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*The effect of discourse networks on the leading  
support schemes for Renewable Electricity*

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## Abstract

An increasing number of organizations are forced or want to contribute to bringing down CO<sub>2</sub>-equivalent emissions by investing in electricity generation using renewable sources. Non-electricity businesses are entering this field without having necessarily the knowledge of how renewables have been supported in Europe in the past and what actors have been active in affecting policy governing this field. This lack of understanding can lead to only a select group of stakeholders to be involved in policy making which can decrease the public acceptance and the legitimacy of the decisions taken on European level.

Due to a lack of a clear overview in the literature, this research aimed to understand how different stakeholder discourses had led to the current framework of the European electricity market in general and more specifically to the current framework for support schemes.

The European framework in which support schemes had to function has been described by going through all the Renewable Energy Directives. In addition, the most common deployed support schemes between 1997 and 2018 have been introduced and explained. This information was subsequently used to create 6 concepts that identified actors could agree with or disagree with. The positions of the actors were identified by coding a database accessed through LexisNexis which resulted in discourse networks. Expert interviews and consultation documents functioned as validation of the analysis.

This has resulted in the identification of two main coalitions. The first coalition consisted of the renewable industry, environmental organizations and Member States who favored national Feed-in tariffs. The second coalition consisted of the electricity sector and green certificate interest groups who wanted to have market-based support schemes that functioned in harmonization throughout Europe. Insights from Advocacy Coalition Framework (ACF) and Punctuated Equilibrium Theory (PET) were partly confirmed in the sense that several coalitions were trying to have their preferred mean being mainstream in Europe. The end result can be explained by a hegemonic coalition, political feasibility and court cases. The gradual cost reduction of renewables and the increasing distortion of Feed-in tariffs has led to more market-based instruments in the final stage of the research period. Affecting European legislation has turned out to be extremely hard for organizations even when gathered together in coalitions. External influences seem to be necessary to really change the course in European legislation.

**Key words:** Renewable Energy Directive (RED), Support schemes, Feed-in tariffs (FiT), Tradable Green Certificates (TGC), Guarantees of Origin (GO), Discourse Network Analysis (DNA)

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## 1. Introduction

Reducing CO<sub>2</sub> equivalent emissions is vital in the fight against climate change and the European Environmental Agency (EEA) expects most reductions between 2020 and 2030 to occur in the energy industries (EEA, 2018a). The European Union (EU) distinguishes energy emissions in emissions from heating and cooling, electricity and transport, but this research focused solely on the European electricity market. Not only because the electricity sector is increasingly important due to the electrification of many processes including the heating sector (Heinen et al, 2018), but also as a way to demarcate the research.

The CO<sub>2</sub> intensity from electricity generation has come down from 523 grams of CO<sub>2</sub> per kWh in 1990 to 295.8 grams/kWh in 2016 (EEA, 2018b). This decrease is partly due to the substantial growth of the European renewable electricity market. Whereas in 2004 renewable sources contributed 14.3% to the total electricity generation, in 2017, this has grown to 30.7% (Eurostat, 2019). Countries that have large hydro potential such as Sweden and Austria increase the European average by having respectively 65,9% and 72.2% of their electricity generated with renewable sources in 2017. Flatter countries without hydro potential such as the Netherlands and Luxembourg only generated respectively 13.8% and 8.1% of their electricity with renewable sources in 2017 (Eurostat, 2019). However, the differences between all European countries cannot be fully put on hydro potential differences. Other renewable technologies such as wind power and solar power have developed greatly and the costs per kWh have come down as a result. The differences between all percentages in Europe can also be put on the different strategies European countries have used to promote the expansion of renewable electricity generation. Methods to make the investment in renewable production devices more attractive are called support mechanisms or support schemes and have a central place in this research.

According to Meyer (2003), the most common support schemes were feed-in tariffs, quota with tradable green certificates and tenders. For long, the feed-in tariff especially was seen as the holy grail for promoting the deployment of renewable electricity, but a recent policy trend is moving away from this type of support mechanism (Gauthier & Lowitzsch, 2019). According to the same report, the way renewable electricity was promoted in directive 2009/28/EC was too much focused on national support which made it incapable of interacting with other measures and market principles. This criticism is shared by the European Commission (2015a) who openly questioned the energy framework because it would consist of 28 national policies instead of a one European policy. Instead, the Commission called for a more integrated energy market that would result in more competition, higher efficiency through market expansion and affordable prices for consumers. Furthermore, they emphasize the core role of the citizens in the energy transition (European Commission, 2015b). The European Union launched the Energy Union in 2015, presented as the new start for the EU's energy policy. Main challenges are European system integration, renewable electricity investments, role of public institutions and public acceptance.

Throughout the years, other types of stimulation for the additional deployment of renewable sourced electricity generation have been suggested and used. For example, a support system where renewable electricity production devices can receive support for having the lowest expected capital expenditures per 1 kW of installed generating capacity has been mentioned by a few authors (Lanshina, John, Potashnikov & Barinova., 2018; Hu, Harmsen, Crijns-Graus, Worrell & van den Broek, 2017; Gauthier & Lowitzsch, 2019; Ecofys, 2014). Also, the monetary value of the Guarantees of Origin (GO) market used for disclosure regulations will soon surpass a billion euro (EcoHZ, 2019). Vattenfall proved the high potential of using the GO system by winning two tenders for wind parks in the North Sea in 2018 and in 2019 for a total

installed capacity of 1500 MW without benefitting from subsidy for the construction and operation (Vattenfall, 2019). From an interview from RECS International with Vattenfall, it became clear that the high demand for renewable electricity (high GO price) played a role in the winning bid for the projects (RECS International, 2018).

One can conclude that a variety of support schemes exist, the circumstances for renewables are changing constantly and that countries have different strategies to achieve a cleaner electricity market. This all is not helping the European Commission's wish for an integrated market.

### 1.1 Problem definition

Trying to find middle ground between different stakeholders in the discussion on how renewable electricity must be promoted financially in terms of the instruments used and the geographical boundaries of these instruments would be unfeasible for this research. This has been a long discussion in which many public and private stakeholders have been involved without having found middle ground. However, it is feasible to create a clear overview of how different stakeholders have interacted in these discussions throughout the years and explain why the current legislation exists in the shape it is in now.

With more and more stakeholders being involved in the energy transition, such as households and companies that want or need to lower their carbon footprints by investing in renewable energy, it is important that these new stakeholders understand how the European legislation looks like, understand what players are active in influencing this legislation and are informed about the functioning of different mechanisms to support renewable energy before taking a position in the discussion. The problem this research aims to solve is that, due to a knowledge deficit of many organizations, only a select group of actors is capable of influencing important European legislation which can decrease the transparency of the policy making process and can decrease the legitimacy of the decisions taken that impact all end-users of electricity.

The European Commission aims to include more stakeholders to be part of the discussion around renewables and to raise public acceptance of renewable electricity (European Commission, 2015b). Hence, an increasing number of organizations being incentivized to join the discussion while being unaware or misinformed of how the current outlook came around is problematic for the quality and transparency of the debate and the legitimacy of the decisions taken.

### 1.2 Knowledge gap

The technical debate on what support schemes would be the best way to promote additional renewable electricity has been covered excessively. Meyer (2003) described the different support schemes implemented in different European countries being feed-in variants (i.e. tariffs and premiums), tenders and a quota system with Tradable Green Certificates. Also, the functioning of Feed-in tariffs or Tradable green certificates or a comparison between them was often subject of research, for example by Fouquet & Johansson (2008), Pavaloaia, Georgescu & Georgescu (2015), Helgesen & Tomasgard (2018), Aune, Dalen & Hagem (2012), Darmani, Rickne, Hidalgo & Arvidsson (2016). Furthermore, support mechanisms are often assessed in relation with other systems such as CO<sub>2</sub> levy (Blume-Werry, Koller & Everts, 2019), the role of civil society (EESC, 2015), the flexible cooperation mechanisms (Jacobsen, Pade, Schröder & Kitzing, 2014), Renewable Portfolio Standards (RPS) (Zhang et al., 2018) and with the electricity disclosure market (Raadal, Dotzauer, Hanssen & Kildal, 2011).

Besides the support schemes mentioned by Meyer (2003), other types of support schemes have been subject of research throughout the years. For example, the importance and potential of capacity-based support schemes has been discussed in recent years by Hu et al (2018), Smeets (2018) and Lanshina et al. (2018). Another potential way of financially supporting renewable energy is by giving more emphasis to the demand side of the electricity market. Raadal et al. (2011) and Dagoumas & Koltsaklis (2017) looked in the potential of GOs playing a bigger role in financing renewable energy.

Although the role of GOs as a support mechanism has not been discussed in detail, the GO system itself has been subject in many articles. The GO system was set up as a disclosure tool and this was assessed by different authors (Aasen, Westskog, Wilhite & Lindberg, 2010; Klimscheffskij et al., 2015; Hufen, 2016). When the European Union was discussing the revision of the Renewable Energy Directive I around 2008, the potential role for GOs for target accounting was widely discussed. In general (Klessmann, 2009) and more specifically as a tool for government trading (Ragwitz, Gonzalez and Resch, 2008) or for private trading (Turmes, 2008; BMU, 2008; EREC, 2008; Klessmann, Ensslin, Ragwitz & Resch., 2007; de Jager, 2007; Toke, 2008; Neuhooff et al., 2008). Eventually, the GO was not picked as a tool for target accounting.

The identified knowledge gap is therefore not what support scheme is the best or whether private trading of GOs would be beneficial, but rather the role that various actors have played in the current outlook of support schemes in Europe. Ydersbond (2012) has looked at how German actors have tried to lobby for a preferable legal framework in the climate package, but to my knowledge no overview exist that tries to explain how stakeholder have affected the current outlook of support schemes. Moreover, the timing of this research is perfect for an ex-post analysis since some important developments have taken place recently including but not limited to the acceptance of the new Renewable Energy Directive in 2018. Filling this knowledge gap is essential for informing new market players that want to be part of the support scheme discussions.

### 1.3 Aim and Research Questions

This research aims to understand how different stakeholder discourses have led to the current framework of the European electricity market in general and more specifically to the current framework for support mechanisms. What stakeholders have played a large role, who was agreeing with who and are the arguments given in the past still valid? This leads to the research question of this research:

*How have stakeholder discourses affected the use of support schemes in the current European renewable electricity market?*

The independent variable is stakeholder discourses which affects the dependent variable: the use of support schemes in the current European renewable electricity market.

In an effort to answer this main question, several sub questions need to be answered first.

#### *Sub questions*

1. *What support mechanisms have been deployed between 1997 and 2018?*
2. *How has the use of support schemes been described in European legislation between 1997 and 2018?*
3. *What actors have been involved in the discussion of support mechanisms in the European renewable electricity market between 1997 and 2018?*



4. *What have been the discourses of these actors with regard to support mechanisms between 1997 and 2018?*
5. *Can a correlation between dominant discourses and European legislation on support schemes be detected?*

Understanding how different stakeholder discourses influenced previous legislation and how stakeholders form(ed) their opinion towards the European renewable electricity market is vital for new participants in this market that are interested in influencing new legislation.

#### 1.4 Scientific Relevance

The Advocacy Coalition Framework (ACF) and Punctual Equilibrium Theory (PET) formed the theoretical background of this research. The general principles of these established theories have been tested in this research too by applying it to European policy making processes in the European electricity market. Especially the role of coalitions and coalitions forming have had a central role in this research. This research has also contributed greatly to the understanding of Discourse Network Analysis (DNA) and its applicability in European legislation processes. DNA has been applied and its results are tested by validating it with literature sources and by conducting interviews with people that have participated in the policy processes at the top level.

In addition to contributions to theories and the DNA method, this research has contributed to research in support schemes. Especially how support schemes have arisen in Europe and what stakeholders have been supporting what type of support schemes has been discussed in this research. This research can potentially contribute to research themes that are currently play a central role in the Copernicus institute of Utrecht University. 'Environmental Governance' and 'Energy and Resources' are two of the main research groups of the Copernicus institute and this research has common ground with both research groups.

#### 1.5 Societal Relevance

The electricity market is used by and therefore relevant for every European household and business with electricity usage in Europe. I argue that the electricity market even becomes increasingly important for European households and businesses, because their efforts to help the market transform from its fossil dependency towards a market that runs on sustainable sources is already expected. This research is hence relevant because it explains how the European electricity market functions, how new production devices have been promoted throughout the years and what stakeholders play a great role in achieving this sustainable transformation.

In addition to the relevance for electricity users, this research is highly relevant for National and European policy makers in the energy sector. The results of this research show clearly how all relevant stakeholders are positioned in the electricity market especially in terms of what support mechanisms they would prefer. Policy makers and also stakeholders themselves could use this research as a reminder how the policy processes took place between 1997-2018 and could potentially learn from it as a way to prepare for future legislation.

#### 1.6 Structure

Chapter 2 deals with the theoretical background which is Advocacy Coalition Framework (ACF) and Punctual Equilibrium Theory (PET). This chapter explains key concepts of both frameworks and contains

information on why these theories are relevant for this specific research. Chapter 3 describes how the European electricity market is shaped. Topics that are highlighted in this chapter are the liberalization process, various Renewable Energy Directives including their implications on the use of support schemes and the functioning of various support schemes. Chapter 3 provides an answer to sub questions 1 and 2. Chapter 4 deals with the methods that are used in this research. The results are discussed in chapter 5 and will provide an answer to sub questions 3, 4 and 5. The remaining chapters discuss the results, draw conclusions and recommend further research topics.

## 2. Theory

Until the 1980s, the framework for understanding policy processes consisted of several consecutive stages being agenda setting, policy formulation, policy implementation, and policy evaluation and reformulation; the so-called stages heuristic (Sabatier & Weible, 2014). This has been criticized by multiple authors for lacking causality between the stages (Weible, Sabatier & McQueen, 2009), for being too focused on top-down processes (Weible, Sabatier & McQueen, 2009; Jenkins-Smith & Sabatier, 1994), for lacking scientific and technical information in the policy process (Weible, Sabatier & McQueen, 2009) and for lacking focus on interaction between involved actors (Jenkins-Smith & Sabatier, 1994).

Out of this criticism, multiple alternative theories were created such as Institutional Rational Choice, Multiple Streams, Punctuated-Equilibrium Theory (PET), the Advocacy Coalition Framework (ACF) and Policy Diffusion Framework (Sabatier & Weible, 2014). This research used two of these alternative theories as a theoretical framework, namely, ACF and PET. The reason for choosing ACF and PET is that these theories especially zoom in on the role of stakeholders and the influence these public and private stakeholders have when formed in larger coalitions. This is something I expect to be very relevant in this case due to the large impact electricity regulations have on all business and Member States (MS) in Europe. Also, European lobbying in the electricity sector is proved to happen on a large scale (Ydersbond, 2012). In addition to ACF and PET, this research used insights from Discourse Analysis, because this fits closely with the methods used to analyze the data. The aim of this research is not to build additional theory but rather to test concepts from these established theories.

This chapter focuses on the basics of ACF first after which the essentials of PET and discourse analysis are covered.

### 2.1 Advocacy Coalition Framework

#### 2.1.1 Unit of analysis

Advocacy Coalition Framework (ACF) was formed by Sabatier and later revised by Sabatier and Jenkins-Smith (Sabatier, 1998). The early ACF research was focused on energy and environmental policy in the US as this was the area of expertise from its authors. ACF has 4 basic principles of which 2 are relevant for this study (Jenkins-Smith & Sabatier, 1994). First, understanding the process of policy change requires at least a time horizon of a decade. This will be met as this research looks at three 5-years periods between 1997 and 2018. Second, the most suitable unit of analysis for understanding policy processes is not governmental organizations. Instead, a policy subsystem which consists of public and private actors who are actively concerned with a policy problem and are interacting with one another is the most important unit of analysis (Sabatier, 1998; Jenkins & Sabatier, 1994). A policy subsystem is “characterized by both a functional/substantive dimension and a territorial one” (Sabatier & Weible, 2007). Sabatier (1988) argues that actor involvement in policy is much wider than the classic ‘iron triangle’ – administrative agencies,

legislative committees and interest groups at a single level of government. Instead, the involvement of actors at various governmental levels should be included, together with journalists, researchers and policy analysts.

### 2.1.2 Coalitions in ACF

Advocacy coalitions consist of a variety of both public and private actors including businesses, politicians, researchers and interest groups (Jenkins-Smith et al., 2014). The composing factor of a certain coalition is a particular shared belief system according to the original version of ACF (Leifeld, 2013). The updated ACF version included coordination between actors as a second layer of structure (Leifeld, 2013). According to the updated version, coalitions consist of actors who “both (a) share a set of normative and causal beliefs and (b) engage in a non-trivial degree of co-ordinated activity over time” (Sabatier, 1998). The Advocacy Coalition Framework (ACF) distinguishes three levels of beliefs. On the top level the deep core beliefs which are defined as the “normative/fundamental beliefs that span multiple policy subsystems and are very resistant to change” (Weible, 2006). This level deals with overarching beliefs covering freedom and equality and will operate throughout all policy domains translating in left and right parties for example. The second layer of the belief system is the policy core belief which functions as the fundamental ‘glue’ for coalitions (Weible, 2006) and is defined as “a coalition's basic normative commitments and causal perceptions across an entire policy domain or subsystem” (Sabatier, 1998). The last layer is called the secondary beliefs and is defined as “empirical beliefs that relate to a subcomponent (either substantively or territorially) of a policy subsystem” (Weible, 2006). This level determines for example the degree of seriousness given to a problem within a policy subsystem and the strategy used to tackle this problem.

The reason for actors to unite in coalitions is that this is vital for translating beliefs into policy according to ACF. The various actors are dependent on their complementary strategies and resources in order to prevent losing against another coalition that is obviously not sharing their particular belief system. ACF claims that every policy subsystem contains between 2 and 5 competing coalitions that try to push forward their belief system into policy (Sabatier & Weible, 2014) and coalitions try to influence this process by using several resources and venues (Weible, 2006).

### 2.1.3. Policy change in ACF

According to ACF, policy change occurs due to four different types of mechanisms (Sabatier & Weible, 2007). First, external shocks that are defined as stimulus to change caused outside of the control of actors within the policy subsystem. Examples are system changes such as change of the political environment or socioeconomic changes such as a recession (Sabatier & Weible, 2007). These types of changes are characterized by the large extent of the policy change but without necessarily a belief system change for coalitions. Second, internal shocks focus on disasters from within a policy subsystem as a cause for major policy change (Sabatier & Weible, 2007). These types of major policy changes confirm the beliefs of the coalitions that are interested in changing current policy as oppose to increase doubt into the beliefs of the dominant coalition that favors policy stability. Third, policy-oriented learning defined as “relatively enduring alternations of thought or behavioral intentions that result from experience and/or new information and that are concerned with the attainment or revision of policy objectives” (Sabatier & Jenkins-Smith, 1999). Because of the normative nature of deep core beliefs and policy core beliefs, these levels of beliefs are less likely to change by policy learning. On the other hand, secondary beliefs are more likely to change, but this type of change is characterized by incremental change rather than large policy

shocks. Lastly, policy change can be a result of a negotiated agreement between rival coalitions (Ydersbond, 2018).

## 2.2 Punctuated-Equilibrium Theory

### 2.2.1 Coalitions and subsystems

Punctuated-Equilibrium Theory (PET) was created out of a long analysis of American politics. PET is based on bounded rationality and tries to explain long-term policy stability followed by sharp shocks which results in large policy changes (Givel, 2010).

PET argues that the political system is incapable of having continuous discussions on all policy issues which causes subsystems – focused on one issue – to exist (True, Jones & Baumgartner, 1999; Princen, 2013). Subsystems are communities of specialists that function outside of the spotlights of the macropolitical system (Sabatier & Weible, 2014). Most subsystems do not even reach the macropolitical agenda, but when a particular subsystem is placed on that agenda, it can result in large policy changes (True, Jones & Baumgartner, 2007). Another way of explaining subsystems has been done by Herbert Simon who introduced the terms parallel and serial processing. Individuals are only capable of handling one thing at the time (serial processing) much like the government according to Simon. Jones & Baumgartner (2012) argued that policy subsystems allow political systems to have parallel processing.

PET argues that subsystems are structured around a single hegemonic coalition instead of several competing coalitions as in ACF (Leifeld, 2013). Within this single hegemonic coalition, a certain consensus exists on the way policy is formulated which is called the policy monopoly (True et al., 1999; Givel, 2010). Opponents of the policy monopoly, being state and non-state actors, try to change the status quo. When it does not make it to the macropolitical agenda, PET speaks of negative feedback. In other words, the existing policies are reinforced. Positive feedback however occurs when the existing policy of the hegemonic coalition is questioned. When the opposing coalition successfully takes down the policy monopoly, meaning that several actors acknowledge that the current policy is no longer credible, the one hegemonic coalition transforms into a new hegemonic coalition with a new policy monopoly (Leifeld, 2013).

### 2.2.2 Causes of policy change

Whether a subsystem can reach this stage of positive feedback is dependent on two forces (True et al., 2007). First, the changing images defined as “a mixture of empirical information and emotive appeals” (Sabatier & Weible, 2014). PET assumes that the framing of a policy problem is causing a lot of attention to be given to it or none at all. For example, when nuclear power is presented as a low-carbon energy source that is made possible by massive technological development, not many people would oppose new nuclear plants. However, when it is presented as a huge environmental risk that potentially dangers the habitability of large pieces of land for the next 20,000 years it would probably receive less support. True et al. (1999) emphasizes that a policy image is not only based on factual information, but also on values.

Second, changing the venue of the policy subsystem. Policy can change on State level or on Federal in the US, one can make use of the separation of power and often courts have jurisdictional overlaps. This can be translated for the EU where policy changes can happen on EU level or within Member States. Often, policy framing and venue changes are working in a tandem according to Princen (2013), because reframing a policy issue changes the venue in which it will be treated. Also, by reframing the issue, more participants are likely to join the discussion which allows access to new venues.

## 2.3 Insights Discourse Analysis

Before going into details of discourse analysis, it is useful to explain what is meant by a discourse as many definitions are around. For example, “an ensemble of ideas, concepts and categories through which meaning is given to phenomena” (Hajer, 1993; Hajer, 2002; Hajer & Versteeg, 2005). This definition may not be easy to grasp, hence, it can be helpful to see a discourse as “a set of concepts that structure the contributions of a group of participants to a discussion” (Hajer, 2002). In practice, this means that some groups would think of environmental issues when talking about acid rain while others would tend to talk about economic losses or health issues.

Discourse Analysis is defined as the study of language-in-use (Hajer & Versteeg, 2005). Hajer (1993; 1995) argues that all political problems are socially constructed which means that problems do only arise when political actors make it a problem by giving meaning to particular social circumstances. Instead of rational or fact-based policy making, linguistics and debates are much more influential in affecting political processing. This is called the linguistic – or argumentative turn meaning that language does not only serve as a tool to describe the world but rather as a medium through which the world is created (Hajer, 1993). Hajer argues that several actors form so-called discourse coalitions when having the same social construct (Hajer, 1993).

A way to look at the role of language and debates in policy processes scientifically is by applying a discourse analysis (Hajer, Hajer, Wagenaar, Goodin & Barry, 2003). Conducting research with discourse analysis allows one to see how actors are actively trying to influence the political process over time (Hajer & Versteeg, 2005). This is done by tracing linguistic regularity that can be found in a variety of data sources such as debates, reports and other statements (Hajer & Versteeg, 2005). According to Hajer (1993), discourse analysis is particularly useful for 1) identifying strategic actions by understanding how one single issue fits in the wider political arena 2) explaining issues beyond the interest level into a context of discourses and organizational practices 3) illuminating how actors reproduce or fight a bias without necessarily coordinating their actions or sharing deep values.

Runhaar (2009) defined decision-making as “a system of competing discourse coalitions and their struggles to ‘control shared meanings’ and to gain acceptance of their framing of a policy issue”. This emphasizes both the importance of framing (PET) and the role of discourses in coalitions (Discourse analysis).

## 2.4 Applicability

Despite some differences between ACF and PET, both theories see an important role for coalitions, consisting of several state and non-state actors, within a policy subsystem. In addition, discourse analysis also talks about coalition forming when actors have the same social construct for a single issue. This research concludes from these theoretical insights that coalitions, formed based on beliefs and discourses, influence policy making.

Therefore, this research looks at stakeholder discourses (independent variable) when looking for an explanation on how policy around support schemes are formulated (dependent variable). Leifeld (2017) sees Discourse Network Analyzer (DNA) as the ideal tool to “describe the structures of political discourses” and this tool is hence used. DNA will be further explained in chapter 4.

