

# Locked-in Europeanization: Swedish renewables exceptionalism

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## *Abstract*

In this paper, we explain Swedish exceptionalism in renewables energy policy. Why has Sweden adopted a green certificates combined with technology specific solar investment support, seemingly without being influenced by the European fads and fashions of renewables policy? Green certificates are market-based; the amount of renewables in the scheme is politically set, but the supply and demand of green certificates determines the certificate price. We apply a multi-field approach, combining neo-institutional sociology with Europeanization theories, and theories on policy segments and policy systems. The initial EU influence around year 2000 eventually became strongly institutionalized, after all in the political discourse. Particularly in the period 2010-16, political steering had high independent importance for the design of the renewables support mix. Hence, we find that the effect of Europeanization is *not* determined by the strength of the coercive signals from the EU nor the diffusion of practices in the European environment. Rather, it is conditioned by the state of the affected national organizational field and the national political field. To our knowledge, no one else has provided a full assessment of why Sweden has adopted its unique renewables support mix. This study also produce general insights into how and why Europeanization at one stage in time can be locked-in and remain effective many decades after the EU has shifted its policy to promote different policies and practices.

Key words: Europeanization, multi-field approach, renewables policy, climate policy,

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*Presented at ECPR General Conference, September 6<sup>th</sup> – 9<sup>th</sup>, 2017, Oslo, Norway*  
Panel: Climate and Energy: EU Renewable Energy in Comparison

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## 1 Introduction

In the late 1990s, green certificate schemes were hailed as superior by the European Commission and the electricity industry<sup>1</sup>. Some twenty years later Sweden is the only EU and EEA country with certificates as its main renewables support scheme. In addition, the Swedish government offers tax exemptions and investment support for solar heating and photovoltaics (PVs). Sweden has seemingly been unaffected by the two waves of conformity that swept EU renewables policies; the diffusion of feed-in schemes in the period 2000 to 2010 and the shift to feed-in premium combined with auctioning that has unfolded after 2010 (Boasson and Wettestad 2013).

In this paper, we question: *Why has Sweden adopted a green certificates combined with technology specific solar investment support, seemingly without being influenced by the European fads and fashions of renewables policy?* Green certificates are market-based; the amount of renewables in the scheme is politically set, but the supply and demand of green certificates determines the certificate price. The Swedish scheme was introduced as early as in 2003, and in 2016 it became clear that an amended version would run until 2030. This paper traces the historical development of Swedish renewables policy from the 1970s and onwards, and through process tracing we detect the factors that best explain the Swedish exceptionalism.

Sweden harnessed much of the potential for large hydro in the post-world war two era. The potential for large hydro was largely exhausted by the entrance to the 1990ies, as remaining untapped rivers have been protected due to environmental concerns. Nuclear energy became a highly contested political issue in the late 1970s, and a referendum in 1980 determined that all nuclear should be phased out by 2010. The nuclear conflict later underpinned political willingness to foster alternative and new renewable energy, escalated by the advent of climate issues in the early 1990s. For over 40 years, nuclear energy has been a heated political issue in Sweden, while renewables seldom has been at the centre of political conflicts.

In order to explain why Sweden has developed this special renewable energy support model, we will apply a multi-field framework, drawing on historical and sociological institutionalism (see Boasson 2015). We will trace the politics of renewables in Sweden, as well as the special character of the Swedish organizational field of stationary energy and the special Swedish responses to EU steering impulses at various critical junctures. We present a case that hereto has gained little scientific attention from scholars of Swedish energy and climate policy and history. There are some notable exceptions, such as Kerstin Åstrands (2005) study of why Sweden adopted green certificates in the first place in 2005, but no others has explored the policy development from the very start and until the renewables policy decisions in 2016. Moreover, to our knowledge no other aim to disentangle the relative

importance of; EU steering, national political steering and the influence of corporate actors and civil servants. Further, we take into account the influence on the EU renewables policy as well as its state aid rules.

Moreover, this study produces theoretical findings of relevance to larger political science discussions relating to Europeanization and EU steering. More specifically, we explain why we in some instances can find that Europeanization at one stage in time can be locked-in and remain effective many decades after the EU has shifted its policy to promote radically different national practices.

In the following, we will first present the theoretical framework before we introduce the design of the Swedish renewables support schemes in 2016. Second, we will present the chronological story of how Swedish renewable energy policy has developed from the 1970s and onwards. Third, we present a first sketchy assessment of the factors that may explain the exceptional Swedish renewables model.

## 2.0 Theory framework

This paper aims to explain the degree of market thinking and direct state steering in the Swedish renewables support schemes in 2016 – and to trace the historical explanations to the 2016 situation. We apply a multi-field approach, developed by Boasson (2015), drawing on a recent trend in social science, where scholars have emphasized the role of multiple social fields – or ‘segments’, or ‘policy systems’– showing how such fields distribute power among actors and shape values, identities and interests (see Bourdieu 2005; Fligstein & McAdam 2012; Baumgartner & Jones 1993). A ‘field’ denotes a circumscribed sphere of political and social life with an identifiable social architecture and a particular constellation of actors (Boasson 2015). Each field has specific structural and institutional characteristics, distributing power between actors and influencing which climate-policy actions are perceived as rational and appropriate. The approach sheds light on why actors of different professions, nationalities and organizations tend to have differing opinions and differing political clout. We distinguish between national *organizational* and *political* fields, but also focus on the external European environment, which consists of several fields.

The Swedish renewables support model is especially puzzling when we take developments in the European environment into account. In the period from 1970 to 1990, Sweden adopted research and development (R&D) support to new renewables technologies, in tandem with many other European countries (Boasson and Wettestad 2013). In the decade from 2000 to 2010, the European Commission and the electricity industry promoted development of a pan-European green certificate scheme, but they had little success. The German and Danish feed-in scheme were copied by other countries, and by the end of the decade almost all EU member states had feed-in schemes of one sort

or another (with some notable exceptions, such as the UK). These developments were underpinned by the EU renewables directive, adopted in 2001 and revised in 2009. After 2010, the Commission and the electricity industry stopped to promote green certificates, and most member states shifted to embrace a support model combining auctioning and feed-in premiums (Boasson 2017). Moreover, the European Commission started to apply state aid rules more forcefully to steer how member states supported renewables. Sweden was seemingly quite unaffected by these twist and turns in the European developments. The Europeanization literatures highlight two main factors that may contribute to create policy convergence; coercive EU steering and peer pressure among EU member states (see discussion in Boasson 2015).

*Hence, we will expect to find that the European environment has influenced the Swedish renewables developments the most in the periods where EU has exerted strong coercive steering in this area and the peer-pressure has been strong.* As the Swedish renewables approach is so different from what we see elsewhere in EU member states, we do however expect the two national fields to have played important roles in the policy development.

