5 Better off alone?

The development of citizen involvement and community energy in the Swedish energy transition

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Introduction

The transition towards a low-carbon society is urgent and is underway. The goals are ambitious, with EU targets of at least a 40% reduction in greenhouse gas (GHG) emissions, 32% renewable energy usage and an energy efficiency of at least 32.5% by 2030 (European Commission, 2019a). Corresponding Swedish goals are a reduction of 63% in GHG emissions, an increase in energy efficiency of 50% by 2030 and 100% renewable energy production by 2040 (Swedish Government, 2019). In order to reach these goals, society must transition on international, national, regional, local and individual levels. While research and policy regarding national energy systems have received much focus, initiatives from communities have only recently gained attention. However, the potential of such initiatives to complement measures taken by energy actors is high.

The concepts of “grassroots innovations” or “grassroots initiatives” (GI) and “community energy” (CE) have received increased attention in recent years. In the first studies on grassroots innovations, they were defined as:

networks of activists and organisations generating novel bottom-up solutions for sustainable development; solutions that respond to the local situation and the interests and values of the communities involved. In contrast to mainstream business greening, grassroots initiatives operate in civil society arenas and involve committed activists experimenting with social innovations as well as using greener technologies.

(Seyfang and Smith, 2007, p. 585)

This definition emphasizes cooperation among citizens, and citizens taking an active role from their own ideas and initiatives. CE is defined as a category under GI, with a focus on either or both renewable energy production or energy saving (Martiskainen, 2017). Interest in GI and CE has increased at the EU level in recent years, with an increased emphasis on their roles in the energy transition. For example, community energy is explicitly mentioned in the directive on common rules for the internal market for electricity (European Commission, 2019b, p. 130):

Community energy offers an inclusive option for all consumers to have a direct stake in producing, consuming or sharing energy. Community energy initiatives focus primarily on providing affordable energy of a specific kind, such as renewable energy, for their members or shareholders rather than on prioritising profit-making like a traditional electricity undertaking.

National differences in the development of community energy are substantial, and some authors have analyzed the reasons for these. Kooij et al. (2018) argued that material-economic, actor-institutional and discursive dimensions have influenced the development of GIs in Denmark, the Netherlands and Sweden, especially concerning existing market structures. They also pointed to the importance of historical development.

This chapter takes its departure from the literature on community energy (cf. Bauwens et al., 2016; Berka and Creamer, 2018; Hargreaves et al., 2013; Martiskainen, 2017; Seyfang et al., 2014) and especially from the dimensions proposed by Kooij et al. (2018). It focuses on Sweden and analyzes the structures that have limited the room for maneuver for CEs and focuses in particular on policy. It suggests that while there has been some development of CEs in Sweden, especially wind cooperatives and eco-villages, it has been limited. During the past decade it has been more modest than in, for example, the Netherlands (Oteman et al., 2017). The reasons involve an already high share of renewable energy in the energy system, strong involvement from the state and municipalities, and the financing structure.

The aim is to analyze the institutional settings and policy settings for community energy Sweden in order to understand the prerequisites for its development.

Methods and material

The chapter is based on material from research in a project financed by the Joint Programming Initiative Urban Europe (JPI) program (Joint Programming Initiative, 2021). The project was called MobGIS (Linköping University, 2021) and focused on GIs and ECs in Denmark, the Netherlands and Sweden. The results have been presented in several papers (Kooij et al., 2018; Magnusson, 2018; Magnusson and Palm, 2019; Magnusson et al., 2021) and the results in this chapter are based on the material presented in these papers, with some supplementary literature and policy documents.

The Swedish material was obtained by a step-wise process (for a detailed description, see Magnusson and Palm (2019)). First, CE initiatives in Sweden were mapped. This process ended in March 2017 and covered databases (e.g., “Cesar,” which covers organizations registered in the electricity certificate system, “Vindstat,” which covers wind power producers, and “Retriever-business,” which covers all registered companies in Sweden); previous research (journals, books and reports); popular science reports from interest groups and umbrella organizations (e.g., SERO, Ekobyarnas riksorganisation, Vindkooperativ); magazines and web searches based on the Swedish terms for such concepts as “energy

community,” and “energy cooperative.” The cases identified were entered into a database along with background information (such as geographical location, organizational form, types of renewable energy projects, goals, number of members, ownership and membership in umbrella organizations).

