

## **“A Rolling Stone Gathers no Moss”**



## **A Case Study of the Wind Power Application Process in Sweden**

**By: Luke Evenbom**

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Luke Evenbom  
Flygelvägen 6: 114  
224 73 Lund  
+(46) 46 -12 11 91  
[evenbom@yahoo.se](mailto:evenbom@yahoo.se)

Advisor: Kerstin Åstrand  
Lund University's Department of  
Environment and Energy Studies  
Gerdagatan 13  
223 62 Lund  
+(46) 46 22 28 645  
[Kerstin.Astrand@miljo.lth.se](mailto:Kerstin.Astrand@miljo.lth.se)

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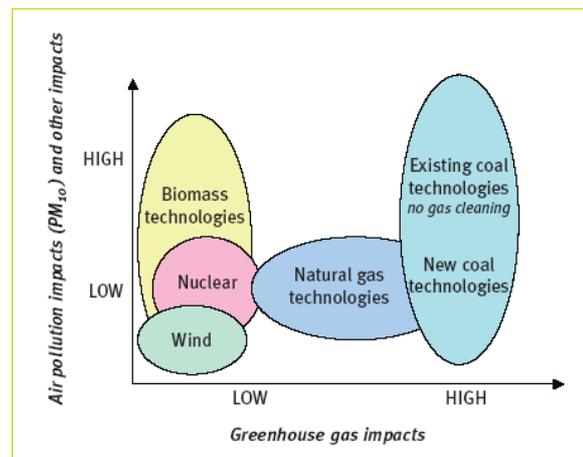
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# 1. Introduction & Problem Definition

## 1.1 Presentation of the thesis

The challenge of electrical generation in accordance with governmental desires in Sweden faces an interesting dynamic. On the demand side, Sweden has the fourth largest consumption of electricity per capita in the world (16,979 kWh); following Norway, Iceland and Canada<sup>1</sup>, and is reported to consume more than twice the EU average of electricity.<sup>2</sup> In 2003, the national end use of electricity was 145 Terawatt hours (TWh).<sup>3</sup> On the supply side, currently low emissions from electrical generation<sup>4</sup>, limited hydro-electric expansion opportunities (no permissible large-scale developments)<sup>5</sup>, and governmental goals to decommission nuclear power and decrease emissions<sup>6</sup> have helped create this dynamic. These factors have pointed Sweden in the direction of renewable electricity resources, such as biomass and wind power.<sup>7</sup> Accordingly, the Swedes have set some renewable energy targets.

Sweden is facing the challenge of the national planning goal of reaching 10 TWh of electrical generation from wind power by the year 2015.<sup>8</sup> This goal, however, is not binding in any way. Sweden has also set a binding national policy goal of an increase by 10 TWh of electricity produced from renewables from 2002 through 2010.<sup>9</sup> Biomass is expected to be the major component in the achievement of this goal as wind power is considered lagging at present (see below). The current sum of electricity coming from wind power in Sweden is approximately .5 TWh (less than 1% of electricity). Figure 1 shows that wind power is the least detrimental source of electrical production in terms of emissions<sup>10</sup>, which is why this paper focuses on wind power.



**Figure 1 Air pollution & greenhouse gas impacts from electricity production**

Today, there are 706 wind turbines in Sweden with an installed effect of 426 Megawatts (MW).<sup>11</sup> While wind power has been growing rapidly in the past few years, it will still require extraordinary development to achieve the goal of 10 TWh by 2015.<sup>12</sup> This goal would require, for example, approximately 12,000 land based turbines at an output of 500 kilowatt hours (kWh) or 2,800 offshore turbines at 1.5 Megawatt hours (MWh).<sup>13</sup> In 1988, the estimated potential for wind power in Sweden on land was determined as 3-7 TWh and offshore potential was 20-22 TWh, taking only into account buffer zones around houses and buildings.<sup>14</sup> This research focuses on land based turbines because they are expected to play a crucial role in the development of the industry in the near future.<sup>15</sup> Technological improvements have continuously made turbines larger and more efficient, thus, requiring less total structures to achieve the goal, and probably increasing the theoretical potential as well.

The Swedish Government has even pointed out that the application process for wind power in Sweden is hindering the large scale expansion of the industry.<sup>16</sup>

The development of wind power has been very dependent upon the different actors and how they interact with each other.<sup>17</sup> "... [A]n ambiguous government policy towards wind power has made the local government a key actor in the development of land based wind power."<sup>18</sup> Claims that avoiding large differences in the way wind power is handled by municipalities through stronger policy measures would be beneficial have also been made.<sup>19</sup>

The current application process for land based turbines involves the municipalities at all levels of development in some form. The research has found that municipal participation is seen as important to the application process in regards to democracy. In Sweden, it is common knowledge that the ideals of democracy shall be realized through emphasis on national and municipal governance.<sup>20</sup>

Due to commentary describing the application process as a hindrance it becomes interesting to find out how the application process works in the two case-study municipalities. This study emphasizes the municipal and private developer perspectives because these two actors are always involved in the application process. While acknowledging the importance of the regional and national governments, they are not the focus of this study.

Since the municipalities are an important actor and the actors are the key to development, it seems a logical transition to study the application process with a more enhanced municipal perspective. Systems analysis will be used in order to find the hindrances in the application process and to demonstrate how improvements could be made in order to achieve the required large scale expansion of wind power. The need for improvement is critical if either of the goals of 10 TWh is to be reached.

There is a noticeable trend by different researchers to point out the wind power application process as a hindrance, but it is difficult to find studies on this topic from Sweden. The basic structure of the application process is regarded well; however, there is also a strong calling for improvements to be made as to how the process functions. This has fueled my aspiration to make a contribution that can influence wind power development positively.

All of these factors lead to the question of how the application process can be improved to aid in the expansion of wind power in Sweden? Democratic principles also take critical focus in regards to the wind power application process in order to evaluate how the process can co-function with optimal democratic properties.

It is apparent that the wind power application process needs to change to accommodate the governmental desire of more renewable electricity generation from wind power in Sweden. The following have been hypothesized to help guide the research:

- **The perspectives of municipal workers and wind power developers should be able to provide a comprehensive portrayal of the issues regarding the wind power application process**
- **Hindrances in the process can be eliminated while simultaneously introducing a more democratic format for the application process**
- **Non binding policy goals cause confusion and illegitimacy**
- **The application process for wind power may be limiting sustainable development of the electrical generation industry**

The scope is to investigate the limitations and hindrances present in the wind power application process for the establishment of wind power on land.

The aim of this research is to evaluate the structure of the application process and identify how the ideals of democracy can be fulfilled to the highest potential within the application process.

An overriding goal of this paper is to provide commentary on how the application process could be improved, and thereby “keep the stone rolling”.

## **1.2 Disposition:**

This paper is structured into eight parts. The first part introduces the current situation in Sweden and defines the problem undertaken in this research. The theoretical aspects as

concerned with the case of the democratic process are presented in the second section. In the third section, the methodological choices of analysis are presented. Background materials to establish the relevance of wind power and why the application process at the municipal level is important are discussed in the fourth section. The fifth section presents the two case-study municipalities of Eslöv and Hörby. Analysis and discussion of results are undertaken in the sixth section. The eighth section presents the conclusions of this research.

## 2. Theory

### 2.1 Components of Democracy

**Democracy** in its broadest meaning is “rule by the people” or “self rule.”<sup>21</sup> Democracy takes on many different definitions and variations<sup>22</sup>, and is very difficult to pin down a precise meaning. Democracy is based on, among others, equality, legitimacy, opportunity, authority, transparency, impartiality, participation, separation of powers, and checks and balances. This paper will be limited to assessing the application process and sustainable development in relation to these attributes of democracy. In this essence, the empirical approach is undertaken.

The hypothesis that the application process can be made better through the context of the democratic process is aided by Robert Dahl, the famous political scientist, who has clarified the relationships of factors that lead to legitimacy. Dahl labeled two dimensions of democracy. The first dimension of democracy, “...presupposes the existence of an enforceable set of rights and opportunities that citizens may choose to exercise and act on.”<sup>23</sup> **Equality** is the supposition that all citizens are the same and have the same opportunities; also the starting point of figure 1: How the democratic process works.

The Causal Loop Diagram (CLD) is used to answer questions by demonstrating how actors operate within a system and create a series of feedback loops, generally manifesting circular patterns.<sup>24</sup> Just as Isaac Newton said, for every action, there is a reaction. This approach is opposed to the traditional flow chart way of thinking of systems, where the actors generally work in top-down, or left-right structure.