The Swedish organizational field of energy consists of governmental bodies, regulators, industry, business organizations and NGOs relating to stationary energy. Key actors are the Ministries of Enterprise and Energy, the Swedish Energy Agency, the three dominant electricity utilities (Vattenfall, E.ON/Sydkraft and Fortum), a gradually larger group of new renewables providers and several business organizations relating to energy. Organizational fields may be segmented, and composed of stable and powerful segments (or 'iron triangles'), allowing industry actors to capture policy developments; or they can be more pluralistic, with industry and governmental organizations basically independent of each other, holding radically different views and engaged in competition aimed at affecting policy outcomes (see Lowi 1969; Rhodes 1997; Fligstein & McAdam 2012). The literature holds that the organizational field will influence policymaking more if the field is a) dominated by a one institutional logic, i.e. one dominant way of thinking about energy policy and renewables development, and b) there is a close relationship between dominant industries and public organizations (Fligstein & McAdam 2012). *We will expect that the national organizational field to have influenced the support schemes the most at the times where the field has been the most segmented.*

*Political fields* comprise legislative and political actors, party organizations and decision-making arenas (Boasson 2015). The political field has certain special structural characteristics. First, the distribution of political positions among political parties (the distribution of votes among parliamentary blocs and the composition of the government) delegates authority among political parties. Second, the issue-specific formal distribution of powers between different parts of the government will affect which ministers and which parliamentary committees have a say. Thus, authority over energy issues will be rooted in the Riksdag (the Swedish parliament) positions as well as in

the Swedish governmental apparatus – both of which may change with each new election, or as a result of shifting political coalitions. The composition of Riksdagen and governments may change fairly often, whereas the distribution of authority between certain political arenas tends to be determined by formal rules that are more difficult to change, such as constitutions (Pierson 2004:120–21). Election results may create stable situations with clear majorities, or instable situations with shifting majorities, and this will influence the extent to which the politicians are able to govern policy development. If authority and information are spread within the political field: the more political actors who share responsibility for an issue, the more information will the politicians have, with greater incentives for engaging and giving priority to it (Boasson 2015). The situation is thus the reverse in organizational fields, where the concentration of structural power enhance the fields' influence over policymaking.

Moreover, the politicians only have capacity to pay attention to a few issues at the time; some issue will be politically salient and subject to political competition, while most issues will be of low salience and gain very little political attention (Baumgartner and Jones 1993; Culpepper 2011, Boasson 2015). In line with (Boasson 2015), we will expect the political field to influence Swedish renewables development the most when formal decision making powers rests in the parliament and not with the executive government and a broad spectrum of politicians are engaged in and compete over the issue in question. In such situations, aspects related to the issue will tend to be subjected to political deliberation, and all actors will do their utmost to win small and large decision-situations relating to the issue. They will follow each other closely; every aspect that can be argued over will be contended.

*Hence, we will expect to find that the political field has influenced the Swedish renewables development the most when Riksdagen has had the formal powers to make key decisions and renewables have been subject to intense political competition.*

The three expectations presented above are not treated as competing; rather we aim to detect how the various fields have influenced each other over time. This qualitative case study is based on process-tracing method. Three different sources are combined: First, an extensive literature review of existing research on Swedish energy policy. Second, a systematic assessments documents: governmental white papers, reports from publicly appointed commissions, Swedish political parties' election programs from two periods in time, transcripts from parliamentary debates and inputs to public consultations on green certificate schemes. Third, we have interviewed 18 actors that have played key roles in Swedish renewables policy developments, including politicians, civil servants and industry representatives. All interviews were transcribed, and all (with the exception of two shorter phone interviews) were recorded.

## 2.0 Swedish Renewables Support

In 2016, a majority in the Swedish parliament, Riksdagen, set as an overall goal to make Swedish energy production 100% renewable by 2040. It was also agreed that target was to be seen as ‘a goal, not an end date prohibiting nuclear power’ and thus the meaning of the goal was highly ambiguous (SOU 2017). Similarly, it was decided to prolong the green certificate scheme to 2030 and to up the target significantly.

The green certificate scheme involves a governmentally-induced market for renewable energy securities (SOU 2017). Various governmental regulations determine the functioning of the market, with the key factor being the size of the quota that renewable energy producers are obliged to produce or purchase. What the purchaser of a green certificate buys is not the actual energy, but a security that confirms its economic contribution to the operation of green electricity somewhere within the area where the scheme applies. The consumers pay the scheme yield operational support, not investment support; and the extra costs, not by state funds. Green certificate schemes yield the most profits for companies that produce the least costly renewable energy and favour actors large enough to manage considerable financial risks (Commission 2008a).

Producers of renewable electricity<sup>1</sup> get a green certificate for every MWh they produce. Distributors have to hand over a certain amount of green certificates to the government, based on a percentage quota of their energy sales or consumption<sup>2</sup>. If they do not produce renewable energy themselves, they have to buy green certificates from renewable energy producers, thereby creating a market for green certificates where producers of renewable energy can obtain additional funding. The quota level is based on a renewable energy target expressed in TWh set by the government. With higher targets, the quotas increase, leading to a greater demand for certificates. This will again lead to higher certificate prices, and therefore higher support levels for renewable energy. In the end, the additional costs of obtaining certificates will be added to the electricity price (Swedish Energy Agency 2012, Swedish Government 2003).

The green certificate scheme is market-based and the governmental steering is indirect. Everyone that receives support is exposed to the market price of electricity. In addition they get a bonus, equal to the worth of certificates at that point in time. The level of support results is determined

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<sup>1</sup> Wind power, solar power, tidal power, geothermal energy, new hydropower, existing small-scale hydropower, bio fuels in Combined Heat and Power (CHP) and peat in CHP can be included in the scheme (Bergek & Jacobsson 2010: 1258).

<sup>2</sup> Energy intensive industry is exempted from the quota obligation.

by the supply and demand on the certificate market, but the demand is highly reliant on the quota obligation set by the government. As all the included energy sources get the same amount of certificates per MWh, the support is technology neutral. It aims at expanding the most competitive renewable energy sources ensuring minimal costs for consumers and for the society by letting the market choose the most profitable technologies (Bergek & Jacobsson 2010: 1257f).

The scheme was introduced in 2003 and it has since been prolonged and expanded, but the design has not changed significantly. The price of the certificates have varied over the life-time of the scheme. In late 2016, the prices were at an all-time low, around 7 Euro per certificate while (Economifakta 2017)

Sweden adopted an investment support scheme for solar PV on public buildings in 2005, and in 2009 also private individuals and corporations became eligible for one-time subsidy for investments in grid-connected PV (Swedish Government 2009a). Initially, the program covered 60% to 80% of installation costs. It has since been lowered successively and since the beginning of 2015, companies can get 30% and private individuals 20% of installation costs (Energimyndigheten 2015: 8). Between July 2009 and September 2016, around 51 billion Euro have been distributed through the scheme, and 19 billion Euro more have been granted and is about to be distributed. More than a third of the total payments granted in the scheme this far are going to private individuals (Swedish Energy Agency 2016). The program has a fixed budget and gives support on a first come first serve basis. Every year, the applications have exceeded the yearly budgets, thus the waiting times have been long. The red-green Government increased the budget of the system for 2016-2019, but the waiting times are still significant (Energimyndigheten 2015: 5). This support scheme is not market based, and the state steering is direct. The support level is fixed and state funds are directly involved. The support covers up-front investments cost, not operation costs. Hence, those that feed electricity back to the grid is exposed to the market price on electricity.

Since 2015, small-scale producers of renewable energy can in addition get a tax reduction of 0.06 Euro for every kWh they transfer to the grid, up to a cap of 2000 Euro per year (Swedish Government 2014). Note that PV is also included in the green certificate scheme, and private individuals hiring workers to install solar cells in their own homes can also get a tax reduction based on the labor costs, as there is a general tax reduction for hiring workers to do home renovations in Sweden.

## 3.0 Renewables development in the shadow of nuclear hurdles

### 1970 – 1989: Politicization of nuclear and energy policy in general

In order to understand Swedish renewables policies in the 2000s, we need to understand the political conflicts over nuclear energy that took place in the period 1970- 1989. During this period, the total electricity production more than doubled, primarily due massive nuclear expansion (Swedish Energy Agency 2003: 8). The rapid nuclear expansion spurred political conflicts with repercussions many decades into the future.

Sweden developed a significant large hydro power portfolio during the 1950s and 1960s (SOU 2017:2 96). This led to some protests, but at the entrance to the 1970s, it has still been argued that energy was hardly a political issue in Sweden at all (Kaijser 1992). Rather, experts such as researchers, civil servants and industry representatives had major leeway to determine the policies. Increased electricity consumption was largely regarded as a prerequisite for economic growth, industrial competitiveness, increased welfare and high employment (Sarasini 2009:639; Nilsson 2005:212). At this stage, Vattenfall and the privately owned medium sized electricity utilities regarded nuclear electricity generation as the technology for the future (Kaijser 1992:449).

