003).

To further understand Sweden's implementation of the RED 2 it is necessary to account for Sweden's renewable energy mix. Some interviewees refer to the district heating system as a distinct way to organize Sweden's energy provision (IP 1, 6, 8, 9, 11). One interviewee informs that the district heating over time has provided energy for both cities and industries in Sweden and has thus played a central role for the energy system (IP 1). It is also described that the district heating has been dependent on the use of bioenergy. For instance, one interviewee with experience in bioenergy explains that forest material have been used as residual heat in the district heating (IP 12). This is also held as one key factor for Sweden's relatively high use of renewable energy in the country's district heating system (IP 1, 8, 9, 12).

Another aspect of Sweden's renewable energy mix is the use of biofuels in the transport sector. For instance, companies in public transport have increased the use of hydrotreated vegetable oil, which for example has been based on residual products from the agricultural and forestry sector, which also has led to an increased use of renewable energy in transport fuels (IP 6). Additionally, it should be noted that also other renewable energy sources constitutes Sweden's renewable energy mix. For instance, since 2018 there has been an expansion in the production of wind power (IP 5). This trend is also observed at regional level in Sweden where the share of both solar and wind power has increased with new projects (IP 3, 13).

Previous sections have accounted for the climate and renewable energy targets in Sweden as well as perspectives on Sweden's renewable energy mix. With respect to the RED 2, the interviewees highlight different articles in the directive as new form of legislation. First, interviewees describe that the introduction of energy communities in the RED 2 was a new formulation which partly has been implemented in Sweden (IP 3, 4). IP 3 explains that it is possible to run an energy community in Sweden, but that there are no concrete incentives in place to support these. However, the energy communities, which aim to support the production and consumption of renewable energy by local initiatives, have been formulated in related EU directives such as the Electricity Market Directive and was not implemented in the legislative amendments discussed in section 6.1 to 6.3. Turning to other sectors, one interviewee highlights that the question of time limits and contact point for permitting processes were new formulations in the directive (IP 2). Additionally, interviewees describe that the formulations regarding sustainability criteria and guarantees of origin were important aspects in the directive which meant an expanded regulatory framework for the use of bioenergy (IP 1, 7, 12). These interview responses generally cover the same articles that were discussed by the legislative amendments in section 6.1 to 6.3, which indicates there is a coherence between the empirics regarding what aspects of the RED 2 that were of relevance for the implementation process.

Focusing especially on the bioenergy sector, it should be noted that the RED 2 came with implications for Sweden's renewable energy mix. Several interviewees highlight that there have been different opinions at EU level regarding how bioenergy should be classified and documented as sustainable (IP 1, 3, 6, 8, 11, 12, 13). This is also applicable for Sweden's energy sources, such as the forestry

sector, where there have been different views on whether forests should be used for energy and industry or restored to fulfil biodiversity targets (IP 13). Relating this to the RED 2, one interviewee describes that “[the RED 2] has not resulted in any absolute restrictions but has not supported the bioenergy sector either” (IP 1). Interviewees also highlight that the adoption of sustainability criteria and guarantees of origin has led to an increased awareness for both producers and consumers of bioenergy in Sweden, for instance regarding the sustainability control of bioproducts (IP 8, 9, 11). Additionally interviewees explain that the EU negotiations about the RED 2 could have resulted in stricter rules regarding production and consumption of bioenergy, for instance regarding what type of material that should be allowed in bioenergy production (IP 7, 8).

While the beginning of section 6.4.1 found that there was an institutional fit between the RED 2 and Sweden’s climate and renewable energy targets, a more nuanced assessment can now be made when looking at specific renewable energy sectors. The interview responses suggest that EU regulation over time has resulted in rules for the bioenergy sector which in broader terms regulate Sweden’s renewable energy mix and use of bioenergy in central energy systems. This is a relevant perspective as it suggests that RED 2, as part of EU climate and energy regulation, has influenced Sweden’s renewable energy norm and reliance on bioenergy use. This can also be viewed as an event of Europeanization as the directive has regulated a relatively strategic energy sector for Sweden and defined how bioenergy practices were considered sustainable and legitimate (Börzel 1999; Olsen 2002). This is also related to Knill & Lehmkuhl (2002: 257) who suggest that EU legislation can influence normative structures, which in this case means that the RED 2 has influenced and regulated Sweden’s conditions for energy politics.