In a CLD, a (+) indicates that the two objects in the relationship increase or decrease in correspondence with one another; a (-) indicates opposite reactions of the two elements. As seen in figure 1, if equality increases, so too does opportunity [(+) (+) = (+)], or alternatively, they both decrease [(-) (-) = (+)]. Either way, the relationship is characterized as positive. An example of a negative relationship can be seen where “Not Acting” is characterized as positive (+) because the action of “not acting” is taking place, and this action decreases state benefits (-), resulting in a negative relationship between the two components of the model [(+) (-) = (-)].

**Opportunity** is the ability to participate: more opportunity yields more chances for participation. Dahl also says that these rights and opportunities must exist in actuality, not just on paper, and that if these rights and opportunities are lacking, then the fundamental political institutions required for democracy also lack.<sup>25</sup> One could translate this as meaning that transparency is not enough without actual opportunity, and legitimacy is fundamental to democracy. In the model, as opportunity increases, so too does participation and legitimacy; hence both relationships are denoted as positive (+).

**Participation** is taking part in something. The second dimension of democracy, as laid out by Dahl, is participation in political life. “*The continuing existence of a democratic order would seem to require that citizens, or at least some of them, sometimes do actually participate in political life by exercising their rights and act on the opportunities guaranteed to them.*”<sup>26</sup> Participation increases legitimacy (+), and creates an additional check and balance on the system (+).

**Legitimacy** is the property that a regime's procedures for making and enforcing policies are acceptable to its subjects.<sup>27</sup> *"The ability to issue commands which are seen as binding because they are legitimate is one of the central pillars of a stable political order."*<sup>28</sup> Samuel P. Huntington writes that legitimacy of a system depends on procedures, and that if a government does not adopt policies to adequately address a problem, then the legitimacy of the government is undermined.<sup>29</sup> Also, a legitimate system is one based on authority, where the governed consent to the state's right to make collective decisions.<sup>30</sup> In this case, legitimacy creates authority; denoting a positive relationship (+).

**Authority** is the right to act.<sup>31</sup> Authority usually leads to acting; creating a positive relationship because if there is more authority, there will likely be more acting (+). The perpendicular line through the arrow between authority and acting signifies a delay. There is a delay because acting does not occur immediately after the right to act is granted.

In some cases, if authority is not exercised, legitimacy can also suffer (see example above). In this case, authority is present (+) and "not acting" is also present (+); resulting in a positive relationship (+). More "not acting" creates less state benefits (-) and results in a negative relationship between the two components of the model (-). This is based on John Locke's view of legitimacy that, *"People consent to government to assure their welfare and liberty."*<sup>32</sup> This is assured through the creation of state benefits, which goods are done for society; thus the relationship between acting and state benefits is positive (+). If state benefits increase, so too does legitimacy of the state (+), or alternatively, if there are less state benefits created, then there is less legitimacy for the state; yielding a positive relationship (+) in both cases.

Legitimacy depends on procedures and processes which uphold the importance of democracy (see above). Reinforcing patterns are created through equality, transparency, impartiality and separation of powers in order for the democratic system to perpetuate. This means that acting must lead to adaptation of rules that favor these elements; thus more acting yields adaptation of rules (+) because both must be present for this to occur. In this model, adaptation of rules can be thought of as a lever that aids acting along. Acting through this mechanism creates more equality, impartiality, transparency and separation of powers; resulting in a positive relationship between adaptation of rules and these elements, signifying the (+) demarcations. An example of this could be the government creating conditions through policies that enhance these attributes.

**Transparency**, in political terms, is access to and communication of information.<sup>33</sup> Access to information allows actors opportunities, with or without exercising their right to be heard, and includes information about ongoing decision making processes. Communication of information includes dissemination of information through mediums such as brochures, the internet, and oral presentations.<sup>34</sup> Thus, transparency has a positive impact on impartiality because more transparency of information creates more fairness for all actors (+). Transparency increases legitimacy because it allows information to be consumed by all actors, and a lack of transparency is bad for legitimacy of a democratic process<sup>35</sup> and denotes a positive impact (+). Transparency also can lead to more evaluation following the logic that if information is more readily available, then it will likely increase evaluation of the process. Therefore, transparency has a positive impact on evaluation in the model (+), while noting that the impact likely will result after a delay since evaluation takes time.

*"... [I]mpartiality articulates the collective implications of human equality."*<sup>36</sup> **Impartiality** is not being biased towards any actor and treating all the same, hence the positive impact of impartiality on equality as shown in the model (+). As demonstrated above, equality creates opportunity, and transparency creates impartiality; thus transparency works its way through the system by increasing impartiality, equality, opportunity, and participation;

leading eventually to increased legitimacy. This highlights a duality in the function of transparency in a democratic process, as it has a direct and indirect effect on legitimacy.

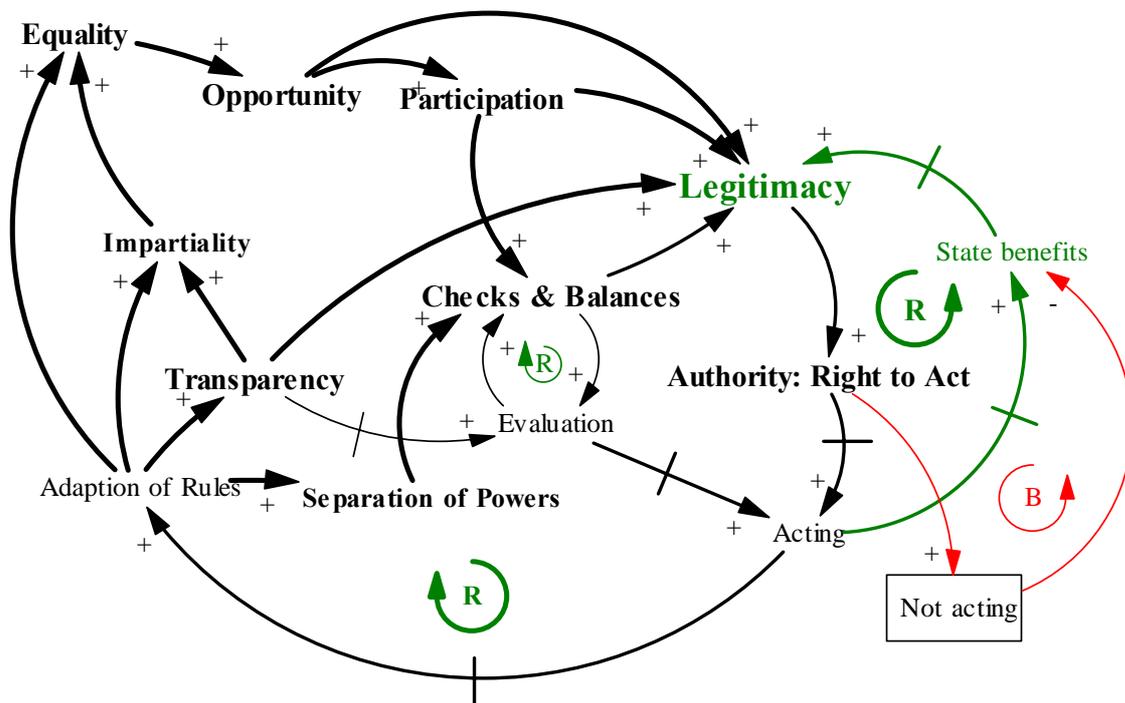


Figure 2: Causal Loop Diagram of how the democratic process works

Legitimacy in democratic governance has been furthered by “separation of powers.” *Separation of Powers* is the practice of establishing specific duties for different branches of government, so as to ensure that one branch of government will not dominate.<sup>37</sup> It was James Madison and Andrew Hamilton who found that mixing powers through *Checks and balances* (the mixing of powers granted to branches of government) created even more legitimacy for governments because it balanced power and thwarted abuse by a single governing body.<sup>38</sup> Separation of powers has had a positive impact on the concept of checks and balances (+). Examples of checks and balances are appeals processes, vetoes, and dual approval processes. Checks and balances increase evaluation (+), which invokes a reinforcing loop because evaluation increases check and balances as well (+). Evaluation in itself can lead to acting, usually after a time delay caused by the process of evaluation not being instantaneous (+).

The **R** symbol indicates a reinforcing loop, which means that the relationships are having a net positive effect on the system of the democratic process. The major reinforcing loops in this system come from acting, which has lead to the adaptation of the previously mentioned rules. These rules increase legitimacy of the process, and eventually the government. This is a good indicator that legitimacy is well intact in such a system because net negative relationships tend to highlight deficiencies in a system. The **B** symbol indicates a balancing loop, which means there is a net negative effect between legitimacy, authority, not acting, and state benefits, This is because of the single (-) attribute causing decreased state benefits from not acting. However, this is not a definitive rule and proper analysis of the rationale behind the CLD is always necessary to successfully transfer understanding to the observer.<sup>39</sup> In this model, not acting to create more state benefits is detrimental to the democratic process, and

thus acting to make the wind power application process as democratic as possible is seen as ideal.