When the first large scale nuclear reactor started to operate in 1972 seven more reactors were in the pipeline (Kaijser 1992:447). The international wave of nuclear energy scepticism eventually influenced Swedish environmental groups. Eventually, the agrarian Centre party, the small Communist party and even parts of the dominant Social Democratic party questioned environmental risks related to nuclear energy. The oil crises in the 1970ies added to the politicization of energy policy, and coupled with the nuclear energy scepticism, it resulted in renewables gaining political attention (Söderholm, Ek & Pettersson 2007: 368).

A research program on wind power was initiated in 1975, resulting in a few demonstration wind farms (Engström 2015: 32, 39-40, 203). In addition, direct government support was introduced for conversion to bioenergy (Andersson 2013: 20). These were marginal developments compared to the rapid nuclear expansion however. In the 1976 elections, nuclear energy became the main issue and the pro-nuclear Social Democrats lost power for the first time in 44 years to a coalition of the Centre Party, Liberal People's Party and the (conservative) Moderate Party (Nohrstedt 2005; Vedung & Brandel 2001: 220).

The Centre party suffered a series of defeats to the pro-nuclear parties in the government, and eventually construction of a series of new reactors were permitted. The internal conflicts were so great that the coalition resigned after only two years in power (Nohrstedt 2005; Vedung & Brandel 2001). At this stage, conflicts over nuclear expansion made it very hard to create stable governments (Nohrstedt 2005). The nuclear issue divided the Social Democrats internally, but it also made it hard

for the liberal-conservative parties to form alternative coalition governments (Möller 2011: 214). Despite five major reactors were already under construction, the political conflict lingered on. Thus it was decided to invite the people to decide over the issue, and even though referendums are advisory, the parliament agreed in advance to act in line with the result. Sweden has only had six referendums, so this choice illustrates the malign nature of the issue (see Swedish Government 2015b).

All referendum alternatives implied expansion of renewables, but none of them said anything concrete about how to achieve this. Option 1 implied phasing out nuclear energy, awaiting for renewables to become “available”, and allowing no new nuclear energy to be built (Swedish Government 2015b). This was preferred by the Moderate Party and gained 19 percent of the votes (Swedish Government 2015b; Möller 2011: 215). Option 2 was rather similar, with the addition that the state and municipalities should own all future energy facilities. This was supported by the Social Democrats and the Liberal Party, gaining 39% of the votes. Option 3 was the hard-line anti-nuclear, leading to decommissioning by 1990. The Centre Party and the Left Communist Party promoted this and gained 39% of the votes.

This outcome enabled the minority government a stable steering basis in Riksdagen (the Swedish parliament) (Möller 2011: 215f). The referendum outcome made Riksdagen decide; 1) all nuclear power plants should be phased out by 2010, 2) the dependence on oil should be reduced and 3) a transition should be made to “an energy system based as far as possible on lasting, preferably renewable and indigenous energy sources with least possible environmental impact” (Kaijser 1992: 445; Wang 2006). The renewables support was primarily symbolic, given voluminous nuclear expansion (Nohrstedt 2005: 1048). When the last reactor was finalized in 1985, the country had a significant electricity surplus (SOU 2017:2: 99). Thus state owned Vattenfall (and eventually also the other electricity utilities) reduced the electricity prices (Kaijser 1992:455). Historically energy consumption had increased rapidly, but the growth stopped in 1987, further undermining any need for renewables (see Högelius and Kaijser 2010:2247).

In the 1970- 1989 period, the Swedish electricity industry was unified and dominated by Vattenfall; the national transmission system operator and regulator (Högelius and Kaijser 2010). Vattenfall collaborated extensively with the 11 other large energy corporations, and this ‘power club’ controlled 90% of the Swedish electricity production (see Högelius and Kaijser 2010:2246). A large number of smaller municipal energy companies produced some 10% of the electricity, but they also transmitted the electricity from the large producers. In her PhD thesis, Inga Carlman (1990) shows that the utilities primarily regarded wind power as a threat to nuclear. (Sweden had a significant energy intensive industry, dominated by pulp and paper production. These electricity consumers had rather strong ties to electricity producers and they predominantly supported nuclear expansion (see Högelius and Kaijser 2010:2246).

Due to the long-term target of phasing out nuclear, renewables continued to gain a certain political attention. In 1985 the Social Democratic government initiated more research and development wind power (Åstrand & Neij 2003: 22; Swedish Government 1985). A few wind power projects were initiated, but the wind turbines were imported and no indigenous wind power industry emerged (Engström 2015: 53). The Chernobyl accident in 1986 led the politicians to agree to start phasing out nuclear in the mid-1990s and the public nuclear research and development program was diminished (see Högelius and Kaijser 2010:2247; Kaijser 1992:457). Interviewees highlight that when climate change started to gain international attention in the late 1980s, it was immediately coupled to energy policy issues, strengthened the politicians attention to renewables

At the end of the 80s, energy policy was still among the most politicized issues in Sweden, but the country neither had a renewables support scheme nor a renewable energy industry. The nuclear controversy had given the politicians the upper hand in energy policy, while the electricity corporations and other experts had lost authority and control over the issue area. Swedish policies were clearly influenced by international waves of nuclear concern, but neither the EU or developments in other European countries seems to influence Sweden much.

### **1990 – 1999: Liberalization and mounting climate ambitions**

In the 90ies, conflicts related to liberalization and climate change, came on top of the omnipresent nuclear issue (Måns Nilsson 2005, Högelius and Kaijser 2010; Sarasini 2009). Moreover, Sweden headed into a serious economic crisis that came to influence all other issues in the ensuing decade. During this decade, Sweden experienced radical changes in the regulation and organization of electricity production and transmission.

In 1991, the Social Democrats, the Centre Party and the Liberal People's Party agreed to introduce an investment support scheme for wind- and bio power (Åstrand & Neij 2003: 22, Swedish Government 1991: 6f). The state aid was technology specific and funds had to be continuously allocated over the annual state budgets (Wang 2006: 1213). Hence, there was often no support available at the end of each budget cycle.

In a parallel development, economists in and out of the government forcefully argued that the direct state steering of energy production and distribution came with a significant societal cost, very well illustrated by the over-investment in nuclear energy (Högelius and Kaijser 2010:2248-49). They suggested to reorganize the electricity regulation in order to ensure that profit maximizing became the driving force in the energy market, rather than long-term state planning (Högelius and Kaijser 2010:2248). The ministry of finance was supportive, but Vattenfall and the private electricity utilities were initially reluctant. This changed rather swiftly, spurred significant merger and acquisition

activities in the electricity industry leading to further concentration in the Swedish electricity industry (Högelius and Kaijser 2010:2249-50).

Vattenfall was corporatized in 1992 and transmission grid responsibilities were transferred to the new Swedish transmission grid operator, Svenska Kraftnät (see Högelius and Kaijser 2010: 2250). Vattenfall was quick to develop an international strategy, aiming to become a leading European energy company. Initially, it branded itself as a non-fossil fuel corporation, primarily engaging in the Nordics and in the Baltic, while slowly enlarging its presence in Germany (Darmani et al. 2016:12).

The energy liberalization created significant political turmoil- not the least due to internal conflicts in the Social Democratic party (Högelius and Kaijser 2010: 2252). However, Riksdagen accepted a liberalization reform in 1995 and the Nordic electricity exchange opened in 1996. This immediately led to market concentration, with three large producers; Vattenfall, Fortum and Sydkraft/E.ON controlling 90% of power generation (Högelius and Kaijser 2010: 2253). Even though Vattenfall had Europeanized its activities, our interviewees agree that they did not take an active role in bringing impulses from the EU energy policy developments to Sweden.

