When regime changes slow down niche development: the example of wind energy business in Finland

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Abstract: This article analyses regime changes and niche development as interlinked processes as part of commercialising energy innovations. Theories about socio-technical changes are used to analyse the changes. A case study on the development of wind energy in Finland is presented to analyse the influence of the regime on niche development. In Finland, the changes in the electricity market have been rather small and the development of the wind energy has been rather modest. Though, a recent increase in the deployment of wind power coincides with the permission to build two new nuclear reactors and with feed-in-tariffs for large scale wind mill parks that ensure the market domination of the utilities. It is concluded that if the government is included among the regime actors, and the ties between the regime actors are strong, the regime can be in a position to influence policies to serve the interests of the regime.

Keywords: socio-technical changes; regime; niche; electricity market; Finland.


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1 Introduction

Changes in the electricity markets have remained rather modest so far. Regardless of policy efforts such as market liberalisation or greenhouse gas mitigation, large utilities continue to dominate the scene. New businesses, such as wind and solar power, are considerably fewer in number and smaller in size. The purpose of this paper is to analyse the underlying reasons for this through analysing both regime changes and the development of niches.

The electricity market is viewed as a socio-technical system which consists of actors and institutions, as well as technologies and knowledge (Geels, 2004; Markard, 2011; Weber, 2003). Socio-technical changes are processes that lead to a fundamental shift in socio-technical systems (e.g., Geels and Schot, 2010). A transition involves far-reaching changes along different dimensions: technological, material, organisational, institutional, political, economic, and socio-cultural.

For example, several of the new power generation technologies are small in scale and decentralised, unlike the centralised power generation technologies used by the incumbent utilities. Policy support for the deployment of decentralised energy would lead to fundamental changes in the market, e.g., the development and growth of related businesses (Lewis and Wiser, 2007; Lund, 2009). Such policies would also improve the energy security and independence of supply at the consumer end and in local communities by protecting against price peaks, black-outs, etc. Such policies reflect multiple changes in user preferences and the role of consumers by turning them into prosumers (Toffler, 1980). These kinds of policies would also increase competition in the market by redistributing decision-making power and businesses to a larger number of actors.

The extant literature on socio-technical changes is ample (Markard et al., 2012). The theoretical frameworks employed in studying sustainability transitions include four major approaches (van den Bergh et al., 2011):

1. transitions linked to the innovation systems
2. the multi-level perspective, which has a close link to strategic niche management
3. transition management based on complex systems
4. the evolutionary systems approach.

Less attention has been paid to the politics of transitions and to the multiple interests when the goals of the changes and the paths to be taken to achieve these have been defined (Smith et al., 2010; Shove and Walker, 2007). According to Raven (2006), understanding the complex nature of the multiple dimensions of socio-technical changes can be improved by analysing both regime changes and niche development as interlinked processes. Attention should also be paid to the ties between the actors in the regime, especially between the government and the industrial actors, and how these influence the changes in the market (Granovetter, 1998; Smith et al., 2005).

To analyse socio-technical changes in the electricity market we use elements from strategic niche management (Raven and Verbong, 2007) and transition management (Smith et al., 2005) while taking notice of the multiple levels of the change processes (Geels and Schot, 2007). We analyse how the regime and the niche aim to influence changes in the market in their own favour. The aim is to increase the understanding of
regime changes and niche development as interlinked processes, which is a gap in the existing research literature (Geels and Raven, 2006; Raven and Verbong, 2007).

Changes in the electricity market, from the development of innovations to changes in the businesses, are influenced by policies as the electricity market remains under governmental jurisdiction. To highlight the contextual nature of the processes, our approach is based on social constructionism rather than on systems thinking. Accordingly, changes in the electricity markets are analysed as contextual and embedded in the social context. The starting premise is that there is a regime and many niches in the electricity market and the actors in both the regime and the niches are self-interested. The actors can be either individuals or organisations.