The database initially contained 225 organizations, which was reduced to 140 after in-depth studies of websites and additional sources. These organizations were cooperatives in wind power, solar energy, small-scale heating, eco-villages and rural communities that owned hydro power or energy-saving plans.

We conducted semi-structured interviews with 36 organizations and five umbrella organizations in the database, focusing on questions that examined the establishment of the cooperatives and their motivations, challenges and organizational structures. The questions also looked at institutional support and barriers, and asked about plans for future development.

The results were analyzed and presented in the papers described above.

This chapter presents a basic mapping of Swedish energy policy that supplements the previously published material. Reports from the Swedish Environmental Protection Agency that evaluate energy policy, along with similar reports from the Swedish Energy Agency, have been used. The main purpose has been to present a picture of the most important policy measures for investment in renewable energy and to identify the targets of these policy measures.

Previous research

Community energy systems have been increasingly studied in recent years. Several definitions of community energy have been proposed, all of which contain an understanding of local, citizen-driven projects, formal or informal, with the purpose of establishing collaborative solutions to facilitate the development of sustainable energy technologies, mainly with non-profit ambitions (Bauwens et al., 2016; Martiskainen, 2014; Martiskainen, 2017; Seyfang et al., 2014).

The most important aspects of such systems for this chapter relate to policy and the different target groups for subsidies and grant programs. Curtin et al. (2017) concluded that these economic incentives have an impact, but that there is no “one size fits all” solution and that it is important to understand the specific needs of local citizens and groups when implementing policies. They argue that regulatory stability and policy certainty are important success factors and that feed-in tariffs, grants and tax incentives are the most successful policy measures.

Kooij et al. (2018) analyzed the institutional settings surrounding GIs in Denmark, the Netherlands and Sweden, and identified historical explanations which they described using three dimensions: material-economic, actor-institutional and discursive. The material-economic dimension contains several components. The structure of the economy and a high degree of industrialization in a country lead to the centralization of the energy production, as the industries are based on cheap and reliable domestic energy. They show that the pricing mechanism has a major impact on whether grassroots innovations succeed, as subsidies,

feed-in tariffs or emission taxation is necessary for such initiatives to enter the market and stand a chance.

Kooij et al. (2018) further argued that the actor-institutional dimension shapes the possibilities for GIs. Market rules and liberalization may have an effect, as they lower the entry threshold to producing renewable energy, but subsidies are still necessary at an early stage to support investment. Another important factor is acceptance from existing grid owners and energy companies, as they can lobby against new market entrants. Small actors do not have the power or organization required to influence policy and depend on rules being in place that enable their entrance. Municipal energy companies can also be important partners for CEs in many cases. Further, the political culture and decision-making processes are important, as networks between various actors are necessary if ECs are to have a chance of entering the market. A nation's vision of the energy future is a further important aspect. In Sweden, for example, a continued strong emphasis on a mix of nuclear power, hydro power plants and other renewable energy sources shapes legislation and investment in the energy sector. The culture and perspectives on citizenship, finally, concern how the roles of the citizen and cooperatives are perceived. Kooij et al. (2018) showed that the Netherlands and Sweden share a culture based on individualism, which leads to renewable energy cooperatives being a rare phenomenon, while Denmark has a history of agricultural and other cooperatives.

A concept known as "path dependency" is important for this study. Path dependency relates to how decisions that are made concerning such issues as technology influence the system development for a long period. Commonly used examples are how standardization leads to path dependency in, for example, decisions about the width of train tracks, as all decisions made after this point must relate to this choice of technology (David, 2001). Hughes (1983) described the concept of "momentum," which is related to path dependency, and how choices of technology, regulations and investments in a technological system generate inertia and make it difficult to change the system. Bladh (2020) uses the concept in a wider form and argues that a decision does not necessarily need to be about a specific technology: a decision may be a political choice of pathway that causes actors to work in this direction. It can relate to a lock-in of the centralization of energy systems rather than their decentralization or a supply orientation rather than efficiency.