The nuclear issue continued to make an imprint on energy issues (see Högelius and Kaijser 2010). A production subsidy for wind power was introduced in 1994, resulting from a parliamentary initiative from the Centre Party (Jönsson & Andersson 1994). Wind power should be granted an 'environmental bonus', corresponding to the electricity tax paid by consumers (Wang 2006: 1214, Åstrand & Neij 2006: 280). Moreover it was decided that societal cost efficiency should be a guiding principle for regulation of the energy market as well as mitigation of climate change (Nilsson 2005:2015).

Climate issues gain increased salience after the new Prime Minister Göran Persson in 1996 launched the new concept 'Green People's Home' to replace the former Peoples Home (a romantic rephrasing of the social welfare state) as the key mission of Social Democrats (Nilsson 2005: 215). A year later, the Social Democrats, the Centre Party and the Left Party reached an 'ecologic energy transition' agreement (Nilsson 2005:2016). This implied creation of a new Energy Agency with responsibility for renewables development and energy efficiency, instruction of Vattenfall to become an 'instrument for ecologic transition' and decommissioning of the two nuclear reactors at the nuclear power plant "Barsebäck" (Swedish Government 1997). The need to compensate for the closing of Barsebäck motivated further renewable energy support (Wang 2006: 1212, Åstrand & Neij 2006:279). The investment subsidies for wind- and bio power were thus prolonged until 2002, and small-scale hydro was also included (DS 2000:20). Moreover, additional funds for operational support to wind power were secured.

However, as the liberalization of the energy market led to decreased electricity prices, the new support schemes hardly spurred more renewables investments (Statistics Sweden 2015). The

investment and operation support to wind power created marginal growth, amounting to only 0,5 TWh in year 2000 (Energy Market Inspectorate 2005). The investment support offered to bioenergy gradually turned some of the waste and pulp- and paper actors into both energy producers and consumers (Jacobsson 2008:1492). Because the volumes of bio energy were still modest, this did not transform the electricity sector in any significant way. Sweden experienced significant expansion of bio energy, in particular related to district heating expansion (Anderson 2013:11). However, domestic industries relating to new renewable electricity sources, such as wind and hydro, did not emerge (Anderson 2013). To the extent that new renewables was developed, it was done by the traditional electricity actors, first and foremost Vattenfall (Anderson 2013:14; Wang 2006:1215). Parts of the energy intensive industry eventually became producers of bio energy, but they remained supportive of nuclear and fossil fuel expansion (Anderson 2013:22).

Several interviewees state that the renewables schemes were widely considered expensive and ineffective. The dependence on yearly allocations in the state budget and lack of flexibility to adjust the support levels to the volume of applications created an unreliable stop-go nature (Åstrand & Neij 2006: 277, 292). Moreover, Sweden became a member of the EU in 1996. Soon after this the European Commission signaled that the 'environmental bonus', that gave wind power an extra support that corresponded to the electricity tax paid by consumer was in conflict with EU state aid rules (Åstrand 2005:114). Sweden was however allowed to continue to provide wind power producers with the support while developing a new support scheme.

Thus, in December 1999, a government task force was set up to assess alternative support schemes and come up with a proposal for a comprehensive and long-term renewable energy support scheme to replace the previous measures. The group was dominated by civil servants, but had regular meetings with energy corporations and the political parties (DS 2000:20: 1). At this stage in time, the European Commission and Eurelectric (the European confederation of the electricity industry) hailed green certificates as the best support measures (Boasson and Wettestad 2013). Netherlands had implemented a voluntary certificate scheme and the Danish government had initiated a shift, but no other countries had implemented a full-scale certificate scheme. The investigative commission visited the two countries in its search for new and better renewables support schemes.

Interviewees told us that Swedish civil servants engaged in the ongoing EU discussions about liberalization of energy markets and development of a pan-European certificate scheme brought this way of thinking to Sweden. At this stage in time, the financial crisis had led the government to instruct all ministries to come up with inventive approaches that could reduce state spending. Hence, continued and increased support to renewables through the government budget was no longer possible (Åstrand 2005:112). The first EU renewables directive was in the making, and according to Kerstin Åstrand (2005:117), the negotiations 'strengthened the belief among the Swedish civil servants,

invoked by the state aid rules, that the future of other instruments than a green certificate trading system was limited'. This view is supported by our interviewees. One states: 'Every ministry worked like crazy to come up with proposals of how to cut costs from the state budget. When we had discussions with the EU, [name of EU official] and the other enthusiastic people, then we at the unit for energy thought that 'oh my god, we can just apply that [the certificate] idea'.

Moreover, a range of interviewees state that the EU's initial response to the PreussenElectra court case made Swedish government representatives assume that a green certificate schemes would be the support scheme design that most readily would get EU endorsement (see also Åstrand 2005: 115). No interviewee mention initiatives from corporate actors directed at introduction of certificates in Sweden, and in response to direct questions, several of them state that they cannot recall any such initiatives.

We may conclude that already in 1999, the certificate idea had started to gain hold in Sweden. The idea came from the EU, but it fitted the market thinking that had come to dominate the Swedish political and organizational fields of energy. It created an opportunity to support renewables without using state resources. Note that it was civil servants that introduced the certificate idea to Sweden. Although only three corporations dominated Swedish electricity production, we do not find any indication that they aimed much to influence renewables policy development. Rather, they seem preoccupied with other issues, such as nuclear, decommissioning, market streamlining and Europeanizing.

### **2000 – 2004: EU influence and adoption of a Green Certificate Scheme**

At the entrance to the 2000, the political energy policy conflicts no longer hindered creation of stable governments. Nuclear phase out was however still an area of political conflict and the electricity industry had started to adjust their corporate strategy to the liberalized market. There was political consensus concerning the need to develop more indigenous renewables and the Swedish government was highly aware of ongoing EU processes that may influence their choice of support scheme: the negotiation of the first renewables directive, restrictions created by the state aid guidelines and the on-going PreussenElectra court case at the European Court of Justice.

In March 2000, the government task force appointed four months earlier issued a report recommending the creation of a green certificate scheme. (DS 2000:20). Anne Bergek and Staffan Jacobsen (2010) as well as Kerstin Åstrand (2005) conclude that the EU had major influence on the work of this Commission. This is supported by our interviews, also indicating that Commission officials were directly involved in the drafting of the report.

The government appointed an expert commission to develop a more detailed proposal for design of a green certificate scheme (SOU 2001:77). According to interviewees, the commission paid

attention to the PreussenElectra court case, assuming the arguments of the European Commission would be upheld by the European Court of Justice. Thus, they aimed to design a scheme that was as market streamlined as possible, hardly implying direct use of state aid. The group discussed to introduce a technology specific design element, with the most costly energy sources receiving more than one certificate. This was rejected because it would make it hard to ensure that the volume target was reached. The group also aimed to develop a scheme that could spread other countries, enabling development of a big certificate market (SOU 2001:77). . Moreover, one interview express the dominant sentiment at the time: ‘This was a couple of years after the deregulation of the electricity market so there was very much of a market focus really, and it was natural to also have a market-based instrument’.

Examination of the political programs of the political parties show that few – if any – mentioned any specific requirements to renewables support schemes (Centerpartiet, 2001; Folkpartiet Liberalerna, 2001; Kristdemokraterna 2002; Miljöpartiet de gröna; 2002; Moderata Samlingspartiet 2001; Sveriges socialdemokratiska arbetareparti 2002; Vänsterpartiet 2000) One interviewee reports that representatives from all political parties enthusiastically supported the idea when it emerged in the first governmental task force. According to one interviewee, the Social Democratic prime minister Göran Persson was initially sceptical, but another interviewee states that in 2001 he was firmly convinced.