### 3. Methodologies

#### 3.1 System Thinking and System Analysis

*“System Thinking is a science that deals with the organization of logic and integration of disciplines for understanding patterns and relations of complex problems.”*<sup>40</sup> System thinking works with the all actors in a system to understand causes and effects of the relationships between the actors in order to bring about solutions that are able to solve problems for the “system” as opposed to single attributes.<sup>41</sup> This methodology is used because it can provide insight as to the underlying factors guiding the wind power application process.

*System Analysis* is “system thinking” that involves a mental model representation of the problem.<sup>42</sup> Systems Analysis is a valuable tool which, through identification of actors and their roles, allows one to understand and highlight deficiencies in a system, and it also allows us to test different scenarios that may possibly improve a system, as opposed to just addressing symptoms of a problem.<sup>43</sup> Due to the complexity of the application process for wind power, it is an apt approach to analyzing the problem because of its systematic approach to gaining understanding. System analysis is aided by CLD’s and model building programs.<sup>44</sup> In this case, the CLD is the model used for analysis because of its ability to demonstrate in a rather straightforward manner how the different factors interact with one another as a system. A computer model has not been built for this research due to time constraints and uncertainty as to whether or not this research could have been significantly advanced beyond the understanding gained from the CLD due to the theoretical nature of this analysis.

The system being studied is the application process, with emphasis on the developer and municipal perspectives. The parameters of the system are the actors and the components of the democratic process; the goal is to determine how the actors can function with optimal use of these elements while upholding a democratic format.

System thinking and analysis utilizes information from all the important actors, thus requiring the use of multidisciplinary perspectives. This makes this methodology especially apt for multifaceted problems, such as those within the realm of sustainable development. It also makes it very receptive to cooperation with other forms of analysis if they aid in drawing understanding of the system.

#### 3.2 Case Studies

In political science, case studies are often used in comparative analyses to gain understanding of a situation, formulate and test hypotheses, and possibly make predictions.<sup>45</sup> It should be noted that not all comparative analyses *can* lead to explanations, and the goal is more modestly to comprehend a situation.<sup>46</sup> Case studies usually have a significance that extends beyond its boundaries.<sup>47</sup> This comparative case study of the wind power application process provides a contribution to the debate concerning sustainable development in the production of electricity in Sweden, and possibly other areas of sustainable development.

The case study in this paper is used to provide insights on the actors and the elements of the democratic process listed in theory section. *“All explanatory research is, by nature, comparative.”*<sup>48</sup> Thus, the purpose of the case study is to aid the system analysis.

Difficulties that can arise in case studies include, among others, conceptual stretching and selection bias. Conceptual stretching is usually more common in international comparisons where concepts have different connotations in each case, such as voting outside party lines in Australia is seen as a major ordeal, where the same instance in the U.S. congress

is not.<sup>49</sup> The risk of conceptual stretching is minimal due to the fact that the cases are a part of one system.

Selection bias runs the risk of making generalizations.<sup>50</sup> This study has a chance to incur selection bias. However, in the application process; the aspects focused on are the actors' roles. These roles are of importance to understanding the functionality of the system as a whole. In the municipalities, the aspects focused on (examples: wind power policy, land use, governmental structure) are presented to provide further comprehension of the factors which can affect the chances of approval of an application, and not necessarily draw conclusions.

The two case study municipalities, Hörby and Eslöv, were chosen through the use of prior contacts, as well as personal knowledge and location. Hörby was chosen first, because of contact established with the municipality during prior coursework. The coursework also brought forth that wind power development has been slow, and that it was theoretically possible to establish more wind power in Hörby. Since the municipal workers were open to the idea of being involved in the case study, it seemed to be a rational choice.

Eslöv was chosen primarily for two reasons: 1) Personal knowledge that there are a considerable amount of wind turbines in Eslöv indicated, preliminarily, that they are encouraging towards wind power. 2) Eslöv borders Hörby, making it an ideal choice for the second municipality because of proximity.

This case study was limited to two municipalities because the objective was to provide general knowledge of the different actors in the wind power application process from the municipal perspective. By all means, one municipality could have been sufficient enough to provide general comprehension, but doubts could have arisen. Three or more cases could possibly have provided even more information, but also runs the risk of redundancy.

Using a municipality without any wind power installed could have been useful as well. It could be reasoned that wind power application process as a whole already functions somewhat aptly due to the fact that there are turbines installed across Sweden. Hence, a case study where there are no turbines would likely be more beneficial to an analysis of how to make the application process “work”, instead of “work better”. The final number of two case study municipalities was settled on to avoid doubts and redundancy, while allowing for possible reflections on improvement.

### **3.3 Material**

#### **3.3.1 Theoretical Material**

Literature reviews that were conducted for this research included materials on democratic theories, such as from Robert Dahl, the highly distinguished political scientist who has devoted his professional life to studying democracy. Political Science handbooks were also utilized resources for comparative analysis and policy making information, such as *Political Science: a comparative introduction*. As noted, research on the area of improvement seems to be rather limited, however, some material was found in publications written about wind power in general, such as the *Journal of Environmental Planning and Management*, as well as publications from Lund University's Department of Environment and Energy Studies.

#### **3.3.2 Empirical Material**

The empirical material for this research was attained primarily through government agencies such as the Swedish Energy Agency ([www.stem.se](http://www.stem.se)) and Statistics Sweden ([www.scb.se](http://www.scb.se)). Government publications both printed and on the internet were widely consulted regarding the wind power application process and sustainable development. An

example of one such source is the Swedish Planning and Building Authority's (Boverket) *Planering och Prövning av vindkraftsanläggningar* (Planning and Testing of Wind Power Installations), which was one of the most valuable sources consulted for this research. Documents from governments such as the municipalities (oversight plans<sup>1</sup>) and the national government (Sweden's *National Strategy for Sustainable Development*) were also consulted. Personal correspondence and interviews with municipal workers and private developers were highly valued sources of information for this study. Further information on the subject was also obtained from attending the Swedish national wind power conference (*Vind 2004*), where speeches were made and workshops conducted regarding wind power in Sweden.

The interviews were semi-structured, and open-ended questions were used. Open-ended questions are seen as both highly valuable and basic. Open-ended questions, when used during interviews, allow one to see the world through the eyes of the respondent.<sup>51</sup> Ideally, an interview mimics an ordinary conversation. Interviews have been perceived as "conversation with a purpose." The researcher who engages in semi-structured interviews has to be able to act as a friend and a confidant who shows interest and understanding towards the person with whom the conversation occurs. The interviews were semi-structured because the same basic questions were asked in each group; one set of questions for municipal workers, and one set of questions for developers.

While conducting the interview it is of extreme importance to build confidence. When using the sensitive information from an interview in a report, it is of importance to not violate your respondents' anonymity, if so wished. For this project, 11 personal interviews were conducted; seven municipal workers, three wind power developers, and one person from the local energy company in the two municipalities. The interviews were arranged with the purpose to gather material and information – so they were informant interviews.

During the interviews impartiality was retained by only asking respondents for their views through use of inductive analysis. Inductive analysis begins with trying to make sense of the situation without imposing pre-existing hypotheses and building towards general patterns.<sup>52</sup> The questions with the municipal workers started with general development questions, followed by energy, wind power, and then specifically the wind power application process. The interviews with the private developers started with questions about general development, then wind power, followed by the application process for wind power. Acknowledging the pre-existing hypothesis that the application process could be improved, it was not shared with the respondents, nor allowed to interfere with the course of the interviews. The point of the interview process was to ascertain the points of view of the respondents only. There were no pre-determined goals for the interview process other than to gather information. All the interviews were conducted in private settings, without disturbances, and were casual and friendly in nature.

Avoiding generalizations from interviews is another problem that can arise. By interviewing multiple respondents from each area, this can be minimized. The same basic strategy was employed with the interviews as with the case studies; by choosing two or more subjects to reduce doubts of generalization.