The wind energy business is used here as an empirical example of niche development, because it was among the first new energy technologies to reach the market. We focus on the period 1980–2000, which was critical for the take-off of the new technology; e.g., policy support for R&D and market deployment played an important role.

The paper is structured by starting with the theories of regime changes and niche development, followed by the presentation of the methodology. Then the qualitative case study (wind energy in Finland) is presented. The paper ends with a summary of the findings, conclusions, and discussion.

2 Linking niche development and regime changes

There are alternative ways to define a regime. For example, it can be defined according to a main technology or a primary fuel source used (Markard and Truffer, 2006). Geels (2004) defines a socio-technical regime as a set of rules, embedded in technological artefacts and social networks, which together ‘fulfil a societal function’. However, as regimes are analysed here in terms of a market, we have chosen to follow Smith et al. (2005), who claim that institutional and market dominance are the defining features of a regime.

On the other hand, a niche is new and marginal. A niche consists of actors involved in emerging innovations and businesses. Niche development and regime changes are often analysed in different yet overlapping streams of literature (Markard et al., 2012). To analyse them as being interlinked, as here, the main aspects of strategic niche management and transition management are presented as being relevant for this article.

In the literature around that deals with strategic niche management, niche development is assumed to take place through the creation of protective spaces such as research and development programmes and special markets for innovations, in which innovations can be developed outside the influence of the regime (Kemp et al., 1998; Smith and Raven, 2012). Hence, it is often assumed that niche development can take place rather independently of the regime. A niche can develop and grow in these protective spaces through local and global projects, social learning, articulating promising expectations, and networking (Geels and Raven, 2006). As the innovations become more developed the number of niche actors grows. Subsequently, there is less need for protection and the innovations can enter and compete on the regime market (Smith and Raven, 2012). However, niche innovations do not necessarily compete with regime technologies but niche innovations can also exist in co-evolution (Raven, 2006) or a regime can adopt niche innovations (Smith, 2007).
In transition management, the focus is on regime changes by actively managing the socio-technical transitions through governance and practice-oriented models for sustainability (Loorbach, 2010; Rotmans et al., 2001; Smith et al., 2005). It is often assumed that the transitions are deliberate and based on consensus. According to Smith et al. (2005), regime changes are influenced by the regime’s ability to adapt to changes, referred to as selection pressures. Selection pressures can originate from the regime, niches, or from wider socio-technical systems. How a regime is able to adjust to selection pressures is also influenced by its resources (Smith et al., 2005). The more resources the regime has, the more adaptive it will be and vice versa. Regimes with fewer resources are less able to adapt and will most probably erode over time.

To combine regime changes and niche development and their mutual interactions, we consider the resources of the regime and the niche, in particular the relative number of actors, the ties between them and the government, and the ties among the actors (Granovetter and McGuire, 1998).

Figure 1 illustrates the framework for analysing the development of the wind energy businesses in a country context consisting of an electricity market regime and several niches (here two niches are used as an example). External pressure creates windows of opportunity for the niches (Geels, 2004).

**Figure 1**  Regime changes and niche development

The regime and niches consist of different actors with different ties based on, e.g., ownerships or financial or other kinds of dependencies. These ties influence the relative strength of the regime and niches, as well as their access to policy making, governmental working groups, and decision making, among others. The ties between the regime and the governmental actors can be eminently influential (Granovetter and McGuire, 1998). The
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dotted circles around the regime and niches symbolise their dynamic nature; e.g., actors can join and leave; there may also be transfer of actors between the regime and the niches. The niche also develops local projects in order to grow and to attract new actors and resources.

Niche development and regime changes in electricity markets are complex processes. For example, in Denmark the regime was relatively weak and the ties with the government were loose. The wind energy business niche managed to gain enough political and financial support to grow, while the regime did not have the resources to resist the changes (Lyhne Ibsen and Skovgaard Poulsen, 2007). In Germany, the wind power niche gained enough support and new actors to grow, in spite of the strong ties between the powerful regime and the government, which did indeed try to slow down the phasing out of nuclear power without succeeding in this, which could have influenced the market take-up of wind power. In a more global context, the nuclear regime had enough resources to redefine nuclear energy as an emissions-free technology, adapting in this way to the need to reduce greenhouse gas emissions from energy (Garud et al., 2010).