The concept of "obduracy," as introduced by Hommels (2005) is related to the idea of path dependence. She introduced the concept in relation to urban planning, but it can be applied to technology development in a broader sense. The argument is that once cities have been built, obdurate structures and technologies make them difficult to change, which can be explained using three concepts: frames, embeddedness and persistent traditions. The frames and persistent traditions described by Hommels are relevant to this chapter. A focus on the roles and strategies of the actors, on a local or micro scale during the development phases of specific technologies or systems, together with the way the actors think, i.e., the sociotechnical framework in which they work, both constrain the possible development paths. It becomes difficult to work for change that requires ways of thinking that lie outside

the current scope and the way in which certain groups of actors share views of the world, values, conventions, problem definitions and typical solutions. Related to this is the idea of persistent traditions. While frames are considered from a micro or local perspective, persistent traditions relate to the wider cultural contexts and long-term persistence of traditions that may explain obduracy. The rules, values and culturally rooted traditions that transcend local contexts are shared by many people, and this shapes systems in a certain direction on a higher level. These ideas are thus more general but can be used in more contexts and will endure for a longer period. Further, they will not be shaped only by certain groups.

I will use the concept of path dependence in relation to the policy decisions that have been unfavorable for the development of CE, often unintentionally, and that have often limited room for action in these matters.

Energy system development in Sweden

In order to understand the Swedish energy system, a brief description of the institutional levels is necessary. Sweden has a long tradition of public ownership and centralized energy systems. Further, municipal autonomy is highly developed in Sweden, and municipalities are self-governing, have taxation rights and a monopoly in urban planning (Blücher, 2006). Public ownership has meant that the Swedish state and the municipalities are responsible for energy production and have been responsible for the transition that has occurred (Magnusson, 2013; Palm, 2004). Municipalities acquired greater power during the 20th century. They were active in the establishment of municipal energy companies, first in the form of municipal gasworks and later district heating. In parallel, the state took an active role in the establishment of hydro power through the state-owned company Vattenfall and later in building and operating the transmission grid. The state cooperated with the industry for the construction of nuclear power from the 1950s. We see that the state has always held a strong position in the energy market (Kaijser, 1994).

Against this background, it is important to understand the relationship between the state and actors at the local level. Both institutional levels strengthened their positions during the late 1800s and 1900s, and the competition has led to a weak regional level (Magnusson, 2013). Municipalities have several other mandatory assignments, such as childcare, schools, elderly care, and water and sewage. They also play an important role in environmental protection and waste management, and their ownership of the energy companies (which only started to become less important in the mid-1990s) made them a part of the welfare state. The situation was characterized by an understanding of strong public involvement, and citizens became accustomed to public institutions being deeply involved in energy production. This has lately continued as the use of renewable energy has grown (Kooij et al., 2018).

Swedish municipalities play other important roles in the energy area. They are required by law to have an energy-conservation policy and to take active measures to develop an energy-supply system that is sustainable in the long run.

Thus, municipalities often take a comprehensive view of the energy system and formulate goals and visions from a system perspective that includes all components of the system: supply, conservation measures and environmental strategies. The municipalities could formulate these goals much thanks to their energy companies. As oil was used in district heating plants at this time, they played an important role in oil-reduction, and in the wider perspective, to reduce CO₂-emissions (Palm, 2004, 2006).

Another important feature of the Swedish energy sector is its low carbon production. Today, nuclear power and hydro power make up 41% and 39% of the production, respectively, with other contributions from wind power (10%), electricity production in combined heat and power plants (9%) and solar power (0.2%) (Swedish Energy Agency, 2020). This composition of energy production gives low emissions of CO₂. The development of wind power has been rapid and has increased from less than 1% in the mid-1990s to 10% in 2018. Even though the share of electricity produced from solar photovoltaics installations is low, capacity increased by more than 70% between 2017 and 2018, from 231 MW to 411 MW. The Swedish Energy Agency has concluded that lower prices for PVs, in combination with favorable economic incentives, are driving this development (Swedish Energy Agency, 2020).