### 3. Understanding the electricity market + support schemes

Because this research aims to describe how discourses have affected the outlook of support schemes in European legislation, it is important to briefly describe the standard process of how directives are made at the European level. This has been done in paragraph 3.1.

In an effort to make this research readable for a wider public, it is important that any reader understands the circumstances in which support schemes work and understands what support schemes are and how they function. Paragraph 3.2 focuses on the liberalization process of the European electricity market which is relevant for understanding the use of support schemes. Paragraph 3.3 elaborates on the dependent variable, namely, how support schemes have been described in European directives up until recently. From paragraph 3.4 onwards, the different types of support schemes are explained.

Chapter 3 aims to answer sub questions 1 and 2.

#### 3.1 Institutional setting in Europe

This research aims to explain how stakeholders have affected the use of support schemes for renewable electricity by influencing the different Renewable Energy Directives. A very brief overview is given on what a directive is and how the processes leading up to a directive works formally.

A directive is a binding document for all Member States, but in contrast to a regulation, a directive has solely a binding final target leaving it up to Member States how to achieve that target. The European Commission (EC) has the right of initiative meaning that all first drafts must come from the EC. The EC does initial research and talks with stakeholders before coming up with a proposal which is presented to the European Parliament (EP) for the first reading.

The EP examines the proposal and may introduce amendments before sending it to the Council. Subsequently, the Council can either accept the document which means that new legislation is adopted or may amend the document before sending it back the EP for a second reading.

Next, the EP has three options. One, the EP approves the document from the Council. Second, the EP rejects the proposal from the Council ending the whole procedure. Third, the EP proposes new amendments and returns it back to the Council for their second reading. In case that happens, the Council can either approve the proposal or deny the proposal causing the conciliation committee to be convened.

This committee consists of an equal number of representatives from the Parliament and the Council. They sit together and have to agree on a text acceptable for both institutions. If the committee is unable to agree on a text, the procedure is ended. However, if the committee is able to agree on a text, it will be sent to both the EP and the Council for a final third reading. In the third reading, both institutions must approve the text in order to adopt the proposal. If either institution rejects the proposal, the processes will end (The Council of the EU, 2019).

#### 3.2 Liberalization of the European electricity market

Until the end of the 20<sup>th</sup> century, the European electricity market consisted of national monopolistic markets meaning that only a few electricity producers had access to the grid and end-users were geographically bounded to one supplier. With 'end-users', all electricity users from small households to large industries are meant. The formation of the European Single Act in 1987 mandated the abolishment of tariffs, an end to protectionism and termination of state-run monopolies (Serrallés, 2006). The



electricity sector was one of the last sectors to liberalize for two main reasons. First, the electricity market is considered vital for national economic and political security which causes Member States not to give up control easily. Second, the complexity of the sector meaning that supply and demand must be equal at any moment in time to ensure 24h access for every end-user (Serrallés, 2006). Despite these difficulties, the liberalization process in the electricity market lingered because a competitive market would lead to lower costs and therefore lower energy prices (Speck, 2003).

The outlook of a liberalized European electricity market was firstly drafted in directive 96/92/EC that initiated common rules for the generation, transmission and distribution of electricity in the EU. The EU obligated Member States to create a competitive market that follows national rules in terms of security, regularity, quality, price and environment (article 3). New capacity had to be realized through an authorization procedure and/or tendering. Moreover, an independent Transmission System Operator (TSO) had to be created.

The liberalization process muddled through and in 2003 a new directive was drafted, namely, directive 2003/54/EC. This directive established rules for the generation, transmission, distribution and supply of electricity. Three important market conditions were identified to achieve a fair and competitive market (Serrallés, 2006). First, every end-user had to be able to choose the supplier of their own choice. Second, any producer had to be able to have access to the grid when complying to certain rules; this is called Third Party Access (TPA). Before the liberalization, large state-supported monopolies were responsible for the transmission and distribution, but this system could not remain as more parties were accessing the grid. Hence the third condition: the transmission must be fully unbundled and the distribution must be legally unbundled from companies that are also supplying electricity, because this would otherwise lead to unfair competition. Having independent TSO's and Distribution System Operators (DSO's) are vital for the non-competitive side of the electricity market that deals with the electricity grid. Another feature from directive 2003/54/EC is that suppliers shall disclose the contribution of each energy source to their fuel mix of the previous year. Member States shall take necessary steps to make sure this information is reliable. Directive 2003/54/EC is not entirely clear on how suppliers should retrieve these numbers.

Directive 2009/72/EC also contains rules for the generation, transmission, distribution and supply of electricity. Additionally, this directive aimed to improve consumer protection, lays down universal service obligation and clarifies competition requirements. It contains more detailed information on how organizations in the electricity sector must behave, without changing the overall thought of the liberalized electricity market.

In 2016, the European Commission launched a new program called 'Clean energy for all Europeans' which consisted of five legislative proposals and three reports with respect to the electricity market<sup>1</sup> (EU, 2019a).

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<sup>1</sup> Proposal for a directive on common rules for the internal electricity market (COM(2016) 864), proposal for a regulation on the internal electricity market (COM(2016) 861), proposal for a revised regulation on the European Agency for the Cooperation of Energy Regulators (COM(2016) 863), proposal for a new regulation on risk preparedness in the electricity sector (COM(2016) 862), proposal for a revised Renewable Energy Directive (COM(2016) 767), evaluation of the electricity market design and security of supply (SWD(2016) 413), report on sector inquiry on capacity mechanisms (COM(2016) 752), and report on energy prices and costs in Europe (COM(2016) 769)

By bundling several legislative pieces together in this one package called 'Clean energy for all Europeans', the EU emphasized the mutual coherence between all these proposals and reports (EU, 2019a).

For the liberalized European electricity market, the most relevant directive is the one that deals with the common rules for the internal market, namely, Directive 2019/944. This directive establishes "common rules for the generation, transmission, distribution, energy storage and supply of electricity". It aims to create "truly integrated competitive, consumer-centered, flexible, fair and transparent electricity markets in the Union". The EU believes that by integrating the market and making it highly competitive, this would result in "affordable transparent energy prices and costs for consumers, a high degree of security of supply and a smooth transition towards sustainable low-carbon energy system", three main pillars of the Energy Union.

After the directive of '96, 2003 and 2009, this directive is even more detailed and clear on how the European internal electricity market should look like and what is needed to achieve a fully integrated market. Member States play an important role in creating this internal market by ensuring a level playing field where fair and effective competition can exist. This entails that they regulate market players on their level of compliance concerning general rules such as free choice of supplier, existence of market-based prices and authorization processes for new capacity. But Member States shall also ensure consumer empowerment in terms of contractual rights, having access to comparison tools, billing information, protecting energy poor- and vulnerable households and much more. However, national legislation cannot hamper key internal market principles as cross-border trade, consumer participation, investments in variable and flexible energy generation, energy storage or new interconnectors between Member States.

Directive 2019/944 does not contain any mention of support schemes. However, in contrast to earlier versions of the directive, the Guarantees of Origin (GO) is mentioned as the sole tool for suppliers to disclose the renewable part of their energy mix.

In conclusion, the liberalization has given European citizens supplier choice and much more protection. Also, the electricity chain has been opened up completely and electricity prices have come down enormously, but have been compensated by higher tax rates. Although the electricity market was being liberalized in the 2000', national authorities still preferred some cases to be handled on a national scale as can be seen in the debate for renewable energy.

### 3.3 Outlook Renewable Electricity framework

The use of support schemes for the promotion of production devices using a renewable energy source has been discussed in the Renewable Energy Directives. So far, three versions of the RES Directive have been drafted.

2001/77/EC was the first Renewable Energy Directive (RED I) and was established to promote the contribution of renewable energy sources in the production of electricity and aimed to create a basis for a future framework of a European Internal Electricity market where renewable sources play an important role. Article 3 commanded Member States (MS) to publish a report every 5 years explaining what their national indicative targets for the consumption of the nationally produced renewable electricity would be for the next 10 years. MS's progress towards these targets had to be published every 2 years. The share of Renewable Electricity consumption of a country is defined by the European Commission by adding all renewable electricity production and divide it by the national electricity production plus imports and minus exports (European Commission, 2017a). This is strange off course, because when using these



definitions, the EU recognizes the import and export of electricity between different MS, but fails to account import and export of renewable statistics. In other words, when accounting for import and export, a country's export is magically 100% generated by fossil energy sources and renewables stay within the country. This causes Norway for example to have, according to this definition, an electricity mix for target accounting of more than 100% because they are a net-exporter of electricity. This definition has been used for all directives and has caused countries to focus and support new renewable electricity production devices within their own borders because it would otherwise not count towards their compliance target.

In an effort to attain the renewable electricity consumption targets, RED I mentions the possibility for MS to use support schemes to reach their targets. Support schemes had to contribute to the compliance of their target, be compatible with internal electricity market principles, take into account different technologies and geographical differences, be as cost effective as possible and keep investor confidence high by including transitional periods for support schemes that lasts at least 7 years.

Moreover, directive 2001/77/EC introduced the Guarantees of Origin (GO) system which meant that electricity producers could get certificates issued for every MWh put on the grid specifying the energy source, date and place of the electricity production. This system enables renewable producers to demonstrate that their electricity was indeed generated using a renewable energy source.

2009/28/EC was a revision of the 2001 directive and expanded the framework for promoting the generation of electricity with a renewable energy source. To start with, the national indicative targets from the 2001 directive were transformed into mandatory national targets. Every Member State received an additional 5.5% to their previous renewable share and the gap between that target and the overall EU target of 20% renewables was proportionally divided according to the MS's Gross Domestic Product (GDP) (Neuhoff, Johnston, Fouquet, Ragwitz, & Resch, 2008). This method was of course not received well by countries with high GDP and unfavorable conditions for the deployment of renewables. As mentioned before, target compliance was calculated by having renewable electricity production within country borders making it extra difficult for low potential countries with a high GDP.

The EU acknowledged that some Member States are more easily capable of reaching their targets due to different potentials for renewables (sun hours, windy days, possibilities for hydro, etc.) and proposed to include methods to influence target compliance in an effort to make up for the relatively high targets for low potential countries. In the process leading up to the final version of the 2009 directive, many different solutions were proposed (i.e. Governmental GO trading, GO trading by market players). Eventually, three other options were chosen. First, a statistical transfer would allow a country who already achieved its target to sell a percentage to a country that is not able to meet its target. Second, joint projects would enable two or more countries to develop a renewable production device together and share the renewable benefits for compliance instead of the country in which the production device is located to benefit fully. Third, joint schemes would allow Member States to coordinate their support schemes together and find ways to both benefit from additional capacity being build. However, the flexible mechanisms turned out to be a failure as "Little use had been made of the RES Directive's flexibility and support mechanisms for cross-border cooperation [...]" according to the European Parliament (European Union, 2019b). The only joint support scheme is the Norwegian-Swedish scheme which even includes one non-EU member. Also, joint projects have been used very little (EEA, 2019) and the statistical transfer has been used twice by Luxembourg in 2017 (European Commission, 2017b; European Commission, 2017c).

Furthermore, 2009/28/EC further specified the use of GOs by making a link to the internal market directive and the related mandatory disclosure for suppliers. It is clearly stated in directive 2009/28/EC that GOs do not contribute for the compliance of the mandatory targets, but GOs may be used for complying to disclosure regulations. This caused a situation in which the same MWh could count for country x for target compliance while also could be claimed by another organization in country y for disclosure regulations. While this distinction between target compliance and disclosure regulations is possible, it has created a lot of confusion for people and organizations.

At last, the revised RED I contains further technical issues such as the priority dispatch which means that electricity producers using a renewable energy source have priority on the grid when an overload is available.

The 2018 RED II prolongs the framework for the promotion of energy from renewable sources. Instead of having national targets, this directive introduces a European-wide, renewable energy consumption target of 32% where the individual 2020 targets serve as minimal requirement for Member States. This gives Member States the freedom to set national targets that fit the political and economic position, but still sets out a target that would keep the EU as a world leader in renewables and would comply to the targets set in the Paris Agreement (Council of the European Union, 2016). Additionally, having a Europe wide target would less likely lead to distortions of the internal energy market than having national binding targets, because that would more likely lead to action solely on national level. The 2030 target is best achieved through partnership with other Member States, something that the EU supports greatly (Council of the European Union, 2016).

With a focus on partnership is also meant a more European focus in terms of support schemes. The REDII suggests that Member States may open their borders for support schemes, but there is no mandatory opening. Yet in 2023, the Commission will evaluate whether a 5% opening of the support schemes in 2025 and 10% in 2030 will become mandatory (2018/2001). Regardless if Member States open their support schemes for other Member States, the RED II states that support schemes must incentivize the integration of electricity using renewable sources and shall be designed in a market-based and market-responsible way and shall take into account system integration costs and grid stability and the support schemes shall not disturb the market. Feed-in tariffs are urged to be phased out and instead the preference is given to market premiums that are responding to market price signals of the physical electricity market.

The flexibility mechanisms introduced in 2009 being statistical transfer, joint projects and joint schemes are sustained in the RED II which seems odd given the limited use of it since 2009 and the fact that one European target is set in place which makes cooperation mechanism irrelevant.

The use of the GO is strengthened by making its use mandatory for disclosure of electricity generated with renewable sources. Also, article 19 urges that when support schemes are installed, the price of the GO must be considered when deciding the compensation for the electricity producer. Lastly, Member States must open up the possibility for all other energy sources to receive GOs too.

### 3.4 Support schemes

Before discussing various support schemes, it is useful to share what this research means by a support scheme. This report follows the definition of Directive 2009/28/EC:

*“‘support scheme’ means any instrument, scheme or mechanism applied by a Member State or a group of Member States, that promotes the use of energy from renewable sources by reducing the cost of that energy, increasing the price at which it can be sold, or increasing, by means of a renewable energy obligation or otherwise, the volume of such energy purchased”.*

After the establishment of the first Renewable Energy Directive in 2001 and especially after the mandatory targets of 2009, Member States have intensively used different types of support schemes. A research from Ecofys (2014) summarized necessary considerations for Member States wanting to have a support scheme.

1. Price-based or volume-driven
2. Cost control
3. Sharing burden
4. The design
5. Stability, predictability and flexibility
6. Compatibility with the internal market

In a price-based scheme, a government sets the price per unit and the producer will produce until the cost curve is too high. This means that the government cannot predict how much volume will be generated and risks overpaying the producer when the cost curve decreases sharper than expected. In a volume-driven scheme the volume is predetermined and the price follows. From a governmental perspective, this scheme risks a steep increase in the cost curve (Fagiani, 2014).

MS must consider what type of design they use in terms of time horizon or technology level, because this affects the way costs can be reduced. A few possible measures to reduce costs for MS are setting a cap on volume (either on capacity or generation) or on policy costs in total. An example of a cap on volume is introducing tender schemes. In price-based mechanisms it is important to be able to revise and adapt the initially support amount correcting differences in technology costs, fuel prices or raw material prices. This could be done in different ways, for example, by reviewing the support when additional capacity is built or by reviewing it periodically (Ecofys, 2014).

Another important feature a government must consider is who will pay for the support scheme and how it is paid for. Ecofys (2014) distinguishes money from a general budget and money collected through a special levy which must be paid for by end-users per unit. In terms of who is paying for it, the balance between small end-users such as households and large end-users like heavy industries is hard to find. Most MS do not want to tax heavy industry as much as smaller users because low energy prices can give the industries present in their country a competitive advantage in the macro economy.

In the end, all these considerations are part of the design but two very important features of the design are what geographical locations will be eligible for receiving the support scheme and what technologies will be supported. Most MS in Europe have had nationalistic support schemes, preventing foreign production devices to claim their tax money. This way of thinking has been subject of large debates on whether this is a good development or not. The design in terms of supporting technologies deals with the question whether support schemes must be technology-specific or not. Having technology-specific schemes could incentivize innovation, but are not most cost-effective in the short term. Having a general support scheme will lead to windfall profits for the most advanced renewable sources.

Many considerations such as the design and cost control are part of a larger discussion of how much stability and predictability is needed for investors and producers to make sure they will not lose too much money and how much flexibility policy makers need to have in order to control the policy costs. Guaranteeing a fixed price for the next twenty years is a perfect solution for investors, but to a less extent for policy makers, because they risk overpaying the production device as can be seen in Germany at the moment.

The last consideration is that support schemes have to be compatible with the rules of the internal market. Support schemes are meant to make electricity from a renewable energy source more attractive but they should not disturb the market in general. In the long term, renewable must be functioning without any support, therefore, making them integrate to the market from the start is an important aspect.

Below, several support schemes are explained in more detail. Most of them can be categorized based on three criteria.

1. Generation based vs capacity based.  
Is remuneration based on generation / output (Kwh / MWh) or based on installed capacity (KW / MW)?
2. Price-driven vs volume-driven  
Do production devices receive an amount from the government for producing electricity leading to an unknown volume or is the volume set in terms of a percentage leading to unknown costs?
3. Overall remuneration vs partial remuneration  
Do production devices have the remuneration as sole cash flow meaning (overall) or does the support scheme only represent an extra stream of remuneration in addition to the value of the electricity sold?

When discussing the several support schemes, the general functioning of the scheme is explained, an overview of the countries in which this scheme was active is given and some positive and negative aspects of the scheme are discussed.

### 3.4.1 Capacity based

This research has identified several types of capacity-based support in literature. First, Smeets (2017) has looked into a Russian support scheme that is not based on production, but is solely aimed at financing upfront capital costs in which the amount of remuneration is based on installed capacity (MW). According to Bunn & Muñoz (2015), most support schemes in Europe have been focused on output rather than capital despite high upfront costs for renewables and low marginal costs because by linking the support scheme to a market mechanism, it becomes easier to charge end-users. Supporting production devices by financing upfront costs is a very political decision which is more difficult to take according to the same research. Capital based upfront payments have been criticized too, because some developers focused on having a very large installed capacity rather than on electricity production (De Jager & Rathmann, 2008).

In addition to a one-time payment based on capacity for compensating high upfront costs, capacity-based support schemes can also incentivize production devices to have capacity available at certain high demand hours. Production devices must sell their output on the electricity market, but receive additional payment for how much installed capacity they have. This creates an incentive to sell output at marginal costs which is good for the stabilization of the grid, but difficult for renewable sources as most of them are weather

dependent (EEX & EPEXSPOT, 2014). Moreover, the peak demand capacity-based remuneration can also be given to non-renewables and falls outside of the support scheme definition used in this research.

In an effort to give an overview on how much this type of remuneration is used, CEER (2018) has listed all the support schemes used in Europe for 2016 and 2017. France, Sweden and Cyprus have a one-time capacity-payments for solar in place and Spain has capacity-based support for all technologies but offshore wind. This is in line with the conclusions of Ecofys (2014) who reported that capacity-based schemes have never been widely used in Europe. Due to the limited use and discussion on this type of remuneration in Europe and the difficult fit with the support scheme definition used in this paper, this research has not included capacity-based schemes.

Instead the focus lays on the most frequent used support schemes in Europe between 1997 and 2018 which will be discussed in the next paragraphs.

### 3.4.2 Generation-based support schemes

#### *Price-led*

Generation-based, price-driven support schemes have been widely used in Europe. The two main price-led support schemes, the Feed-in Tariff (FiT) and the Feed-in Premium (FiP), are characterized by a price per electricity output awarded to electricity generators. The difference between the FiT and the FiP is the amount of exposure to market principles an electricity generator has. The FiP can be further divided into several variations which are visible in figure 1 below.

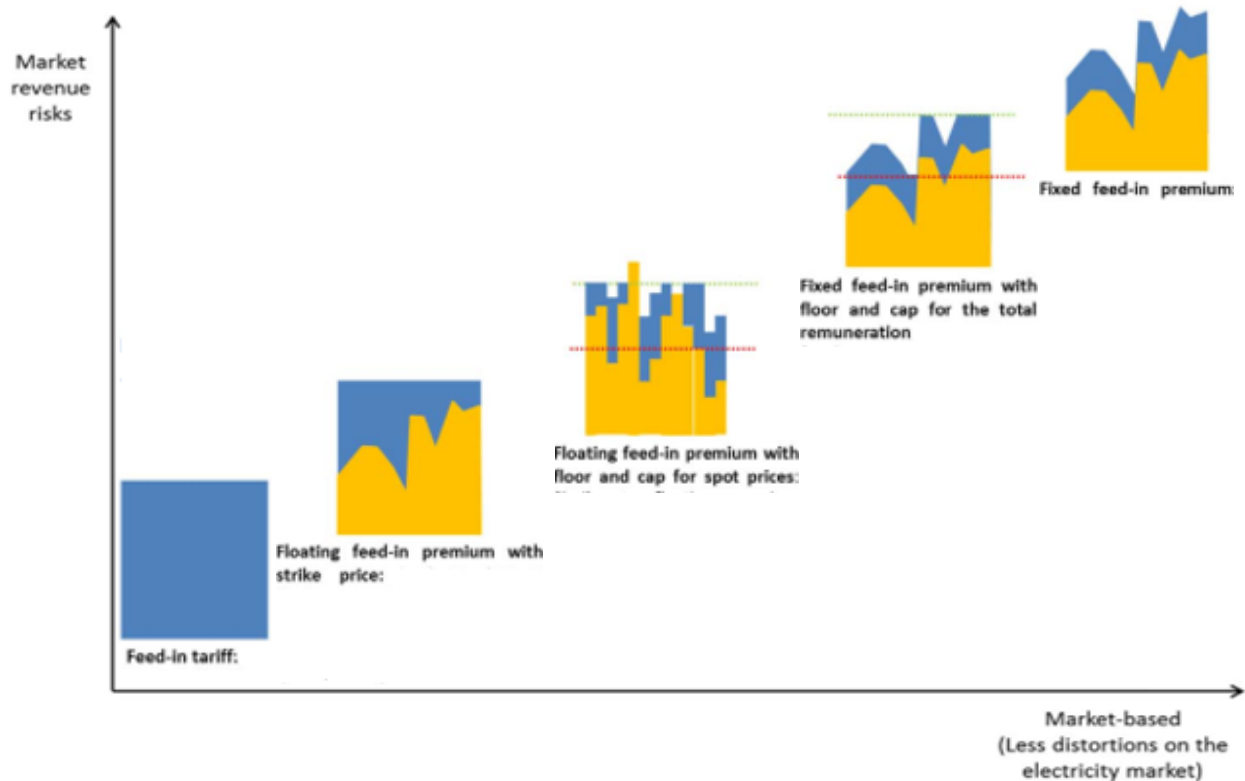


Figure 1 – overview price-led support schemes

Source: Hu et al (2018)

### *Overall remuneration - Feed-in Tariff (FiT)*

The FiT system has been widely used in Europe for promoting the development of electricity generation with a renewable energy source (SEC, 2005). The system is characterized by a fixed, long-term cashflow towards the generator per unit of electricity generated, independently from the electricity market price (Ecofys, 2014). Hence its position in figure 1 in the left bottom meaning that the system causes low revenue risk while causing a higher degree of distortion in the overall electricity market compared to more market-based instruments. It causes distortion because production devices receiving a FiT receive the same remuneration for every MWh put on the grid regardless of the situation on the grid. This means that in case of oversupply and therefore low prices, these particular production devices still earn the same per MWh causing them to operate outside of the normal electricity market distorting normal price developments and grid stability. Generally, the electricity producer receives a fixed amount for multiple years and this is eventually paid for by end-users with a levy per kWh or through general taxes. The level of remuneration per kWh can be administratively determined or via the use of tenders/auctions (Ecofys, 2014).

Generally, the FiT is characterized as a great success in developing new renewable production devices, because it brings down the risk for investors to almost zero (Ecofys, 2014; SEC, 2005). It is no surprise that many Member States have used this type of support in the past and/or are still using it. Germany is the FiT pioneer in this field since they set up the first type of FiT in the 1990s (Leiren & Reimer, 2018). Subsequently, more and more Member States started to set up FiT schemes in order to boost the installation of new renewable production devices. The Council of European Energy Regulators (CEER) has made several reports in which they provided overviews of the available support schemes in Member States. Before May 1<sup>st</sup> 2004, the EU had 15 members and 8 of them used FiT schemes. These countries were Austria, France, Greece, Italy, Luxembourg, the Netherlands, Portugal and Spain. 5 countries (Belgium, Great Britain, Italy, the Netherlands and Sweden) had some sort of certificate system that functioned alone or in combination with a FiT. Often, specific technologies or sizes received different remuneration than others. Almost all countries were giving out investment grants for the construction of new plants except Denmark, France, Ireland and Sweden (CEER, 2004).