3 Research methodology

The main framework of our analysis relates to socio-technical changes through changes in market dominance. To do that this article is based on a case study method and on quantitative research material. This methodological choice was made because the aim is to analyse the socio-technical changes as unique and embedded in time and the context (Yin, 1989).

The framework was illustrated above in Figure 1. As these changes are unique and embedded in time and the context (Yin, 1989), here we employ a case study (wind power in Finland) and quantitative material from multiple sources (Stake, 2000). Regime changes and niche development are a complex research theme which involves analysing the complex interconnections of several actors. Hence, our approach is based on an in-depth analysis that pays attention to details and causal processes in a limited number of cases. Using mainly qualitative data is justified in order to gain an understanding of how a unique process develops in a particular case. A clear limitation of the method is that the results are not likely to be representative of an average process and thus this limits the generalisability in a conventional sense. Therefore, it is important in detail to describe the context and conditions under which the conclusions are valid as this will increase the applicability of the results to other cases with a similar kind of context (Sayer, 1992).

We chose wind energy as the case because it is one of the fastest-growing energy technologies worldwide, the future prospects for wind energy are good, and there is also a long historical track record available. Choosing Finland as the main case is interesting as the country has one of the world’s most advanced innovation systems and the wind resource is excellent, but there is also a clear lock-in into old regimes. We will also briefly describe the development of wind power in other countries, in particular in the European Union, which used to be the lead market for wind power in the past. Other energy technologies were not analysed because of the limited scope of the study.

The time period of the analysis is 1980-2000, during which major changes in the energy policy occurred, such as market liberalisation, the awareness of climate change, an increase in renewable energy, which caused changes in the energy regimes and increased the uptake of wind power worldwide. As a consequence, the price of wind
power clearly fell during this time period (see Figure 2). In our global analysis of wind power (Section 4), the time horizon extends till the present.

Written material from available research and governmental reports, archive materials of the Finnish Parliament, statistics, and energy companies’ websites were used. These are listed in alphabetical order in the list of references.

The case study is presented in the following sequence. First, an overview of the development of the wind power market globally and in Europe is presented, followed by an analysis of the main features of the Finnish electricity market regime and the wind energy niche business. Then the regime changes and niche development will be described.

4 Transition of the global and European wind power market

Wind power has undergone a major transition from a marginal niche technology into a major mainstream energy option during the last three decades. Figure 2 shows how the installed capacity and cost of wind power developed globally during 1980–2012 (EWEA, 2013; BP, 2013). The installed wind power capacity has reached the 300 GW landmark and produces more than 500 TWh of electricity annually. This development would not have been possible without major changes in policies and regimes in several countries from the 1980s up till now.

Figure 2  Cost and installed capacity of wind power 1980–2012

Early lead countries in the deployment of wind power included Denmark and the USA, where the first support schemes for wind power were introduced. Denmark represents a good example of how regime changes may influence the uptake of technology: wind power has enjoyed acceptance by all political groupings and industries for several
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decades, and its strong hold on the energy regime led, e.g., in 2012 to a Parliamentary decision backed by a strong majority to strive for 100% renewable energy production by 2050, in which wind power plays a central role (Gatermann, 2013; Danish Energy Regulatory Authority, 2011). The development of wind energy in Germany has followed much the same pattern as in Denmark, but is at a much later stage: Germany was the first country to introduce feed-in tariffs for renewable electricity in the 1990s, it progressed steadily with wind and solar PV, and in 2011, in the aftermath of the Fukushima nuclear catastrophe, Germany decided to abandon nuclear power and strive instead for an 80% share of renewables in electricity by 2050 (Federal Ministry, 2013).