6.4.2 Legislation in Sweden

When discussing Sweden’s implementation of the RED 2, interviewees highlight different aspects that were relevant for the implementation process. Regarding legislation in general terms IP 13 describes: “in my experience there have been synergies between the RED and our climate legislation in Sweden”. With respect to the bioenergy sector, interviewees describe that there have been different legislation in place which enabled the implementation of the RED 2. For instance, IP 8 explains that Sweden has legislation which have regulated and controlled the forestry supply chain. Also IP 7 shares the view that there have been synergies between Sweden’s legislation and the RED 2 and adds that the implementation of the sustainability criteria and guarantees of origin mostly concerned practical issues, such as how actors would be affected by the expanded legislation. The implementation of the RED 2 has therefore had a relatively limited impact on the use of bioenergy in Sweden since it was possible to integrate the directive in Swedish legislation (IP 1, 8, 12). This suggests that formal institutions have enabled a relatively cost-effective implementation process (Duina 1997), which were consistent with the formulations in the RED 2. Together this strengthens

hypothesis 1 that the RED 2 has been implemented according to a policy fit (Börzel & Risse 2003).

However, turning to other renewable energy sectors it is possible to present a more nuanced assessment of the implementation process. Some interviewees refer to the permitting processes in Sweden which sometimes have prolonged the development of projects in wind power and hydropower (IP 2, 6, 10, 13). One interviewee describes that legislation, such as environmental impact assessments, have been applied when planning for wind power plants which also have included public authorities such as the Land and Environmental Court (IP 2). Relating this to the implementation of the RED 2, these factors have led to prolonged processes and increased the investment costs for renewable energy projects. In this respect, these legislative processes have hindered an increased production of renewable energy in Sweden (IP 10).

This is a relevant perspective to consider as it suggests that there have been parts of the Swedish legislation that have prolonged the establishment of expanded renewable energy use. As these legal aspects refer to formal institutions established in Sweden, it can be viewed as a policy misfit for the implementation of the RED 2 (Börzel & Risse 2003; Lowndes & Roberts 2013). This reasoning is also related to what was discussed in section 6.2, where the Swedish government reasoned regarding the potential effects of shortened time limits for permitting processes. As noted in section 6.2, however, Sweden implemented the time limit of one to two years for these procedures as also formulated in the directive.

Previous paragraphs have discussed Sweden's legislation and its relation to the RED 2. On this subject, interviewees also refer to other EU directives which regulate the use of renewable energy. IP 5 describes that around 2018, when the RED 2 was adopted together with other EU legislation in the Clean Energy For All Europeans package, several government agencies were commissioned to investigate the conditions for implementing the directives. Some interviewees describe that the RED 2 in general has been linked to both the Energy Efficiency Directive, which has aimed to improve the efficiency in the power grid, and the Electricity Market Directive which has aimed to improve the competition and transparency on the electricity market (IP 2, 3, 13). Turning to specific sectors, IP 4 explains that the Electricity Market Directive has been relevant as it has improved the conditions for establishing solar power projects. Furthermore, IP 10 describes that the Water Framework Directive has been of relevance for the hydropower sector as it has regulated the water management. Moreover, interviewees with experience in bioenergy refer to EU legislation regarding, for instance, land use which have regulated the conditions for renewable energy projects (IP 1, 8). Interviewees also describe that the Clean Vehicles Directive has been of relevance for the bioenergy sector since it has formulated targets for biofuels used in transports (IP 11, 13).

This discussion highlights that the implementation of the RED 2 was dependent on other EU related directives. As for the case of solar power, there have been synergies between the RED 2 and the Electricity Market Directive which also have made the directives more useful together (IP 4). Other interviewees, however, describe that these connections have hindered the

development of renewable energy. For instance, one interviewee with experience in hydropower highlights that the implementation of the Water Framework Directive has been prioritized which has prolonged the expansion of hydropower projects (IP 10). Furthermore, in the bioenergy sector legislation regarding, for instance, land use change have resulted in new instructions for bioenergy practices which not always have been coordinated at EU level (IP 8, 9). Relating this discussion to the hypotheses assessed in this thesis, it suggests that both the policy and institutional fit for the RED 2 were dependent on the implementation of other EU legislation as part of the EU's climate and energy governance.