By 2013, the EU was expanded to 28 Member States and 19 of them were working with a FiT system as the sole support scheme or sometimes in combination with green certificates or FiP (European Commission, 2013; CEER, 2015). Again, countries with mixed support schemes mostly separated between the type of support schemes based on the supported technology or the size of the installation.

By 2017, still 19 out of the 28 Member States were using FiT schemes, but they were increasingly complemented by FiP schemes. FiT schemes were especially in place for smaller sized installations (CEER, 2018). The European Commission promoted phasing out FiT schemes in 2013 by calling it the best practice to use market-based instruments (European Commission, 2015). In 2014, the start date for phasing out feed-in tariffs was set at the first of January 2016 which meant that only certain small-scale operations could still receive this type of support by then opposed to larger scale operations for whom it would be banned (European Commission, 2014).

It can be concluded that the Feed-in tariff is highly effective in developing new production devices and in addition it can be technology specific which is considered a positive thing according to Ecofys (2014). Supporting specific technologies allows higher remuneration for premature technologies to promote innovation, while more mature renewables could receive lower remuneration rates. On the other hand,

the FiT is difficult to harmonize within the EU (SEC, 2005), is not a very efficient way of promoting looking at the high risk of overfunding and it does not follow market principles causing to distort the electricity market.

#### *Partial remuneration - Feed-in Premium (FiP)*

The FiP has been called the “evolved version of feed in tariff system” by the European Commission (2013) and the difference with a FiT is that generators must market their electricity directly and receive a remuneration on top of the money received from selling the electricity (Ecofys, 2014). Two types of FiP exist (Floating & Fixed) and both types have two variations, with and without a cap and floor price. The different types of FiP all have a different ratio of risk sharing between the power plant operators and the public as figure 2 visualizes.

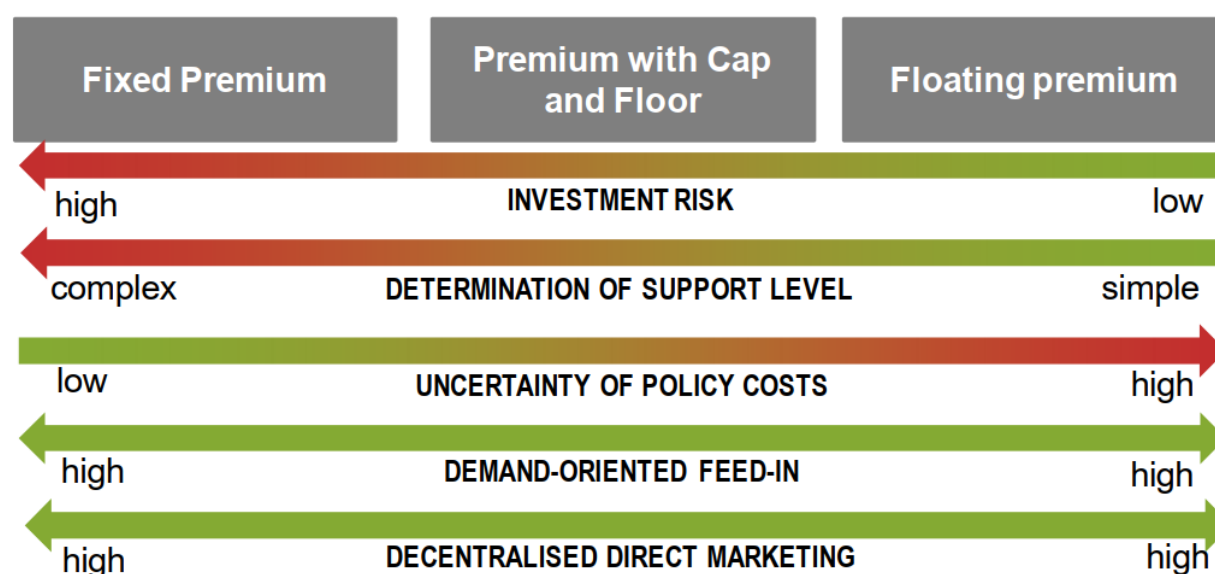


Figure 2 – Risk profiles various FiP

source: Ecofys, 2014

Below, the various forms of the FiP are further explained. The first type having the least risk and most market distortion towards a premium with the most risk for investors and low market distortion.

#### *Floating FiP with strike price*

Similar to a FiT, the plant operator still receives a fixed amount regardless of the spot price, but it must sell its own electricity. When the spot price is high, the remuneration will decrease and the other way around. Plant operators are therefore not entirely exposed to electricity prices risk, but it introduces the production device owner to market principles without having too much risk. Depending on the specific design in a country, the risk goes up or down. When the used spot price for calculating how much remuneration the plant receives is based on hourly prices, the production device is basically receiving a FiT. When the remuneration is calculated on monthly or even yearly prices, it becomes increasingly important for the production device to sell its electricity when demand is high, because their real costs will fluctuate more than the remuneration.

In this type of FiP, the government is exposed to much more risk because it guarantees a certain price and when the electricity spot price is low, the government must compensate this.

#### *Floating FiP with cap and floor*

The principle is similar to a floating FiP, but instead of one strike price a cap and floor exist. When the average spot price is between the floor and cap price, nothing changes compared to the normal floating FiP. However, when the average spot price is below the floor price, the remuneration is the difference between the cap and floor price causing the production device to receive less than compared to the floating FiP without cap and floor. The method used for calculating the spot price (hourly, monthly or any other time period) is still influencing the amount of risk for the production device owner.

#### *Fixed premium with cap and floor*

A fixed premium with cap and floor means that a fixed price is given on top of the electricity spot price with a clear minimum and maximum total price (electricity + premium). The fixed premium is lower than the difference between cap and floor in the example of the floating FiP with cap and floor causing more market exposure for the production device in the fixed premium with cap and floor.

#### *Fixed premium*

A fixed premium is given to the production device, but no minimum remuneration price (electricity + premium) is guaranteed. This means that the production device is fully exposed to price fluctuations and almost functioning like conventional production devices except for the small amount of fixed remuneration. Governments have a reduced risk in this type of FiP, because their remuneration is similar regardless of the spot price.

For all types of the premium the amount of risk depends off course greatly on the value of the premium and the height of the cap and floor price. This overview just gives a general view on how much risk each method generally generates for the plant owner / investor.

#### *What countries use FiP*

Spain was the first country to introduce a variable FiP for wind energy in 2004, but abolished it again in 2013 (Kampman et al., 2015). After the introduction of FiP by Spain and increasing recommendation from the European Commission to use more and more market-based instruments, the FiP was already used by 10 countries between 2012-2013 (European Commission, 2013). Besides Spain who was still using a FiP at the moment of the report, Cyprus, Czech Republic, Denmark, Estonia, Finland, Germany, Italy, The Netherlands and Slovenia were using FiPs for at least one technology. The growth of FiP sustained and by 2017 16 countries were using a FiP (CEER, 2018): Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Luxembourg, Malta, Netherlands, Poland and the United Kingdom.

The positive point of FiP are that production devices are more exposed to market principles leading to less distortion on the electricity market. Moreover, having competition between all producers including renewable producers drives innovation and limits costs according to the EC. However, by using FiP schemes, investors have more risk exposure compared to FiT schemes and production devices will have higher integration costs due to the difficulty of having weather dependent technologies such as wind and solar being adaptive to price signals (Ecofys, 2014).



### *Volume-led*

Opposed to price-led schemes in which a certain amount of money per is given to electricity generators to allow them to be compatible with conventional electricity generators, volume-led schemes are not aimed at compensating renewable generators directly. Instead, it is focused on end-users of electricity who can or who are forced to purchase electricity from production devices using a renewable energy source despite the higher costs of doing so. Estimating policy costs is easier with price-led schemes causing an unknown amount of renewable electricity, while volume-led schemes will most certainly reach the percentage it was aiming for, but at unknown policy costs.

In a volume-led scheme, electricity generators are per definition exposed to market principles, but besides the physical electricity, they are enabled to sell the 'greenness' of their electricity as a second revenue stream. In the US, many States have volume-led schemes called Renewable Portfolio Standards (RPS) which is a percentage of total supplied electricity that must be 'green'. The word 'green' is between quotation marks because electricity cannot be green, but rather the primary energy source to generate the electricity can be renewable. Supplying companies in the US must purchase certificates to proof that they have met the green percentage and by doing so they comply to the target and they are allowed to disclose their greenness. In Europe, this is much more complicated because not all Member States use volume-led support schemes, instead a separate certificate system called the Guarantee of Origin (GO) is used for disclosure purposes while certain countries use national certificates that are solely used as a support scheme for national quota's meaning that a supplying company must buy two certificates for the same MWh to a) comply to the national quota b) to be able to disclose it as green. The distinction between these certificates is very important and is explained in further detail down below.

### *Quota scheme with Tradable Green Certificates (TGC)*

In countries that use TGC as a support scheme, any renewable producer must sell the electricity directly to the market causing them to be vulnerable for price fluctuations. On top of their earnings for selling the electricity, producers using a renewable energy source for generating electricity receive a certificate for every MWh put on the grid. This certificate must be purchased by supplying companies as a way to meet a certain green quota set by the government. In case of non-compliance, supplying companies receive a penalty (Raadal, Dotzauer, Hanssen & Kildal, 2011).

The positive points of TGC are the cost-efficient way of driving renewable electricity which stimulates innovation and technical changes (Darmani, Rickne, Hidalgo & Arvidsson, 2015). It incentivizes renewable growth at minimum costs, because the suppliers need to comply to a quota and will do so by buying an economical option. On the other hand, this type of support leads to less certainty for investors because the prices for the certificates are dependent on what market players pay for it. In addition, more expensive technologies will be funded less and almost-mature technologies will benefit from windfall profits (Darmani et al., 2015; European Commission, 2013). However, the investment certainty can be partly avoided by the specific design of including a minimum price of the certificate and the support of high cost technologies can be promoted by having technologic specific certificates. For example, in the UK 5 types of certificate classes were used. Onshore wind and hydro received one certificate / MWh while offshore wind received 1.5 certificates / MWh and tidal and solar even 2 certificates per MWh (European Commission, 2009).

The TGC scheme has been used by several European countries. It started with a voluntary version in the Netherlands which was abandoned in 2000. By 2005, 6 European countries (Belgium, Italy, Latvia, Poland,

Sweden and the UK) + Romania who became an EU-member in 2007 + Norway had a quota system with TGC in place (Midttun, Gautesen & Meyer, 2006; SEC, 2008). By 2013, Belgium, Italy, Poland, Romania, UK and Sweden-Norway had a quota system in place with Sweden and Norway having one scheme together since 2012 (European Commission, 2013; IEA, 2012). By 2017, Belgium, Ireland, Norway-Sweden, Romania and the UK were the countries with this type of scheme (CEER, 2018). In contrast to the FiT and FiP, the number of countries having this volume-led scheme has been rather stable over the years.

Raadal et al (2011) wrote a paper about the interaction between TGC and the GO which indicates the need for clarification in this area. In short, the TGC is a support system and the buyers of the certificates are solely supplying companies that need to comply to a certain target. However, the purchase of the TGC does not enable the right to disclose the use of green electricity. This is very confusing and different from the situation in the US. In Europe, renewable claims for disclosure purposes are proved by a European certificate system called the Guarantee of Origin (GO). The use of the GO system is explained in the next paragraph in an effort to make the distinction between the two certificates as clear as possible.

#### *Guarantee of Origin (GO)*

More background information concerning the GO can be found in Appendix 3. This can be helpful for further understanding on the system's functioning and why it was a large discussion point for the 2009 directive. However, this information falls outside of the direct scope of the research and can hence be found in Appendix 3.

Although never created as a support scheme, the role of the GO system in supporting renewable production devices has now been acknowledged by the RED II by stating that the value of the GO must be included in the calculation for giving out financial aid to producers. Therefore, the GO system is included in this chapter of support schemes. However, categorizing the GO within the variables used for the above support schemes is difficult due to its voluntary nature. The GO's voluntary nature makes variables such as budget control and burden sharing less relevant for public institutions. Moreover, the core task of the GO is not support but rather providing reliable information concerning the way electricity was generated.

Since 2001, every EU Member State needed to have a GO system in place. The core reason for setting this system up is because electricity is a homogenous product and due to an interconnected grid, it is impossible to claim consumption from a specific production device. The only way to make reliable claims about the consumption is to use a book-and-claim system. The certificates are based on real production and represent one MWh. Yet, the trade in certificates is independent from the physical electricity market which enables trade and consumption from specific production devices.

As seen in figure 3 below, the market development for the GO in Europe has been increasing every year with rising numbers for issuing and cancellation.



Figure 3 – GO market development 2009-2018

Source: RECS International and VaasaETT, 2019

#### GO as a support scheme

Where the GO as a disclosure tool has been active since 2001, recent developments show the potential of the GO system as an additional supportive tool for renewables. A solar farm in Spain, wind parks off the shore of the Netherlands and projects in Denmark and the UK were won in tenders by bidders who did not need subsidy. Some devices are being built while others are already fully operational without the need for subsidy (Deign, 2019; Dob-Academy, 2018; Fuhs, 2018).

This is partly possible because of the cashflow of the GO system. As visible in figure 3, the volumes of the GO issuance are rising every year and the prices are also fluctuating more. There is no such thing as a single price, because all certificates are attached to different production devices, but different niche markets have arisen such as Dutch Wind or Nordic Hydro or Alpine Hydro. Due to an extreme high demand for Dutch wind, the price for Dutch wind GOs has touched the 8 euro per MWh, at least 4 times higher than any other GO.

Companies that want to make sure that the finances needed for renewable electricity disclosure do not fluctuate too much, they increasingly make use of Power Purchase Agreements (PPA). This means that a company signs a long-term contract with an electricity producer agreeing on the obtainment of an amount of GOs on a fixed price. This creates a longer-term fixed cash flow from a company towards a producer of electricity using a clean energy source.

The GO can be seen as an additional money flow paid for by the willingness of end-users who in turn can claim the attributes of a specific production device. This money flow can be an additional to existing support schemes or can function on its own.

Advantages of this type of support system is that it allows all end-users including households to purchase electricity from a specific production device. This empowers all electricity users by influencing the demand

for specific devices, for example devices that harm the environment at least as possible. Next, because the certification trade is outside of the physical market, it does not lead to any market distortion. Moreover, it allows consumers to purchase electricity from production devices outside of their own country leading to the most efficient development of renewable production devices.

A disadvantage of the GO as a support scheme is its dependency on the willingness of end-users making it more difficult to support premature technologies. However, it can still be used as an additional stream of money next to other support schemes such as subsidizing the consumer for buying GOs from that specific premature technology. Another disadvantage is that investors have less security on their investment due to its voluntary structure unless the GO is part of a long-term agreement like in a Power Purchase Agreement (PPA) structure which divides that risk between end-user and investor. At last, not only new renewable production devices receive GO certificates, but also existing production devices which can potentially overflow the market with GOs leading to low prices. This could be avoided when enough customers request GOs leading to higher prices in niche markets (example niche market: new production devices).

### 3.4.3 Others

Although other types of measures have been taken by Member States to promote the use of renewable energy, this has not been taken into account in this research. For example, auctions and tendering procedures are used extensively by Member States, but this research sees this as a tool to allocate resources as efficient as possible rather than as a support scheme in itself. Moreover, various tax incentives have been used by various Member States, but this has been excluded too due to its limited effect on the European discussion on support schemes.

At last, some literature suggested the influence of the Emission Trade Scheme (ETS) on the use of renewables, but also this has been excluded from the scope. Even though the ETS could have affected the installation of renewable production devices in Europe, there was clearly a discussion solely focused on European support schemes which is the scope of this research. Hence, this research has focused on the support schemes and has omitted the influence of the ETS.

## 4. Methods

This research aimed to understand how different stakeholder discourses have led to the current framework of the European electricity market in general and more specifically to the current framework for support schemes. This chapter explains and justifies the methodological choices made in assessing this aim by focusing on the operationalization of the variables, the data collection and the analysis of the data. In addition, this chapter explains what choices were made in terms of methodology in an effort to maximize the validity and reliability of the research.

First, the case study is introduced briefly and the choice for looking at the European electricity market is justified. Second, the tool Discourse Network Analyzer (DNA) is explained before more details are given about the operationalization, data collection and analysis, because understanding the basics of this tool is needed to understand the methodological choices in other parts of the research.

## 4.1 Case study

The case study was chosen due to recent interesting developments and personal interest. The theory was chosen to fit the case study rather than the other way around. Hence, the reason for choosing to look into the electricity market is not further justified.

However, one particular aspect of my case study must be justified, namely, the choice for looking at the European level of the renewable electricity market instead of at the national level. This was done because European legislation plays an important role in the chosen strategy at the national level. Focusing on national cases would make it easy to neglect important outside influences and would neglect some important market boundaries of the European electricity market. As explained in chapter 3, there is no such thing as the Dutch or German electricity market that functions independently from any other market in Europe (except Iceland). This causes stakeholders to also play a role in areas outside of national borders and makes it logical to look at legislation and lobbying at the European level.

Although chapter 3 has introduced the case study in great detail, the methodological consequences of choosing this case study have not been discussed yet. Verschuren and Doorewaard (2010) talk about a case study as a research strategy used to gain full insight in objects or processes such as a process of passing legislation which is the case in this research. Some characteristics that case studies have in common are a small number of research units, intensive data generation, in-depth research rather than broad research and qualitative data and research methods (Verschuren and Doorewaard, 2010). The focus of single case studies should lay on triangulation of sources.

Advantages of a single case study are that it allows a holistic approach, it gives flexibility and the results are more easily accepted by people in the field opposed to multiple case studies (Verschuren and Doorewaard, 2010). The largest disadvantage of a single case study is the external validity of the results.

## 4.2 Discourse Network Analyzer (DNA)

This paragraph explains why DNA was used, how it influenced other parts of the research and how DNA works in general.

### *Why was DNA used?*

Advocacy Coalition Framework (ACF), Punctual Equilibrium Theory (PET) and discourse analysis all focus on the role of stakeholders and how their discourses or beliefs form coalitions which in their turn influence policy making processes. This research looked at the way various stakeholder discourses have played a role in the establishment of European policy concerning the support schemes for electricity production by production devices using a renewable energy source. This research was hence in need of a way to identify and assess several discourses and coalitions that are relevant in the case study.

DNA was found suitable because it enables the visualizing of coalition developments over time by combining social network analysis with qualitative content analysis (Leifeld, 2013). In addition, Leifeld (2017), who is the developer of the DNA tool, mentioned ACF in his explanatory paper which indicates that the combined use of DNA and ACF is highly recommended.

### *How does it work?*

Statements which can be found in text sources such as newspaper articles or testimonies are coded using a coding scheme created by the researcher. Each statement, depending on the research purpose, gives 4 pieces of information according to Leifeld (2017). First, each statement was made by an actor, hence this

statement can be linked to a specific individual or organization. Second, the statement reveals what concept was talked about by the actor. Leifeld (2017) distinguishes advocacy coalitions from discourse coalitions by stating that in the case of advocacy coalitions the concepts represent policy instruments which is the case in this research. Concepts used to identify discourse coalitions represent justifications for supporting or opposing a very specific policy subsystem. For example, the justification health can be used for opposing nuclear power while the creation of jobs is a justification for supporting the development of nuclear power (Leifeld, 2017). Third, the statement is about the attitude towards that concept which can be positive or negative and vital in the process of detecting the different coalitions. It prevents actors being put in the same coalition because they have discussed the same topics leaving out that their opinion towards the topic can be opposing. Fourth, each statement was made on a certain date which allows a temporal analysis of the same policy debate.

After having coded all the statements in the data, the statements can be analyzed in various ways. DNA differentiates descriptive and inferential discourse network analyses. Inferential analysis is concerned with micro-level mechanisms of political discourse and is used “to understand why any actor ‘*a*’ supports or rejects any concept ‘*c*’ at any given point in time” by looking at behavioral mechanisms and exogenous variables (Leifeld, 2017). However, this research used a descriptive DNA because it aims to trace a debate over time, visualize competing coalitions on the macro level and analyze their characteristics (Leifeld, 2017). Although more types of descriptive analyses exist, this research used the affiliation network and actor congruence network as this is the best starting point for exploring an empirical debate (Leifeld, 2017).

### *Affiliation network*

Affiliation networks are networks in which the relation between two variables are visualized; hence called two-mode networks. This research looked at whether actors were positioned positively or negatively towards a certain concept over time. In figure 4, the affiliation network is visible by looking at the dashed lines. The example on the right shows that actor 1 (*a*<sub>1</sub>) only had statements about concept 1 (*c*<sub>1</sub>) while *a*<sub>2</sub> had statements about *c*<sub>1</sub>, *c*<sub>2</sub> and *c*<sub>3</sub>. The positive or negative attitude towards these concepts are visualized by making the link between the actors and concept green or red.

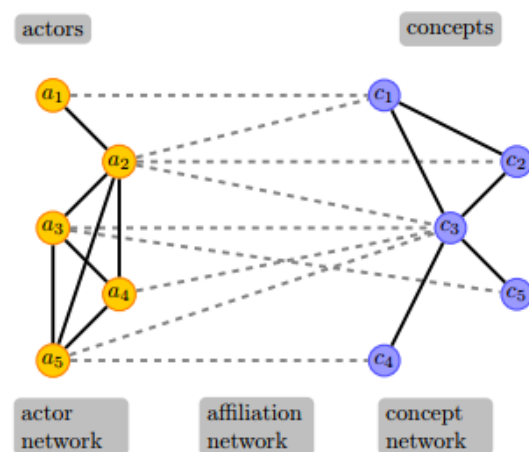


Figure 4 - Affiliation network (leifeld, 2017)

### *Congruence network & conflict network*

In an effort to visualize coalitions, the use of congruence and conflict networks are recommended, because affiliation networks tend to be too large to detect clear coalitions (Leifeld, 2017). Congruence network visualizes the degree of similarity between different actors by looking at how often the two actors

agree on various concepts while conflict networks look at the degree of disagreement between different actors (Leifeld, 2013).

As can be seen under 'congruence networks' in figure 5 below, a line is drawn between different actors when they respond similarly to the same concept. The dashed lines that represent the agreement or disagreement towards a concept is kept in the background causing an overview in which likeminded actors are easier identifiable. Conflict networks work the same, but the connecting factor which causes a line to be drawn between the two actors is an opposing standpoint towards a concept.

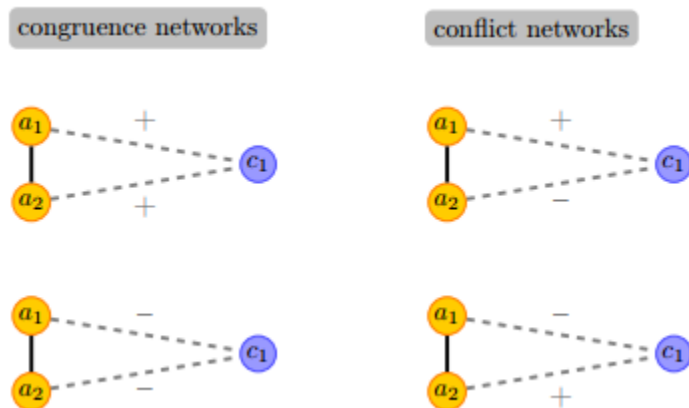


Figure 5 - Congruence network (left) and Conflict network (right) Source: Leifeld, 2017

### 4.3 Operationalization

2 variables needed to be operationalized, the dependent variable and the independent variable. The dependent variable is the outlook of the use of support schemes in the European renewable electricity market. The independent variable is stakeholder discourses.

#### 4.3.1 Dependent variable

The European renewable electricity market and the used support schemes are not static objects that can be measured at one point in time, instead, it has transformed over the years. The outlook of this market can be made measurable by evaluating all European Renewable Energy Directives (RED). The first RED was created in 2001 and was later revised in 2009. In 2018, the final version of the second RED (RED II) was accepted. Everything that is stated in the REDs that relates to the use of support schemes was used in this research in an effort to construct a view of the dependent variable.

The operationalization of the dependent variable of the three different REDs causes three different time periods to exist. This research assumes that relevant actors with influence on the creation of the RED have shared their views within 5 years of the final release of the directive. Therefore, this research uses three different time frames being 1997-2001, 2005-2009 and 2014-2018. The final year of all three periods matches the creation or revision of the RED. The time gaps are chosen to reduce the number of articles that needed to be coded, but by taking all five years prior to the final draft of the directive, all important statements from relevant actors are believed to be included.

Paragraph 3.3 already discussed all the various REDs and is therefore used as an operationalization of the dependent variable.