Wind power has enjoyed public support in many other countries as well, which altogether has positively influenced both the demand and the unit cost through increased competition and the effects of economies of scale. Decreasing costs have a positive effect on demand, leading to a virtuous circle between capacity and costs, as demonstrated in Figure 2. We also observe that the lead countries for the development of wind power have changed over time, e.g., it is now shifting from Europe more toward Asia: in 2002, three-quarters of all the wind power employed was found in Europe, but ten years later this had dropped to less than 50%. China represents around 20% and the USA 30% of all wind power, though in these countries wind accounts for just 2% and 3.3% respectively of the national power production. It is perceived that China will remain the largest market for wind power during the present decade (Energy Markets Ltd., 2013). Because such geographical shifts in markets will also take place in the future, it is important to note that the deployment of wind power has often started as a niche in the country in question (when starting from scratch) and that the pace of take-off (or lock-in to conventional power) will depend on local policies and regime changes. Therefore, the Finnish case offers some interesting findings for future projections.

Europe has been a key market for the deployment and market penetration of wind power, which have been strongly influenced by the common energy and climate policy targets of the European Union, which have influenced the uptake of renewable energy in Europe through the reformulation of national energy policies, thus also influencing the regimes (European Commission, 2010). For this reason a short analysis of the wind power situation in Europe is presented next. Figure 3 shows how the share of wind power of all electricity has evolved in European countries since 1990 (BP, 2013). A true take-off did not take place until around the year 2000 (except for Denmark), but in terms of changes in the energy policy and regimes, the preceding period was important for preparing the market transformation of wind power from a niche to a real energy option. In many EU countries in which the share of renewable electricity has traditionally been low, the obligatory EU renewable targets for the year 2020 (20% RE of all electricity in the EU) have positively influenced the wind power market as in several countries (e.g., the UK, Denmark, Germany, Spain, and Italy) wind has become one of the preferred RE technologies. These targets have ‘forced’ the updating of the national policies since the 1990s and increased the financial support for renewable electricity, which has led to changes in the energy regime. From Figure 3 we can see that the market share of wind power in most EU countries is in the 1%–10% band, four countries are above the 10% mark (Denmark, Ireland, Portugal, and Spain) and a few countries fall below the 1% mark, including Finland (0.7%).
Furthermore, in Figure 4 we analyse the Finnish case in comparison with other medium-sized European countries by investigating the installed wind power capacity from 1997–2012. The differences in installed wind power capacity between the selected countries in the late 1990s were not that large in terms of MWs (observe the logarithmic scale used in Figure 4); e.g., in 1999, Finland was close to Portugal, Ireland, and Austria, but by 2012 the difference in comparison with these countries had grown by close to an order of magnitude. This large gap cannot be explained by technical or wind resource-related factors only, but it is directly linked to national energy policy and regimes. It is important to notice that the binding EU targets for renewable energy by 2020 do not state which RE technology must be invested in and the member states can choose their preferred technology freely. In the Finnish case, the priority was clearly not wind energy but bioenergy, which is strongly favoured by the Finnish energy regime. Interestingly, the development in the neighbouring country, Sweden, with similar bioenergy and wind resources and conditions, has been quite different: by the end of 2012, there were 3,750 MW of wind power capacity in Sweden and 268 MW in Finland, respectively. Swedish electricity consumption is around 50% higher than that in Finland.
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Figure 4  Development of installed wind power capacity in selected medium-sized countries in Europe (see online version for colours)

Though the cost of wind power has developed favourably over the years, as shown in Figure 2, it tends to be more expensive than the traditional power-generating technologies, though several factors, such as carbon pricing, wind resources, site planning, financial conditions, etc. may affect the competitiveness. The spread of the levelised cost of wind electricity may therefore vary from less than $45/MWh to over $160/MWh (IEA, 2013), which stresses the importance of local energy policies for the market penetration of wind power. However, the International Energy Agency, IEA, estimates that the installed wind power capacity will almost double from 282 GW in 2012 to 559 GW in 2018. Most of the wind energy increase will come from onshore wind power to be installed in China, the USA, India, and Germany, and in the case of offshore wind, the UK represents an important market (IEA, 2013). However, the largest relative increase in generation should be seen in totally new markets in the Middle East and in Africa, which are in a similar situation to Finland now, meaning that the question of energy regime changes and its mutual links to energy policies is highly topical.