The final report of the expert commission was presented in October 2001, and based on this the government developed a law proposal that they issued for notification at the European Commission, as required by state aid rules. The scheme predominantly exposed the renewables producers to market risks relating to the fluctuating certificate prices, with the exception that they would be guaranteed a minimum price in the first five years of the scheme, ranging from 7 Euro in 2003 to 2,3 Euro in 2007 Two weeks after they received the notification, the Commission endorsed the proposal (Europeiska Kommissionen 2003a). By now, the European Court of Justice had surprisingly sided with the German state in the PreussenElectra case. The Commission referred to this case, enabling them to conclude that since the producers were not given aid directly from state owned funds, then most elements of the scheme did not substitute state aid at all. The guaranteed price was however regarded as state aid, but in compliance with the EU treaty.

On this backdrop, Riksdagen in April 2003 decided to introduce a green certificate scheme. Initially, the target was to produce 10 TWh of renewable energy until 2010 (Swedish government 2003). The Social Democrats, the Centre Party and the Left Party made up the majority that supported the bill, with phasing out of nuclear power as an important rationale. The Liberal People’s Party and the Moderate Party voted against the bill, arguing against administrative costs, stating that market forces would ensure renewable energy investments without interventions and criticizing the closing of two

Barsebäck reactors. (Swedish Parliament 2003a). The small Christian Democratic party was also against the bill, preferring a feed-in scheme. The Green Party abstained from voting, arguing that it would be better to extend the CO<sub>2</sub>-tax.

Note however that Riksdagen decided that peat should be included in addition to the other renewables sources in the scheme. That led to a new letter exchange with DG Competition, lasting for almost half a year until the Commission finally came to the same decision for peat as for the rest of the scheme (Europeiska kommissionen, 2003b).

Our interviewees agree that the electricity industry did not engage much in the decision-making process. The electricity market was almost as consolidated as in the late 90s, three large electricity corporations still accounted for more than 80% of the annual electricity production in Sweden in this period (Energy Market Inspectorate 2005). Vattenfall was the biggest by far, supplying almost half of the electricity. It had abandoned its growth strategy based on renewables investments. It gained a position as the third largest actor in the German market, with a portfolio dominated by old coal power production (Darmani et al. 2016, Vattenfall 2007). By this time, Vattenfall had become a truly market based actor, making investment decisions based on short-term profit concerns, not long-term objectives set by the government. Several interviewees states that Vattenfall was fine with the green certificate decision, even though it had not called for its development.

The certificate scheme became an instant success, especially with respect to enabling more bio power. The certificate price for the first years of operation was several times higher than the guaranteed price and hence the participants did not receive the quarantined price (Ekonomifakta 2016). However, it took some time until the scheme yielded results in actual increased capacity.

In this section, we have seen that EU influence played a major role for the establishment of the Swedish green certificate scheme, but it was the civil servants, not politicians or business representatives played the major role in this process. In the political field, the renewables policy still evolved in the shadow of the nuclear issue, and the large electricity actors seemed rather uninterested in the issue.

### **2005 – 2010: Booming renewables investment and modest industry diversification**

This period saw a range of significant renewables development; the certificate scheme swiftly resulted in a boom in bio power and eventually also the wind power investments took off, and investment support scheme for solar was introduced and rather swiftly it became far more popular than anticipated. The political controversial issue was however the lifting of the ban on new nuclear reactors towards the end of the period.

Sweden has for a rather long period had a large share of district heating, primarily based on bio and waste. The certificate scheme made bioelectricity a profitable bi-product of existing district

heating and pulp- and paper industry activity (Engström 2015; Jacobsson 2008;). Wind power developments did not take off to the same extent. Eventually, Vattenfall gained interested in wind power, and in 2005 it decided to aim to become ‘the largest wind-power producers in Europe’ (Darmani 2016:13, 14). At the same time Vattenfall experienced costly accidents in Swedish and German nuclear plants, and this made it less willing to actually invest (Darmani 2016:13). However, it increased its presence in Europe, among other things it acquired the leading Dutch electricity utility Nuon (Darmani 2016:14).

The bioenergy boom ensured that in 2008, the dominance of Vattenfall, E.ON (earlier Sydkraft) and Fortum was reduced somewhat, but still they were the most dominant electricity providers (Energy Market Inspectorate 2010: 24). No new renewables industry emerged, but the traditional energy intensive Swedish pulp and paper industry gained a more prominent role in the organizational field of electricity. Some researchers criticized the scheme for favouring mature technologies, but otherwise it was popular within the industry as well as politically (Jacobssen 2008:1505; Bergek & Jacobsson, Söderholm & Petterson 2010:521). By now, the utilities that used to be dominated by engineers, had become heavily influenced by the market thinking of economists (see Inderberg 2012).

As part of a string of measures introduced to enhance the energy performance of buildings, the first solar PVs supports scheme was introduced in 2005 (Näringsdepartementet 2008; Riksdagen 2009). Publicly owned sector buildings became eligible for investment support, a one-time up-front support covering parts of the investments. It seems as if thus scheme was a part of the Swedish implementation of the EU Energy Performance of Buildings Directive, although the directive did not specifically require this (Boverket 2009). Rather, the directive in softer terms promoted installation of PV on buildings and encouraged member states to focus on public buildings (see Boasson and Wettestad 2013). Interview information indicates that the scheme was readily endorsed by the Riksdagen, without much political controversy. EU state aid guidelines allowed for PV investment support, even though many countries in this period, such as UK and Germany chose to apply feed-in in to promote this energy source (see Leiren et al. 2017; Leiren and Reimer 2017). The scheme was eventually designed to fit the requirements in the EU state aid guidelines, but as it took more time to get formal approval from the Commission than expected (Boverket 2009).

In 2006, the Social Democratic government proposed to prolong the certificate system until 2030, expanding the target to 17 TWh by 2016 (Swedish Government 2006). Just like in 2003, the Centre Party, the Left Party and the Social Democrats defended it while the Liberal People’s Party and the Moderate Party wanted to revoke it (Swedish Parliament 2006). The small Christian Democratic party once more argued for a feed-in tariff. The Green Party had many objections to details in its design, calling for support to a wider range of technologies and a higher renewables target. After the revision

of the scheme, the investments in wind power increased (Ek et al. 2013:137; Pettersson et al 2010: 3118, Pettersson & Söderholm 2009:2036).

Later in 2006, the election result created a shift in government. The Moderate party, the Liberal Moderate party, the Centre party, and the Christian Democrats created the so-called Alliance government in September 2006. These parties had very different opinions on energy policy. One interviewee describes energy as the most challenging use for this government. This interviewee underlines that the government managed to 'keep peace publicly', but that the internal disagreements were significant. The Centre Party wanted more renewables produced through the certificate scheme while the others wanted to stall the nuclear phase out.

In November 2008, the Swedish Ministry of Enterprise sent an informal letter to the Commission, stating that it wanted to open the solar PV for public buildings for private citizens and commercial actors, but also expand it to include solar thermal heating (Näringsdepartementet 2008). The ministry asked for a swift notification, arguing that as the scheme for public buildings was about to expire they were about to embark on a period without any functioning scheme. The written correspondence does however show that it took several months with informal deliberation before the Swedish government had designed adapted to the state air requirements (Europeiska kommissionen 2009). In line with the guidelines, large corporations could get 60% of their investment costs covered, and small and medium sized corporations 80% and 70% respectively. The Commission endorsed the scheme in May. The notification was only valid until December 2011 – it could not be prolonged without re-notification.