#### 4.3.2 Independent variable

The operationalization of stakeholder discourses is less straightforward than the operationalization of the dependent variable. Discourses are “an ensemble of ideas, concept and categories through which meaning is given to phenomena” (Hajer, 1993) and therefore Leifeld (2013) has suggested to operationalize discourses by analyzing actors’ statements in various sources such as newspaper articles. By analyzing statements of relevant actors by coding them through a coding scheme (see 4.3.3) it becomes possible to create a congruence network which is a straight operationalizing of advocacy or discourse coalitions according to Leifeld (2013). The argument behind this statement is that when actors respond similarly to a variety of concepts, it can be assumed that actors have similar beliefs which is the glue for cooperation and coalition forming (Leifeld, 2013).

In an effort to detect the discourses of actors in this research, a variety of concepts had to be created which allows systematic coding of statements concerning the use of support schemes in the European renewable electricity market. Paragraph 4.3.3 introduces the 6 concepts which are used in this research.

#### 4.3.3 Coding scheme/Concept creation

The concepts are based on pre-knowledge on the topic and complemented by concepts that were created while coding all the data. Lastly, they have been checked during the expert interviews and no interviewee had any comment on the created concepts. All concepts together aim to cover the discussion of the use of support schemes in the European electricity market. The various concepts are presented in table 1 after which all will be elaborated upon one by one.

It must be noted that all concepts are created based on having production targets in the EU. This is relevant because if the EU were to have consumption-based targets such as in the US, concept 3 would have been unnecessary. In a consumption-based target, the trade of ‘green’ electricity is automatically done through a certificate system, because otherwise the consumption of electricity cannot be proven and allocated to a specific country or state.

Table 1 – overview of concepts

<b>Concept 1</b>	Independent national support schemes are the way to promote renewable electricity in Europe.
<b>Concept 2</b>	EU harmonization of support schemes is a plan for the long term, not the short term
<b>Concept 3</b>	Import and export of ‘green’ electricity for target accounting must be registered through a certificate system.
<b>Concept 4</b>	Recipients of support schemes must be exposed to market principles.
<b>Concept 5</b>	Remuneration must be a) price-led b) volume-led
<b>Concept 6</b>	Complying to target accounting by increasing supply of and demand for renewable electricity is solely a governmental task



1. Independent national support schemes are the way to promote renewable electricity in Europe.

This concept was included to make a distinction between organizations that were in favor of having the framework of support schemes decided fully by national governments without necessarily a certain degree of harmonization between Member States and organizations that were in favor of having similar systems between countries or even one European system. Information box 1 illustrates the importance of this concept.

*Information box 1*

**Åland Case – 2014**

The Åland Islands are Finnish territory located in the Baltic Sea between Finland and Sweden. Yet, its electricity grid is stronger connected to Sweden than to Finland.

Electricity company Ålands Vindkraft AB installed wind turbines in Åland, but was unable to benefit from a Finnish support scheme due to the island's semi-autonomous status and unable to benefit from the Norway-Sweden scheme despite having a strong physical link to Sweden. Ålands Vindkraft AB went to a Swedish court that directed them to the European Court of Justice (ECJ). The ECJ had to decide whether Sweden was allowed not to give support to the wind turbines (despite benefiting from the electricity output of the wind turbines) purely because the turbines were not located on Swedish soil. In other words, can a country that has support schemes for a specific industry within their borders refuse to let another company benefit from this purely because the company is located in another EU Member State?

If the word electricity would be replaced by cars, the answer would be extremely logical. No European country is allowed to give support to car manufacturers located within their country borders because that would be market distortion which is illegal under the free movement of goods that is applicable in the EU.

The consequences for the energy market would have been enormous if Ålands Vindkraft AB would have won, because it would have meant that all production devices in Europe could ask for remuneration from any European country due to Europe's interconnectedness which would have led to support schemes being fully harmonised in the EU. Electricity generators would logically ask for support from the country who offers the highest support causing all countries or at least many of them to offer the same price or less as their neighbor country.

The Advocate General favored Ålands Vindkraft AB, but the court ignored the advice of its Advocate General and decided that the refusal of Sweden was in line with the European free movement of goods making the electricity sector an exception when comparing it to any other sector.

Statements were coded as '**agree**' when actors' statements were including but not limited to advocating for independent national support schemes due to its necessity or its effectiveness and efficiency. In addition, a clear disapproval towards European alignment or harmonization of support schemes also led to an agree on concept one.

**Disagreement** was put for organizations that had a clear statement that national schemes were unwanted for whatever reason. Openly support for harmonization or alignment of support schemes also resulted in a disagreement for this concept.

2. EU harmonization of support schemes is a plan for the long term, not the short term.

This concept was included to make concept one slightly less black or white. Including this concept allowed a more refined opinion for both organizations agreeing and disagreeing with concept 1. Organizations that ideally wanted some sort of alignment of support schemes in European countries, but did not find it feasible at that moment could now be coded as agreeing at concept 1 and agreeing with concept 2. On the other hand, organizations disagreeing with concept 1 could now be further distinguished by having an urge of timing by disagreeing with concept 2 stating that harmonization was needed as soon as possible.

3. Import and export of 'green' electricity for target accounting must be registered through a certificate system.

This concept deals with the extent to which target accounting and therefore support schemes must be aligned. Some organizations defined harmonization if a few rules would align, others believed harmonization meant a completely open and competitive market in which the target accounting can only be done with a certificate system. This discussion was at its peak in the period leading up to the 2009 directive and supporters of this concept saw the European electricity market as one single market where end-users in France were not necessarily consuming electricity that was produced in France because the grid is interconnected. Supporters find that every MWh must receive a certificate and the user of that certificate can eventually claim the electricity put on the grid by that production device. Just like citizens of France not necessarily all drive Peugeots and German citizens not all necessarily drive Volkswagen. Opponents of this concept believed that it would be unfair/ unwanted to create a market where Member States invest in renewables without being able to count it for their national targets. It could lead to overcompensation of production devices and countries would be able to comply to European targets by buying certificates instead by installing more capacity on their territory.

**Disagree** was put for statements that opposed the use of the certificate system for target accounting and a disagreement was also put on statements supportive of using flexible mechanisms because this does not harmonize to such an extent that the market would be open as with a certificate system. It would only allow Member States to transfer statistics or build projects together with mutual benefits.

**Agree** was put for organizations that openly supported the use of certificates for target accounting.

4. Recipients of support schemes must be exposed to market principles

Exposure to market principles can mean different things, but in this concept, it means that electricity generators should sell their electricity in the market causing them to be vulnerable to price fluctuations on the electricity market just like any other electricity generator. This concept captures one of the largest discussion points for the support schemes. One camp believed that new technologies (renewables) needed time to develop and therefore needed to be protected from market exposure. This camp supported the use of the feed-in tariff because this was a remuneration given regardless of the electricity price and would give investors the ultimate security for the investment. The other camp believed that giving money to production devices regardless of the market development was market distortion and

could potentially lead to too much capacity operating outside of the market which could jeopardize the European electricity market as a whole.

Organizations were giving an **'agree'** on this concept when statements would contain a negative remark about feed-in tariffs such as the distortional effect on the market. Statements that were favoring support schemes that were exposed to market principles or countries that installed support schemes exposed to market principles were also given an agree. Statements that supported the use of feed-in tariffs for whatever reason were coded as **'disagree'**.

#### 5. Remuneration must be a) price-led b) volume-led

As showed in chapter 3, financial support can be given out based on actual electricity output (MWh) or based on capacity (MW). For reasons explained in paragraph 3.4.1, this research solely focused on the most common support schemes in Europe being all based on electricity output. Furthermore, other types of remuneration such as investment aid have been given to renewable producers. However, this was not part of the large discussions at European level which caused this research to solely focus on the remuneration based on electricity output.

The biggest distinction between giving out price-led remuneration versus giving out volume-led remuneration is that with price-led remuneration it becomes easier to estimate the costs of giving out this remuneration without knowing how much electricity will be produced. On the other hand, when remuneration is volume-led (for example a 20% target), the end goal is clear but the total costs of the remuneration is more difficult to estimate. Statements supporting the use of feed-in tariffs or feed-in premiums were given an agree for price-led remuneration (a). Supporters of volume-led remuneration (b) were given an agree when statements were positive towards quota systems.

#### 6. Complying to target accounting by increasing supply of and demand for renewable electricity is solely a governmental task

This concept was included to make a distinction between organizations that see private businesses being responsible too for investing in new production devices and organizations that mainly look at the government for the way forward. Recently, several renewable Power Purchase Agreements (PPA) were signed for both new production devices and existing ones. This could accelerate the independency of investors on public support by carrying that risk on to companies that are willing to do so. However, this would mean that more companies would make bilateral deals with generators or suppliers instead of following normal market prices.

Statements were coded as **'agree'** when it was openly opposing any contribution or initiative from private organizations. A **'disagree'** was given to statements including some sort of support towards businesses initiating new production devices as for example in a Power Purchase Agreement (PPA)

### 4.3 Data collection

It is important for a single case study to have a triangulation of sources meaning that data should come from more than one source. This research used two types of sources coming from three different locations. First type is documents coming from the database of LexisNexis and from consultation documents published by the European Commission. The second type of data came from interviews held with energy experts.

The first data source was the database LexisNexis and was used for creating the affiliation and congruence networks for all periods. The data was retrieved by using the following search terms for all three periods (1997-2001; 2005-2009; 2014-2018):

1. “support scheme” OR “support schemes” OR “support mechanism” OR “support mechanisms”  
These search terms were used, because this research aims to understand how different actors have influenced European legislation regarding support schemes. The plural and singular form were used and the synonym support mechanism was included.
2. “renewable” OR “renewables”  
Because support schemes for other products are not interesting for this research, this search term was included. The search term “renewable energy” or “renewable electricity” was not used because often articles refer to the general term “renewables”.

Subsequently, the geographical area was set to Europe which causes the period 1997-2001 to have 47 results, the period 2005-2009 to have 951 results and the last period to have 4215 results.

The sample for period 2 and 3 were too big for the scope of this research and therefore only a few sources could be selected. Platts was chosen because it is an independent provider of information specialized at the energy and commodities markets. Also, Platts articles were found in both period 2 and three giving it a consistency. For period 2, all Platts’ published articles were chosen being 309 divided between Platts Renewable energy report (96), Platts EU Energy (93), Platts Power in Europe (40), Platts European Power Daily (39) and Platts Power UK (27). For period 3, Platts’ reports did not provide a large enough sample. The biggest publisher were articles from the European Union, but it contained merely reports over 30,000 words making it unfeasible to go through all. Instead, 442 articles were selected published by Seenews renewables, Platts European Power Daily, European Daily Electricity Markets, Platts Power in Europe and Contify energy news.

The second data source was expert interviews. Some of the interviewees were contacted because their organization had come up in my research while other energy experts were recommended to me. The table below introduces the interviewees quickly. The results of the interviews can be found in the ‘results’ section and the semi-structured nature of the interview can be found in appendix two. The semi-structured method was chosen in an effort to have comparable results for all interviewees, but also to keep the flexibility of asking additional questions appropriate to the situation. The table below briefly introduces the interviewees.

*Table 2 – Introduction interviewees*

<b>Name</b>	<b>Activities</b>
Jared Braslawsky	Jared Braslawsky has been active in the renewable field since 2010 when he started working for RECS International. RECS International is a non-profit organization that promotes and supports the use of Energy Attribute Certificates (EAC) systems around the world including the Guarantees of Origin (GO) in Europe. He has been Secretary General of RECS International since 2014.
Michael Lenzen	Michael Lenzen is founder of the company communicating sustainability which started in 2015 and has previously worked for CertiQ, which is the issuing body for GOs in the Netherlands and daughter company of Tennet (a large Transmission System Operator in Europe). In addition, he has been

	active for the project CA.RES which supports the transposition and implementation of the 2009 RED and gives advice to the Association of Issuing Bodies (AIB).
David de Jager	David de Jager's knowledge on this topic is due to its working experience (1992-2018) at Ecofys, a consultancy firm that regularly did research for the European Commission during the development of the Renewable Energy Directives. Between 2008 and 2017, he also worked for the IEA-RETD (International Energy Agency – Renewable Energy Technology Deployment) which was a technology collaboration program under the IEA that acted as a vehicle to accelerate the deployment of renewable energy technologies. Currently, he works for himself at GROW (Growth through Research, development & demonstration in Offshore Wind), a joint research program that initiates and accelerates innovations in offshore wind.
Hans ten Berge	Hans ten Berge has many years of experience in the energy sector as can be seen in his working experience. He worked at the utility Eneco Energy between 1998 and 2006 after which he became Secretary General of Eurelectric, which is a sector association that represents the common interests of the electricity industry at pan-European level. Hans ten Berge was Secretary General between 2007 and 2016.
Dirk van Evercooren	Dirk van Evercooren has worked for the VREG (Flemish Electricity and Gas Regulator) since 2002 and is now Director Markets, the department that deals with the retail market for electricity, gas and certificates (both CHP and GOs). Also, he has been spokesperson of the VREG since 2015. In addition to his tasks within the VREG, he is a member of the CEER Customer and Retail markets working group since 2008 and co-chair of the Customer Empowerment Task Force since 2011. Lastly, he is president of the Association of Issuing Bodies since 2014.
Hélène Lavray	Helene Lavray is a Doctor of Law and has been active within Eurelectric since 2008. At first, she worked as an adviser for Environment and Sustainable Development Policy and has been focused on renewables since 2016. Currently, she works as Senior Advisor for the Renewables and Environment department and as Public Affairs Coordinator. She is responsible for the coordination, representation and advocacy of the power sector views on the Clean Energy Package.
Tom Howes	Tom Howes has worked for the IEA between 2001 and 2004 after he started his still ongoing career at the European Commission. He worked as policy officer between 2004 and 2010 in which his main project was doing research, drafting impact assessments and conducting consultations and discussions with Member States and other stakeholders for the 2009 RED. He was specialized in renewable energy heating, trade, financing, statistics and the GO. In 2010 he became Deputy Head of the Renewable Energy policy unit in which he managed teams working on the 2013 guidance document for renewable energy support schemes and the renewable energy progress reports. Currently, he works as Deputy Head of the economic analysis and financial instruments unit.
Aurélié Beauvais	Aurelie Beauvais worked between 2012 and 2017 for the Union Française de l'Electricité (UFE) which is the trade association for the French electricity sector. The UFE represents employers in the electricity sector in the

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economic, industrial and social field. First as advisor for European affairs after which she became Head of EU and International Affairs in 2013. In 2017 she joined SolarPower Europe (former EPIA) as Policy Director. SolarPower Europe represents organisations along the Solar value chain and aims to shape the regulatory environment for solar power in Europe.

Pierre Tardieu is Chief Policy Officer at WindEurope. He leads WindEurope's Policy Department covering advocacy, market intelligence, conferences and membership engagement. Pierre joined WindEurope in 2011 and has a decade of experience in European Climate and Energy policy. WindEurope is the voice of the wind industry, actively promoting wind power in Europe and worldwide. In addition to wind turbine manufacturers with a leading share of the global market, the membership encompasses electricity providers, developers, component suppliers, contractors, finance and insurance companies, research institutes, and national wind and renewables associations.

The final source of information was taken from two consultation documents. The first one was the 2015 public consultation on a new energy market design of which questions 5,7 and 9 were chosen as being relevant to this research.

Table 3

	Question	Relevance
Q5	Are long-term contracts between generators and consumers required to provide investment certainty for new generation capacity? What barriers, if any, prevent such long-term hedging products from emerging? Is there any role for the public sector in enabling markets for long term contracts?	Concept 6
Q7	In your view, which specific evolutions of the market rules would facilitate the integration of renewables into the market and allow for the creation of a level playing field across generation technologies?	Concept 4
Q9	Should there be a more coordinated approach across Member States for renewables support schemes? What are the main barriers to regional support schemes and how could these barriers be removed (e.g. through legislation)?	Concept 1

The 2016 consultation 'preparation of a new Renewable Energy Directive for the period after 2020' was chosen because it was also highly relevant as it was a consultation about the Directive this research has looked into. Questions 4, 15 and 19 were chosen as being relevant for this research.

Table 4

	Question	Relevance
Q4	What should be the geographical scope of support schemes, if and when needed, in order to drive the achievement of the 2030 target in a cost-effective way?	Concept 1
Q15	Should the current system for providing consumers with information on the sources of electricity that they consume be further developed and improved?	Concept 3 – GO for disclosure

		and/or target accounting
Q19	Currently, some exceptions from the standard balancing responsibilities of generators exist for energy from renewable sources. In view of increasingly mature renewable generation technologies and a growing role of short-term markets, is time ready to in principle make all generation technologies subject to full balancing responsibilities?	Concept 4

No consultations on this topic from before 2014 could be found on the website<sup>2</sup>. Hence, the number of consultations remained at two. Hundreds of organizations have filled in these consultation documents, but in an effort to select only relevant documents, only consultations from identified actors were selected.

#### 4.4 Analysis

As already explained in paragraph 4.2, the DNA tool was used for analyzing the data. Only the data retrieved from the LexisNexis database was used for the creation of the affiliation and congruence network. The expert interviews and consultation documents were purely used for the verification of the analysis. The affiliation network shows the opinion of all identified stakeholders towards all concepts. The congruence network better visualizes the coalition forming processes through time and can be considered an operationalization of a coalition.

#### 4.5 Maximizing validity

A potential risk of looking at stakeholder discourses is that the difference between influential actors and non-influential actors is neglected. This risk was mitigated as much as possible by selecting independent information sources such as Platts renewables and other news websites that filter out opinions from organizations that do not have any influence on policy making. However, by taking indirect sources from journalists this research risks to have gathered data which contains misquotation or misinterpretation of journalists.

Hence, the consultation document from the identified actors, written by the stakeholders themselves, were used to verify the information found in the articles written by journalists. Moreover, 9 expert interviews were conducted to verify the information found in the database. The results were shown to the expert only at the end of the interview to ensure that the showed results would not alter the answers given by the interviewee.

### 5. Results

This chapter is cut up in four different parts. The first part shows the intensity of the European discussion around the use of support schemes which is visualized by showing how many articles were published for each year within the research scope. The second, third and fourth part contain the results for period one, two and three respectively. The results for each specific period are build up as follows: first, the biggest changes in the directive are repeated from chapter 3.3 answering sub-question 2. Subsequently, the stakeholders are identified for the particular period together with their opinion towards the concept. This

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<sup>2</sup>Consultations EC. See:

[https://ec.europa.eu/info/consultations\\_en?order\\_by\\_status=closed&field\\_core\\_topics\\_target\\_id\\_entityreference\\_filter=367&page=4](https://ec.europa.eu/info/consultations_en?order_by_status=closed&field_core_topics_target_id_entityreference_filter=367&page=4)

is visualized in the affiliation network and answers sub-question 3 and 4. Next, the congruence network is presented in which coalition forming among actors can be identified. All the information for both the affiliation network and congruence network is retrieved from the data set. After, the information retrieved from other sources function as control on the data found through LexisNexis. These outside sources are the expert interviews for all periods complemented with consultation documents for the last period. At last, the possible relation between stakeholder discourses and the final text of the RED can be identified and further explained which will answer sub-question 5.

#### How to read the affiliation networks

The concepts are presented in the center of the figure and connected with identified stakeholder through green or red lines. A green line represents an agreement with the concept whereas a red line means a disagreement with the concept. The positioning of the stakeholders on the right or left side of the concepts and high or low in the list has no meaning. It rather serves the readability of the figure, because of the many lines being visible. Actors have different shapes and colors to make a distinction on the type of organization. When an organization had conflicting statements for one concept during a specific period, the visible line in the graph represents the statement mentioned more often. In case of an equal number of agreeing and disagreeing statements towards one concept, the actor is visible in the scheme without any attached line towards that concept.

#### How to read the congruence network

Lines between actors means that they are likeminded on at least one of the concepts. Concept two has been omitted from this, because it gives a sense of urgency towards the opinion on concept one. Two actors that both disagree with concept 2, but have different opinions towards concept one could hence could be unfairly linked together in a congruence network.

### 5.1 Intensity of the discussion

After having put all the search terms in LexisNexis, the intensity of the discussion became very visible. Within this 22-year period, this research focused on 3 5-year periods (1997-2001; 2005-2009; 2014-2018). The first period got very few hits and surprisingly in 2000 (the year before the first RED), very few articles were published. After the first RED of 2001, the number of articles increased due to more attention being given to climate issues in general and the implementation of the RED 2001. The second period being 2005-2009 already had a significant number of articles more with its peak being in 2008, the year leading up to the final draft of the revised RED in 2009. From this moment on, the number of articles did not come under the 400 a year with the third period 2014-2018 having an enormous 4291 results. Not only was a new RED published in 2018 explaining a high peak in the years before, but this RED was part of a larger energy package called the 'Clean energy for all European' explaining more attention being given to this topic. Moreover, the Paris agreement in December 2015 and rising climate change discussions can easily explain the high number of articles being published within this third period.



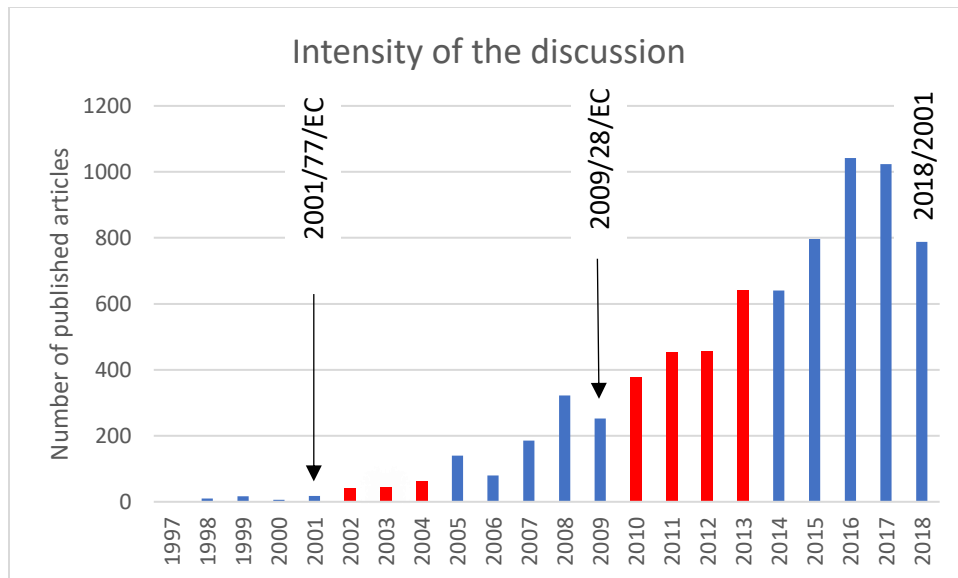


Figure 6 – Blue years within scope / red years excluded in the scope

## 5.2 Period one: 1997-2001

### Description in 2001/77/EC

2001/77/EC was the first directive that actively promoted the use of renewable energy and it introduced indicative targets for all Member States (article 3). Calculating the consumption of electricity for target accounting was defined as total national production plus imports minus exports (article 2). Also, countries were obligated to create reports sharing their progress every 2 years and explaining their future plans every 5 years. To make target compliance possible, Member States were allowed to introduce support schemes which had to fit within a framework (article 4). For example, support schemes had to fit within the rules of the internal market which was defined by directive 96/92/EC as “an area without internal frontiers in which the free movement of goods, persons, services and capital is ensured”. The final relevant point was the obligation for Member States to set up a GO system in an effort to prove the origin of renewables sources (article 5).

### Affiliation network

The affiliation network below shows the result of analyzing the articles found for the 1997-2001 period. No statements were found for concept 6.