5 Electricity market and wind energy businesses in Finland

The regime in Finland consists of energy intensive industry, in particular the forestry industry, large energy utilities, top civil servants, and politicians. The forestry industry, because of its large economic value for the country in the past, and the government have had close political and economic ties for decades, which have influenced the economic and energy policies which supported the industry (Lilja et al., 1992; Ruostetsaari, 2007; Tirkkonen, 2000).

The forestry industry has established energy companies, such as Pohjolan Voima Ltd. (PVO) and Teollisuuden Voima Ltd. (TVO), which have constructed electric grids and power plants and been an important driver for nuclear power in the country. The formerly state-owned utilities such as Vapo Ltd. and Fortum Ltd. have been only partially privatised. The three largest utilities, Fortum, PVO, and TVO, control 60% of the electricity market. A unique feature in Finland is that utilities are allowed to operate as
non-profit companies selling electricity to their owners without profit and without paying VAT.

Nuclear power and bioenergy dominate the energy policies in Finland. Nuclear power represents some 25% of all electricity, but its share will increase to close to 60% by 2025 as a result of political decisions taken in 2002 and 2010 (Ministry of Employment and the Economy, 2005, 008). Bioenergy represents close to 30% of all energy in Finland and around 80% of it stems from biomass residues from the forestry industry. Biomass development and innovations have been strongly supported financially by the Ministry of Trade and Industry (later the Ministry of the Economy and Employment) and through Tekes – the Finnish Funding Agency for Technology and Innovation (Kivimaa and Mickwitz, 2006).

The development of wind energy has remained marginal in Finland and represents only 0.7% of all electricity. In an EU comparison on wind energy utilisation, Finland falls into 23rd place out of the 27 member states that the EU had at that time. An exception is the semi-autonomous Åland in Finland, where wind accounts for 23% of all electricity (VTT, 2013), which could be explained by that it is quite outside the Finnish regime. The official goal of the national energy policy is to increase the use of wind power tenfold by 2020, to 6 TWh (Ministry of Employment and the Economy, 2008).

5.1 Regime actors and their interlinks

In this section, the main features of the regime actors and the ties between them are presented. The Finnish electricity market consists of about 120 companies (Energy Market Authority, 2013). However, there are significant cross-ownerships between the utilities, and between utilities and energy-intensive companies. Table 1 presents an overview of the ownership structure of the six largest utilities.

The Finnish state has a significant share in in the Fortum and Kemijoki utilities, as shown in Table 1. UPM and StoraEnso are large forestry companies, and Outokumpu and Rautaruukki are metal industries; the state is also a shareholder in the last three of these. SEV and EPV Energia are holding companies. SEV is owned by 16 regional energy companies and it is a minority owner of Vapo. EPV is owned by 21 firms, most of which are regional utilities. EPV in turn owns shares in PVO and TVO, but also in several wind power parks. Voimaosakeyhtiö SF owns shares in Fennovoima, which was established in 2007 to develop nuclear energy in northern Finland. The smaller regional utilities form a complex web of interdependencies through direct ownerships and holding companies, some of which are illustrated in Table 2. Regional utilities have also formed companies for cooperation in development, marketing, and trading.