6.4.3 Policy instruments in Sweden

Several interviewees refer to policy instruments in Sweden which have been associated with the implementation of the RED 2. First, interviewees highlight that the Swedish electricity certificate scheme has been a useful policy instrument to support the expansion of renewable energy in Sweden (IP 1, 3, 5, 7). IP 1 describes that since the introduction of the scheme in 2003, the policy instrument has led to “substantial investments in both wind power and bioenergy” and thus supported the renewable energy provision in Sweden. Furthermore, IP 9 explains that the electricity certificate scheme has been the most prominent policy instrument between 2003 and 2020 to support the use of bioenergy in heating and electricity production. Secondly, interviewees refer to the Swedish carbon tax which since its adoption in 1991 has supported the use of renewable energy (IP 1, 6, 9, 12). IP 6 explains that the carbon tax was “an important factor why [Sweden] has changed the energy systems to use more of renewable energy”. IP 9 adds that the carbon tax has increased gradually which has enabled actors to adapt to the policy instrument.

Additionally interviewees highlight the EU ETS which since its introduction in 2005 has constituted a market for trading of carbon emission allowances in the EU. For instance, the EU ETS is held to be a cost-effective policy instrument which has promoted market based solutions to climate and energy projects, such as the expansion of renewable energy power plants (IP 1, 5, 7, 9). IP 7 describes that the EU ETS has been a good example of when the EU has supported the green transition by reducing costs at EU level rather than on national level which, in turn, has created more efficient solutions.

Interviewees highlight that these are policy instruments which have been applied in Sweden before the adoption of the RED 2. In this respect formal institutions, here conceptualized by policy instruments, have generated an expansion of renewable energy in Sweden which supports hypothesis 1 (Lowndes & Roberts 2013). However, a distinction should be made between the policy instruments at domestic and EU level. The electricity certificate scheme and the carbon tax have been domestic policy instruments which have been adopted by domestic political decisions and priorities (Boasson et al. 2021; Hildingsson & Knaggård 2022). The EU ETS, on the other hand, has been a policy instrument adopted at EU level and over time connected economic actors on the EU market

(Johansson 2022: 1159, 1173). In this respect, formal institutions at both domestic and EU level supported the implementation of the RED 2.

6.4.4 Routines in Sweden

Interviewees with experience in bioenergy highlight the role of Biometria as an important factor for Sweden's control systems in forest management. Interviewees explain that Biometria has enabled a traceability in the forestry sector which helps to control and document the forest products used for bioenergy (IP 1, 12). In addition, one interviewee highlight the role of research programs which have improved the knowledge and traceability systems in forestry supply chains (IP 8). Altogether these empirics support the finding that informal institutions, here conceptualized as organizational work, supported the implementation of sustainability criteria in the RED 2.

Furthermore, the interviewees describe that during implementation process it has been a dialogue between different actors to make the implementation cost effective. First, different government agencies have been involved to discuss relevant legislation and share data which have been applicable for the directive (IP 7). Secondly, dialogues have been organized between government agencies and interest organizations where potential challenges with the implementation process have been discussed. This was for instance the case for the sustainability criteria and guarantees of origin in the bioenergy sector and how the new legislation would be interpreted in Sweden (IP 1, 8, 9, 12). IP 1 describes that these forums were established already during the implementation of the RED 1 where representatives from government agencies and private organizations "met and discussed the implementation of the sustainability criteria".

These empirics illustrate that informal institutions, again conceptualized as organizational work, have been applied with respect to the implementation of the RED 2 (Lowndes & Roberts 2013). It is relevant to highlight that these dialogues have involved both public and private representatives to share relevant data and experiences with respect to the implementation process. As noted, these dialogues have aimed to implement parts of the directive in a cost-effective manner which is also an expected behavior when implementing EU legislation (Duina 1997; Sverdrup 2008). It also supports the "institutionalized collaboration" discussed by Johansson (2022: 1168) where, in this case, different policy actors have been involved to discuss and support the implementation of the directive. Together these empirics strengthens hypothesis 2 that the implementation of the RED 2 has been consistent with an institutional fit (Börzel & Risse 2003).

7 Discussion

This section presents a discussion of the analysis and is divided in two subsections. The first section summarizes the findings and evaluates the hypotheses introduced for the analysis. The second section relates the findings to previous literature and discusses its implications for domestic institutions and the implementation of EU directives.