## **4.0 Background**

### **4.1 Wind Power**

In other countries like Germany, Denmark and Spain, wind power has developed much more quickly than in Sweden, even though conditions for wind power are not necessarily

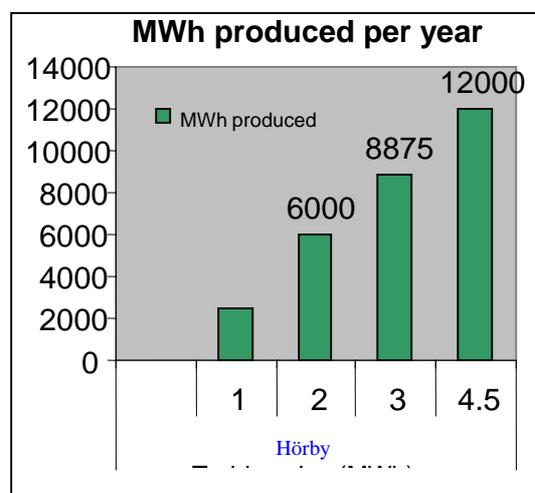
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<sup>1</sup> Oversight plans have been labeled by others, such as Khan as "comprehensive" plans, but the term "oversight" is used in this study.

better.<sup>53</sup> The reasons for this can be summarized as a strong commitment, continuity, and a clear strategy and approach for establishment and expansion of wind power; all of which are considered lacking in Sweden.<sup>54</sup>

Wind power is usually physically best suited in the mountains or along the open plains, as well as at sea. Construction costs are lower for land based turbines than offshore installations, as well as having a longer building season. Land based turbines are the cheapest source of electrical generation today, with factoring of subsidies.<sup>55</sup> Further opportunities for wind power on land are presented through technological improvements that are making it possible to construct turbines in wooded areas which were formerly deemed nearly impossible.<sup>56</sup> These factors further support the desirableness of expansion of wind power on land.

Production of wind power varies by location, as do wind patterns. For the area of the case study, the theoretical production capability on land for wind power is listed below.



**Figure 3** Theoretical production of different sized land based turbines in the case study area<sup>57 2</sup>

One of the advantages to wind turbines is that they are modular and can be installed on an as needed basis to the electrical grid. Another is the environmentally friendly nature of the machines; The energy required to build, run and demolish a wind power station amounts to only 2 % of the total energy that the plant generates during its lifetime and usually pays back within 4 months of start-up.<sup>58</sup>

The Swedish Energy Agency announced 49 areas of national interest for wind power in October, 2004<sup>59</sup>; giving more opportunity for the national government's plan for increased renewable energy production to succeed by setting aside areas for wind power development. This may be the strongest action in support of wind power taken by the national government to date.

There are also problems that arise with wind power and there have been numerous studies undertaken to understand the intricacies of the social issues surrounding wind power. To name some of these issues; participation, sighting conflicts, and public opinion all come into account at the local level. Environmental concerns regarding wind power affect the ecosystem, including flora and fauna. Proper planning can address and take into account

<sup>2</sup> Actual production can vary based on location and wind conditions, but this is the best possible calculation for land based wind turbines in Skåne.

many of these issues.<sup>60</sup> Research may be required to fully understand others, such as environmental issues; however, results have generally demonstrated a minimal impact by wind power on the environment as of late.<sup>61</sup> Discussion of particular societal issues is not a part of the aim of this research.

#### **4.2 Governance in Sweden**

There are three main governing bodies in Sweden, national, regional, and municipal. The national government has the responsibility of making laws and policies for the welfare of the land. It is the national government that must ensure that policies are equally disbursed throughout the land; meaning national interests should be treated equally everywhere in Sweden.<sup>62</sup> Arguably, the best way for the national government to ensure this equal disbursement is by exercising authority to create direct, clear, and binding goals because they are more apt to increase legitimacy.

Regional governments are largely seen as conduits of representation of the national government at the regional level. As well as having certain areas of responsibility, they serve as both representatives and coordinators of the national government regarding regional issues. They also serve as a link between the national and local levels of government.<sup>63</sup>

Municipal governments' roles in governance in Sweden can be described as a far-reaching autonomy within a framework of strong responsibility for national goals.<sup>64</sup> The underlying philosophy behind strong municipal governance is because this level is closest to the people<sup>65</sup>, and therefore it is most encouraging towards opportunity and participation by the people.

#### **4.3 Policy types**

Policy analysts are largely aided by two models for analyzing decision making concerning policy structures. The rational model (associated with Simon, 1983) and the incremental model (associated with Lindblom, 1979).<sup>66</sup> While acknowledging the existence of other models, this research presents these two for the purpose of creating awareness, not necessarily analysis.

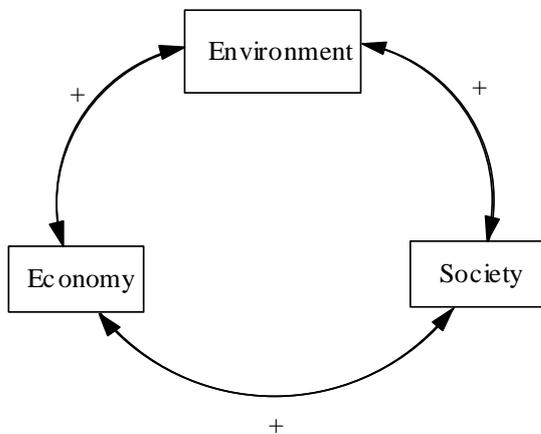
The rational (see also synoptic) model requires ranking of values, formulation of clear options, calculating all results of each option, and selecting the alternative that achieves the most values.<sup>67</sup> It has been stated that this model is unrealistic because, "*It requires policy makers to foresee the unforeseeable and measure the unmeasurable. It can lead to enormous disasters.*"<sup>68</sup> Also, in the rational model, goals tend to be set without consideration of the means of achievement.<sup>69</sup> On the positive side, its decisions are seen as efficient, highly researched and comprehensive.<sup>70</sup>

The incremental model utilizes consultations with all the organized interests in hopes of forming a consensus.<sup>71</sup> The approach is evolutionary and works in steps (increments) of adjustments. "*The approach may not lead to achieving grand objectives but it does at least avoid making huge mistakes.*"<sup>72</sup> A negative side to incremental policy could be that it is selective; where the goal is a good policy, and not necessarily the best policy.<sup>73</sup> In incremental policy making, it is not the most important that all actors should agree on objectives, but that a particular policy needs to be developed and followed; policy should emerge from negotiations between actors.<sup>74</sup>

#### **4.4 Sustainable Development and the relevance of wind power**

Sustainable Development has been defined in many variations over the years, but it is arguably "Our Common Future," (also known as the Brundtland Report) a report from The World Commission on Environment and Development that put the term "Sustainable Development" on the map. The definition used in the Brundtland report describes *sustainable*

**development** as, “Any development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.”<sup>75</sup> The basis of sustainable development today lies in promoting a positive relationship between its three major attributes simultaneously; environment, economy, and society, as shown in figure 4.<sup>76</sup>



**Figure 4 The relationship of the attributes of sustainable development**

Energy is one of the largest challenges of sustainable development worldwide. Industrialized nations with older, un-renewable production systems sometimes find it difficult to switch over to new, renewable forms of energy production due to existing infrastructure already in place, and in many cases developing nations look for the most affordable means of production. Agenda-21 calls on developed nations to lead the way in demonstrating that sustainable development is achievable.<sup>77</sup>

Agenda 21 is grounded on citizen action and sustainable development. Every one of Sweden’s 288 municipalities had launched an Agenda 21 process in some form by 1996.<sup>78</sup> Agenda 21 says, among other things; 1) that broad public participation in decision making is necessary for the achievement of sustainable development.<sup>79</sup> 2) “Governments at the appropriate level, in collaboration with national organizations and with the support of regional and international organizations, should establish innovative procedures, programs, projects and services that facilitate and encourage the active participation of those affected in the decision-making and implementation process.”<sup>80</sup> 3) Energy is essential to economic and social development and improved quality of life, constraints to increasing sound energy (one of which is renewable energy) supplies need to be removed, and governments at the appropriate levels need to cooperate in developing economically viable, renewable energy sources to support sustainable development.<sup>81</sup> Some research in Sweden, however, has shown that Agenda 21 is not as significant as previously thought.<sup>82</sup>

Perhaps of more importance in Sweden today is Sweden’s *National Strategy for Sustainable Development 2002* (skr.2001/02:172).<sup>83</sup> One of the purposes with the plan was to describe its vision for the future of sustainable development in Sweden. One of the points of departure for effectiveness in planning a national strategy is making sure that the national plan for sustainable development covers all policy areas of relevance and be based upon existing policy areas.<sup>84</sup> The plan is comprehensive, but also specifically states, “The Government may initiate new or amended legislation or guidelines in order to strengthen support for the shift to sustainable development.”<sup>85</sup> Further, the plan also affirms the importance of the following to sustainable development:

- Consumption patterns need to be sustainable
- Economic growth which regards the importance of the environment should be encouraged

- Energy should make the least impact on health, the environment, and climate as possible
- People's environment is important in providing good health, security, and a sense of well-being.

All areas of sustainable development must be accounted for in order for sustainable development to reach its goals; environmental, economic, and societal growth.

#### 4.4.1 Environment and Wind Power

The current scenario in Sweden demonstrates how the national government has exercised the authority granted to push the electrical production system towards sustainable development, and thereby increase legitimacy that has been granted upon it, in this case, to positively effect the environment. Sustainable development can not be totally achieved until all the other dimensions of sustainable development are achieved: social and economic.