Table 5

<b>Concept 1</b>	Independent national support schemes are the way to promote renewable electricity in Europe.
<b>Concept 2</b>	EU harmonization of support schemes is a plan for the long term, not the short term
<b>Concept 3</b>	Import and export of 'green' electricity for target accounting must be registered through a certificate system.
<b>Concept 4</b>	Recipients of support schemes must be exposed to market principles.
<b>Concept 5</b>	Remuneration must be a) price-led b) volume-led
<b>Concept 6</b>	Complying to target accounting by increasing supply of and demand for renewable electricity is solely a governmental task

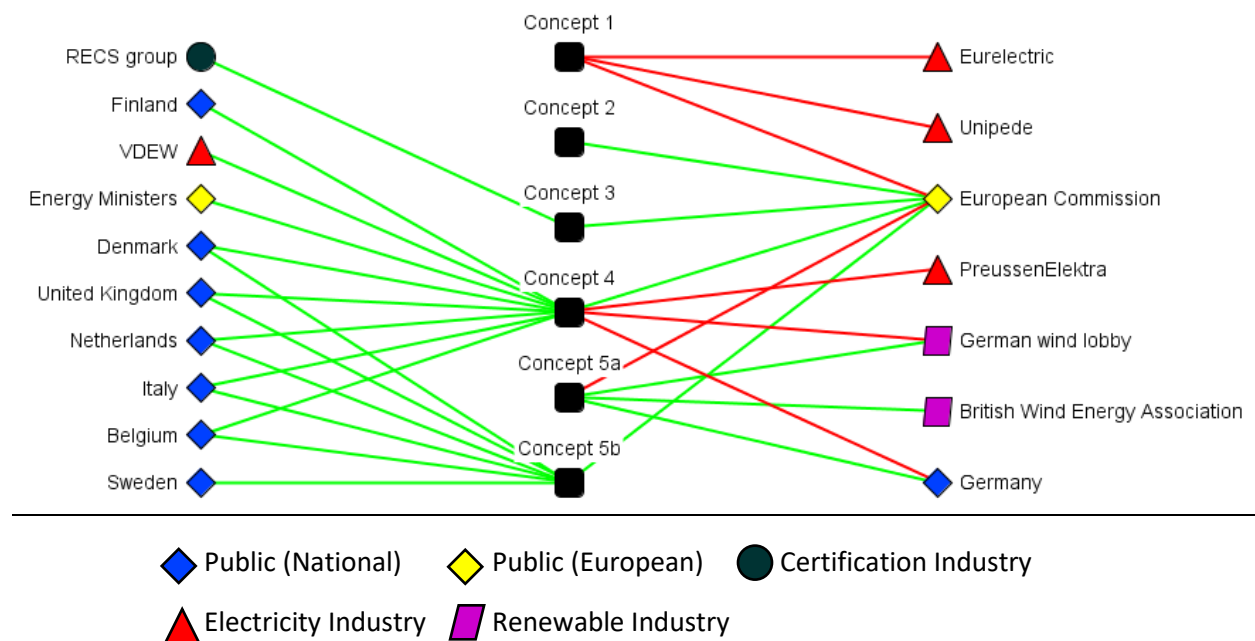


Figure 7 - Affiliation network 1997-2001<sup>3</sup>

### Concept 1 & 2

The EC wanted to create a single European electricity market in light of the liberalization of the European electricity market and believed that this was also the way forward to introduce more renewables in this market because a single market would facilitate the introduction of renewables in the most cost-efficient way. One single European market in which renewables are promoted means that the European Commission was not in favor of independent national support schemes (concept 1). However, the agreement of the EC with concept 2 shows that the EC acknowledged the difficulty to achieve this single market because Europe was in the middle of the liberalization process of the electricity market.

“[...] political process has shown that at present the climate is not right for harmonisation and the directive is expected to leave it open for national states to formulate their own subsidy schemes. The

<sup>3</sup> All stakeholders are described in Appendix 1

Commission is not likely to propose harmonised subsidy schemes before more experience is obtained with the various national systems over the coming years”

Electricity market representatives Eurelectric and Unipede also believed in harmonized support schemes, but saw the single European electricity market as a bridge too far in 1999. Paul Bulteel, secretary general of both organizations argued that “there were still many issues to be solved in creating a single market including international transmission pricing, operational handling of international transmission access and harmonization of support mechanisms for renewables”.

### Concept 3

This concept shows that the EC together with the RECS group, an organization consisting of market facilitators, electricity companies and government representatives, were also in favor of setting up a certificate system that would facilitate trade of renewable electricity in Europe. The Energy Department DG17 stated that “in order to permit trade to take place, a certification system is necessary which will permit purchasers to be certain that the electricity acquired is indeed produced from renewable sources”.

RECS Group represented already more than 10 countries at that time and was in the test phase of voluntarily trading green certificates across Europe.

### Concept 4

In 1999, the European Commission started a proceeding against Germany due to their feed-in laws not complying to the EU state aid rules. In Germany, operators were forced to purchase renewable electricity at minimum prices which were higher than market prices. Because Europe is an internal market concerning goods, persons and capital and therefore also electricity, supporting only German renewable electricity producers was viewed as not being in line with this requirement. However, the first draft of the Commission included a 5% exception rate for electricity meaning that any country could give out state support until the country surpassed 5 percent of domestic electricity production. After having achieved 5 percent, governments would have to open its support schemes to renewable generators in any other European Union country.

The draft was quickly watered down after Germany met with legislators by arguing that their support schemes were needed for reaching the Commissions’ renewable electricity targets which was more than 5%. The result of the proceeding came in 2001 when the ECJ ruled that the German purchase obligation could not be considered state aid, because of two reasons. First, there was no indication that State resources were transferred via public organizations to beneficiaries. Instead the levy was directly put to the consumer, not firstly collected centrally and given to the beneficiary. Second, the transfers occurred directly between private companies meaning no State interference, even though the private companies were forced to do so.

After this ruling, the Commission raised no objections to German feed-in laws (European Commission, 2002).

In the affiliation figure, it is visible that Germany, German Wind lobby organizations and PreussenElektra, a utility who had already huge wind developments in Northern Germany at that time, were the sole actors opposing this concept. Exposure to market principles would only bring insecurity for the German wind industry and would jeopardize the support scheme that was already set in Germany since 1991. The ruling

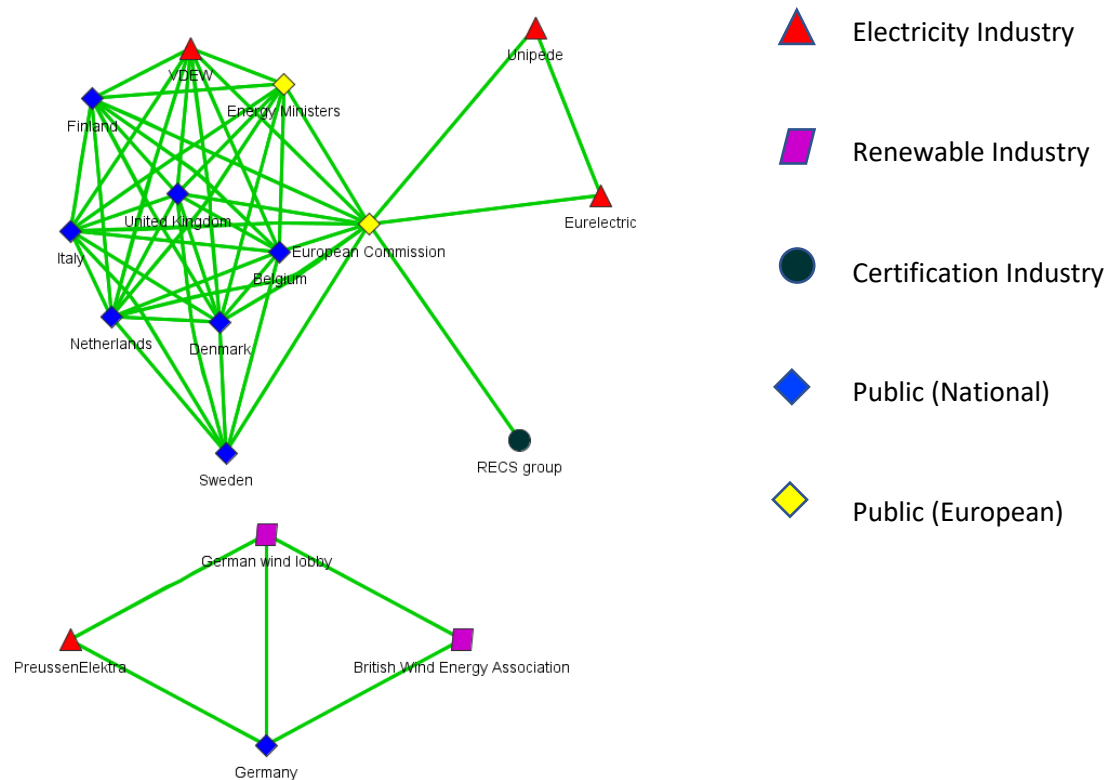
of the German system not being State aid enabled the existence of the German tariff under the 2001/77/EC directive.

Opposing to the German actors, many countries agreeing with the concept were countries that had a certificate system in which market players are automatically exposed to market principles. Also, the Commission wanted this because it was necessary to have this in a single European electricity market in which renewables were integrated. German utility association VDEW was also not happy with the German rules, because it would force utilities to buy electricity at prices higher than the market and according to the managing director at that time the laws would “promote long term subsidies, multiple support mechanisms and windfall effects and ignored market forces”.

#### 5a / 5b: volume-led and price-led

Because of the national character of the support schemes, every country could choose the support scheme of their choice creating some differences between German actors favoring price-led schemes and other countries favoring volume-led schemes. This did not lead to many discussions because the opposing preferences were not interfering with each other. However, the EC wanted to have a single market with volume-led schemes installed, but this turned out to be impossible for this period.

#### **Congruence network**



*Figure 8 – Congruence Network 1997-2001*

The coalitions are clearly visible when taking away the concepts from the figure. In the bottom of the figure, it is clearly visible that German actors and the British Wind Energy Association formed a coalition because they all supported the use of FiT systems while the larger coalition in the top favored a Tradable Green Certificate system in which renewable producers were exposed to market principles. The European Commission is also agreeing with Eurelectric that no independent national support schemes should be in place and agrees with the RECS group that certificates are needed to prove the origin of electricity.

### **Verification expert interviews**

Period 1 occurred a long time ago causing only a few interviewees to be able to recall the discussions at that time or even to recall the activities of the organization they represent at the moment. However, Jared Braslawsky could confirm the role of RECS Group in this first period as RECS Group was created out of the believe to set up a reliable certificate system in Europe that facilitates trade of energy attributes among Member States. Hans ten Berge was not active for Eurelectric in the 1997-2001 period, but could confirm that Eurelectric had always promoted a harmonized European electricity market.

David de Jager was already active for Ecofys since 1992 and was able to give more details about this period. He mentioned that countries and energy companies were not yet convinced by the merit of renewables, resulting in a business as usual approach with more attention to conventional energy including nuclear power. Germany was the exception who believed in renewables since the early '90 and hence supported renewables from that moment on. Other countries, like Denmark and the Netherlands supported renewables too, but policy support was not stable (e.g. various changes in financial support schemes) resulting in a less stable investment climate. In terms of harmonization, David de Jager explained that renewables and support schemes were in such an early phase that the focus was purely on research and setting up projects for learning purposes. Research and development were done in harmonization, but the operational phase, that included the finances, was done on a national scale.

Tom Howes confirmed that the EC supported harmonization and market-based schemes, but this was not written down explicitly in the directive due to several countries who did not want to harmonize finances causing it to be politically impossible. Tom also mentioned that the 2001 court case against the German support was crucial for the further development of FiT in Europe.

### **Correlation discourses and final text**

In general, actors agreed that the European electricity sector had to emit less CO<sub>2</sub> causing the existence of directive 2001/77/EC. Also, no actor in this analysis was against having national indicative targets and no actor was against the way target compliance was calculated. The mandatory development of the GO system for all Member States to prove the origin of electricity was supported by the European Commission and RECS Group and opposed by no one causing the assumption to arise that this tool got developed in this directive due to the discourse of the EC and RECS Group.

Article 4 of the 2001/77/EC concerning the support schemes used for target compliance was discussed at greater length. First, it is argued that the directive does not call for harmonization between support schemes due to the discourses of stakeholders. The data indicated that Eurelectric and the EC favored harmonization of the entire electricity market including the use of support schemes, but this was omitted from the directive because it was too soon in the liberalization process according to the data and because of Member States who preferred to keep this for national legislation according to the interviews with Tom

Howes and David de Jager. Second, in terms of market exposure for electricity generators receiving a support schemes, it looked like the coalition of several countries using TGC, the EC and VDEW got their way by having written down in the directive that support schemes must be following the rules of the internal market. Nonetheless, the coalition of Germany got its way eventually because of the ruling of the Court that allowed the support from Germany at that time by labeling it as not being state aid and therefore being compatible with rules of the internal market.

### 5.3 Period two: 2005-2009

#### Description 2009/28/EC

Directive 2009/28/EC was a revision of the first RED (2001/77/EC). A major development was the transformation from indicative targets to mandatory targets (article 3). While the calculation method for target accounting only allowed Member States to comply to the targets by building production devices within their national borders, Member States were given some sort of flexibility with the development of three cooperation mechanisms. Member states who already achieved their 2020 targets could do a statistical transfer with a country that needed additional renewables for their target (article 6). Another option was to develop a joint project within Europe or outside of Europe (article 7-10) or to set up a joint support scheme (article 11). There was no mention of harmonization and it was not explicitly mentioned that recipients of support schemes had to be exposed to market principles.

The GO system was further specified in its task of disclosure by linking it to the internal market directive (article 15).

#### Affiliation network

The affiliation figure of 2005-2009 is presented below and shows how actors looked at these various subjects prior to the acceptance of the directive.

Table 6

<b>Concept 1</b>	Independent national support schemes are the way to promote renewable electricity in Europe.
<b>Concept 2</b>	EU harmonization of support schemes is a plan for the long term, not the short term
<b>Concept 3</b>	Import and export of 'green' electricity for target accounting must be registered through a certificate system.
<b>Concept 4</b>	Recipients of support schemes must be exposed to market principles.
<b>Concept 5</b>	Remuneration must be a) price-led b) volume-led
<b>Concept 6</b>	Complying to target accounting by increasing supply of and demand for renewable electricity is solely a governmental task

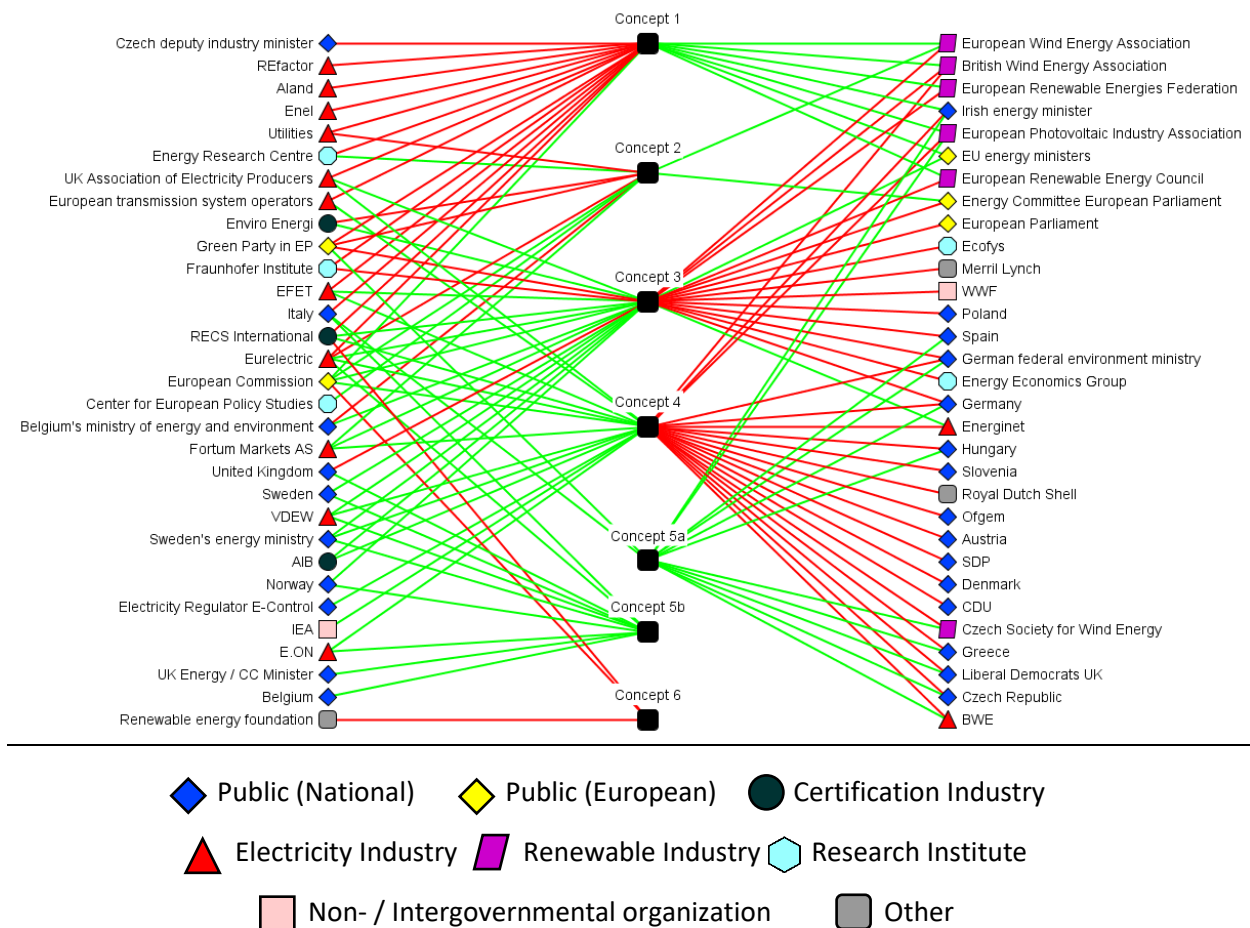


Figure 9 – Affiliation network 2005-2009

### Concept 1 & 2

The European Commission had conflicting statements compared to period one, as can be seen in the figure above. Where the Commission urged for harmonization in the 1997-2001 period and pushed it forward due to timing issues in light of the total liberalization of the electricity market, the European Commission now believed that Member States should “optimize rather than harmonize their renewable support schemes in the short term”. In another statement from the EC, the possibility for a single EU support scheme is put aside and it was suggested to instead strengthen national support schemes. However, these statements are softened by the belief of the EC that harmonization of support schemes is still a plan for the long term. In short, the EC wanted to set up a harmonized system in period 1, but was hold back politically due to the liberalization. In period 2, the EC promotes national systems keeping harmonization solely as a long-term goal.

Period one did not identify strong supporters of national support schemes, but this had changed in period two. The renewable industries favored the generous national FiT schemes, because it gave renewables the chance to develop further without any investment risk. The loudest voices came from interest organizations European Renewable Energy Council (EREC), European Renewable Energy Federation (EREF), European Wind Energy Association (EWEA) and the European Photovoltaic Industry Association (EPIA). Supporters of independent national support schemes were often criticized for supporting market

distortional policies by opponents of national schemes. EWEA justified their support for national schemes by stating that the energy market as a whole still had fundamental flaws meaning no level playing field which was particularly linked to “market concentration, the lack of good interconnections and a lack of full unbundling of transmission from production and sales activities”. EWEA hence did not agree with the fact that the public discussion was mainly focused on harmonizing renewables instead of harmonizing other parts of the market first. Hence, EWEA was supportive of concept 2 because they acknowledged that after the market was truly harmonized, support schemes should be harmonized too.

The number of actors opposing to national support schemes had also grown compared to period 1. The largest group of organizations opposing national support schemes were actors active in the electricity sector and representatives of this sector. Examples are Eurelectric, Enviro Energi and a United Kingdom based association for producers. The Eurelectric secretary general summarized their criticism in the following statement: “We want wind farms built where the wind blows, not where the subsidies flow”. This argument was also used by RECS International who was a supporter of an EU-wide single support scheme to promote the development of energy sources where they would be most efficient. Several utilities and association companies such as Eurelectric were even stronger in their eviction towards national support schemes which can be seen in their disagreement with concept 2.

Also, UK energy trader REfactor and the European Federation Energy Traders (EFET) opposed national schemes which was clear in the court case Åland which has been explained in paragraph 4.3.3. EFET said: “power transmitted is ineligible for national feed-in tariffs, government support or green certificates”, while the installation on Åland could be nominated to transmission system operators in four countries. EFET found this a restriction on free movement of goods under Article 28 of the EC Treaty, and filled a complaint.

In addition, the European Transmission System Operators opposed national schemes because “national and regional differences in support for wind and other renewables was causing additional congestion in the European power grids”. They recommended a harmonized support scheme in an effort to have more evenly spread installation of wind power capacity.

### Concept 3

The original draft of the EC included the GO being the instrument to facilitate the trade of renewable electricity that would count for target compliance. This idea was set aside just months before the final draft. Hence, it is not surprising that this topic was heavily debated in period 2.

*Opponents* of using GOs for target accounting were mainly Germany and Spain, environmental organizations such as WWF and the renewable energy industry. Germany and Spain, who both had a FiT in place, feared that by using the GO for target compliance FiT countries would have high additional costs and feared that this rule would eventually lead to a European quota system. This fear was confirmed by Ecofys who did research on this topic and concluded that the introduction of a European GO system would cause interference with existing national schemes such as quota’s and FiTs. Hence, Germany and Spain slammed the original idea of the EC by writing a joint letter to the EC. EWEA did not believe that the use of certificates could lead to more cost-efficient development, because there was simply no pool of cheap renewables available according to EWEA. All countries already needed to do all they could to meet the targets. In addition, EWEA feared that the introduction of a European certificate system would lead to strategic gaming exercises that would higher the costs of renewables for some MS. Yet, EWEA was not



completely against any form of trade, but simply wanted to assure that Member States would preserve the ability to have full control over their support schemes and national policies regarding the support of renewables.

EREF was even stronger in dismissing the GO trading idea. According to them, the introduction of a European-wide trading system with GOs could eventually lead “to the collapse of existing energy programs of the Member States”. Moreover, Member States would lose control over their own support scheme causing countries to have reduced ability to achieve their targets.

WWF was also critical towards the plan, because WWF feared that it would lead to a lot of trading without creating new additional renewable production devices.

The Energy Committee of the European Parliament also wanted to preserve power to Member States in deciding their strategy and only supported to eventually chosen cooperation mechanisms to create a flexible mechanism for countries to achieve their targets.

*Supporters* of the international trading scheme for target accounting facilitated by the GO system were organizations active in the electricity sector, actors within the GO market, energy traders, some Member States and the European Commission.

RECS International advocated for the use of the GO system as an accounting tool for target accounting which would facilitate trade between various Member States. If it was expensive to develop new projects within one’s borders, it should become possible to buy renewable electricity from across the border for consumption and this party selling the GO could potentially develop a new renewable production device more efficiently. Criticism from parties claiming that this system would enable countries to reach their target without building additional production devices was set aside by RECS International. “We should be trying to meet the EU overall target in the most cost-effective manner possible,” said RECS International. Both the AIB and RECS International talked about a pan-European market, focusing on the EU target without looking into national targets as this was subordinate to the overall EU target. If one country would reach their target by purchasing GOs, it would mean that another country has sold so much GOs that it must build additional production devices to create new GOs for their own target. On the EU level, not everyone can reach their targets by purchasing GOs and using a certificate system would avoid double claiming making it the most reliable way to count for target compliance, according to RECS International.

RECS International also believed that the GO system used for target accounting could co-exist with FiT schemes without jeopardizing it. In the final year leading up to the final draft, RECS International proposed to let every Member State open up 10-20% of their renewable production for free GO trade for target accounting. A proposal from the Commission to restrict GO trade to governments was set aside abruptly by the AIB, because it would destroy the voluntary market which had grown enormously over the years.

Also, EFET and Eurelectric were in favor of having the GO trading scheme active in Europe for target accounting. Eurelectric found it unlogic that an EU directive was in place with an EU renewable target without an EU system to achieve that target. According to Eurelectric, the introduction of the scheme would lower market distortions in such dramatic matter that the introduction of it would save 17 billion Euro by 2020 compared to the system at the time.

Some national authorities such as the Swedish energy ministry believed the market worked and saw opportunities in expanding a certificate system to the rest of the EU recognizing it would possibly clash

with countries using feed-in systems. The European Commission came up with the draft and stuck to the idea for a long time as could be seen in an article end of 2007 which showed that "A powerful faction within the EC's energy service is pushing the idea of virtual trade of Guarantees of Origin". However, by September 2008 it looked the idea wouldn't last as the European Parliament noted that "The commission is now in a minority in supporting the guarantees of origin scheme". Just before September 2008, a coalition of Poland, Germany and the United Kingdom had proposed an alternative to reach flexibility, namely, by introducing statistical transfer, joint projects and joint support schemes which eventually became the final text.

#### Concept 4

Similar to period 1, many organizations were positioned on both sides of this concept. The final text of the directive did not specify that support schemes had to be complying to rules of the internal as the first directive did. Instead, the mandatory targets were set and the directive obligated MS to achieve these targets by using support schemes and the cooperation mechanisms.