7.1 Assessment of the hypotheses

The analysis indicates that both formal and informal institutions have been applied during Sweden's implementation of the RED 2. Starting with formal institutions, the analysis shows that Sweden applied domestic legislation which shaped conditions and legislative capability to implement the directive. This legislation were mainly including energy and environmental laws where Sweden fulfilled relevant aspects of the RED 2. These findings are also consistent with the notion that Sweden over time has been relatively converged with EU legislation (Nilsson 2011). Furthermore, the analysis found that policy instruments such as the carbon tax, the electricity certificate scheme, emission reduction obligation and the EU ETS has been applied for the renewable energy sector and enabled the implementation of the directive. Altogether, these findings support the first hypothesis that the RED 2 has been implemented according to a policy fit (Börzel & Risse 2003).

At the same time, the analysis found evidence where formal institutions have hindered the expansion of renewable energy and thus partly prolonged the implementation process. This was the case for environmental assessments as found in section 6.4.2 where legislative procedures made it more difficult to expand the use of renewable energy. Additionally it was found that other EU legislation regarding land use have hindered expansion of the bioenergy production. These can be seen as formal institutions which together have prolonged the implementation of the RED 2. Together these empirics also nuances the assessment of the policy fit hypothesis.

The analysis also shows that informal institutions have been applied during the implementation. Firstly, the analysis found that organizational work has been established which has consisted of both collaboration between public and private representatives as well as research and development practices, particularly in the field of forestry control systems. These results also support the "institutionalized collaboration" as discussed by Johansson (2022: 1168), where different actors have participated during the implementation of sustainability criteria and

guarantees of origin. Secondly, the renewable energy norm has enabled Sweden to have a relatively high use of renewable energy in central systems such as district heating. Additionally, it was found that there has been a consistency between Sweden's national and regional targets and the one stated in the RED 2. These findings suggest that the RED 2 has been implemented according to an institutional fit which strengthens the second hypothesis (Börzel & Risse 2003).

However, the analysis also found oppositions for this norm when focusing on the bioenergy sector. Interviewees noted that the RED 2 had introduced regulation for the bioenergy sector which illustrated oppositions at the EU level regarding sustainable use of bioenergy. This result highlights that while the RED 2 in general has been consistent with Sweden's renewable energy norm, the directive has also challenged how bioenergy is perceived as a sustainable and legitimate renewable energy source. Therefore, as similar to the discussion above, we thus find a nuanced assessment of the institutional fit hypothesis (Börzel & Risse 2003).

Altogether we find support for both formal and informal institutions which have been applied and consistent with the implementation of the RED 2. These findings support the general argument that implementation of an EU directive depends on the fit with domestic institutions (Börzel & Risse 2003). The findings are also consistent with the notion that Sweden traditionally conform with EU directives (Falkner et al. 2007). However, the analysis has identified both supporting and constraining factors during the implementation process which extends the understanding regarding domestic institutions and the implementation of EU directives.

7.2 Broader implications of the findings

The previous section summarized the findings and found general support for the policy respectively institutional fit hypothesis. This suggests that the domestic institutional framework matters when explaining the implementation of an EU directive. Building upon these findings it is possible to discuss broader implications for domestic institutions and implementation.

A first notation refers to the sectoral variation that has been analyzed. The analysis found that three legislative processes were adopted which introduced legislative changes for different energy sectors in Sweden. For the sustainability criteria, the legislation covered the bioenergy sector and introduced, for instance, land criteria and requirements for reduced greenhouse gas emissions for forestry biomass. For contact point and time limits in permitting processes, this led to a general sector legislation which did not explicitly aim to cover a specific sector. Lastly, for the guarantees of origin the legislative amendments included non-renewable energy sectors involved in production of gas, cooling and heating. Thereby, the RED 2 has introduced legislative changes for different renewable and non-renewable energy sectors.

Furthermore, the analysis shows that institutions have been applied differently depending on the renewable energy sector that is studied. The analysis found that

a majority of the organizational work, such as collaboration as well as research and development practices, was found with respect to the bioenergy sector. This could indicate that informal institutions are especially developed in this sector which, in turn, may be explained by its relatively strategic importance for Sweden's renewable energy provision. Given the debate regarding sustainable practices in the bioenergy sector, this could also explain the relatively high level of collaboration in this area during the implementation (cf. Johansson 2022).