Interview information indicate that the Centre party used its leadership of the Ministry of Enterprise to promote the solar scheme, but they also gained support from the opposition, producers of solar power, and environmental protection groups. Although technology neutrality was accepted as a guiding principle for the governments energy policies, all political parties, including the more nuclear friendly Liberal People's Party and the Moderate Party, accepted to give solar energy special treatment. The Ministry of Finance, led by the Moderate Party, was skeptical, but interviewees underline that no one expected solar to constitute a significant part of the energy mix for years to come, thus the issue was regarded as of minor importance. The conflict was resolved at the highest political level, in internal negotiations between the where the parties in coalition.

As so often before in Swedish energy policy history, the nuclear issue aroused major political controversy. In March 2009, the parties in government made a grand climate and energy agreement that opened up for replacement of old reactors, ending the ban on nuclear power expansion (Swedish Government 2009a, Swedish Government 2009b). However, nuclear should not get any subsidies, the safety requirements became stricter and the nuclear energy owners' liability responsibilities of in case

of accidents was increased (Swedish Government 2009c). Moreover, the certificate scheme was prolonged to 2035, and the 2020 target was expanded to 25 TWh.

Several interviewees argue that the Centre Party used the certificate scheme as a bargaining chip; they had called for higher ambitions in the certificate scheme in return for accepting to lift the nuclear ban. One of our interviewee states that the agreement implied 'letting nuclear energy dismantle itself'. Another argues that accepting the application of nuclear energy but no new state aid for nuclear in practice made it impossible to construct new reactors. Some scholars do however claim that the agreement continued to prolong the life of nuclear in Sweden, hampering expansion of renewables (Sarasini 2009: 650, Tobin 2015: 148).

The 2009 agreement implemented the 2009 EU renewables directive. Initially, the Commission fought for the adoption of a pan-European certificate scheme, inspired by the Swedish scheme, but renewables industry, the German and Spanish governments and green politicians fought hard for a directive that allowed for continued use of feed-in schemes as the main national renewables instruments (See Boasson and Wettestad 2013). Hence, the directive was completely rewritten in the legislative process. The final directive did not contain any incentives towards certificate schemes. Interestingly, it does not seem as if the failure of certificates at the EU level contributed to de-legitimize the Swedish certificate scheme. The 2009 directive created a 49% binding renewable energy target by 2020 for Sweden, but the Riksdag increased this to 50% (European Parliament 2009: 46; Swedish Government 2009a; Swedish Government 2009b). Moreover, the Swedish and Norwegian governments agreed that Norway should join the certificate scheme (see Boasson 2015). This spurred intimate collaboration between the Norwegian and Swedish energy agencies, but our interviewees agree that the enlargement did not lead to significant changes in the design (see also Swedish Government 2010).

We have seen that nuclear and renewables become more intimately intertwined in this period, and as we will see this development continued in the period to come. Moreover, the 2005-2009 period was marked by lengthy process relating to adjusting to the EU state aid rules and EU renewables policy, causing the national policy processes to become more cumbersome, but seemingly without other important implications.

### **2010 – 2016: Certificate scheme prolonged against all odds**

During this period, the large Swedish utilities as well as the European Commission largely turned against the certificate idea. Despite of this, the Swedish scheme was prolonged and the ambitions increased. In order to understand this we will need to explore the extraordinary political situation in the Riksdag and the increased politicizing of renewables.

We see a remarkable shift in the larger European environment in this period. The financial crisis and the steep reduction in renewables cost led to increased criticism towards feed-in schemes, especially from the financially constrained electricity utilities (Boasson 2017). Moreover, the EU steering of renewables support schemes, became significantly more coercive in 2014, when the Commission issued guidelines that clearly favoured auctioning combined with feed in premium. This created a shift from traditional feed-in schemes to auctioning and feed-in premium all over Europe, even in the feed-in champion Germany (see Boasson 2017, Leiren and Reimer 2017). The energy policy developments in Sweden was however of a very different nature, and very few actors brought the European developments into the European developments.

In May 2010, the Riksdag endorsed implementation of the Alliance governments energy agreement from 2009. The minority opposition rejected this, suggesting to expand the certificate scheme with 5 TWh more, calling for additional technology specific feed-in tariffs and accusing the government of being too nuclear friendly (Bolund et al. 2010). Both the government and the opposition appeared as two coherent blocks, and none of the parties that previously had opposed the certificate scheme displayed open criticism.

In the 2010 election, the Alliance lost parliamentary majority and the right-wing and nationalist party the Sweden Democrats entered the Parliament. However, the Alliance still had more parliamentarians than the red-green parties (the Social Democrats, the Left Party and the Green Party). Since the latter parties refused to cooperate with the Sweden Democrats, the Alliance continued as a minority government. According an interviewee, the deep-seated conflicts over energy policy within the Government became fiercer, as the government was forced to forge alliances with other parties in order to get parliamentary supported.

Already in 2012, the 2020 target of 50% renewables energy consumption was reached (Swedish Energy Agency & Swedish Environmental Protection Agency 2014: 39). This year, wind power became the most dominant technology in the certificate system. This was partly explained by older bio power facilities being phased out of the system and wind power investments growing almost exponentially (Darmani 2015; Energy Market Inspectorate 2010; 2014:24). Vattenfall, Fortum and E.ON still dominated electricity production, but the landscape of electricity providers started to diversify (Bergek et al. 2013, Energy Market Inspectorate 2014:26). The new wind power investors had highly varying backgrounds (Darmani 2015). Corporations that sold bio power with a primary rooting in waste management, pulp-and paper and agriculture dominated. By now, the European adventures of Vattenfall became very, very expensive. Hence, it divested in Europe and the Swedish home market became more important (Darmani et al. 2016: 15).

The election in 2014 led to a shift in government to a minority government consisting of the Social Democrats and the Green party. The government had no stable basis in the Riksdagen, making

Swedish politics significantly messier, with shifting alliances across issues. In 2015, the new government gained parliamentary endorsement to up the target for Sweden in the Swedish-Norwegian scheme to finance 30 TWh new RES to 2020, instead of the earlier target of 25 TWh (Swedish Government 2015a).

In addition to the existing solar investment scheme and certificates, the new government also introduced a tax reduction for solar and potentially other micro producers of renewable electricity. Interviews indicate that the solar industry association had initially pushed for a system that rewarded those that fed electricity from micro decentralized electricity to the net, but the government rather wanted tax-reduction, arguing that it was easier to make this compatible with EU state aid and competition policy (SOU 2013). This was criticized by the renewable electricity industry, the red-green parties and the Energy Agency (Energimyndigheten 2013; Nordin 2014; Persson 2014; Jakobsson 2014), while the Sweden Democrats opposed any such aid (Alfsson and Fransson 2014). Yet, the Swedish government had to work with DG Competition for more than a year before they agreed on how to design the scheme in a way that did not violate the rules (Swedish Government 2014: 9).

In March 2015, the Swedish Government appointed a parliamentary Committee, instructed to propose a broad energy policy agreement at January 2017 the latest (SOU 2017: 29). The group was headed by the Minister of Energy: the directors of the TSO, the Energy Agency and the Energy Market Inspectorate participated at all meetings. Corporate actors were consulted, but not included in the Commission. In January 2016, Vattenfall surprisingly claimed publicly that all their Swedish nuclear power plants would close down in the near future due to economic problems, caused by the low electricity prices, the effect tax on nuclear power and the new safety requirements (Dagens Industri 2016). Not only would a close down of all reactors mean enormous losses to the state-owned company, it would put the whole Swedish electricity system at risk (SOU 2017). Interviewees confirm that politicians from most parties understood it as critical to respond swiftly to the Vattenfall initiative. Hence, they started to negotiate a new energy agreement – one year before the Commission had finalized its technically informed assessment of the Swedish energy system.