In the heating sector, district heating makes up almost 60% of the market, while electric heating (including heat pumps and resistance heating) makes up 29%, biomass-based production 12% and oil-based production around 1% (Statistics Sweden, 2020; Swedish Energy Agency, 2020). In the district heating sector, 42% of the production in 2018 was from biomass, around 22% from waste and the remainder from a combination of sources (including internal flue gas condensation, peat, waste heat, oil, heat pumps and coal) (Swedenergy, 2021). This means that carbon production from the heating market is generally low.

Ownership has changed substantially in the energy sector in Sweden in recent decades. The hydro power plants were mainly built by state-owned Vattenfall, while nuclear power has remained state-owned or jointly owned with private actors. Large changes have occurred in electricity production and sales, while another major change has been the increase in the number of municipal energy companies, due to the liberalization processes that started in the 1990s. The electricity market was deregulated in January 1996, and production and sales were opened for competition, while distribution and transmission remained as natural monopolies. The district heating market changed from self-cost pricing to market pricing at the same time (Högselius and Kaijser, 2007). However, the free market was available in practice only for large consumers at that time. An electricity meter that measured consumption on an hourly basis was required, and these were relatively expensive, which meant that small consumers lacked an economical incentive to buy them and change suppliers. The Swedish parliament subsequently removed the requirement for hourly meters for most consumers and introduced profile-settlement of consumption instead. In 2004, the government introduced monthly meter readings of electricity consumption for all customers from 1 July 2009 at the latest, to comply with EU regulations (Palm, 2018).

Before the deregulation in the latter half of the 1990s, energy companies were owned mainly by municipalities, but a clear trend of mergers and acquisitions on the electricity and district heating market began. Previously, actors in the manufacturing industry owned substantial electricity production facilities, especially in hydro power, but these were sold to large companies (private, state-owned or municipally owned) that operated in several municipalities. The market was consolidated until only three large energy companies remained: E.ON, Fortum and Vattenfall. During this period, however, several other companies increased their market share (Högselius and Kaijser, 2007) and, importantly, new actors entered the market. These were mainly in two fields: investment in wind power and investment by district heating companies in combined heat and power plants. Notably, many municipal energy companies with district heating were sold to private, state-owned companies or large municipal companies owned by neighboring, often larger, municipalities that basically ran their company as regional energy companies (Magnusson, 2016).

Public involvement was generally strong during the 20th century, and municipalities and the state played an important role in both establishing a low-carbon energy system and in transitioning the sectors with high shares of fossil fuels into more sustainable production systems. This meant that the starting point in Sweden was better than in, for example, the Netherlands, when policies intended to reduce climate impact started to be introduced (Kooij et al., 2018). It is possible that this led citizens to downplay the urgency of investing in renewable energy, since the public was taking an active role in this. The citizens *participated* in municipal planning, but seldom initiated it or took the lead (Fenton et al., 2016).

The price of energy is an important factor in the Swedish context. This is the case for electricity in particular, and for district heating, the pricing of which was determined by self-cost principles until 1996. The price of electricity (in particular to industrial customers) in Sweden was kept low as a consequence of heavy investments in hydro power and later nuclear power. It should be remembered that industry in many cases owned the production plants and adopted a policy of keeping prices low, in order to increase international competitiveness. Bladh (2020, p. 228) summarizes the situation:

The structure of the Swedish electricity system, with hydro power and nuclear power, where the industries themselves were electricity producers and could thus ensure low prices for themselves, has arguably been successful in the intent to make Swedish industry competitive.

Low electricity prices and high energy security were clear political goals throughout the 1990s (Bladh, 2020). Deregulation and competition, however, led to higher electricity prices, and I argue that the low prices led to lower interest among citizens and potential cooperatives to invest in renewable energy, as the economic incentives were low. Only a strong, over-arching environmental interest would be enough to cause people to “do something,” and this was the trend among the eco-villages (Magnusson, 2018).

Development of grassroots innovations in Sweden

Community energy in Sweden can be divided into five categories: wind cooperatives, eco-villages, solar PV communities, small-scale district heating networks and rural communities with some variety in focus (hydro power or energy-saving projects). We identified around 140 active CE initiatives in our study in 2017 and around 20 previously active ones, most of which were wind cooperatives. This is considerably lower than in, for example, Denmark, the UK and the Netherlands (Kooij et al., 2018; Oteman et al., 2017; Seyfang et al., 2013).