However, many organizations were still strongly against support schemes that were functioning outside of the electricity market. Eurelectric, the UK association of electricity producers and RECS International expressed their concerns that more and more renewables were added to the grid meaning that in the near future 35% all electricity was functioning in non-market circumstances. The UK association of electricity producers feared that this could not only disturb the electricity market, but also would interfere and displace other carbon-abatement strategies such as promoting energy efficiency and developing carbon capture and storage technologies. Also, the price renewable producers were getting was too high, according to Eurelectric. The liberalization of the electricity market was fully underway and it was time to stop the FiT. This opinion from Eurelectric was shared by the International Energy Agency (IEA) who also believed that market-based schemes could reduce the risk of overfunding and that it was time for policy makers to focus on market-based promotion schemes.

E.ON, a German utility company described the Feed-in tariff as "sweet poison", meaning that it was so beneficial for renewable producers that it was leading to windfall profits for some generators and disturb other parties in the electricity chain. The European Network of Transmission System Operators (ENTSO) blamed FiT countries, but Germany in specific, for contributing to a growing problem of unscheduled cross border electricity exchange. ENTSO believed that especially the wind sector must have balancing responsibility in an effort to reduce that problem.

The European Commission also strongly believed that FiT should be minimized, but still approved countries using FiT. Nonetheless, the EC reported that a further use of premiums was desirable.

The most active opposers of this concept were still the renewable industry and many Member States. Member States including Germany, Hungary, Slovenia, Austria, Denmark, Czech Republic and Greece had installed FiT schemes for reaching their national target. Interesting to see is that Spain, a huge supporter of FiT in the previous period, is not included in this graph. This is explained by the fact that Spain had similar statements about being in favor and against the principle. Spain had installed a premium tariff in 2004 meaning that some production devices in Spain were receiving remuneration as additional cash flow instead of as sole cash flow. The BWE, the German Wind Energy Association, emphasized that the FiT was more efficient than the quota system because it resulted in more wind energy for a lower price. The EPIA was still in favor of FiT systems to develop solar in Europe, but mentioned that in the long run premium

systems would be more sustainable according to their 2006 report: "it has become evident that premium feed-in tariffs are the most appropriate tool for creating an eventual self-sustaining solar electricity market". This is in line with the EWEA who had a less strong voice on supporting FiT compared to period one. Both EPIA and EWEA had many more statements for supporting national systems compared to European systems than statements defending FiT.

Besides Germany, the United Kingdom had a lot of discussions around support schemes in this period. The UK had moved from a Renewable Obligation (RO) towards a Contract for difference (Cfd) which was a form of premium tariff. UK electricity regulator Ofgem even suggested to move towards a fixed return for renewable generators due to cost savings. The same line of reasoning was used by Royal Dutch Shell who saw German's FiT as the most effective policy to promote renewables.

#### Concept 5

In contrast to period 1, the feed-in premium was installed in this period creating another price led support scheme but with market exposure for generators. This concept was not heavily debated according to the data, some parties/countries preferred volume led schemes such as the tradable green certificate while others preferred price-led schemes, but both could be used to reach the national targets.

If Europe had defined its renewable target as in the US, it would have been much more logical for all countries to have solely volume led schemes. After all, in the US the State targets can only be met by having green certificates leading to way to focus on volume-led support schemes. German utility company E.ON referred to the system of the US as a preferred option over the German support scheme.

#### Concept 6

In its draft, the European Commission was supporting the GO certificate system as a way to create flexibility for countries to meet their targets. The EC not only wanted to open up the possibility for governments to trade GOs, but also supported the possibility to have private companies to trade GOs for target accounting as it was already possible in the voluntary disclosure market. This so-called 'person to person' trade would link the disclosure market with the compliance market meaning that whoever could claim the use of renewables was also helping the country it was located in to meet their target. There were obviously also many organizations against this type of accounting, but this have been put under concept 3 because it was more focused against the certificate system in itself rather than against parties outside of the national authorities to help creating more renewables.

RECS International was positive towards the idea of having private companies to trade GOs, but was strongly against having governments trade in GOs because it would completely kill the free market principle and more generally, it would not make sense to have public officials to trade in products produced by private companies.

The Renewable energy foundation was even more rigorous by suggesting that governments should stop meddling in the energy sector all together.

### Congruence network

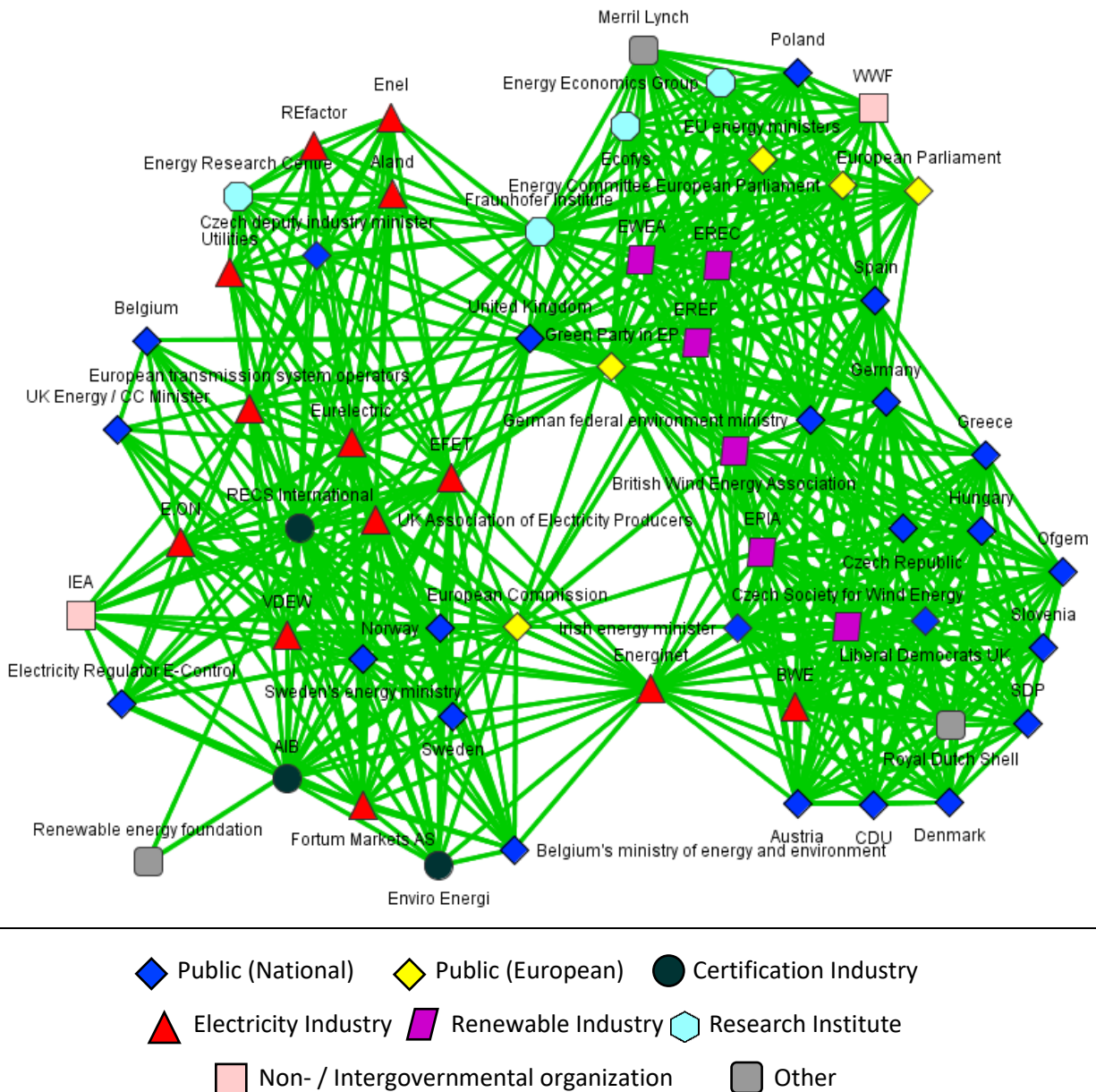


Figure 10 – Congruence Network 2005-2009

Compared to period one, the discussions exploded in terms of stakeholders. However, there are still some coalitions detectable in the figure above. When taking a very hard distinction, there are roughly two sides, left and right. The left side is supportive of market-based support schemes and/or supportive harmonized support schemes and having the GO as a trading mechanism for target accounting. The right side of the figure generally supports national support schemes being the FiT and rejected the idea of GO trading for target accounting. Some parties such as Energinet, the European Commission, Fraunhofer Institute and a few others are in between the two coalitions because they supported for example national schemes while also supporting market-based schemes and the use of the GO for target accounting such as the European Commission.

When zooming in more closely, the right bottom of the figure visualizes the actors being against market principles for recipients of support schemes, while the right top of the figure opposed the use of GO as a trading mechanism for target accounting. However, many organizations opposed both these concepts causing so many lines to be drawn between the right top and right bottom of the figure. On the left side of the figure, the top of the figure around REfactor is in favor of harmonization while more towards the bottom the stakeholders agreed more on volume-led schemes, market-based instruments and trading the GO for target compliance. Organizations such as Eurelectric and RECS International favored all these concepts.

### **Verification expert interviews**

The transformation from indicative targets towards mandatory targets was a logical one according to David de Jager who claimed that countries had learned from the Kyoto protocol in which targets were also indicative. If it were not for the mandatory targets, the Netherlands, for example, would not have done as much as it has done now.

In terms of harmonization, both Aurelie from SolarPower Europe (former EPIA) and Pierre Tardieu from WindEurope (former EWEA) confirmed that both their organizations were indeed in favor of national schemes. Pierre noted that the pan-European model had always been more of a theoretical idea. Europe was in need of so much more renewables than just the most efficient spots. New renewable production devices had to be built wherever possible. Aurelie agreed on that by noting that achieving solar deployment in some countries was always better than no development at all, because it would be beneficial for the learning curve of the technology. Members of EPIA were focusing on installing as much solar as possible to drive cost down and improve the technology's competitiveness regarding energy performance and efficiency. The potential higher cost due to less efficiency was less important. However, Aurelie did mention the need for harmonization, but in terms of European rules concerning tenders or grid access. Not in terms of support schemes as concept 1 suggests. This statement was shared by David de Jager who claimed that many organizations including WindEurope were a huge fan of the German model and harmonization meant for these types of organization copying the German model. WindEurope believed that everyone should have adopted the German model meaning that all countries would focus on a national support scheme running on FiT, according to David de Jager.

Both Helene Lavray and Hans ten Berge from Eurelectric confirmed that Eurelectric was opposing national support schemes and even support schemes all together. Hans ten Berge argued that the focus should have been on reducing CO<sub>2</sub> instead of supporting renewable electricity. He said that because of support schemes, non-renewables with a lower marginal cost were kept in production. Between gas and lignite, gas is more expensive looking at marginal cost causing lignite to stay active while lignite is much more polluting than gas. He argued that if instead the focus had been on reducing CO<sub>2</sub>, lignite would have ended a long time ago in Germany. The national character of the support schemes was also a very bad thing according to Eurelectric. They compared it with Germany supporting Volkswagen or BMW financially, while they were not supporting any other non-German car brand which was illegal in every branch except for electricity.

Jared Braslawsky from RECS International could understand national targets, but found that support schemes should have been harmonized. He emphasized that all countries in the EU are connected through the grid which makes it logical to have a European scheme or at least harmonized schemes. This would have benefitted several pillars of the EU being the competitiveness, sustainability and the security of

supply, according to Jared. He argued that when support schemes are on a European scale, the new production devices would come at locations that would not hurt the stability of the grid. Jared said that many countries used the security of supply as an excuse to keep support schemes national, because they wanted to keep control of their own market. Invalidly, according to Jared who saw this as pure protectionism.

Tom Howes from the European Commission was responsible for the development of this specific directive and told in the interview that the EC acknowledged that national schemes were distortive in the market, but that the EC saw this distortion as an additional distortion in an already distortive market that was not fully liberalized yet. By keeping support schemes national, the EC gave national authorities time to fix the other distortions in the electricity market. For example, national authorities had the power to support and hence introduce new renewable market players in the market competing with ex monopolies. This was the reason that the EC switched position compared to period one and focused on national authorities creating effective national policies rather than focusing on creating a harmonized support scheme.

Michael Lenzen confirmed that TSOs were indeed not in favor of national schemes because of the increasing distortive role of renewables in the electricity sector. Several TSOs bundled their power in an effort to avoid letting support schemes become too much of a risk. Michael mentioned that this harmonization discussion was secondary to concept 4 of the research: the exposure to market principles. Therefore, Michael did not want to go as far that TSOs were advocating for a European support scheme, but they were definitely in favor of harmonization and market-based support schemes. TSOs believed that all support had to be market-based to reduce the distortion factor of support schemes on the European electricity market.

Aurelie Beauvais from SolarPower Europe told during the interview that solar power was simply not competitive enough to have market exposure. On top of that, the rules concerning access to the grid and the day-ahead market were all focused on non-renewables causing priority dispatch and FiT to be a necessity for solar to grow.

Eurelectric on the other hand, was strongly against the FiT because more and more production was immune for market signals. Even when the electricity prices were negative, renewables were receiving remuneration causing the whole market to be distorted. Electricity prices for households in Germany were towards the 30ct / kwh, while the price to generate this was only 5 ct. Hans ten Berge mentioned that large industries were leaving Europe despite their discounted rates in Europe, because renewable electricity in the United States was so much cheaper. This concept was a top priority for Eurelectric according to Helene Lavray and Hans ten Berge.

David de Jager confirmed the picture stating that utilities were generally favorable of the UK model using a certificate system. He said that research showed that FiT was more efficient and effective than TGC when comparing Germany to any other TGC country. However, solar in Spain, a FiT country, was much more expensive than solar in France proving that especially the stability of a system was important for developing renewables. Spain had made several retroactive changes in its support schemes which did not turn out to be favorable for the investment security. This story of Spain was also brought forward by Jared Braslawsky who called the FiT a successful, but very expensive way of promoting renewables. He said that RECS International was invalidly seen as the enemy of FiT systems, because RECS International believed that the GO system could be complementary to FiT schemes.

Tom Howes explained that the EC was supportive of market-based schemes, but because the liberalization was not fully underway the EC believed that FiT schemes were justified. The directive contains no article advocating for market-based schemes, but the EC advised national authorities to slowly switch to market-based schemes as this would lower the risk of overfunding.

The biggest discussion of this period was the questions whether the GO system had to be used for target accounting enabling trade among Member States.

RECS International, Eurelectric, TSOs and the European Commission were all in favor of having the GO as accounting tool for target accounting. The AIB was split on this topic and supported different instruments. The reason for the AIB to exist is to promote harmonization of the use of the GO in Europe and EECS was architected in such way that it could support both certificates for disclosure purposes and for target accounting. RECS International found it a big mistake that the GO was not taken as accounting tool, because it would have led to more renewables for less money. Jared highlighted that production and consumption are two different things and since the EU is interested in who consumes renewable electricity, the only logical choice is to look at the certificates as they are used to prove the origin of the electricity consumed.

Michael Lenzen confirmed that the discussions around the way target account had to work was at its peak in this period. He confirmed that the Netherlands and TSOs were in favor of GO trade for target accounting, but that it was politically unfeasible to push this idea through. EWEA and EPIA were two examples of organizations that were indeed not favoring the GO for target accounting. Pierre Tardieu found the GO a useful tool for disclosure but nothing more than that. Aurelie Beauvais found the GO not good for promoting new production devices and found it unnecessarily complicated to use it as a compliance tool.

David de Jager explained that utilities were in favor of this development because it would result in efficiency gains and this was the reason that parties such as Eurelectric were supporting RECS International in this discussion. Many countries and environmental organizations such as WWF, Greenpeace and EREC distrusted large utilities as they had been responsible for polluting electricity generation and wanted to have bottom-up grassroots development instead of top-down. Yet, the GO would enable even households to choose their electricity source and to contribute to the target of their country. David responded that bottom-up cooperatives wanted to have a sense of local physical connection between the target and local renewable electricity production. In addition, they focused on other aspects such as improving air quality and employment and due to their distrust towards large utilities who supported the use of the GO system, many local initiatives and environmental organizations were against this idea of GO trade. At the end of the period, Germany did a lot of research towards the flexible mechanisms and after these mechanisms were agreed upon, the GO developed parallel to the electricity market as a tool for disclosure.

At first, Tom Howes mentioned that the EC was supportive of the flexible mechanisms. However, he agreed that the EC was originally a supporter of using the GO for target accounting, but due to imperfections in the electricity and GO market, the EC was eventually very supportive of the flexible mechanisms. He took the example of the European ETS system for showing that it took many years to produce a system insensitive for fraud. After asking the biggest disappointment for the EC concerning the 2009/28/EC directive, he mentioned the lack of usage of the flexible mechanisms.

### Cooperation and threats

This research talks about coalition forming and interviewees were asked what organizations were working alongside with them and what organizations had other opinions.

TSOs were working closely together with the electricity exchange EEX, because their view was very similar. Both organizations were market facilitators and had hence comparable opinions. Their biggest threat was renewable generators who wanted FiTs. EWEA worked together with other Renewable Energy associations such as EPIA and EREC, but also with Greenpeace and climate network. Opponents of these organizations were EFET, Business Europe and Eurelectric. The established electricity chain and large industry.

Eurelectric worked closely together with RECS International and EFET in period two for promoting the GO as target compliance tool and worked together with the Heat pump association and Eurogas. Hans ten Berge said that no organization was seen as a threat, but there were opposing and conflicting statements that were very logical. For example, the coal industry did not want any support for renewables, the nuclear industry wanted a strong CO2 price and the Wind industry wanted a FiT.

RECS International also mentioned Eurelectric and EFET as the organizations with whom they cooperated and saw national governments as largest threat to their idea of a pan-European market. National governments were protective of their borders because of the security of supply and because of financial reasons. The AIB mentioned the environmental NGOs as critical to their instrument, but also large parts of the industry in countries where the production mix is almost completely renewable such as in Norway and Iceland.

### **Correlation discourse and final text**

From early on, it was clear that many stakeholders wanted mandatory targets, according to David de Jager, as can be seen in the final text of the directive. The way target compliance had to be calculated was the largest discussion of this period based on the number of statements found on this topic and as mentioned by several interviewees. It was clear that many stakeholders wanted to have some sort of mechanism in place that allowed Member States to reach their target in a more flexible way. This required a change from the previous directive in which target compliance of the indicative target was calculated based on how much production occurred within the border of the country.

The first draft of the EC introduced the idea of having the GO system function as target compliance tool. Although many stakeholders were in favor of this development, the idea was not picked in the end because several Member States and representatives from the renewable industry were against this suggestion. Member States did not want to give up control on whether they could comply to their target by opening up their renewable electricity market to other countries while environmental organizations wanted to have local benefits from renewable electricity in every country and not just in places where the costs were the lowest. Supporters of the GO system tried to have numerous variations with partly opening the market and an opt-out or opt-in system, but the status quo could not be changed. Instead the cooperation mechanisms were chosen to function as a tool to enable Member States to reach their target in a flexible way while maintaining the Member States in the driving seat of support schemes and target accounting.



It makes sense that the GO system was not thrown in the garbage, because so many organizations including the EC saw the merit of having this system in place. Instead of being used as a way to account for target accounting, its position was strengthened for a tool used in disclosure purposes. This created the confusing possibility to have the same MWh to count for target compliance in country 'a' while being counted for disclosure regulations for an end-user in country 'b'. The EC mentioned that the GO system was not completely free of fraud and by not choosing it as target compliance mechanism, the GO system could be further perfected.

The national character of support schemes and the non-market-based support schemes were discussed in the period prior to the final directive, but the final text of the directive had no explicit mention of these topics. Organizations such as Eurelectric and ENTSO were favoring market-based schemes, but too many Member States and organizations in the renewable industry were favoring FiT systems for it to be changed. Several studies were done that looked into the efficiency and effectiveness of market-based systems versus the FiT, but gave different outcomes. Furthermore, the 2001 court case which allowed the German support scheme under the rules of State aid made it very hard for policy makers to forbid a FiT. In addition to the court case and many organizations being against market-based schemes, the EC named the lack of a fully liberalized market a reason to maintain national based FiT systems.

Yet, the supporters of market-based schemes were not making up the problems linked to the FiT systems and the EC acknowledged the distortive character of the FiT. This led to the European Commission increasingly promote the use of market-based support schemes without putting it as a requirement in the directive.

To conclude, the final outcome of the directive can be explained perfectly by the various discourses that were found in the data and the expert interviews. It turned out to be harder to change the status quo than to keep the status quo in terms of how target compliance was calculated and how much market exposure recipients of support schemes needed to have.

#### 5.4 Period three: 2014-2018

The RED II changed a few features of the 2009 directive. The most obvious one being the abolishment of national renewable targets by instead having one European target of 32%. No free card was given to national authorities because the national targets for 2020 are meant to function as minimum requirement for Member States and their contributions will be tested by applying a formula set out in annex 2 of directive 1999/2018. In terms of support schemes, the directive stated that support schemes cannot disturb the internal market and FiT were urged to be phased out. Also, the possibility of a mandatory 5% opening of support schemes will be evaluated in 2023 and could potentially become 10% by 2030. For the GO, the price of the GO had to be taken into account when determining the remuneration of a support scheme and GOs 'must' be used for the disclosure of electricity instead of 'may' be used for disclosure. Lastly, countries had to make it possible to expand the GO to all energy sources.

Table 7

<b>Concept 1</b>	Independent national support schemes are the way to promote renewable electricity in Europe.
<b>Concept 2</b>	EU harmonization of support schemes is a plan for the long term, not the short term
<b>Concept 3</b>	Import and export of 'green' electricity for target accounting must be registered through a certificate system.
<b>Concept 4</b>	Recipients of support schemes must be exposed to market principles.
<b>Concept 5</b>	Remuneration must be a) price-led b) volume-led
<b>Concept 6</b>	Complying to target accounting by increasing supply of and demand for renewable electricity is solely a governmental task

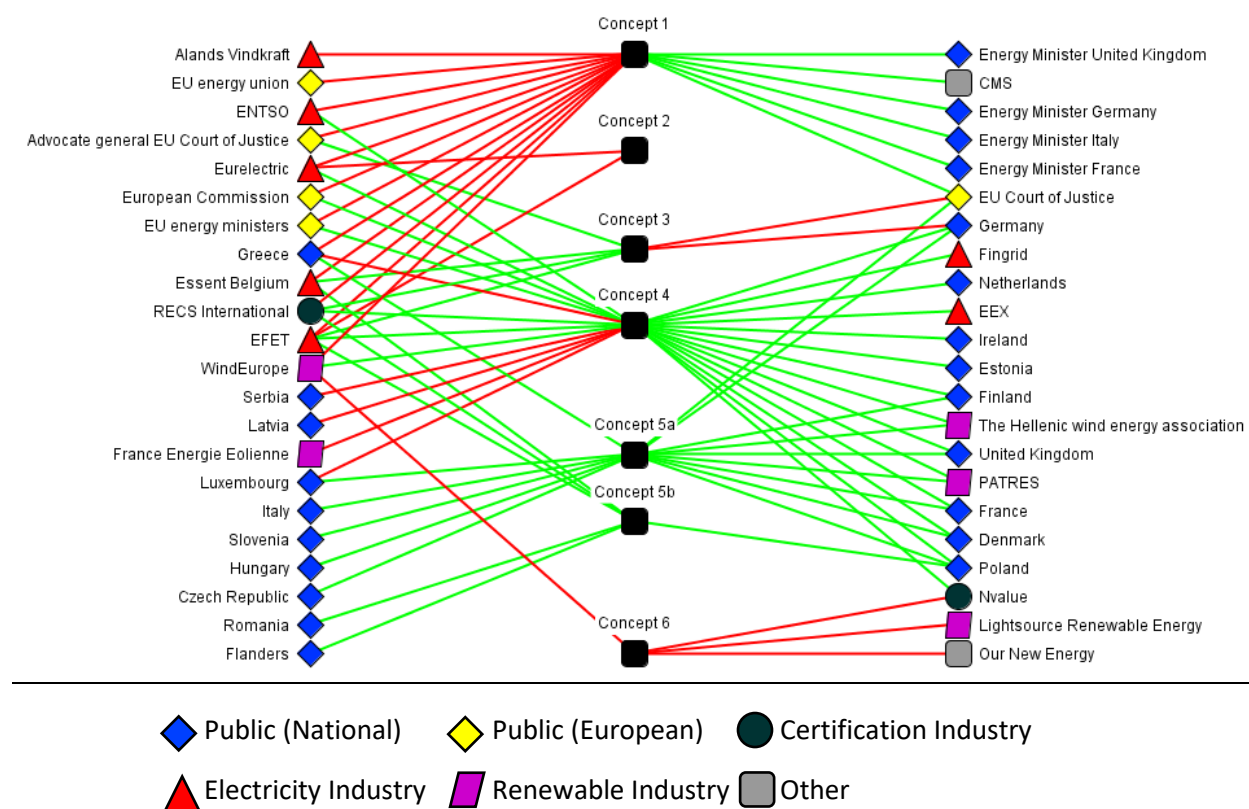


Figure 11 – Affiliation network 2014-2018

### Concept 1&2

The data shows that in period three most actors acknowledged the need to harmonize support schemes. In a single published article, four energy ministers from Germany, France, United Kingdom and Italy argued that “one size fits all approach is not appropriate”. However, the EU energy ministers stated as a group:

"for rapid improvement of interconnections, having due regard to the more remote and/or less well connected [sic] parts of the single market, and implementation of EU internal market rules, together with a progressive evolution of support mechanisms for renewables towards more market integration

and cost-effective and market-based instruments, including more convergence of national support schemes beyond 2020 in order to moderate the energy costs borne by energy end-users”.