These points suggest that the implementation of the RED 2 is characterized by a sectoral variation. This thesis understood implementation as "the processes through which European norms are transposed, adhered to and enforced at the domestic level" (Sverdrup 2008: 197). By summarizing the results above we find that this process may influence sectors differently depending on the legislation and objectives introduced in the directive. Departing from this definition, it can therefore be suggested that implementation is a relative concept which needs to consider different sectors and their specific conditions.

While considering the importance of sectoral perspectives, it should be noted that other empirical data could have revealed other findings. For instance, another sample of interviewees with different industrial, regional or political experiences could have provided other data which either strengthened or weakened the hypotheses. I would argue, however, that the sample of interviewees still provides information which have been useful to evaluate the hypotheses in a more nuanced way. By using both policy documents and interviews, the analysis also shows that the material in practice confirm and complement each other during the analysis.

The analysis identifies an important time perspective which is applicable when discussing domestic institutions. The analysis found that policy instruments during the implementation had been in place during a relative long period. This was the case for the carbon tax from 1991 and the electricity certificate scheme from 2003. The similar time perspective was found for the informal institutions. For instance, it was found that research and development practices, such as the annual forestry assessment made by the Swedish University of Agricultural Sciences, had been in place from beginning of the 20th century. For other institutions, such as collaboration meetings with respect to sustainability criteria and guarantees of origin, some of these were initiated in 2009 as result of the implementation of the RED 1. In this respect, we find a time variation both between and within the institutions and how they were applied with respect to the implementation of the RED 2.

Furthermore, the analysis identified a complexity in renewable energy governance which has both supportive and constraining influences during the implementation. Previous research has analyzed the interconnection between climate and energy governance in the EU which relates to both thematic and decision making levels (Szulecki et al. 2016; Solorio & Jörgens 2020; Oberthür & von Homeyer 2023). Relating to these findings, the analysis shows that the implementation of the RED 2 was dependent on other EU related legislation, such as the Electricity Market Directive, the Water Framework Directive or legislation regarding land use. It was found that these directives either have supported or hindered the use of renewable energy in Sweden and thus influenced the

implementation of the RED 2. This implies that there is a legal complexity when studying implementation in renewable energy which links thematic areas of energy, environment and climate. These results are also associated with Europeanization, where it can be suggested that the RED 2 has introduced both supporting and constraining expectations on renewable energy in Sweden (Knill & Lehmkuhl 2002; Olsen 2002). Furthermore, these results support and nuance the understanding of EU's influence in Sweden's energy sector (cf. Åstrand 2005; Nilsson 2011).

The findings also indicate that Sweden's implementation of the RED 2 has been dependent on decision making at EU level. For instance, it was found that guarantees of origin continued to be negotiated at EU level after the implementation of the RED 2 which prolonged the implementation. Additionally, when focusing on the bioenergy sector interviewees explained that negotiations regarding the RED 2 could have resulted in more strict regulation regarding the production and use of bioenergy. Therefore, explanatory factors such as interests and decision making at both the domestic and EU level need to be considered when analyzing implementation.

Lastly, it should be noted that implementation is a broad concept that involves different stages in the policy process. While this thesis has analyzed how institutions can be used to describe and explain the implementation of the RED 2, it can be criticized for not considering the level of compliance and potential deficit in Sweden with respect to the directive. As noted by Sverdrup (2008: 206–207), literature on implementation can consider the performance, compliance and deficit with respect to EU legislation. For this thesis, such analysis could have provided a more comprehensive understanding regarding the effect of domestic institutions with respect to the requirements in the RED 2. However, the aim of this thesis has been to analyze the factors applied during the implementation process and not to evaluate the potential implementation deficit.

8 Conclusion

8.1 Summary of the thesis

This thesis has investigated Sweden's implementation of the RED 2 and has provided descriptive and explanatory perspectives on the process. The analysis draws upon institutionalism and Europeanization and suggests that Sweden's implementation of the directive can be explained by domestic institutions. These findings have been presented by using empirical data from both policy documents and semi-structured interviews.

The analysis has aimed to answer two research questions. The first research question asked how the directive has been implemented in Sweden and focused on descriptive explanations. The thesis concludes that three distinct measures have been applied in Sweden to implement the RED 2. These legislative changes covered 1) sustainability criteria for solid and gaseous biofuels used for fuels, electricity, heating and cooling, 2) contact point and time limits for permitting processes, and 3) guarantees of origin for gas, cooling and heating. Furthermore, the thesis concludes that these measures have either amended or established new legislation. For sustainability criteria and guarantees of origin the Swedish parliament amended established legislation. For the contact point and time limits, this process introduced new legislation which authorized the government to share provisions for municipalities with respect to permitting processes.