The largest number of CE initiatives were wind cooperatives, with 78 active and around 20 discontinued. The second largest group was eco-villages¹ (32), most of which were in rural settings. We identified ten solar PV communities and ten small-scale heating organizations that we classified as CE. Eight rural communities ran various forms of production with a local focus.

The total generating capacity of the organizations was around 160 MW, most of which was from wind cooperatives, with a smaller amount coming from solar PV cooperatives.

Figure 5.1 presents the starting years of the initiatives. The years of the new millennium have seen considerable growth in the number of organizations founded. The main reason for this is the liberalization of the electricity market,

Figure 5.1 Starting years of CE initiatives (number per year).

which created opportunities to invest in such technologies as wind-based generation. Many eco-villages were founded during the 1990s. The peak in new establishments that occurred between 2006 and 2010 arose from new establishments in most categories.

More than 20 wind cooperatives have been discontinued since 2010. Magnusson and Palm (2019) identified several factors and showed that timing is a critical factor. Most of these cooperatives had been started in the 1990s and the plants were reaching the end of their technical life span. It was necessary to decide about new investments. The founding members had been active in the facility for a long time and were hesitating to continue with a new round of applications and plans. An organizational vacuum appeared, while at the same time the profitability was low due to low electricity prices and the expiration of green electricity certificates.

Most CEs were located in the Västra Götaland region (in the west of Sweden), and the number was somewhat higher than expected from the population distribution in Sweden. CE initiatives in Norrland (northern Sweden) were also over-represented relative to the population, while they were underrepresented in the Stockholm region. The population density is high in the Stockholm region, and thus land available for CE initiatives is limited (Magnusson and Palm, 2019).

The most common form of organization was as an incorporated association,² used by 90 of the organizations, followed by non-profit association (*samfällighet*) 20, tenant-owned apartments (*bostadsrättsföreningar*) ten and non-profit organizations four. Fourteen CE initiatives were organized as some kind of commercial enterprise (ranging from a limited company to an individual enterprise) (Magnusson and Palm, 2019).

We identified the keywords used in aims and goals used by the initiatives, based on strategy documents and websites, in order to understand the focus of the organizations (see Figure 5.2). There is a significant focus on the production of green

Figure 5.2 Keywords among the goals and aims of CE initiatives.

energy, energy savings and production from a local perspective. Self-sufficiency and spreading knowledge did not have a high profile among the CE initiatives, which reflects the fact that these organizations focused on their own activities. In addition, their aims were often limited to energy saving and energy production.

Financing structure

The development towards a higher share of renewable electricity production in Sweden has affected economic policy instruments profoundly. Sweden was among the first in the world to introduce taxation on carbon dioxide emissions, and many other subsequent policies strongly supported this development (Naturvårdsverket, 2012). Table 5.1 summarizes the most important policy measures.

Some conclusions regarding economic support for renewable energy can be drawn. Sweden has had significant programs since the 1990s and these programs have stimulated investment in renewable energy (Naturvårdsverket, 2004/2012; Jordbruksverket, 2019; Swedish Energy Agency, 2006). However, support has focused on industries and corporations, public authorities and private citizens, while energy communities have not been the main targets of the most important policy measures. I suggest that this has been an important factor in the limited development of such communities, as attention and a greater focus would stimulate these kinds of initiatives and add a different category of owners of renewable energy systems. Energy communities have not been explicitly excluded from these systems: they have been able to apply for investment support and to become a part of the green electricity certificate system. However, these initiatives have been forced to find their way among these policy measures and create possibilities for themselves, rather than “just” having to apply within existing structures. This means that the members must have the substantial knowledge and time that is needed to navigate through these structures, or other forms of support structure must be available through umbrella organizations or intermediaries.

Policy in the 1990s aimed to support development in renewable energy in general, with some technologies receiving particular attention. This subsequently shifted and came to focus even more on support for individuals. This brings into play a central question for CEs and GIs: these are based on components of collective action, but when the support structures for individual homeowners are strong, why should people work collectively? The development of the energy market leads to frames and a tradition of understanding in which public actors take control of the energy transition. However, for homeowners, who have greater economic incentives to invest in renewable energy such as solar PVs, the development of the energy market means that the very idea of coming together is rather far-fetched and the way forward contains considerable hurdles.