The electricity industry coupled the economic hardship of nuclear to the renewables investments boost; the Swedish electricity industry claimed that the new renewables production was the main cause for a 65% drop in wholesale Swedish electricity prices dropped between 2010 and 2015 (see Hirt 2016). Several interviewees underlined that considerable efforts were made by Vattenfall to influence the politicians' decisions on nuclear, while it paid less attention to the renewables issues. At the time of the negotiations, the Norwegian government had already decided to leave the certificate scheme after 2020, but this did not contribute to delegitimize the system in Sweden (see Meld. St. 25 2015–2016). Moreover, the European Commission in 2014 issues new state aid guidelines, requiring auctioning combined with feed-in premium. Certificate schemes could also be acceptable if designed

in accordance with a complex set of new rules (see Boasson 2017). Interestingly, the final report from the Energy commission only makes a superficial reference to these EU state aid guidelines– indicating that these got little attention from the politicians in the commission (SOU 2017:67-8).

In June 2016, the parties in power (the Social Democrats and the Green party) and three of the four parties of the former center-right Alliance Government (now in opposition) struck an energy policy deal. The overall goal was that Swedish energy production should be 100% renewable by 2040 (SOU 2017:16). Ambiguity was added by stating that this was ‘a goal, not an end date prohibiting nuclear power’ and that it did not imply ‘a politically forced closure of nuclear’. The agreement also removed the thermal effect tax on nuclear power production, but at the same time it was ensured nuclear would not be allowed state aid any form and that nuclear energy producers should carry the costs of nuclear waste management (SOU 2017:17). On the other hand, the green certificate scheme was prolonged and expanded by 18 TWh worth of certificates until 2030, the property tax on hydro should be lowered and the grid connection fee for windmills abolished.

We have interviewed several of the politicians in the commission, and several seem to have been motivated to reach an agreement well in advance of the 2018 election. One interviewee argue that in Swedish energy politics expressed it, energy policy ‘is not something that wins you an election, but you could perhaps lose an election on account of it not working’. According to interviewees, the Centre and Green parties pushed hard for the expansion of the certificate scheme, and the Moderate Party accepted this on the basis that the taxation was lifted for nuclear as well as large hydro.

The political parties gave widely different interpretations of the the agreement. The Green Party stated in their press release that the agreement meant ‘step by step leaving old nuclear power and fossil electricity behind us’ (Miljöpartiet 2016). In contrast, the Moderate Party claimed that it had secured ‘the conditions for nuclear power to be an important part of Sweden’s energy supply for a long time to come’ (Moderaterna 2016). The Christian Democratic Party even hailed they had ‘saved nuclear power’ (Kristendemokraterna 2016). The Liberals and the Sweden Democrats opposed the agreement as they thought it would mean too hefty subsidies to weather dependent renewable energy (SOU 2017:2: 333, 338). The Left Party also opposed the agreement, the main reason being that it was too nuclear (SOU 2017:2: 352).

The prolonging of the certificate system run counter to the inputs from the electricity industry to a public consultation over the future design of the scheme in 2015 (Energy Agency 2015). Vattenfall, E.ON as well as the medium sized electricity utilities Uniper/Sydkraft and Statkraft criticise the system. They argue that it have been effective in the past it is time to abolish it. E.ON explicitly call for a system based on auctioning, similar to the system prescribed in the EU state aid guidelines from 2014. The Swedish Energy business association is even more vocal in its criticism than the corporations. Fortum is the only major producer that do not voice criticism. The pulp and paper business association, the

Swedish wind power organization and the Nature conservation organizations are positive to a prolonged system. Interestingly, Svebio criticize certificate schemes for not being market based and cause too low prices.

The fate of the certificate scheme was closely related to the sudden nuclear controversy that arose early in 2016; and the unstable parliamentary situation contributed to heighten the level of political conflict. The political promoters of a prolonged certificate scheme is to a surprising degree unaffected by the range of factors that undermine the legitimacy of this scheme. Note also that in this period, Swedish civil servants engaged in several lengthy negotiations with the EU on the detailed design of the two support measures for solar energy. It was no Swedish consensus on how to interpret the various EU rules, and the dialogue with the EU contributed to create instabilities in these support schemes.

#### **4 Assessment and conclusion**

This paper has provided the empirical backdrop for explaining why Sweden has a unique renewables support mix, consisting of a market based green certificate scheme and more technology specific investment support and tax exemptions for solar PV and heating. The chronological story shows that the importance of the European environment, the national organisational field of stationary energy production and the political field has varied over time. Let us first assess the extent, when and how the *European environment* influenced the Swedish developments. From the late 1990ies and onwards, the Swedish support schemes have developed in dialogue with developments at the EU level, but the political conflicts Swedish energy policy debate has been different from those the EU level. The large electricity utilities did not promote the certificate scheme, and feed-in was hardly raised as a serious alternative.

Swedish civil servants took the green certificate idea promoted by key actors in the European Commission and the European electricity industry into the national Swedish context in the early 2000s, Commission officials was even involved in the drafting of the Swedish scheme. The Swedish civil servants expected the Court of Justice of endorse the Commissions rulings against feed- schemes and a pan-European certificate scheme would emerge. This was not what happened, but the diffusion of feed-in in Europe in the 2000s seemingly had no effect of the Swedish developments. It seems as if the adoption of the 2009 renewables directive with obligatory national renewables target, contributed to increase the ambitions of the certificate scheme somewhat. The directive did not underpin green certificate schemes, but this had no impact on the Swedish certificate scheme.

However, the promotion roof top PV on public buildings in the energy performance of buildings directive from 2002 seems to have spurred the development of a solar investment scheme for public buildings in Sweden. This scheme eventually came to include commercial as well as individual

households, in addition to public buildings. The initial design of this scheme was neatly adjusted to the requirements of the EU state aid guidelines, but Sweden acts counter to what other EU countries do, who primarily adopted feed-in schemes to promote solar energy. Interestingly, the Commission notification procedure contributed to create substantial instabilities in the system, which in itself seems to have fostered demands for additional support schemes. This contributes to explain why Sweden in 2015 introduced a tax reduction on top of the other support measures for solar power.

In contrast to what we expected, the European environment had the most significant influence on Swedish renewables developments at the stage in time where the EU had the least formal powers. Moreover, Sweden has been far more affected by the ideas that have been floated by the Commission, than by what other European countries have done. In order to understand this, we need to take into account that Swedish actors was searching for a way to support renewables that did not increase public spending. The EU impulse was crucial for the development of the Swedish certificate scheme, and the idea later became locked-in and resilient to change. Indeed, the Swedish politicians holds on to this instrument even in the 2010 – 16 period, when faced with stark opposition from the organizational field.

To what extent, when and how has the *Swedish organizational field* of stationary energy production influenced the support schemes? In the 1970s, the field seemed segmented; highly dominated by Vattenfall who controlled most developments in the field, relating to energy production, transmission and price setting. Engineers had the upper hand, and their institutional logic of technology development seems highly institutionalized. The strong politicization of nuclear was indeed an external shock to the field, but it did not lead to any immediate structural or institutional changes that reduced the internal unity of the field. Rather, the radical nuclear expansion continued for a full decade after the election, no significant new renewables industry actors emerged, Vattenfall continue to control the field and the public apparatus remained rather unchanged. Moreover, the rapid of nuclear created an electricity surplus so big that Sweden had no need for renewables.