The second research question asked to what extent the implementation can be explained by Sweden's institutional framework. This thesis concludes that the implementation of the RED 2 overall can be explained by Sweden's domestic institutional framework. The analysis has distinguished between formal and informal institutions and operationalized these according to *legislation*, *policy instruments*, *organizational work* and *renewable energy norm*. The analysis shows that legislation, policy instruments and the renewable energy norm overall has been consistent and applied to the objectives in the RED 2. The analysis also shows that organizational work has been especially applied with respect to the bioenergy sector, where research and development practices as well as collaboration between actors have enabled the implementation.

These results indicate that domestic institutions can explain the implementation of an EU directive. The thesis thus contributes to previous literature by analyzing different domestic institutions which are applied during the implementation process. However, the analysis finds that certain formal and informal institutions have constrained the use of renewable energy in Sweden and

prolonged the implementation of the RED 2. The analysis also identified explanatory factors such as negotiations at the EU level which are important to consider for a more comprehensive assessment. In this way the thesis can be placed in a wider field of literature regarding domestic institutions and the implementation of EU directives.

8.2 Future research

This thesis contributes to literature on institutionalism, implementation and renewable energy policy and opens for future research in these areas. Firstly, future research can build upon the time variation and analyze how formal and informal institutions have developed over time in Sweden with respect to EU legislation. For instance, research can focus on specific renewable energy sectors in Sweden and in depth analyze how formal and informal practices evolve and correlate within these. This could provide relevant results regarding how institutions operate and varies over renewable energy sectors.

Secondly, future research can investigate theoretical perspectives to provide a more nuanced account of Sweden's implementation of the RED 2 and other EU directives. As suggested elsewhere, research can consider how the implementation can be explained by using rational choice or sociological institutionalism (Mastenbroek & Kaeding 2006). This research can provide further evidence on the intervening variables during implementation. Furthermore, it can provide insights regarding what actors that are involved during the implementation process and how this relates to agency and interests.

Lastly, to strengthen the generalizability of the findings future research can apply a methodological framework which considers cross case comparison. Focusing on Sweden, future research can compare the implementation of the RED 2 with other cases of EU climate and energy directives. Furthermore, research can investigate what similarities and differences that are found when comparing Sweden's implementation of the RED 2 with other EU member states with either similar and different legislative and organizational conditions. Altogether these suggestions are likely to provide a more comprehensive assessment of formal and informal institutions and their importance during the implementation of EU directives.

9 References

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Appendix 1 – Table of interviewees

Interview person (IP)	Role	Telephone/Teams, Date
IP 1.	Representative from interest organization in Sweden with experience in bioenergy.	Telephone, February 28 2024.
IP 2.	Representative from interest organization in Sweden with experience in wind power.	Teams, March 12 2024.
IP 3.	Representative from regional energy office in Sweden with experience in renewable energy.	Teams, March 13 2024.
IP 4.	Representative from interest organization in Sweden with experience in solar power.	Telephone, March 13 2024.
IP 5.	Representative from government agency in Sweden with experience in renewable energy.	Telephone, March 14 2024.
IP 6.	Representative from Swedish interest organization in Brussels.	Telephone, March 15 2024.
IP 7.	Representative from government agency in Sweden with experience in renewable energy.	Teams, March 18 2024.
IP 8, IP 9.	Representative from interest organization in Sweden with experience in bioenergy, Representative from interest organization in Sweden with experience in renewable energy.	Teams, March 20 2024.
IP 10.	Representative from interest organization in Sweden with experience in hydropower.	Teams, March 21 2024.
IP 11.	Representative from regional energy office in Sweden with experience in renewable energy.	Teams, March 26 2024.
IP 12.	Representative from interest organization in Sweden with experience in bioenergy.	Teams, March 26 2024.
IP 13.	Representative from regional energy office in Sweden with experience in renewable energy.	Teams, April 4 2024.