Few specific regulations have actively supported energy communities. One of the exceptions arose in the 1990s, when some policy measures were adopted that favored eco-villages. Berg et al. (2002) argued that the interest for eco-villages

Table 5.1 Policy measures affecting the energy sector (Naturvårdsverket, 2004; Swedish Energy Agency, 2006; Naturvårdsverket, 2012; Swedish Government, 2009.)

<i>Year</i>	<i>Policy measure</i>
1991	Carbon dioxide taxation
1991	Investment support for bio-based combined heat and power plants
1991	Investment support for wind power plants over 60 kW – up to 20% of investment
1991	Investment support for solar heating – up to 25% of investment
1993	Increase in support for wind power – up to 35% of investment
1994	Investment support for wind power through an environmental bonus – to cover energy taxation on electricity
1997	Investment support for wind power reduced to 15%
1997–1999	Investment support for small-scale hydro power – discontinued in 1999
1998–2002	Local Investment Program (LIP). Transition to ecological sustainability on a local level – focused on municipalities – 162 municipalities were included, and 1800 projects were conducted
1999–2003	Support for operational costs (0.09 SEK/kWh)
1999	Environmental objects – national goals, including limited climate impact
2001	Green taxation change (“Grön skatteväxling”) – taxation on energy is increased and tax on labor is decreased – the industry is compensated
2002	Economic support to regional energy agencies – advisory support
2003	Green electricity certificate system – taxation on usage and support for investment in renewable energy production – investment support for e.g., wind power discontinued
2003–2012	Climate investment program – support for local projects that reduce climate impact – for municipalities, corporations and regions. 50% of energy-related investments in district heating
2005	EU emission trading system
2005–2008	Investment support for solar heating and PVs. Only public facilities
2007–2010	Planning support for wind power plants – municipalities, regions, county administrative boards
2009	Tax reduction for repair, remodeling and house extension (the so called “ROT”-reduction), – support for installation of e.g., solar PVs – supports labor costs
2009–2020	Investment support for solar PVs – maximum 60% in 2009 of the investment costs. Support for investment in solar heating. Replacement for previous support. Reduced in steps to 20% in 2020
2014–2020	Rural area program – support for investment in renewable energy – small corporations
2015	Tax reduction for micro production – for private owners

at this time was related to work with Agenda 21 in the municipalities and an increased interest in environmental friendly building techniques. Magnusson (2018) further argued that eco-villages were favored also due to generally increased interest in this form of habitation and that a definition by the National Board of Housing, Building and Planning in Sweden (Boverket) was a further important factor. The definition included provisions that the villages should

include a maximum of 50 households, include small farming lots, include a community house and use little energy. The definition might seem technical, but it gave a “stamp of approval” that legitimized the form and made it easier for founders to approach banks to apply for loans; the definition increased interest in these villages and their legitimacy.

In contrast, some regulations have been actively unfavorable for energy communities. The most cited example is the taxation of wind cooperatives. The Swedish electricity law prevents wind cooperatives from selling electricity directly to their users. This has meant that wind cooperatives have been compelled to find other business models. One of these is to sell all the electricity to the market and pay a dividend to the members, while another is to cooperate with an energy company. The energy company would buy the electricity and sell it back to the members (often at a low price) or, since the members must be customers of the energy company, it could reduce the electricity used and charged for by the equivalent of the members’ share of the production by the cooperative. The political discussions have centered on the model in which electricity is sold back to the members. This was made possible by a change in the interpretation of the taxation law, by which it was concluded that the electricity could not be sold at self-cost price to the members. The members should thus be taxed on the difference between the price and the market price (Magnusson and Palm, 2019; Wizelius, 2012).