#### 4.4.2 Economy of Wind Power

Due to current economical forces, land based wind power has the lowest electricity production cost of all new forms of production available today in Sweden.<sup>55</sup> One example of the profitability of wind power can be seen through an example from a Eolus Vind AB.; which claims that a net investment of 8,630,000 sek can yield 16,396,000 sek after 25 years (average lifespan of a turbine) with factoring of all foreseeable costs.<sup>86</sup>

There is skepticism towards the economic system for wind power in regards to the future standing of the policy because the government has not stated a long term future plan after 2010.<sup>87</sup> This policy does, however, show how the national government has used its authority to give legitimacy to the economic aspect of sustainable development in the energy sector by creating financial preference for renewables. It could be argued that the area that has proven most important to complete the cycle of authority and legitimacy is the handling of social issues surrounding wind power. These aspects are addressed by the application process.<sup>88</sup>

#### 4.4.3 Social Issues Regarding Wind Power

The purpose of this research is not to address the specific social issues, rather to investigate the wind power application process, which incidentally, allows for the social issues to be heard. Still, investigation of some of the social issues is beneficial to aid in comprehension of underlying factors possibly affecting the case studies.

The so-called *NIMBY* (Not-in-my-backyard) effect has been argued as not significantly prevalent.<sup>89</sup> Further, collaboration has been shown between increased age and income as deterrents in the acceptance of wind power in Sweden, and people primarily in favor of public preferences are more likely to be accepting of wind power than those primarily concerned with private interests.<sup>90</sup> Land-use and siting conflicts seem to perpetually come into the discussion arena regarding an application for wind power, and thus need careful consideration.<sup>91</sup>

There are compelling arguments to have a uniform policy for the way wind power is handled at the municipal level. Some municipalities have been known to neglect wind power; which can raise the question of impartiality. Others have been known to be overly eager to develop wind power without proper planning, and in doing so have neglected participation, as well as incurring a scattered array of turbines on the landscape.<sup>92</sup> The results have been decreased legitimacy from over exertion of authority in various manners.

At the national level, political will for wind power has sent mixed signals. Positives for wind power can be seen in the current organization of the electrical system, as mentioned earlier. On the other hand, there has been a lack of input by the national government regarding the social issues aspect, particularly the problems with the application process. The

process is mentioned as problematic, but suggestions for improvements have been in short or no supply; hence, the application process itself takes critical focus.

## 5.0 Wind Power Application Process in Sweden

### 5.1 Laws

There are three levels of governance over the application process in Sweden; national, county, and municipal, as shown in table 1. There are two main laws that encompass the application process; the planning and building law (PBL) and environmental law (MB) have determined how wind power applications are tried for their respective components. Wind power projects, depending on their size, fall under different jurisdictions for environmental testing. The largest scale projects that fall under national application criteria, and the county is responsible for midsized, and the municipal level is responsible for the smaller projects. Building permits are always tested initially at the municipal level.

**Table 1 Land Based Wind Power Application Guidelines** <sup>93</sup>

Size	Environmental Code (MB)	Planning and Building Law (PBL)	Cultural Environment Law (KML)
<b>≥ 10 MW</b>	National government permission process. Environmental Court hears the case. Environmental Impact Assessment is required.	Building permit required. "Detail" or "Area Decision" Plan can be required.	Permission can be required
<b>&gt; 1 MW but &lt; 10 MW</b>	Permission from the county / environmental delegation required. Environmental Impact Assessment is required. "Early" and "In depth" collaboration meetings required with the community. <sup>94</sup>	Building permit required. "Detail" or "Area Decision" Plan can be required.	Permission can be required
<b>&gt; 125 kW– 1 MW</b>	Requirement that application is submitted to the municipal environmental committee. Environmental Impact Assessment can be required.	Building permit required. "Detail" or "Area Decision" Plan can be required.	Permission can be required
<b>≤ 125 kW</b>	*	Building permit required. "Detail" or "Area Decision" Plan can be required.	Permission can be required
<b>Hobby scale turbine with a rotor diameter Larger than 2 meters, if the turbine is mounted to a building or higher than the distance to the property border</b>	*	Building permit required.	Permission can be required

\* General guidelines take precedence. In some situations a joint decision between the county and the municipality can be necessary.

### Planning and Building Law (PBL)

The PBL states that for a building permit: 1) All applications for land based wind power start at the municipal level. 2) Localization feasibility is the first issue to be resolved. Feasibility

issues include economical evaluation, as well as general public interests, public health, safety, traffic, affect on recreation areas, city and landscape affects, and private interests. 3) If a detail plan exists (detail plans include pre-approved building permits for certain structures in a specific area; see section 5.2 for more information), the building committee tests the application to see if it concurs with the detail plan rules 4) The application shall be considered in regards to other private interests in the area of the proposed project 5) A judgment shall be made concerning planning and design of the project 6) The building committee shall inform the applicant of other permissions that can be required by, for example, the cultural environment law or the environmental code.<sup>95</sup>

The project developer is also responsible for general building competence issues; the developer must make sure the project fills the requirements of the municipality regarding, for example, safety, among others. The developer must submit a control plan that allows building committee to determine 1) if the developer is competent enough to carry out the project 2) the complexity of the project / how the project will be carried out 3) the extent of and quality of the developer's own control of the project. The control plan must provide documented corroboration of the developer's attributes in order for the building committee to make its decision. The developer must appoint someone responsible for quality control of the project, whose main function is to assist the developer and make sure the control plan is followed. This person(s) is usually certified by a national accrediting agency, but in some instances may not be.<sup>96</sup>

### **Environmental Law (MB)**

As the preceding figure shows, the municipality tries smaller applications, up to 1 MW in size, the county tests applications between 1-10 MW, and the national environmental court tests applications over 10 MW in size; this law was enacted in 1998, when the largest land based turbines had a total effect of around 2 MW, yet were also of significantly shorter in height.<sup>97</sup> The national government may test an application if the municipal council refers it to them through a veto vote, or if it is openly important that the installation comes to stand and no other feasible location is found.<sup>98</sup> For smaller installations (up to 1 MWh), chapter nine of the environmental code and the regulations for environmentally dangerous structures (due to impacts on the surroundings) applies.<sup>99</sup>

Localization is an important part of the environmental analysis. The chosen site shall be one that has the smallest infringement on the surroundings. The developer should first create a dialog with the different interested parties and search out the best possible areas for localization. One of the areas can be chosen for an in-depth plan, but even other areas must be included in the analysis. The municipal oversight plan or the in-depth plan are important elements of the process. Areas of national interest in the same area (if any) weigh heavily under consideration as well. The environmental impact assessment process shall lead to a well balanced basis for the application.<sup>100</sup>

An application should include the following: 1) All information, blueprints and technical descriptions needed to judge the scope of the project. 2) An environmental impact assessment and information about the collaboration meetings that have taken place. 3) The information needed to judge how the general considerations in chapter 2 of the MB will be followed. 4) Suggestions for protection measures and other cautionary measures. 5) Suggestions for how the turbine(s) will be inspected. (6) Demonstration of how the project will affect nature, such as birdlife, and should include maps and all necessary information to judge effects in the area prior, during, and after the project has taken place.<sup>101</sup>

### **Cultural Environment Law (KML)**

The cultural environment law gives the county the jurisdiction to oversee the protection of county cultural heritage sites. The law allows the county to veto a project if it will damage

such sites. The law also gives the national agency, The Cultural Heritage Board, oversight of national cultural heritage sights and likewise accords. These agencies can require archeological research to be carried out before they make their decision(s), and may stop a project if it damages the relationship or significance of a cultural heritage sight to the area.<sup>102</sup>

### **Electricity Laws**

High voltage power lines are needed for wind power installations, and permission must be obtained from the national government. The Swedish Energy Agency oversees this process. An environmental impact assessment is required for the application, in accordance with the MB. Also required is permission from the county surveying office or the land owner(s) depending on which path the developer chooses to pursue.<sup>103</sup>

### **Other Governmental Actors**

Certain government agencies have specific veto powers. The military, aviation authority, communications authority, road administration, etc. can all veto an application if it infringes upon general interests of which they represent. There are also areas of national interest for various elements that could be imposed upon by a wind power development, and the corresponding governmental agency overseeing these areas can also veto a project. The Swedish environmental protection agency is one such example of an authority whose responsibility is to protect areas of national interest, such as recreation areas, as well as biodiversity areas.<sup>104</sup>

## **5.2 Application process at the county level (Skåne) [Projects $\geq$ 1 MW & < 10 MW in size]**

The PBL has certain specific requirements for wind power installations over 1 MWh in size, which must be tried by the municipality for a building permit. The other aspect is the specific requirements of the national environmental law (MB), which must be tried by the county (between 1-10 MWh) or environmental court (over 10 MWh).<sup>105</sup> The attributes of the PBL are presented in the Appendix 1. What can be seen is a concise program to be followed by the municipality for testing a building permit. Appendix 2 precisely describes the process order as directed by the MB for the county to follow for environmental testing of wind power application which is undertaken at the same time as the planning and building process.