Appendix 2 – Interview guide with code of conduct and questionnaire

Code of conduct

Albin Lagerlöf (uppsatsförfattare)
Intervjuguide

Masteruppsats i statsvetenskap
Lunds universitet

Intervjuguide

Etiska riktlinjer

Den här intervjun genomförs för att samla in material till min masteruppsats i statsvetenskap. Masteruppsatsen genomförs inom ramen för masterprogrammet i statsvetenskap vid Lunds universitet. Efter masteruppsatsen är examinerad kommer den laddas upp på *Lund University Publications Student Papers* där den är offentlig.

Min studie syftar till att analysera Förnybartdirektivet (Renewable Energy Directive) och dess implementering i Sverige samt effekter för svensk energisektor. Intervjupersoner till studien representerar både offentlig och privat sektor och bjuds in till intervju då de väntas ha erfarenhet och insikt om Förnybartdirektivet och förnybar energi i Sverige. Medverkan i intervjun är frivillig och anonym. Efter intervjun kommer svaren analyseras utifrån olika teoretiska perspektiv. De referat och citat som används från intervjun kommer mejlas till intervjupersonen för godkännande.

Genom att delta i intervjun ger intervjupersonen sitt godkännande till följande punkter:

- All medverkan i intervjun är frivillig och jag kan dra tillbaka min medverkan när som helst innan arbetet examineras.
- Jag är medveten om att svar under intervjun kommer publiceras i text och bli offentliga.
- Jag har blivit informerad om studiens och intervjuns syfte.
- Jag har blivit informerad om varför jag har blivit inbjuden till att delta i intervjun samt vad min medverkan innebär.
- Jag har blivit informerad om hur jag kontakta uppsatsförfattaren för att dra tillbaka min medverkan eller för att ställa frågor.

Questionnaire

Albin Lagerlöf (uppsatsförfattare)
Intervjuguide

Masteruppsats i statsvetenskap
Lunds universitet

Intervjufrågor

Inledning

- Studien och etiska riktlinjer presenteras med information om anonymitet och godkännande till medverkan.
 - o Förslag till pseudonym i uppsatsen.
- Fråga om godkännande till inspelning för transkribering.
- Eventuella frågor.

Huvuddel

1. Inledande frågor:
 - Kan du presentera er organisation och kort beskriva ert arbete?
 - Kan du beskriva hur EU-lagstiftning påverkar er verksamhet/Sveriges produktion och konsumtion av förnybar energi?
 - Av er erfarenhet, vad är de generella möjligheterna/utmaningarna med EU-lagstiftning inom svensk förnybar energi? (ex. inom ekonomi, miljö/klimat, övrigt)
2. Implementeringen av Förnybartdirektivet 2018–2023 (RED 2):
 - Var några frågor särskilt viktiga för er i Förnybartdirektivet som beslutades på EU-nivå 2018?
 - o Varför/varför inte?
 - Vad är era erfarenheter av implementeringen av Förnybartdirektivet i Sverige mellan 2018–2023?
 - o Vilka möjligheter/utmaningar har funnits i implementeringen av direktivet?
 - Har det funnits synergier/motsättningar mellan Förnybartdirektivet och andra lagar i Sverige/EU?
 - Har det funnits synergier/motsättningar mellan Förnybartdirektivet och andra styrmedel i Sverige/EU?
 - Av din erfarenhet, har synen på förnybar energi förändrats i Sverige i och med implementeringen av Förnybartdirektivet 2018–2023? (ex. inom ekonomi, miljö/klimat, övrigt)
 - Har samarbetet mellan svensk offentlig och privat sektor utvecklats/påverkats under implementeringen av Förnybartdirektivet 2018–2023?

Avslutning

- Var det några frågor som var särskilt viktiga för er i Förnybartdirektivet som beslutades på EU-nivå 2023 (RED 3)?
- Vilka möjligheter/utmaningar ser ni med EU-lagstiftning inom förnybar energi framöver?
- Skulle ni vilja se mer ambitiösa målsättningar på EU-nivå gällande mål för förnybar energi?
 - o Om ja, varför och på vilka sätt? Om nej, varför inte?
- Vill ni tillägga något som inte tagits upp? (ex. gällande Förnybartdirektivet, förnybar energi och/eller samarbetet mellan Sverige och EU)
- Finns det andra organisationer/personer som ni anser är relevanta för intervju till denna studie?

Intervjun avslutas

- Sammanfattning.
- Information om återkoppling för användning av referat/citat.
- Information om kontakt till uppsatsförfattaren vid frågor.
- Övriga frågor.
- Tack för din medverkan.