The changed interpretation was met by substantial criticism, and it was argued that the taxation agency had not considered the capital costs paid by the members when they purchased shares in the production facilities. A parallel was drawn with housing cooperatives, which are a common form of housing in Sweden. Tenants purchase a share in the organization that owns the building and then pay a monthly fee. To be equivalent to the proposed system for wind cooperatives, the tenants would be required to pay the difference between the monthly fee and the market rent for the apartment – clearly an absurd situation (Magnusson and Palm, 2019; Wizelius, 2012).

Magnusson and Palm (2019) found that the changed regulation had minor direct effects, as the Swedish Tax Agency chose not to follow up on the tax returns. However, the taxation debacle has severely changed the prerequisites and citizen trust in long-term policy.

Another example is a change in the taxation of solar PV communities that was proposed in 2015–2016. Before this, producers of electricity from solar power had been exempt from energy taxation when the electricity was used by the producer, which meant that it was never sold to the grid. It was then proposed that facilities over 255 kW should be taxed, which was heavily debated. The regulation was changed, and producers that have installed more than 255 kW in more than one plant receive a reduction in taxation, (paying 0.005 SEK per kWh) (Magnusson and Palm, 2019). It has been proposed that the limit be changed to 500 kW in July 2021 (Government Offices of Sweden, 2021).

In summary, these findings show that it is important to establish long-term policies and that citizens have trust in the system.

Discussion: energy communities at a cross-roads

In this section, I discuss and analyze the findings from the previous sections.

The theoretical concepts of path dependence and obduracy lead us to conclude that previous decisions, investments and standardization create a path along which all future development must travel. In the development of energy systems, and in particular the Swedish energy system which has been examined here, many of the large investments were made before 1950. These investments include investment in hydro power, the establishment of a strong national energy company, the expansion of national electricity grids and the development of municipal energy companies. This led to a well-structured and organizationally mature system in place as early as 1950 and laid the foundation for the development of municipal district heating systems and, later, nuclear power. It gave cheap, universal, standardized and publicly owned or regulated energy systems that laid the foundation for the modernization of Sweden.

Energy systems in Sweden were thus highly centralized, and energy policy, especially up until the 1990s, was focused on large organizations and not on individuals and especially not on cooperatives or similar groupings. It would be a stretch to argue that this was intentional: it was rather a matter of a lack of awareness or thought about alternative ways to organize energy production. The frames and persistent traditions of the actors involved meant that technology and policy were developed along established pathways and the developing alternative movements, which at this time were principally eco-villages, were small, local and did not concern the energy system at a national level.

At the same time, opportunities to enter the electricity market were slim, due to a regulated system and – before the deregulation – the need for new actors to be awarded concessions. To even think of investing in renewable energy as a citizen or citizen group was far-fetched; support structures did not exist, and inspiring examples were not available. The development in Denmark, in contrast, was quite different, and a transition towards a different structure of the energy system took place as early as the 1970s. The restructuring was helped along the way by the first oil crisis, and several GIs were started, along with local energy offices and courses in energy management. These early initiatives mean that when it came to “choosing its path,” Denmark gave precedence to renewable energy, rather than nuclear power (Kooij et al., 2018). It was also from these movements that the wind industry developed, sprung out of grassroots and technical tinkering (Ornetzeder and Rohrer, 2013). The debates in Sweden also focused on alternative pathways and considered the importance of future visions and an openness to debate (Kooij et al., 2018), but investments in nuclear power had already been approved and made, and much of the responsibility was put onto municipalities to develop municipal energy plans and oil-reduction plans (Bladh, 2020). The system remained centralized with little involvement from other groups than the actors.

It should also be remembered that these early investments created a system that was well-working, reliable and formed the foundation for the subsequent strong industrial development. The electricity system generated low emissions of greenhouse gases thanks to its extensive use of hydro power and nuclear power, and it produced cheap electricity. It should, of course, be noted that nuclear power had been politically contested for a long time and that this culminated in a referendum in 1980 about the future of nuclear power (Bladh, 2020). Nevertheless, what is to complain about from a citizen's perspective, if energy is cheap, reliant and (relatively) green?

Policy incentives are central here and taxation of CO₂ emissions was a first step in this direction, followed by major policy incentives that stimulated development and investment in renewable energy. These programs, however, focused on corporations and large organizations and not on citizens or cooperatives. The first wind cooperatives were founded at this time, and they managed to find their way through these policy programs and managed to engage interested citizens, but the policies and support structures did not favor them. The organizations needed to find their way themselves, and so quite successfully, considering the rather strong development in the 1990s.