The first step for the application process at the county level is when the developer/applicant makes contact with the municipality (and possibly but not necessarily the county) to discuss the feasibility of the area and whether or not the project interferes with any municipal development goals from the oversight plan for the area.<sup>106</sup> The next step is to fill out a formal application. The application must include the following. As shown in box 1, and be turned in to the county:

### **Box 1 Contents of an application for the county<sup>107</sup>**

1. Name of applicant(s) (who will be responsible for the structure)
2. Registration information for all parties
3. Organization identification number(s)
4. Contact information for all parties
5. Contracts with land owners or proof of land ownership
6. Which municipality(s) structure(s) will be erected in
7. Number of turbines
8. Tower height(s)
9. Rotor diameter(s)
10. Total height(s) (tower height + ½ of rotor diameter)
11. Wind turbine(s) maximum electrical generation capacity
12. Placement (coordinates) of structure(s) in map format RT90
13. environmental classification code number(s)
14. Suggestions for conditions (sound calculations, shadow calculations, etc.)
15. Protection measurements for the surrounding area
16. General considerations (how the general guidelines from chapter 6 of the environmental law will be followed)
17. Technical description of wind turbines and fundamental variables
18. Environmental impact assessment (which shall be a separate document/attachment) which follows the guidelines laid out in chapter 6 of the environmental law
19. Signature of the applicant(s)

The next step or steps are where the parallel process begins.

A detail plan for an area includes prior approval of a building permit for specific building types plus all aspects of an area decision plan. An area decision plan is used to define public and private interests by describing the affects different interests incur from diverse types of land use in a specific area.<sup>108</sup> Neither of the case-study municipalities makes prior use of these planning instruments for wind power. As stated, the need can be determined to make a detail or area decision plan for the area a proposed development is to be physically located in. One of these plans are usually required the first time a wind power development is proposed in a previously undeveloped area which has no such plans in effect.<sup>109</sup>

Despite similarities, the different types of collaboration meetings and investigations required by the different laws may not be held together. The Swedish planning and building authority (Boverket) acknowledges that this causes “double work” and “time wasting” and says that the project developer, municipality and appropriate environmental authority should try to be effective and coordinate together, as well as possibly organizing a time-plan for the different processes.<sup>110</sup> The MB encourages municipal participation in the environmental testing process, as seen in appendix 2, step 2.

Environmental impact assessments (EIA) for the two different laws carry two different burdens; the municipality is responsible for carrying out the EIA according to the planning and building laws and the developer is required to carry out the EIA according to the environmental law.

### **5.3 Application process at the national level [Projects $\geq$ 10 MW in size]**

When a proposed project is over 10 MWh in size, then the PBL requires that the municipal council to vote on a building permit. The MB requires the oversight of the environmental court for environmental testing of projects over 10 MWh in size. The differences from appendix 2 are such: The national government decides over the localization permission then the environmental court decides over the conditions (everything else).<sup>111</sup>

### **5.4 Municipal application process [Projects $<$ 1 MW in size]**

The Swedish national environmental code states that environmental issues regarding wind power must be heard as a separate agenda matter by the environmental committee. Within the municipal level, this means that for most projects, the municipal environmental committee hears matters up to 1 MW and decides whether or not to approve the application based solely on its environmental merits. If the environmental committee is combined with another committee, such as the building and planning committee for instance, then the environmental analysis must be addressed in its own segment of the meeting.<sup>112</sup>

The municipality decides upon the building permit application by following the guidelines of the PBL. Table 1 shows that all turbines with a diameter greater than two meters must have a building permit. Detail and area decision plans, and investigations can be required for turbines over 125 kW in size.

### **5.5 Appeals process**

As can be seen in the previous descriptions of the application process, there are many analyses where analysis of a wind power project during the application process. Be that as it may, there are also many places where appeals can take place in the process.

When a developer meets with the municipality and county to discuss informally the project, there is no appeal process available today for the idea / localization step. That being said, if an application is filed and then the plan is rejected, according to the PBL, the county is

the first to hear an appeal. If the county does not overturn the appeal, the national government can be appealed to. The other party can also appeal the decision if the county overturns. The national government is the final stop in the appeals process for the planning stage.<sup>113</sup> It is the same process for the building permit also.

According to the MB, for applications up to 1 MWh, if the municipality says no to an application, the county hears the appeal. If the county decision is appealed, the environmental court hears the appeal.<sup>114</sup> As per the MB, when the county presides over the environmental testing of the application, the first level of appeal is to the environmental court. If the environmental court decision is appealed, the environmental appellate court may take the case. The MB also states that for applications larger than 10 MWh, where the environmental court presides over the application process, the first level of appeal is the environmental appellate court, and the Swedish Supreme Court (highest court in the land) may agree to hear an eventual appeal of the environmental appellate court's decision.<sup>115</sup>

## **5.6 Commentary by others on the application process**

### ***Literature***

The Swedish Energy Agency's *Environmental Goal Report 2002* says that the wind power application process is hindering large scale expansion.<sup>116</sup> Many have experienced the application process for wind power as divided and unsuitably structured, and that investigations regarding improvements should be carried out in the future.<sup>117</sup>

Claes Ånstrand, the Swedish Undersecretary of the Department of Industry, Employment and Communication has went on record to say that application process today takes far too long to reach finalization, putting large blame on the overly bureaucratic process. Further, the appointment of national coordinators for wind power development to work with municipal politicians and employees could increase support for wind power developments, thereby speeding up the application process.<sup>118</sup>

National regulations and guidelines would increase efficiency, as it is currently a complicated process, especially for developers, who must adapt to the conditions set by each municipality.<sup>119</sup>

### ***Swedish national wind power conference***

There was a big interest displayed by the participants of the national wind power conference regarding the Swedish military's role in the application process. A representative from the Swedish Department of Defense, said that concerns over radar and radio signal disturbances, and localization of turbines near airfields and training areas were among the topmost concerns of the military and usually the basis for negative decisions on the part of the military. The audience was largely concerned with the military's decision base lying behind the cloud of "classified information". The developers would like to know the decision base so as to possibly make applications in the future that have greater chance of success.<sup>120</sup>

Greenpeace was not in favor of the current wind power development system as a whole in Sweden, and said that for the success of wind power in general, the "Swedish model" should be avoided, due to its time consumption.<sup>121</sup>

The Swedish Environmental Protection Agency stressed that no energy source is completely free of environmental impact, and that must be taken into account for wind power as well. Environmental testing is important and should be continued for wind power applications.<sup>122</sup>

The Swedish Energy Agency is currently in the process of preparing an information program that can, among other things, be used as a basis for many of the environmental judgments needed in an environmental impact assessment. This should help decrease the application processing time and aid the expansion of wind power in Sweden.<sup>123</sup>

Notably absent from the conference was a plan for changing the application system as it stands today. In general, some issues such as those listed above were brought up during the course of the conference, but there was no presentation made regarding the problems of the application process and the need for change.

### ***Interviews with wind power developers***

All of the wind power developers had worked with wind power for over five years. Being a wind power developer can be a nerve-racking process, as was learned through these interviews; thus, at the request of the developers, I have assigned a “*nick name*” to each developer to protect their identities. All the subjects felt able to speak more freely knowing that that which they said could not come back to possibly harm their businesses. The names I have assigned are *Jesse*, *Kim*, and *Terry*. The names are gender neutral to avoid any form of projection. Jesse and Kim had both investigated in the past the possibilities for development in at least one of the case study municipalities. The interview with Terry was much shorter than the others; therefore, is only cited in limitation.

All subjects worked with wind power to make money first and foremost, but are pleased that it makes a positive impact on society by, for example, reducing emissions. People are generally positive towards wind power, but there are, of course those who are adamantly opposed to wind power and believe that other energy sources are more valid, such as nuclear. There is a feeling that the higher levels of government are generally more positive towards and competent with wind power than the lower levels [1) national 2) county 3) municipal].<sup>124</sup>

### ***Interview with Jesse.***<sup>125</sup>

Some people are concerned about wind power installations affecting real estate prices negatively and causing disturbances in the immediate area. There seem to be three types of municipalities; 1) Positive, helpful 2) Honest and not helpful 3) Conflicted, say they are positive, but their policy is nearly impossible to work with. The third type is the worst because a lot of time can be wasted trying to apply for permission. It is difficult to work with the PBL and the MB at the same time. The application process is the greatest problem for developers.