Regardless of market liberalisation, the ties between the civil servants, unions, research organisations, and large utilities and heavy industry are close. Formally, energy policies are developed through negotiations in the Cabinet and decisions are made in the Parliament. In practice, energy policies are developed in cooperation with the civil servants and unions. The Ministry of Employment and the Economy is a central organisation in the process. Governmental research organisations such as the Technical Research Center of Finland (VTT), Government Institute for Economic Research, and the Finnish Environment Center conduct analyses for the ministries that are used in policies.
Table 1  The largest utilities in Finland and their main owners

<table>
<thead>
<tr>
<th>Largest utilities</th>
<th>Main generating capacity</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fortum Ltd.</td>
<td>Nuclear, hydropower, bioenergy, CHP</td>
<td>State, pension funds</td>
</tr>
<tr>
<td></td>
<td>Utilities</td>
<td>Turun Energia, Imatran Seudun sähkö</td>
</tr>
<tr>
<td></td>
<td>Industry</td>
<td>StoraEnso</td>
</tr>
<tr>
<td>PVO Ltd.</td>
<td>Nuclear, hydropower, bioenergy</td>
<td>EPV Energia, Kymppivoima, Etelä-Suomen Voima, Vantaan Energia</td>
</tr>
<tr>
<td></td>
<td>Utilities</td>
<td>Industry</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Metsä, UPM, Outokumpu, Rautaruukki, Kemira</td>
</tr>
<tr>
<td>TVO Ltd.</td>
<td>Nuclear</td>
<td>Utilities</td>
</tr>
<tr>
<td>Kemijoki Ltd.</td>
<td>Hydropower</td>
<td>PVO, Fortum, Mankala, EPV Energia</td>
</tr>
<tr>
<td>Vapo Ltd.</td>
<td>Peat, bioenergy</td>
<td>Other</td>
</tr>
<tr>
<td></td>
<td></td>
<td>State</td>
</tr>
<tr>
<td></td>
<td>Utilities</td>
<td>Fortum, Lapin sähkövoima, Rovaniemen Energia</td>
</tr>
<tr>
<td></td>
<td>Industry</td>
<td>UPM</td>
</tr>
<tr>
<td>Fennovoima Ltd.</td>
<td>Permission to construct a nuclear reactor</td>
<td>Voimaosakeyhtiö SF, which is owned by 49 regional utilities and 12 other firms, including Outokumpu and Rautaruukki</td>
</tr>
</tbody>
</table>

Table 2  Examples of ownerships of local utilities

<table>
<thead>
<tr>
<th>Holding company</th>
<th>Main generating capacity</th>
<th>Number of owners (local utilities)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVP Energia Ltd.</td>
<td>Shareholder in renewable and nuclear power (4 TWh electricity, 1.3 TWh heat)</td>
<td>20</td>
</tr>
<tr>
<td>Kymppivoima Ltd.</td>
<td>Hydro, nuclear, and wind; shares in Innopower, EPV, PVO (3 TWh of own power production, in total 7.4 TWh)</td>
<td>4</td>
</tr>
<tr>
<td>SEV Ltd.</td>
<td>Peat and bioenergy production; 49.9% ownership of Vapo Ltd.</td>
<td>15</td>
</tr>
<tr>
<td>Suomen Voima Ltd.</td>
<td>Low-carbon electricity production through own production and shares (3 TWh)</td>
<td>16</td>
</tr>
<tr>
<td>Voimaosakeyhtiö SF Ltd.</td>
<td>Shareholder in the Fennovoima nuclear plant (10 TWh)</td>
<td>49</td>
</tr>
</tbody>
</table>

5.2  Niche actors and ties between them

Compared to the regime described above, the wind energy niche is composed of fewer and less powerful actors that have much weaker ties with one another. The national wind energy associations, with members from research, industry, and private persons, represent an important actor in the niche (Ratinen et al., 2011). The Green Party of Finland could be perceived as an actor in the niche, though it has a low profile in wind power issues in practice.
The technology industry is also among the actors; however, as the support for wind energy has been marginal the companies are also quite small. Some of them are also regime actors. For example, in 1999, the PVO utility established a company to develop wind energy but later withdrew from the wind business. Mervento Ltd. was established in 2009 by private investors and the EPV energy company. Additionally, many companies that supply technology and services to the forest industry are involved in the new energy business as well.

Almost half of the wind power capacity in Finland is owned by the utilities, about 40% by private persons or cooperatives, and the remaining 10% by the industry (Turkia and Holttinen, 2012; VTT, 2013). The largest wind power projects are owned by the utilities or by the same companies that have shares in the utilities, expect Åland, where the owners are mainly private owners.