Policies in the subsequent years expanded to focus also on citizens, but there is a vacuum at the level of cooperatives. These may be the only way for residents in rental apartments, who do not have a roof on which to place solar PVs and who are connected to district heating over which they have no control. The threshold to invest in community energy, however, is high, since there are no real economic incentives or a visible structure that supports cooperatives. Homeowners can install solar PVs with economic support and buy a heat pump, and in this case the incentives are clear, so why do anything collectively?

These initiatives must receive a political acknowledgment, if CE is to receive support. The few policy and institutional incentives that have been implemented, as in the case of, for example, eco-villages, have been positive for the development, and with an increasing focus at the EU level, a window of opportunity is opening.

This also goes back to the importance of champions and pioneers in the initiatives, and the major time investments made by these citizens need to be acknowledged and supported. As with the cases of discontinued wind cooperatives, the fact that there might be difficulties finding new champions that carries on. There is an important distinction here, between the members that have bought shares, but are rather passive, and the persons in the board with managerial positions. These organizations, especially wind cooperatives, can be rather complex and time consuming, almost run as companies, but with less economic incentives to take an active role. These persons are crucial and they need support, but they can also help in supporting others. Here umbrella organizations could have an important role, but they are not as strong in Sweden as in other countries.

Conclusions and policy recommendations

This chapter has been argued that the historical development of the Swedish energy system has led to path dependency and obduracy, and that community energy and collective initiatives have never been actively supported. They have often been neglected. Sweden has had strong and active policies to support reductions in greenhouse gas emissions and increases in renewable energy production and has been successful in these goals. It could be argued that this success allows the country to reduce its ambitions and the need for individuals to engage in CE, since the state or municipalities have taken an active role. Further, homeowners can just do it themselves through investing in solar PVs.

I put forward four recommendations to conclude the chapter.

First of all, cooperatives and collective initiatives should be actively acknowledged and supported in policy and regulations. The increased focus on the EU level has increased attention in this field and focusing specific policy measures on collective action could result in more citizens becoming involved in the energy transition. Support structures in the form of economic incentives and support to umbrella organizations as intermediaries could help this development. Decentralized electricity production is needed in Sweden now more than ever, in the face of an increasing shortfall in power supply capacity.

Second, long-term rules and regulations should be put in place, since businesses require these before investing. Several policies, such as the green electricity certificate system, have a long expected time span, which is favorable for all investments in that it makes informed calculations possible. However, on at least two occasions (taxation of wind cooperatives and the 255 kW limit for solar PVs), policy and regulations have been formed with a short perspective, which has led to insecurity and directly and indirectly worked against CE.

Thirdly, support for existing organizational structures and their ability to invest must be looked at. In Sweden, joint property units (*samfälligheter*) exist in most urban areas, especially for buildings that contain one or two dwellings. These may have responsibility for, for example, roads and common infrastructure. Tenant-owned associations (*bostadsrättsförening*) are another common form of residential organization. These are all registered organizations with a developed structure with a chairperson, board members and economic rules. This makes the threshold to do something together lower and supporting investments in these organizations may lead to substantial investments in renewable energy production.

Lastly, what can other Baltic Sea Region countries learn from Sweden? An important aspect is for policy makers at the national level to remain open for alternative pathways. The prerequisites for countries, concerning for example geography, resources and economy, obviously shapes the possible pathways, but by keeping the doors open and supporting alternative groups to invest in renewable energy, there might be surprising developments and alternative solutions. There is interest in renewable energy among citizens, but often the thresholds are often too high and other prioritizations in life may take over.

Notes

- 1 Eco-villages are in this instance defined by a set of criteria, which is also the definition by National Board of Housing, Building and Planning. The criteria's include for example that it should be a small community (maximum 50 dwellings), be involved renewable energy production, energy efficiency measures, have large share of voluntary work and contain a "common house" for social activities.
- 2 "Ekonomisk förening" in Swedish. The organization is owned by the members, who are not economically liable.

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