In addition to a single statement from several Energy ministers, the EU Court of Justice came with a verdict concerning the Åland case (see information box 1, 4.3.3) and decided that “National governments do not have to open their national renewables support schemes to producers from other countries”, which was against the advice from the advocate general who claimed that the national restrictions from support schemes broke the EU free movement of goods. The last actor visible in the figure is the legal firm CMS who stated that the ECJ had decided correctly.

The third period was characterized with increasing harmonization in terms of tenders and auctions. Germany was the first country in Europe that, after pressure from DG Competition, did a cross-border renewables support auction as part of their 10% opening of German RES through auctions. Besides Germany, Greece also partly opened their support scheme in 2017.

In addition to countries slowly opening up their schemes or organizing cross-border auctions/tenders, WindEurope also switched position compared to the previous period by supporting and advocating for a European approach in which European funding could be used for project development. Furthermore, organizations such as Eurelectric, EFET, RECS International and ENTSO are still calling for more harmonization. Both Eurelectric and ENTSO wanted countries to align their support schemes through market incentives rather than imposed by legislation. Also, EFET welcomed the changes that were being made by Member States, but remained convinced that a fundamental shift to an EU-wide quota system facilitated with European tradable certificates was needed. RECS International responded negatively towards the verdict of the ECJ by saying that it continued to allow protectionist support schemes that pushes producers to develop on places with the highest subsidies instead of places that are cost-efficient.

The European Commission encouraged national governments to cooperate and convergent their support schemes in an effort to get the overall costs down. This was mostly done by updating the guidelines on state aid rather than putting in the directive itself.

### Concept 3

After the intense discussions from period two, this concept was much less discussed in period three. The few statements concerning this concept were no different from the statements found in period two. RECS International still advocated for cross-border trade facilitated by a certificate system to create an efficient internal market and got supported by EFET in this view.

Germany still did not want to have a certificate system for cross border trade and instead decided to partly open up their support scheme.

### Concept 4

For individual Member States, the data was difficult to code for this period, because they often had multiple support schemes available with different conditions. Often, FiT schemes were used for small production devices that needed support while more mature and larger installations were exposed to market principles. Actors disagreeing with concept 4 are mostly countries that were mentioned because of an opening of a FiT for small installations.

Besides some countries that wanted a FiT for some of their installations, almost all other actors agreed with concept 4 at this point in time. Many countries including Germany had installed schemes that forced production devices to be exposed to market principles. Germany changed their scheme in 2014 which started a Feed-in Premium for many production devices including wind farms in an effort “to reduce market distortions caused by feed-in-tariffs”.

Other organizations that previously advocated for FiT schemes such as WindEurope (former EWEA) were now advocating for market-based schemes. Giles Dickson, CEO of WindEurope called stated in 2017 that “Feed-in Tariffs are history”. WindEurope expected that by 2030 only 6% of all wind capacity would not be exposed to market principles down from 75% in 2017.

In addition to some actors that changed position, the actors that were in favor of market exposure in previous periods were still advocating for it in period three. Examples are Eurelectric, RECS International, the European Commission and ENTSO.

#### Concept 5a and 5b

Actors agreeing with price-led schemes are mostly national authorities that increasingly installed FiP schemes in order to reach their national target for 2020. These concepts did not lead to large discussions, but simply gives an overview on what type of support schemes countries were installing in period three.

#### Concept 6

Due to price developments, renewables need less and less public support. WindEurope is advocating for large energy consumers to secure wind power at a competitive price in power purchase agreements (PPA). WindEurope wants countries to remove regulatory and administrative barriers for these corporate PPA agreements. Also, Our New Energy sees the PPA as an emerging opportunity for large energy consumers to promote new renewable production devices without interference of authorities' money.

## Congruence network

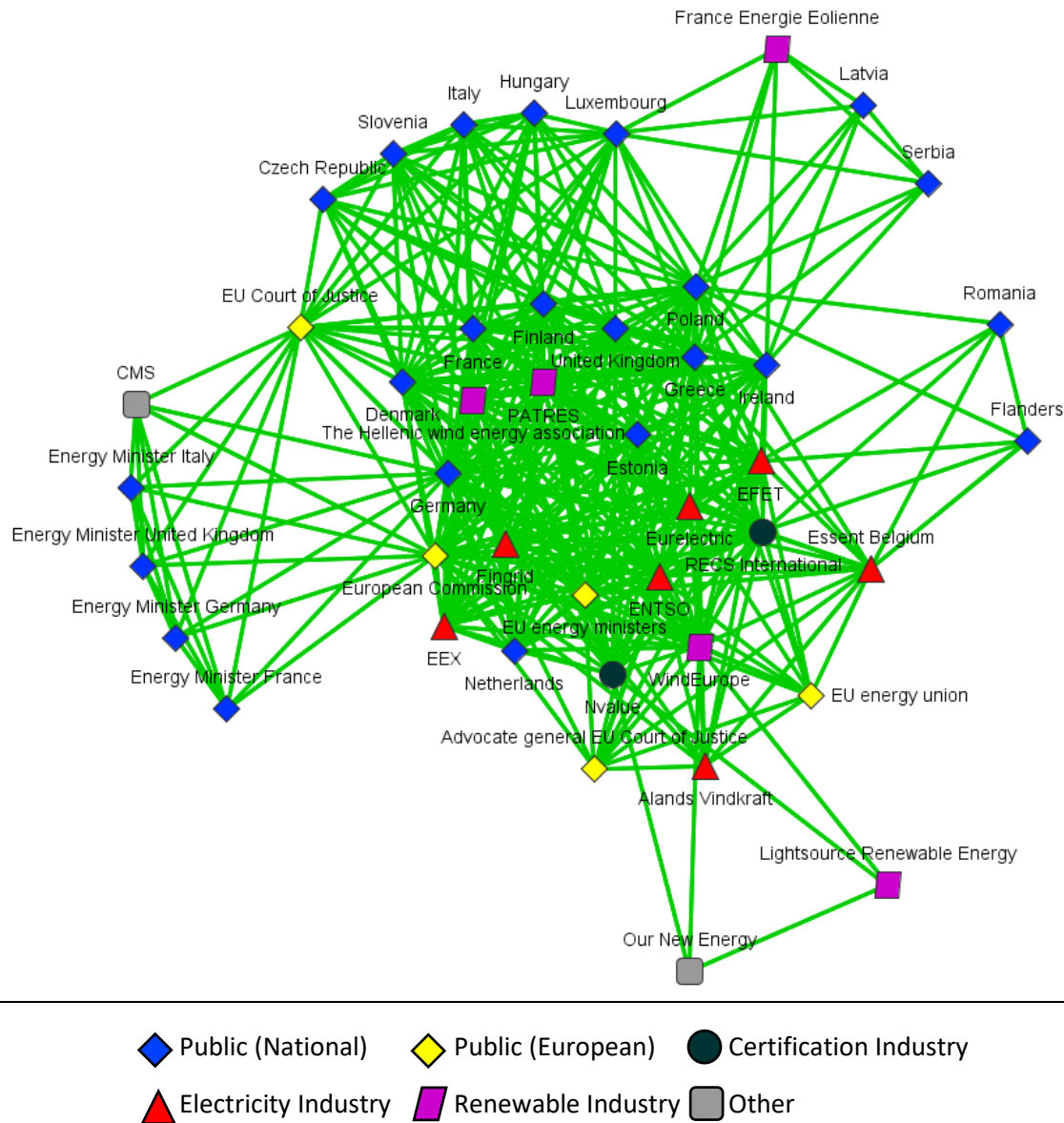


Figure 12 – Congruence network 2014-2018

When comparing this figure to the congruence from period two, it becomes clear that much more stakeholders are aligned in period three. A clear core coalition is formed in the middle that advocates for market-based support schemes and increasing harmonization between Member States in supporting renewables. The renewable industry is agreeing with the renewable industry which did not happen that much in the other periods.

Several energy ministers do still not agree with more harmonized support schemes and are supported by the European Court of Justice and by the European Commission in this figure. The European Commission had several conflicting statements during this period causing them to agree with everyone in this figure. While there are still some countries against market-based instruments (group of Czech Republic and

Slovenia), it is not surprising that the FiT was urged to be phased out in the 2018 directive. A strong coalition was formed advocating for this resulting in the final text that promotes the use of market-based instruments.

### **Verification expert interviews & consultation documents**

Tom Howes told that period three was a continuation of the discussions from period one in which the focus was on enhancing trade between Member States. This statement was validated by Jared Braslawsky who mentioned that the last period was focused on harmonization between Member States. Many producers were about to lose their FiT scheme and were looking for new ways to secure enough revenue by focusing beyond national borders.

Also, Aurelie Beauvais confirmed that support schemes were getting more harmonized across Europe. On top of support scheme harmonization, discussions regarding a European tendering system were also developing. National authorities with strong reservations on the deployment of renewables at national level were more at ease reaching their targets with financing renewable deployment in other countries. She took Czech Republic as an example that could be willing to develop devices across the border because they saw renewables as a burden. Dirk van Evercooren stated that most countries were indeed into harmonization, except for e.g. Hungary that wanted to continue focusing on national legislation where general energy regulation is concerned.

Besides harmonization across Europe, market exposure for renewables was becoming mainstream too, according to Michael Lenzen. He told that there was a broad coalition agreeing that support was inappropriate in periods of negative prices and this led to state support aid guidelines to become stricter. David de Jager told that companies started to realize that it was possible to make money with renewables and this led to more competition in this sector. Due to the increasing capacity of wind farms in Europe, it became harder to balance the grid because the grid rules dictated that when the grid was close to be unbalanced, all wind had to be turned off. After the grid rules were re-written, wind was capable to support in balancing the grid, according to David. SolarPower Europe also preferred the use of market-based support schemes for most renewables, but small production devices and the prosumer needed to be exempted according to Aurelie which they tried to get done by setting up the campaign 'small is beautiful'. This succeeded as Tom Howes told that period three was dominated by phasing out FiT schemes, except for small installations. The EC promoted the use of FiP schemes for larger production instead.

The message that Eurelectric had been promoting since period one was finally getting reality as most schemes were market based although Helene Lavray mentioned that Eurelectric ideally wanted no support schemes at all by having the ETS as key signal for investment.

In terms of the use of energy certificates for renewable electricity trade in Europe, the heated discussions from period two resulted in a very mild debate in period three according to Michael Lenzen. He said that it was clear that the idea was politically unfeasible and that the focus was instead on having the GO system for disclosure purposes. Helene Lavray said that Eurelectric was happy with the GO becoming a mandatory instrument for disclosure of electricity and that the issuance of GOs would be enlarged to non-renewables too. The AIB raised several issues in their vision paper, including full disclosure and integration of GO and carbon markets. A broad debate had taken place in period three in terms of the GO, namely against the idea of auctioning GOs for production devices that received public support. This was advocated against

by RE100, RECS International, SolarPower Europe and WindEurope. The AIB pointed to the need for well-designed auctions, in particular that those in one country should not impact energy markets in other countries, or have an impact on prices elsewhere.

In terms of what type of organizations (public or private) are responsible for developing renewables further, the answers were quite similar among the interviewees. Eurelectric pointed out that the government must only set targets, while the market should take care of the rest. RECS International agreed and added that governments should also set legislation in terms of disclosure rules for example. SolarPower Europe and David de Jager indicated that the grid will need structural changes which will be the responsibility of the public grid operators. Furthermore, David de Jager believed the market could generate enough renewables in the near future, but it was the task of the government to support demand-response and demand in general in terms of electrification for transport and heating.

Michael Lenzen pointed out that some Member States prefer to let everything be handled by the public, because it would be more transparent. According to Michael, some Member States had problems with private companies developing renewables because they did so outside of the viewpoint of market regulators.

#### Cooperation & threats

Opposed to period two, the AIB and RECS International were now collaborating with WindEurope and SolarPower Europe. Also, Eurelectric was more in line with WindEurope and SolarPower Europe than ever before. This had several reasons; first, solar and wind were becoming so large that organizations in these chains became Member of Eurelectric. Second, the costs for solar and wind were decreasing at such a pace that it became more feasible to participate in the electricity market.

Aurelie Beauvais noted that for the first time they had different views than WindEurope on the centralization versus decentralization topic. Wind energy is mostly installed in large farms while solar often has a small capacity causing the representatives to have different views. Both WindEurope and SolarPower Europe mentioned business Europe as the organization that was opposing their views the most.

#### **Consultation**

##### Public consultation on a new energy market design – 2015

##### *Long term contracts between generators and consumers.*

Numerous organizations and countries are positive towards long-term contracts between generators and consumers. From the electricity sector, Fortum, Europex, Eurelectric, Enel, E.ON and EFET mention the value of such contracts. Most of them specifically mention the need for such contracts to remain voluntarily and that the public sector should only make such contracts possible by having predictable energy policy. Further invention from the public is not welcomed. E.ON agrees that such contracts should be enabled, but highlights the need for other instruments too. ENTSO-E believes that such contracts are not required to provide investment incentives. They would like to see hedging products as crucial feature of future markets and investment decisions.

Countries are more reserved towards this development. Hungary is not supportive of the development, because it would form a barrier for new players to enter the market if contracts are such long term. They

prefer medium-term contracts. Sweden, Denmark, Finland and Norway are not against these long term contracts, but believe that a competitive and liquid financial market is more important to attract additional investments. The UK is supportive, but adds that more measures will be needed to attract investment. The Netherlands, Czech Republic and Estonia are supportive of the development and expect these types of contracts to occur more frequently.

In the renewable industry, both EWEA and EREF believe that such contracts are important for attracting new investments. Public authorities have the task to remove barriers for such contracts. The opinion of the renewable industry is hence in line with the (conventional) electricity sector.

WWF believes that PPAs can be one of the solutions, but believes that other measures should be taken too. In addition, strict rules must prevent long-term contracts with unsustainable power generators. The IEA suggest that long-term contracts are needed but, opposing to the electricity sector, they believe that governments must push for long-term agreements.

#### *Investments driven by market signals*

The whole electricity sector agrees that market signals must be leading in new investments. Fortum, Eurelectric, ENTSO-E and EFET would like to see the European Trading Scheme (ETS) as the main driver of RES investments while phasing out all other support. Some parties such as Fortum, Europex and ENTSO-E mention that some support schemes can still be needed for immature technologies as long as FiT schemes are avoided. FiP or quota systems are preferred over FiT, but capacity payments are also increasingly interesting according to Enel and Europex. Enel suggests that non-programmable technologies such as wind and solar can still be awarded FiP while programmable technologies should receive investment aid based on capacity.

As last market signal, Europex sees the GO as the best way for all end-users to promote the energy source of their choice given that GO systems are standardized over Europe and expended to all energy sources. This idea is shared by the AIB who believes that purchasing renewable power made possible by clear disclosure regulations will help investments.

A strong and leading ETS system is also mentioned by Denmark, Czech Republic and Norway. All countries agree that maturing renewables need to be fully integrated on spot, intraday and balancing markets. Finland and the Netherlands are satisfied with the recent developments of the state-aid guidelines.

Both the renewable industry, IEA and WWF focus on creating a truly internal market where conventional technologies pay for their own externalities (e.g. through CO2 price) without receiving subsidies. Instead of supporting renewables, the real costs of conventional plants should be visible in the market making renewables automatically more competitive. Another proposed measure by EREF is to shut down inflexible conventional plants.

#### *Coordinated support schemes*

A coordinated approach for support schemes is desirable for the whole electricity sector. Without coordination of support schemes, the internal market would never be reached. E.ON mentions that if support is not soon harmonized, it could trigger further national auctions via capacity mechanisms leading to more fragmentation across Europe. Some parties such as EFET and Europex find harmonization and coordination desirable, but prefer a European framework.



Many Member States are more hesitant towards the idea or towards the execution of the idea. Hungary opposes the idea of standard mandatory support schemes and would like to see any cooperation staying completely voluntary. Although Finland and the UK can see the benefits of coordination, they claim that local policies have a strong link with support schemes causing every country to have other ideal regulations for support schemes. Both countries would more easily support the possibility to open national support schemes to foreign installations. Also, Norway and Denmark think cooperation is good, but see harmonization of investment conditions as impossible or as an enormous administrative task.

EWEA defines harmonization as partly opening up support schemes, but stresses that it would not be harmonization as the Åland case describes it. EWEA supports coordination of the design of support schemes, because it would make the use of the cooperation mechanisms easier. WWF is supportive of coordinated support as long as it stays a tool to have improved efficiency rather than making it a goal in itself.

### Consultation RED II – 2016

#### *Geographical scope support schemes*

Not a single respondent in this consultation promoted the use of independent national schemes such as described in concept one. However, there are some differences between organizations on what alignment / harmonization / cooperation entails. Within the electricity industry, Enel, ENTSO and Eurelectric support gradual alignment of national support schemes through common EU rules. They believe that countries will not and cannot suddenly change the way support schemes work due to economic and political reasons. Hence, these organizations promote more coordination, yet, acknowledge some difficulties in reaching that. E.ON, Europex and EFET believe in harmonized EU-wide support schemes. E.ON mentioned that if the EU is striving for an internal market, the geographical scope of support schemes cannot remain national. EFET and Europex agree with this and see the ETS as the perfect tool to account for externalities of conventional power plants.

EWEA and EREF also believed in gradual alignment of national support schemes through common EU rules. EWEA writes that the level of convergence strongly depends on the elimination of structural barriers such as subsidies for conventional power. EREF does not believe that more harmonization would bring more efficiency. According to EREF, there are too many local rules causing an EU-wide scheme to not be beneficial. WWF also emphasized the importance of local rules for installment of new renewables, but stated that efficiency is unrelated to geographical scope. Convergence of national schemes through common EU rules would seem useful to bring down costs, according to WWF.

#### *Role of the GO*

All respondent reacted positive towards the GO system, but where its function was potentially for target accounting in period two, all respondents only talk about disclosure purposes in this consultation.

Throughout the electricity sector, respondents want to further develop the GO system by extending it to all energy sources and not only for renewable sources. Also, most companies mention the need to merge directive 2009/28/EC and 2009/72/EC because the GO and disclosure regulations are linked. Eurelectric indicated that the use of the GO should be mandatory for disclosing renewable power.

Also, the renewable industry (EWEA, EREF) wants to further develop the GO system by expanding it to all energy sources. EREF indicates that information concerning the carbon and radioactive waste could be included on the GO per unit of electricity. The AIB also suggested to have CO<sub>2</sub> on the GO and wants to strengthen the role of the GO by merging the two directives from 2009 and to expand the GO for non-renewables. RECS International and Austrian electricity regulator E-control want to merge the two directives as well.

### *Balancing responsibilities for RES*

This was a binary question in the consultation document and the yes-camp saw this as a necessity for renewables to be really integrated in the market while the no-camp still believed that there was no level playing field for renewables.

All electricity sector respondents (EFET, Europex, Fortum, Eurelectric, E.ON, ENTSO-E) said yes except for Enel who believed that the obstacles for renewables was still too high. EREF and EWEA agreed with Enel saying that exemptions were still needed. EREF claimed that RES should remain exempted “until markets can guarantee that RE producers are not being discriminated against”.

### **Correlation discourse and final text**

#### *Harmonization*

Period three started with the verdict in the Åland case in which the ECJ decided that national authorities did not have to open their support schemes to foreign producers. Furthermore, the cooperation mechanisms that were chosen above the use of the GO system for enabling Member States flexibility in their targets failed as it was barely used.

Yet, an increasing number of actors were calling for collective action and more alignment between Member States because this would result in more renewables for less costs. This is visible in the congruence network of period three in which a strong coalition of actors supports increasing cooperation and a European approach of deploying renewables. In addition to the actors that had supported harmonization and/or a European approach in the past (i.e. Eurelectric, RECS International, ENTSO), other parties that had been hesitant about this development in the past joined the coalition such as WindEurope. However, the consultation documents showed that the renewable industry was not completely on the same level yet in terms of harmonization. Furthermore, Member States decided, partly under pressure of DG Competition, to partially opening up their support scheme such as Germany that opened up 10% of the German RES.

The RED II directive states that the EC will review the possibility to create a mandatory 5% opening of support schemes in 2023 and potentially 10% in 2027. Ironically, in 1999 the European Commission wanted to force Member States to open 95% of their support schemes, because they wanted Member States to limit national support to 5%. Also, the shift from 28 national targets towards one European target can be explained by this discourse, because having a shared goal without national obligations incentivizes Member States to develop more renewables in the most cost-efficient way without being limited to national borders. The European target and the potential mandatory opening of support schemes fits with the statement of Tom Howes who explained that period three continued the discussion of period one concerning the full liberalization of the European electricity market.

### *Market based schemes*

Another development identified in this period was the increasing belief among actors that renewables were becoming competitive in the market. Again, organizations that had been hesitant towards market exposure for renewables such as SolarPower Europe and WindEurope acknowledged that solar and wind were increasingly competitive in this period and could hence integrate further in the market. This has led to the phasing out of FiT schemes as it is mentioned in the RED II and the promotion of market-based schemes. It seems that the arguments of not having a fully liberalized market and renewables still being too expensive has shifted between period two and three making this shift in the RED II possible. The argument of renewables not being ready for market exposure is now used for new immature technologies and small production devices and those are hence still exempted from market exposure.

### *GO*

The strong clash of discourses concerning the role of the GO for target accounting in period two has led to a lack of a debate in period three according to several interviewees. Also, the data supports this claim as not much statements were found for concept 3. Although not clearly found in the data, through the interviews it became clear that some actors feared that the increasing remuneration of the GO would lead to double remuneration. Hence, the EC proposed to let countries auction all GOs that were generated by devices that receive public support. The profits of the GO would then end up at the government as a way to reduce the burden of support schemes. This idea was slammed by a coalition of the AIB, RECS International, RE100, SolarPower Europe and WindEurope, because this idea would hinder developments in the voluntary market. Because the GO is needed in setting up renewable corporate PPA structures that was increasingly interesting for SolarPower Europe and WindEurope, it would also hinder corporates to set up those PPA deals with generators because the generators would lose control over the ownership of the GO. The final text of the RED II includes that the market value of the GO can be subtracted from the given support scheme. By formulating it in this way, the double remuneration was avoided and generators could retain the ownership of the GO despite receiving public support.

Furthermore, the consultation documents clearly showed that several stakeholders wished to see the former 2009/28/EC and 2009/72/EC merged. However, the directives were not merged to one document, the GO was mentioned in directive 2019/944 for disclosure purposes making the link between the GOs and disclosure regulations stronger as requested by the stakeholders. Moreover, many stakeholders also requested to expand the GO for energy sources beyond the renewables which happened in the end. Both requests were supported by all sorts of organizations making it not surprising that they were put in the final text.

## 6. Discussions

### 6.1 Discussion of results

To my knowledge, this research is the first that has successfully visualized how actors thought about the use of support schemes for electricity generators using a renewable source and how their discourse has affected the use of these schemes in Europe. The results proved that it can be incredibly hard for organizations, even the large and powerful ones, to influence European legislation. Not only have many actors been involved (see period two and period three) which caused the influence of a single organization to decrease, outside sources such as technological development and legal matters quickly changed the

circumstances in which the discussions took place. Because of the involvement of so many actors, the focus on coalition forming was hence very useful and interesting. The coalitions were clearly visible in the congruence networks and the preferences from the different coalitions could be identified in the renewable energy directives or it was possible to identify why specific preferences did not make it to the final directive.

The consultation documents made clear that the renewable industry is still a bit more hesitant towards market-based and harmonized support schemes than the data for period three suggested. Harmonization is a very difficult term that is understood slightly different by various organizations. For one organization it means that support schemes follow similar rules while the other sees harmonization as a development towards a European scheme. While not being explicitly mentioned in the data, the consultation document and an interviewee mentioned the support from several Member States towards concept six, meaning that they preferred governments to be active in promoting renewables opposed to long-term agreements between producers and consumers.