Jesse says that a solution could be to change the rules so that the municipalities try applications up to 5 or 10 MWh for both laws so that only one government body's approval is needed (municipal). On the other hand, it may be good to take the municipality out of the equation totally because it is generally easier to work with the higher levels of government regarding wind power applications because they seem to be more in favor of wind power. The question is how to involve the municipalities, because it is necessary. It would be best to take away the current parallel process. It would be nice to have a nationally coordinated process, but may be impractical to implement.

If the environmental analysis dictates that the turbine should be moved, if even a little, then the building application has to start over. The time frame takes too long for an application to be processed. The current application process takes a long time, which may be acceptable for democracy, but there should be reasonable time limits imposed. Jesse says that an application itself can take ½ - 1 ½ years to finalize because of the need for studies of the area. The county can take from 3 months to a year depending on variables. The appeals process can (generally) factor out like the following: 1<sup>st</sup> step = ½ year. 2<sup>nd</sup> step = ½ year. 3<sup>rd</sup> step = 2 months; Jesse has seen the application process take even longer, however.

The process could be improved by making a clear policy for wind power, with reasonable attributes. The developers should be honest and straightforward. The county and municipality should work closely together to alleviate time consumption caused by the

parallel process. Possibly the best thing would be that the municipality should try applications up to at least 5 MWh, possibly 10, and that there should only be one permission required for medium scale developments. The whole application processing time should take no more than 3 years.

### ***Interview with Kim.***<sup>126</sup>

The Environmental impact assessment (EIA) process used to be simpler, now they are very extensive. Applications today take 100's of pages to include everything required. The application process generally has a good structure. One problem is there is no real check-and-balance on the system, especially for smaller turbine applications where only the municipality carries out the testing of the application. Kim was not sure if the application process should be changed *per sé*, however, there should be a nationally coordinated application process administered by the municipalities to make the "rules of the game" more impartial, as this would be a better administration of the process.

The military can make its decisions without providing the basis, citing national security interests, which can cause frustration. The complications with the application process make Kim sometimes wonder if it would be easier to build a coal or nuclear power plant. Kim has seen applications that have taken more than 5 years to be processed. Appeals have taken up to 2 years to be decided upon. The application process takes too long. The process could definitely be made more clear and straightforward so everyone could have a better understanding of the requirements before a project is ever started. Kim is glad to have started with wind power years ago because it feels like it would be difficult to start working with wind power today.

### **5.7 Summary of the wind power application process**

The above descriptions highlight how the municipal level is always important in Sweden due to emphasis on the local level in governance. This is because the building permit process is always decided upon by the municipality, as stated in the PBL. The MB encourages municipal participation, even when the environmental testing lies outside of jurisdiction. It is generally felt that municipal participation is important to the application process as a whole.

The national and county governments have a clearly organized process, which is highly transparent and able to be clearly seen because information is available in printed format. The laws are described and expectations are clear for applications' requirements from these two levels of government. The parallel processes signify the importance of environmental testing. Cooperation between both sides of the process is encouraged.

As noted, the application process today is not seen as ideal, as is felt to present an uphill battle for developers. Overall, there have not been a lot of analyses of how to improve the application process. The presence of the parallel process and multiple actor participation is seen as both a positive and negative. On one hand, it is good for democracy to have participation from the many actors, as well as the check-and-balance provided from these multiple actors. On the other hand, it can also be very time consuming to have to hear from all the different actors before a decision is made. The appeals process is also seen as time consuming. Time of processing an application from start to finish, through all steps, is a large hindrance.

From the actors, a stronger national government presence would be preferential throughout, while acknowledging the importance of the municipalities. More transparent policies and procedures from the municipalities would be beneficial to the process. The basic structure is seen as good, yet improvements need to be made as to how the process functions.

Many feel that a time limit should be imposed on application process testing, so as to speed up the process.

## 6. Case Studies



Eslöv and Hörby both lie in an area of good wind power potential (among the best in Sweden)<sup>127</sup>. They have distinctly unique characteristics to date regarding wind power; Eslöv has the highest electricity production from wind turbines in the region, whereas Hörby has relatively little installed wind power production within its municipal borders (Hörby had the smallest production of wind power for all municipalities that have wind power in the region for 2002).<sup>128</sup> Making comparisons may lead to comprehension of the current situations in these two municipalities. Also, a relevant question then arises as to how the municipalities are

responding to national initiatives regarding wind power, and if the municipalities are using the authority given to them to increase legitimacy of the political system or not.

Table 2 Demographics

<b>Case Study</b> <b>Demographics</b> <b>as of</b> <b>Dec. 31, 2003<sup>1</sup></b>	<b>Population</b>	<b>Voting</b> <b>Population</b>	<b>Total population</b> <b>age 18-44</b> <b>years of age</b>	<b>Total population</b> <b>age 45 +</b> <b>years of age</b>	<b>% of voters</b> <b>45 +</b> <b>years of</b> <b>age</b>
<b>Sweden</b>	<b>8,975,670</b>	<b>7,034,234</b>	<b>3,158,388</b>	<b>3,875,846</b>	<b>55%</b>
<b>Eslöv</b>	<b>29,400</b>	<b>22,458</b>	<b>10,222</b>	<b>12,236</b>	<b>54%</b>
<b>Hörby</b>	<b>14,051</b>	<b>10,944</b>	<b>4,434</b>	<b>6,510</b>	<b>59%</b>

\* In the Table above and in the following text, there are two colors used to denote the different municipalities, blue is used for Hörby, and purple is used for Eslöv; the colors have no particular significance.

Table 2 shows that both municipalities have a similar percentage of voters 45 years of age and older. The Swedish national average is 55% of voters over the age of 45, which means that Hörby and Eslöv are very close to the national average, with 59% and 54%, respectively. The population density in Eslöv is circa 70 people per square kilometer, and about 33 people per square kilometer in Hörby. The area of Eslöv's municipality is largely farmland (73%) on an area of 422 square kilometers.<sup>129</sup> Hörby has a land area of 422.5 square kilometers, and has also a large percentage of farmland (49.9%) and wooded areas (33.9%), and some of the farmland is used for animal production (ca. 20% of farmland). Eslöv is mostly open farmland used for growing crops.<sup>130</sup> The area to the south and east of the wind power development area in Hörby is reserved by the Swedish military as training grounds,

thereby significantly reducing the availability of land for wind power. Although there are similarities in the two municipalities, there are also differences between the two.

One major difference, one could say, is the political culture. Today, Eslöv has a leftist coalition government of social democrats (s), the left-party (V), and the environmental party (MP).<sup>131</sup> Hörby has a conservative coalition government of the center party (C), moderate party (M), liberal party (FP), Christian democrats (KD), and the Hörby party (HP).<sup>132</sup> Eslöv has a left oriented government and Hörby has a right oriented government for the Swedish

**Table 3 Party positions**

POLITICAL PARTY	ENERGY STANCE
Left (V)	Increase use of renewables. Negative towards nuclear power. <sup>133</sup>
Green (MP)	Wind power could and should be a big part of the future. No money should be put into upgrading nuclear power. Future investments should go to renewables. <sup>134</sup>
Social Democratic (S)	Renewable energy is desirable. Wind energy is important for both land and sea based applications. Negative towards nuclear power. <sup>135</sup>
Center (C)	A strong development of wind power should take place, with municipal control. Negative towards nuclear power. <sup>136</sup>
Moderate (M)	Wind power is a bad idea. Positive towards nuclear power, as long as high safety can be guaranteed. <sup>137</sup>
People's Party (FP)	Negative towards wind power, not a realistic alternative today. Positive towards nuclear power. <sup>138</sup>
Christian Democratic (KD)	Positive towards renewable energy sources. Wind power is unrealistic alternative to nuclear power. Positive towards nuclear power. <sup>139</sup>
Hörby Party (HP)	Supports nuclear power. Wind power can not replace nuclear power today. Positive towards and waiting for, new economically viable renewable energy sources. <sup>140</sup>

context. Table 3 shows the general fervor of the political parties regarding wind power and nuclear power, mostly at the national level (Hörby Party is a local Party). In energy discussions in Sweden, debate seems to put nuclear and wind power into a face off. Generally speaking, right-oriented political philosophy in Sweden is more strongly in favor of the individual, whereas left oriented political parties are more favorable towards the public rights and concerns. These parties have control over the committees that make the final vote on an application in their respective municipalities, as described in the application section.

### 6.1 Wind power production and electrical consumption in the two municipalities

Table 4 displays a side by side comparison of the Hörby and Eslöv concerning electricity use and production. The most recent statistics available were through 2002.