It is first in the 1990ies, that the de-segmentation process in the field starts; economists gains prominence and a liberalization reform is initiated. Moreover, the advent of the climate issue weakens Vattenfall's control of the field. Moreover, the Energy Agency is established, as a strong regulatory instructed to ensure developments of new renewables and energy efficiency as well as overseeing the functioning electricity system (eventually electricity market regulation is taken over by the new Energy Market Inspectorate). Moreover, the pulp- and paper industry eventually became an important energy producer, with more to gain from development of new renewables (especially biomass) than the conventional actors. True, Vattenfall together with E.ON/Sydkraft and Fortum continued to control most of the Swedish electricity market, but the shift in logic from technology development to market thinking and the organizational changes creates more internal tension. It is the public actors that

promote green certificates, while the commercial actors seems rather disinterested at time when the scheme is adopted.

Moreover, from 2000 and onwards the field was heavily dominated by market logic, shared by the electricity producers and the Energy Agency alike. This mind-set eventually becomes heavily institutionalized; underpinning a smooth implementation of the green certificate scheme.

In 2010-16 period, the big utilities starts to question the market logic and we see an inflow of new smaller actors. The utilities have experienced major economic problems, partly caused by the market's reactions to increased intermittent new renewables capacity in Sweden and elsewhere. The utilities neither resist or promote the solar support schemes developed by the Energy Agency in this period, but it is embedded in a technology development logic alien to the big utilities. Despite that the solar industry is small and marginal group within the organizational field, they have seemingly a good dialogue with the Energy Agency, and also the politicians (as we will discuss later). The influx of a diverse group of solar and wind energy actors in the field does indeed contribute to create more internal conflicts and less unity, making the field more pluralistic in nature. This is well illustrated by the actors diverging inputs to the 2015 consultation on the certificate scheme; not only does the utilities disagree with the smaller and newer actors, there are also significant discrepancy among utilities. In this period, the utilities, and especially Vattenfall, put in a lot of effort to save their nuclear operations while they pay far less attention to the renewables support schemes.

On this backdrop, we can conclude that the segmented nature of organizational contributed to hinder development of any ambitious renewables support in the period leading up to the late 1990ies. After this, the field gradually became more pluralistic; the shift to market logics and the eventual inflow of more actors made the field less influential. The adoption of the green certificate scheme in 2003 was not underpinned by a united field, but was rather the production of civil servants responds to political renewables ambitions. From year 2000 and onwards, the field as become gradually weaker, especially after 2010 when the market logic started to de-institutionalize and internal conflicts grew: between the various groups of commercial actors, but seemingly also between Energy Agency and the utilities. Importantly, the Energy Agency is open to inputs from a range of actors, not only the dominant utilities. However, the weakened state of the field cannot alone explain that Riksdagen in 2016 decided to prolong a string of renewables support schemes that lack support among the largest electricity producers. Part of the explanation is that the utilities regarded the nuclear issue was perceived as much more important, but used little resources to influence renewables policies.

Finally, to what extent, when and how did *the Swedish political field* influence the support schemes? The nuclear referendum in 1980 constituted nuclear policy as a subject of intense political competition. Note that the nuclear referendum result was interpreted by the parliament, and this created a Swedish tradition of broad energy political agreements in Riksdagen. The structural power

of the parliament became further strengthened after the 2010 election; Sweden has only had minority governments after this, all of whom have had a very unstable parliamentary basis. Renewables support design was an issue for the parliament to decide, and this unstable situation made it impossible for the government or the ministry with energy responsibility to control the energy policy agenda to any large extent.

For more than thirty years, nuclear has been a salient political issue, subject to political competition. From 1980 to 1999, nuclear had a significant symbolic value, but as Sweden already had more electricity production than they needed renewables policy had very little practical importance. In the early 2000s, a political majority decided to adopt a more potent renewables support scheme, but the design of the scheme was not politicized; this was delegated to civil servants and experts. In the periods from 2000 to 2009, we also see that we see that many political parties have rather unstable and rapidly shifting positions on green certificate schemes, with some exceptions, such as the Centre party that turn into a stern supporter of this measure. The investment support to solar is introduced in this period, but this seems to result more from soft EU-influence and bureaucratic support in the Energy Agency, than direct political steering.

Eventually however, political discussions on renewables support becomes more and more intertwined with nuclear, but it is first after 2010 that renewables support schemes becomes subject to political competition in the same way as nuclear. Note that at this stage in time it is hardly possible to separate the two issues. With respect to both nuclear and renewables, politicians from all of the involved parties aimed to act in consistency with their former positions. They all work hard to be perceived as winners, presenting so diverging interpretations of the ambiguous energy deal that it became absurd and rather comical. Indeed, the dynamics of the Swedish political field is the main driver of the developments in the renewables schemes in the 2010 – 2016 period, not European developments or the situation in the organizational field. This can explain that Sweden prolongs the green certificate period and the ambitions. In addition, the investment support scheme and the tax reduction for solar energy production also gains wide held political support, even though it is only promoted by small and rather marginal actors in the organizational field.

Note that in all periods after 1999, Swedish actors has used a quite much resources, and increasingly so, to ensure that the Swedish support mix is in line with the EU state aid guidelines. This has probably been frustrating for the parties involved, but eventually the lengthy dialogues with DG Competition has had minor importance for the actual design of the schemes. If anything, it has sustained an impression of unreliable support, and this may have fuelled the demands for additional solar energy support in the 2010 – 2016 period.

On this backdrop, we conclude that after 2010 political steering had high independent importance for the design of the renewables support mix. The political field had significance also earlier,

but not to the extent that we see in the last period. This is in line with our expectation; *the political field has indeed influenced the Swedish renewables development the most when Riksdagen has had the formal powers to make key decisions and renewables have been subject to intense political competition.* Ironically, the politicians make sure to lock in earlier EU impulses, implemented in a period where the civil servants ruled and political steering had less importance.

We can conclude that in order to understand Swedish exceptionalism in renewable energy we need to take developments within the national fields as well as the European environment into account. Yet, the importance of the European environment was *not* determined by the strength of the coercive signals from the EU or the diffusion of practices in the European environment, but rather conditioned by the state of the two national fields. Rather, the EU influence around year 2000 has become strongly institutionalized in Sweden, especially in the political field.

## Interviews (affiliation and date of interview)

**Alterå, Ola** State Secretary at the Ministry of Enterprise and Energy, Center party, 2017-04-06 over (phone interview)

**Andersson, Bosse**, Swedenergy, 2016-11-15

**Andersson, Nils**, Green Certificate Commission (2000-2001), 2016-11-18

**Blümer, Magnus**, Ministry of Enterprise and Energy.2017-01-20

**Diczfalusy, Bo**The Energy Commission, Ministry of Enterprise and Energy, 2017-01-10

**Ebenå, Gustav** Swedish Energy Agency, October 2016.

**Flink, Linda**, Confederation of Swedish Enterprise. 2016-12-16.

**Fridström, Jenny**, Svenska Kraftnä, 2017-01-18

**Fredriksson Yvonne**, Ministry of Industry (years), 2017-01-18

**Hannes, Carl Borg**, Political Advisor at the Ministry of the Environment years, party affiliation, 2017-03-30 (phone interview)

**Hedenström, Claes** Vattenfall 2016-11-15

**Hjälmered, Lars**, Member of Parliament, the Moderate Party, 2016-11-16.

**Kåberger, Tomas**, director General at the Swedish Energy Agency, 2008 – 11,2016-11-14.

**Joelsson, Lars**, Vattenfall 2016-11-15

**Johansson, Daniel** State Secretary at the Ministry of Enterprise and Energy (2010–14), Arise, Centre Party, 2016-11-16.

**Lindahl, Johan**, Solar Energy Association of Sweden, 2017-01-17.

**Nordin, Rickard**, Member of Parliament, Centre Party, 2016-11-16.

**Stephansson, Magnus**, Svenska Kraftnät, 2017-01-18

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<sup>i</sup> Thanks to inputs from the REMIX research group, and especially Tor Håkon Inderberg for valuable inputs. . Also thanks to Mårten Pella for research assistance in an early phase of the work with this paper.