Only minor remarks on the results were given by the interviewees on the identification of the stakeholders and their respective discourse. The only major remark regarding the discourses was concerning concept three in period two which was supported by EU energy ministers according to the coding while major countries such as Germany, Spain and the United Kingdom were against. For the identification of the stakeholders, it was noted that consumer organizations were strongly against concept three in period two while this was not visible in the figure. Moreover, Ecofys, Fraunhofer, CEPS and Åland were not considered stakeholders by interviewees. Ecofys, Fraunhofer and CEPS because their core function was research related and hence did not have any interest in influencing European legislation. Åland was not considered a stakeholder, because they were not active on this discussion except for the court case that was about their installation.

The double verification through the expert interviews and the consultation documents proved to be a very useful tool to check the results using DNA. It enabled the claim that, based on this research, DNA is a very appropriate tool for mapping out large discussion and for detecting coalitions. It gives a good overview of the discussion which can be shown to new actors in the field in an effort to inform them about more than 20 years of history of support schemes.

## 6.2 Contribution to literature

The research focus of this research is a good example of a policy subsystem in the meaning of ACF and PET. Many aspects of ACF and PET can be confirmed by this research. For example, in terms of ACF, the several layers of belief systems of actors can be identified. While all identified stakeholders wanted to have more renewables, the means to reach that target differed greatly. One group believed in the principle of the market and can be called the market-purists while the other group was more market-skeptical and wanted to promote renewables outside of the market. This resulted in support for different types of support schemes causing the discussion whether FiT schemes were favorable over Tradable Green Certificates or not.

The mechanisms of change from ACF can partly be recognized also. The continuous technological development lowering the costs of renewables has influenced the policy choices greatly. This can be seen as an internal shock in which the beliefs of the opposing coalition are confirmed or as policy-oriented learning in which the thoughts of the market-sceptic altered due to new information. The 2001 court case

can be seen as an external shock that altered the thought of the 2001 directive in which support schemes had to be developed according to the rules of the internal market. Similarly, the court case of Åland had the potential to cause a large external shock, but the ruling avoided that.

In addition to ACF, aspects of PET can clearly be found in this research too. After the 2001 directive, a status quo or a hegemonic coalition in PET terms was clearly visible being the renewable industry backed up by powerful Member States such as Germany and Spain. The opposing coalition framed the support schemes as being disruptive to the market and as allowing overfunding the renewables in an effort to change the support for the FiT. At the same time, the hegemonic coalition framed the renewables as immature technologies that were not ready for market exposure causing the FiT to be the only and most effective tool to introduce renewables in the market. The change of venue was less visible in this discussion except for a few court cases.

PET was less capable of explaining shifts in the policy, because the imagine framing and venue shifting together was not enough to change the policy. The technological development of renewables making them cheaper can more easily be explained by the mechanisms of change of ACF. On the other hand, PET's view on a hegemonic coalition containing an opposing coalition seemed to be more valid than several coalitions competing to be leading as ACF assumes.

### 6.3 Limitations and recommendations

Every research design has its limitations and it is important to take them into account when drawing conclusions. First, this is a single case study making the external validity to be limited. However, this was not the aim of the research causing it to be less relevant. Instead, the focus on this single case allowed a holistic and detailed view on how stakeholders affected the use of support schemes in Europe between 1997-2018.

More specifically to the methods of this research, the database used for coding actors' statements is very decisive for the end result. An incomplete database caused by stakeholders that solely meet with European representatives instead of having publications can trigger a wrong impression in the results. Furthermore, any miscommunications between the actor and the journalist or the journalist and the researcher can affect the final result. This is also linked to the subjectivity of the coding process. The creation of the concepts and the translation from articles to statements is a process that every researcher will do differently. However, on both the concept creation and end result no critical remarks were given during the expert interviews after having asked for it.

The nature of DNA is to have a binary answer for various complicated statements causing the coding to be difficult at times. Not all concepts can be answered with yes or no and by trying to do so it can give a simplistic overview of the discussion. This is beneficial when using the results for a general overview of the discussion, but can become more problematic when trying to understand the full extent of the discussion.

Specific to this research, the choice for the focus on support schemes can be defended, but it does not cover the whole discussion around supporting renewable energy in Europe. Production devices were stimulated outside of the use of support schemes by for example national tax benefits, financial products and other non-monetary rules.

Based on this research, it is recommended to conduct further research on this topic. The role of renewables has changed significantly between 1997 and 2018 and this change is still ongoing. Renewables are becoming cheaper and more mainstream causing other types of discussion to be relevant for further research. The six concepts used for this research were relevant for the research scope of this research, but might be less relevant for the period until 2030. In both the consultation documents and in the interviews, it became clear that other concepts might become relevant such as the CO2 price, capacity mechanisms and Power Purchase Agreements. A new framework needs to be established in which electricity producers with all type of renewable sources can have stabilized remuneration while keeping a competitive market in which the security of supply is not put at risk. A part of this remuneration stream can be fulfilled by the GO system that is expected to be further developed to all energy sources in Europe while increasing overall demand.

This research focused on the introduction of renewables in the market, and recommendations for further research would be to assess how stakeholders have or will affect European legislation on how renewables must be integrated in the market. By doing so, additional questions as to what extent identified coalitions in this research would hold in these new types of discussions would become extremely relevant in terms of ACF and PET.

Moreover, following the steps of the electricity market, there are increasing discussions on setting up a European-wide certification scheme for green gas. A research on how stakeholders interact here and compare it to the developments in the electricity sector would also be very interesting to look at.

## 7. Conclusions

Chapter 5 described sub questions 3,4 and 5 being the identification of stakeholders, their discourses throughout the time and the correlation of those discourses with the final directives. This allows to go back to the research question *“How have stakeholder discourses affected the use of support schemes in the current European renewable electricity market?”*.

At first, the number of stakeholders was very low and no European framework existed around stimulating renewables. Only a handful of Member States had some sort of support for renewables with Germany being the frontrunner. Based on the affiliation and congruence network complemented with the interviews, it can be concluded that Germany had an enormous influence on how renewables were stimulated during and after period one. The German government and wind lobby wanted to prolong their support scheme while the many other stakeholders initially wanted to come with more market-based and integrated schemes. Despite the final text in the 2001 directive that support schemes had to be following the rules of the internal market, the German program could continue to exist after a court case in 2001 ruled that the German support could not be labelled as state-aid.

This first period set the tone for the rest of the debate, because due to the court case that allowed the German scheme, the liberalization of the electricity market and the support of renewables became two different topics. Instead of supporting renewables in a way that was in line with the ongoing liberalization process, support schemes were stimulating renewables outside of market principles. With success, because the German scheme was very effective in stimulating renewables causing other Member States, the renewable industry and environmental organizations to be supportive of the German model. The number of stakeholders in the discussion grew enormously in period two resulting in clearly detectable coalitions as could be seen in the congruence network of period two. One side supported the German

model or schemes based on the German model while the other side consisting of the conventional electricity market including producers, suppliers, traders, TSOs and interest groups advocated for a harmonized electricity market in which renewables would also be exposed to market principles. The coalition of the conventional electricity market almost had a huge success in period two when the GO system was almost chosen as instrument for target accounting which would have led to more harmonization across Europe and possibly more market exposure. This almost victory was possible, because there was a need for flexibility. However, another idea being the cooperation mechanisms was eventually chosen to reach that flexibility without giving up national control over support schemes.

It was only for period three when stakeholders favoring market-based instruments were able to have a more favorable outcome in the directive. Although period three started with the Åland case that maintained the national character of support schemes, the technological development causing renewables to become cheaper in addition to more renewable capacity being installed, pushed the trend towards integration of renewables. Stakeholders from the renewable industry and Germany started to be supportive of more market-based instruments causing the discussion to shift.

Changing policy has turned out to be difficult for individual stakeholders and even for a large coalition. Protecting national interests and guaranteeing development of renewables were two important arguments for one coalition who has successfully defended that line of thoughts for a long time. Now a new phase seems to have started in which renewables will eventually be fully integrated in the electricity market and become mainstream. Further research is advised on how stakeholders influence that discussion to ensure the participation of various organizations. This would improve the transparency of the discussion and would lead to more legitimate decisions.

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1999/2018

**Font page visual:** <https://www.ifri.org/en/publications/editoriaux-de-lifri/edito-energie/more-renewables-european-union-yes-we-can>

## Appendix 1

Below a table with all actors that are found in the affiliation and congruence networks. Actors that did not need any explanation are identified with ‘-’.

Advocate general EU Court of Justice	Advocate general European Court of Justice (ECJ)
AIB	Association of Issuing Bodies
Aland Vindkraft	Energy Company
Austria	Governmental decision of Austria
Belgium	Governmental decision of Belgium
Belgium’s ministry of energy and environment	-
British Wind Energy Association	-
BWE	Bundesverband WindEnergie (German Wind Energy Association)
CDU	Christian Democratic Union of Germany – Political party
Center for European Policy Studies	CEPS
CMS	Law Firm
Czech deputy industry minister	-
Czech Republic	Governmental decision of Czech Republic
Czech Society for Wind Energy	-
Denmark	Governmental decision of Denmark
E.ON	German electric utility company
Ecofys	Consultant / Research
E-Control	Austrian electricity and natural gas regulator
EEX	European Energy Exchange
EFET	European Federation of Energy Traders
Enel	Italian Energy Company
Energinet	Danish national transmission system operator
Energy Committee European Parliament	-
Energy Economics Group	-
Energy Minister France	-
Energy Minister Germany	-
Energy Minister Italy	-
Energy Minister United Kingdom	-
Energy Ministers	Energy ministers from all EU countries
Energy Research Centre	-
ENTSO	European Network of Transmission System Operators
Enviro Energi	Norwegian Green certificate trader
Essent Belgium	Energy company
Estonia	Governmental decision of Estonia
EU Court of Justice	European Court of Justice (ECJ)
EU energy ministers	Energy ministers from all EU countries
EU energy union	-
Eurelectric	Union of the Electricity Industry – sector association
European Commission	-

European Parliament	-
European Photovoltaic Industry Association	EPIA (now SolarPower Europe) – association for solar industry
European Renewable Energies Federation	EREF – a federation of national renewable energy associations from all EU Member States
European Renewable Energy Council	EREC – Representing European renewable energy industry, trade and research associations
European transmission system operators	See ENTSO
European Wind Energy Association	EWEA – Association representing wind energy chain in Europe. Now called: WindEurope
Fingrid	Finnish national electricity transmission grid operator.
Finland	Governmental decision of Finland
Flanders	Governmental decision of Flanders
Fortum Markets AS	Finnish energy company
France	Governmental decision of France
France Energie Eolienne	Wind association in France
Fraunhofer Institute	Research organization
German federal environmental ministry	-
German wind lobby	-
Germany	Governmental decision of Germany
Greece	Governmental decision of Greece
Green Party in EP	-
Hungary	Governmental decision of Hungary
IEA	International Energy Agency – intergovernmental organization
Ireland	Governmental decision of Ireland
Irish energy minister	-
Italy	Governmental decision of Italy
Latvia	Governmental decision of Latvia
Liberal Democrats UK	Political party in the UK
Lightsource Renewable Energy	Renewable Energy Developer
Luxembourg	Governmental decision of Luxembourg
Marril Lynch	Investment management company
Netherlands	Governmental decision of the Netherlands
Norway	Governmental decision of Norway
Nvalue	Swiss green certificate trader
Ofgem	Office of gas and electricity markets – UK regulator electricity and gas
Our New Energy	Consulting firm
PATRES	Romanian renewable energy producers association
Poland	Governmental decision of Poland
PreussenElektra	German Utility
RECS Group	Former RECS International



RECS International	Non profit members organization promoting the use of Energy Attribute Certificates (EAC) markets, including the GO
REfactor	UK energy trader
Renewable energy foundation	Charity in the UK
Romania	Governmental decision of Romania
Royal Dutch Shell	Oil industry company
SDP	Social Democratic Party in Germany
Serbia	Governmental decision of Serbia
Slovenia	Governmental decision of Slovenia
Spain	Governmental decision of Spain
Sweden	Governmental decision of Sweden
Sweden's energy ministry	-
The Hellenic wind energy association	Greek Wind Energy Association
UK Association of Electricity Producers	Association of electricity producers in the UK
UK Energy / CC Minister	The Energy and Climate Change minister in the UK
Unipede	International Union of Producers and Distributors of Electrical Energy – merged with Eurelectric in 1999
United Kingdom	Governmental decision of the UK
Utilities	Article just mentioned Utilities, not clear which ones
VDEW	Verband der Elektrizitätswirtschaft – German electricity association
WindEurope	Former European Wind Energy Association. Association of wind chain in Europe
WWF	World Wildlife Fund – non-governmental organization

## Appendix 2

Interview structure used for the interviews:

1. Introduction
  - a. Myself
  - b. Research
2. Introduction (interviewee)
  - a. Could you introduce *[name of the organization]* broadly, focusing on its core goal and role in the European electricity market.
  - b. What are your responsibilities within *[name of the organization]*?
  - c. Since when have you been active in this field of renewables in Europe?
3. Explanation concepts
  - a. Go through all concepts – reasoning why they are included. Mix of splitting characteristics of support schemes and concepts added when going through my database. After having introduced all 6 concepts. Move to all concepts individually
  - b. Concept 1 –
    - i. Show my result for *[name of the organization]*.
    - ii. Ask whether this is inline with *[name of the organization]*, according to them.
      1. If yes. What arguments are behind this opinion.
      2. If no, or partially no (for only 1 period for example). How does it differ? Reason why you believe *[name of organisation]* had a different opinion than what it looks like in my analysis.
  - c. Same for concept 2,3,4,5,6
4. Have you lobbied the original RED or the recent REDII? Or tried to have any influence in the support scheme debate?
  - i. If so,
    1. what was your primary area of concern?
    2. how did this work within the broad concepts suggested?
    3. What alliances did you have? Did you work closely with another organisation?
  - ii. If not, why weren't you interested in putting your opinion out there? And could you find a reason why I identified you as a stakeholder in this debate?
5. Are there threats to the success of the broad concepts for which you support? If so, what are these threats or are they seen in the views of specific organizations?
6. Review: Show my full results
  - i. Do you broadly agree with the opinion of other organisations you might have worked closely with?
  - ii. Do you broadly agree with my results looking at organisations that came out as a threat to your opinion?
  - iii. Are there characteristics which have been important for the support schemes debate 1997-2018 and are not represented in my concepts?
7. Future

- a. According to you, what is the future of support schemes? Necessary? In what form?  
What concepts will be central in future debates (2019-2030) about support schemes and financing of renewables in Europe?
- b. What can we expect from policy makers – what can we expect from market players?

## Appendix 3

### The GO – An Energy Attribute Certificate system for disclosure

The GO system is the Energy Attribute Certificate (EAC) system in Europe just like North America has the REC and many other countries use I-REC (figure 13). Energy Attributes are fact-based and defined as the social, economic and environmental characteristics of the generation of one MWh of electricity such as the location of the production device, the date on which the electricity was generated and the energy source used. Using these certificates allows end-users to make reliable claims on the origin of their electricity.

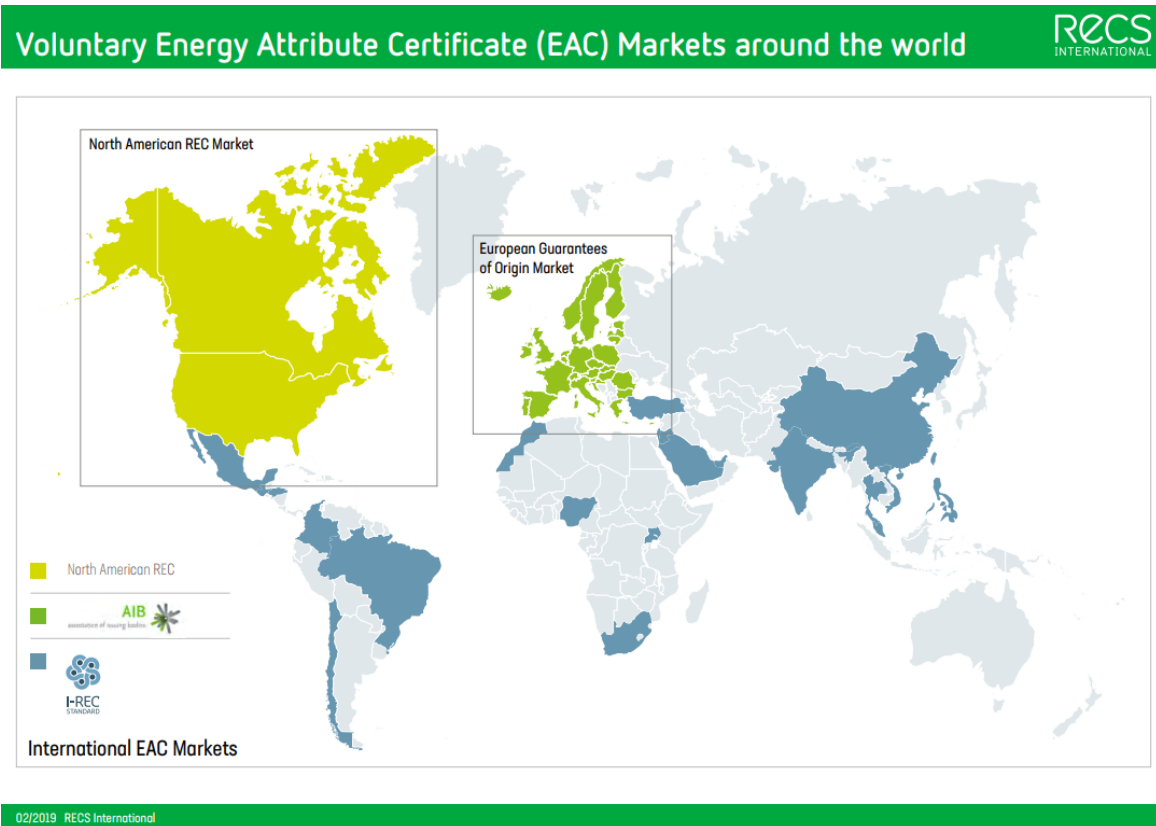


Figure 13 – Overview of EAC markets around the world (source: RECS International presentation)

EAC markets have developed because of increasing renewable energy generation and increasing awareness for sustainability issues among end-users which has led to increasing demand for renewable energy.

A characteristic of electricity is that it is a homogenous product which cannot physically be traced back to the source once put on the grid. However, as described in the chapter 'outlook European liberalization of the electricity market', suppliers in Europe were forced to disclose their fuel mix to their consumers and the EU was therefore in need of a reliable way of giving that disclosure. Furthermore, an increasing number of companies have also become aware of their environmental footprint which has caused a growing interest in environmental reporting. Due to the large portion of emissions caused by electricity consumption, reducing the footprint for electricity is a high priority for commercial end-users. Initiatives like the RE100, Greenhouse Gas Protocol (GHGP) and Carbon Disclosure Project (CDP) are a result of this.

Although energy attributes could be allocated based on location, many downsides are connected to this way of tracking. Location-based tracking cannot fulfil the task of allocating attributes properly, because it does not allow end-users to influence their mix and therefore to invest money in order to improve their mix. It is purely based on what the production mix is in that specific country.

For these reasons among others, dividing the attributes based on a book-and-claim system like all EAC's do is the most reliable way of dividing attributes among end-users which has been acknowledged in the new RED II by making the cancellation of a GO mandatory before any claims can be made about the use of renewable electricity. In an EAC system, the certificates are based on real production and represent one MWh. Yet, the trade in certificates is independent from the physical electricity market which enables trade and consumption from specific production devices.

#### How does the GO system work?

An independent organization named the issuing body needed to be created in every Member State since directive 2001/77/EC was accepted. All issuing bodies are responsible for the issuing and redemption (cancellation) of certificates including the registry, the administrative system in which all certificates are registered. The production device owners can register their device by filling in forms revealing important features of their production device such as the location, date of operation, energy source used to generate electricity and whether subsidy was received by building the device or during operation.

Once registered, the production device owner sends periodically data to the issuing body saying how much MWh was put on the grid in that particular period. Subsequently, the issuing body verifies this number with the TSO. Next, the issuing body issues certificates corresponding with the number of MWh produced to the account of the production device owner who is then in possession of fact-based energy attributes of his production device. Large electricity users such as supplying companies, heavy industries or special agents also have accounts on the registry and they increase the demand of the certificates. This follows classic market rules meaning that increasing demand leads to higher prices. Certificates can be traded until a user decides to redeem (cancel) the certificate meaning that this party claims the attributes represented by that certificate. Because of a unique number on every certificate, only one party can eventually claim the attributes represented by that certificate.

In Europe, every country has one issuing body and 21 countries have decided to align their rules to such an extent that they comply to the European Energy Certification System (EECS). This set of rules was created by the Association of Issuing Bodies (AIB) and by complying to the EECS rules, a country can become a member of the AIB. Members are allowed to use the AIB hub that makes it easier and more reliable to trade GOs between the different registries.

#### Fuel mix calculations

So far, it has been discussed how the GO system works and how end-users can buy certificates for the disclosure of their electricity mix. But the GO system also has consequences for end-users who do not choose to buy certificates themselves or on their behalves, because they can only claim the attributes that are present in the residual mix which is altered after every GO purchase.

In a market where no EAC systems are in operation, no organization connected to the grid is capable of making reliable claims about their electricity usage. This is visible in figure 14 where the left side represents 15 types of production devices that are connected to all end-users (on the right side) through one electricity grid. Figure 15 shows the situation where an EAC system is active and several end-users have bought wind certificates. There, some end-users can claim the use of wind energy where the others are now left with a revised residual mix.

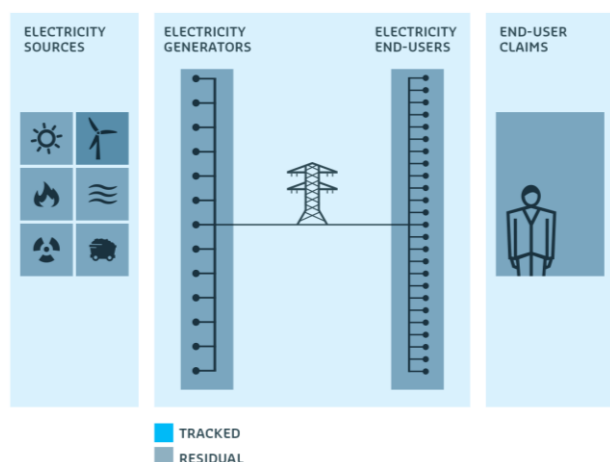


Figure 14 – situation without consumer claims

Source: RECS International presentation

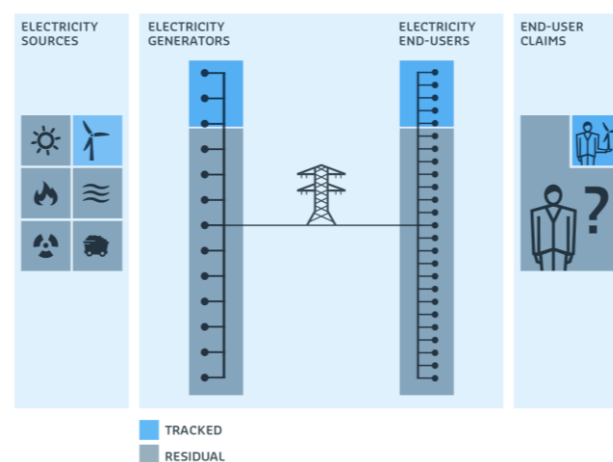


Figure 15 – situation with wind energy claim

The residual mix is defined as a “set of attributes for use in electricity disclosure, which has been determined based on the attributes of all electricity generation in one or several disclosure domains and corrected by all attributes which have been used for explicit tracking or by ERTS (External Reliable Trading Systems), and also for exports and imports of attributes and physical energy” (Raadal, Nyland, & Hanssen, 2009). In other words, the residual mix is a mix that shows what energy source was used on average for the consumption of electricity after end-users have purchased / consumed EACs (GOs in Europe). End-users of electricity can use this mix to disclosure their electricity use when their purchase of EACs is not sufficient to match their real electricity consumption or when no certificates have been bought at all.

Information box 2 explains this phenomenon simplistically.

#### Information box 2

- One island with 120MWh electricity consumption each year.
- Production: 60MWh coal, 60MWh wind.

Without EAC system:

- Residual mix: 50% coal, 50% wind.

With EAC system and 20 wind certificates redeemed:

- Buyers of certificates: 100% wind
- Residual mix: 60% coal, 40% wind