5.3 Wind energy in the national energy policy

The interest in harnessing wind power started in Finland along with the oil crises and as part of the anti-nuclear movement in the 1970s. An important early milestone was the assessment of the potential of wind energy (Tammelin, 1978; Kallio-Mannila, 1976). The key milestones in the development of wind power in the Finnish context can be summarised as follows. The first official target for wind energy utilisation, 100 MW by 2005 (what was actually achieved was 86 MW), was set in 1992 and was mainly influenced by the wind power niche. The issuing of the EU Renewable Energy Directive 2001/77/EY led to the target being increased to 500 MW by 2010 (197 MW was actually achieved). The current goal for wind power is 2,000 MW (6 TWh/a) by 2020, which would represent 6%–7% of the entire electricity demand. Compared to the present use of wind power (0.49 TWh), a more than ten-fold increase in wind power capacity in less than ten years would be necessary. However, the introduction of a feed-in tariff scheme at the end of 2010 (Ministry of Employment and the Economy, 2012) led to a 45% increase in the wind power capacity added yearly from 2011 to 2012.

From a policy perspective, one might expect that the measures described above would have an impact on the key actors and on the relationships between them. As explained in the previous chapter, the impact remained quite modest because of the strong position of the energy regime. However, around 2010–2011 a certain change in attitudes toward wind power started to be observed, resulting in new partnership arrangements for the deployment of wind power. Two reasons may explain this: first, the stronger public incentives to support wind power from 2010 onwards; second, the political decisions taken in 2002 and 2010 to grant permission for three new nuclear power stations, which, in practice, strengthened the market position of the energy regime in the long run.

5.4 Summary of findings

The development of the wind energy sector in Finland over the last two decades has been rather modest, for several reasons. The actors in the electricity market regime have been accustomed to making energy policy decisions that were quite often reached outside democratic processes and on the basis of their business interests. Key policies were mainly formulated and developed in governmental working groups and parliamentary committees, etc., admission to which was controlled by civil servants. Major external sources of pressure on the energy sector, such as the oil crises, the liberalisation of
electricity markets, and climate change mitigation, were turned into legislation and policies that mainly favoured the regime’s business interests. The niches were too weak to get their voices heard.

The changes resulting from the liberalisation of the market and privatisation actually increased the ties among the actors in the regime. For example, the privatisations of municipally owned utilities led to rather extensive cross-ownerships between the utilities. Because of the rather continuous policy support for nuclear energy, most of the Finnish utilities are currently involved in the development of nuclear energy.

The governmental policies appear to portray electricity as a public utility rather than a private business. Except for the energy policy update in 1997, competition in the market and the functioning of the energy markets have not been a discussion theme when energy policy directions have been formulated during the last two decades. However, the price of electricity is a major theme and is often discussed in relation to economies of scale of power generation. Increased competition may be perceived as being negative in this context.

6 Discussion and conclusions

In this paper we have analysed socio-technical changes through regime changes and niche development that are important for the commercialisation of new energy technologies and innovations. Changes in the electricity markets and in the development of wind energy businesses were investigated in more detail through a case study to shed new light on the importance of politics and multiple interests in the transitions.

We found that the regime seemed to be able to control the development of the niche and to slow it down, for which reason the development of wind energy businesses in the Finnish case has remained quite slow. The national energy policies appear to have strengthened the regime.

The niche did not manage to attract enough regime actors or support from them. It can be concluded that if the protective spaces for niches can be controlled by actors who are closely linked to the regime, it is unlikely that the niche will grow. However, social changes may bring about changes in the regime (Smith et al., 2005). A rise in the price of electricity or a decline in the price of the new energy technologies could work in the same direction.

An interesting question is the position and the role of the government. The government can have many roles as a member of the regime, which would be worth further research, in particular to gain a better understanding of ties with other regime actors, e.g., institutional ties that influence funding and may indirectly influence decision making.

References


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