**Table 4 Electricity Statistics for Hörby and Eslöv**

Electricity statistics for Hörby and Eslöv <sup>141</sup>	Ei-energy (MWh)		Ei-energy (MWh)	
	2001	2002	2001	2002
	Hörby		Eslöv	
Total el end use	141941	166520	344437	367563
Transformed wind power	722	1000	12759	21604
EI use for households	68578	82705	99637	116752
Transfer losses	7949	13305	19288	29368
Total consumed electricity				
- (transfer losses + total el end use)	149890	179825	363725	396931

Hörby's only source of electrical production comes from wind power (2002 = 1,000 MWh), whereas in Eslöv (2002 = 21,604 MWh), electricity is also produced by some industries<sup>142</sup>; also noteworthy is that Eslöv had 17 turbines installed in 2002.<sup>143</sup> Both municipalities have far surpassed the national average in overall electricity consumption growth.<sup>144</sup>

## 6.2 Hörby

### 6.2.1 Wind Power Situation and Policy

Hörby today, has just two installed turbine within its borders, of which, one is small scale (15 kW).<sup>145</sup> The large scale turbine is owned by the local energy company, Ringsjö Energi, and has been in production for over 10 years.<sup>146</sup> There have been 18 applications for wind turbine projects since 2001, of which 6 have received permission to build from the municipality.<sup>147</sup>

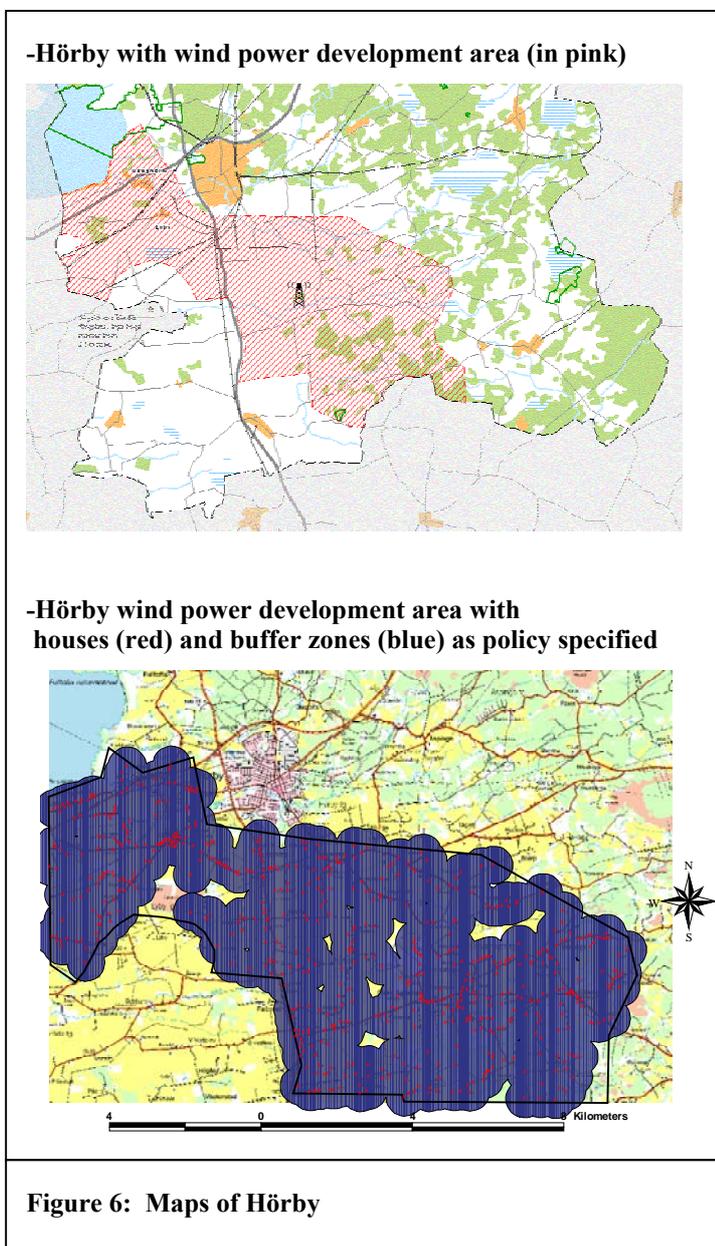
This essay is not about the wind power policies in the municipalities; however, it is important to understand how the policies are structured to be able to understand how it may affect the application process. Hörby's wind power policy is a separate document, not a part of the municipal oversight plan, and was given to me upon request. Hörby enacted its wind

power policy 6-25-2001, and is summarized in appendix 1.

Figure 6 to shows how the wind power policy has affected the possibility for development of wind power in Hörby with the use of two maps.<sup>148</sup> The first map sets aside an area for wind power development. The second map of Hörby was made with the use of the Geographical Information Systems (GIS) mapping program ArcView, which shows the buffer zones (in blue), and clearly demonstrates that there is not a lot of area for wind power development left in the municipality (the yellow areas frame are available for wind power development). The area to the south and west of the wind power development area is designated as a military training ground, and can not be developed for wind power; leaving a large constraint on wind power development in Hörby.

### 6.2.2 Application process in Hörby (projects up to 1 MW)

The wind power application process in Hörby starts similar to other building projects. The protocols for the application process are determined by the building and planning committee and the environmental committee: Both of which are political entities. Wind



turbines are structures, and treated as such in the beginning. The following information is not specifically available anywhere on the internet or in printed form from the municipality of Hörby.

Usually, an informal phone call or meeting takes place with the developer and the city architect. During this informal meeting, discussions entailing the location and size of the project take place. It is possible, already, at this point that the proposed project can be judged and an informal decision is made as to the feasibility of the project.<sup>149</sup> It is usually after this meeting the developer decides whether or not to apply for a permit. The first official step for a developer is to apply for a building permit, which is done by filling out the same form anyone wishing to build any type of structure needs to fill out. This form can be obtained from the municipality personally and on the internet ([www.horby.se](http://www.horby.se)).

The building permit application is first looked at by the city architect, and then it is given to the building inspector for analysis of the structural plans. During the next phase, the neighbors are contacted. The city architect sends out a letter informing people of the proposed project, thereby giving people an opportunity to voice their concerns. The letter is sent out to property owners, homeowners, tenants, and other people with an interest in the area within an area of at least 700 meters from the proposed project sight.<sup>150</sup>

As dictated by the PBL, the application is sent on for environmental analysis. The environmental analysis follows the guise of the MB. The municipal ecologist in Hörby looks at environmental concerns, such as impacts on nature, as well as impacts on humans. Sometimes he has contact with people affected by and living within the area of the project. He then makes a recommendation to the environmental committee before a vote is taken. Certain, smaller scale works (hobby-scale) can be directly decided upon by the civil servants regarding environmental issues.<sup>151</sup>

After the city architect has heard from the neighbors, and made considerations, he writes his suggestion regarding the project to the building and planning commission.<sup>152</sup> The Building and Planning Committee then votes on the issue. If the application is approved by the building and planning committee it is then sent on to the environmental committee for a vote.<sup>153</sup> This is the final step in the process for the municipality. Often the application is approved, pending the outcome of the military, aviation authority, communications authority, road administration, and county decisions.<sup>154</sup> If all of these approve the application, and there are no objections from the other various government agencies which have the right to object, the developer can then start construction.

### **6.2.3 Interview results from Hörby**

Four interviews were conducted for this portion of the study. The city architect, the municipal ecologist, the technical, environmental, and planning department head, and the environmental department manager were interviewed. The interviews were structured into four parts; 1) General Development 2) Energy 3) Wind Power and 4) Wind Power Application Process.

#### *General Development*

Hörby has set some overall development goals, with preference for population growth and business growth, which can be seen in the oversight plan and in a document called *Vision 2010*.<sup>155</sup> The emphasis on sustainable development is starting to grow. An example is that district heating with bio fuels has just begun, as there was previously no district heating in Hörby. There is also a plan to clean storm water run off before it goes into the river, as it currently now drains directly into the river.<sup>156</sup> There used to be an Agenda-21 coordinator,

however, today there is no one person specifically devoted to working with Agenda-21 in Hörby.<sup>157</sup>

### *Energy*

There is no current energy plan for Hörby today. The last energy plan was done in 1986.<sup>158</sup> Renewable energy sources are not highly promoted at present, while the biggest issue in regards to renewable energy now is a discussion on waste management: to burn or produce bio gas?<sup>159</sup> It requires many wind turbines to make a significant impact on electricity production.<sup>160</sup>

### *Wind Power*

People are positive about wind power if there are economic gains. Many people do not want wind turbines around them or their homes because of the disturbances caused by the large structures (such as visual disturbances, loss of property value, and shadows).<sup>161</sup> There is a lack of good land available for wind power within the municipality. Wind power is rarely, if ever, discussed in relation to Agenda-21. All the respondents think that wind power is a part of sustainable development and generally look positively upon wind power. Wind power is a part of the political agenda; however, many other issues take precedence. In general, there seem to be a lot of misconceptions within the municipality as a whole about wind power; people are not exactly sure what to believe.<sup>162</sup>

The national government should be more involved with wind power issues regarding spreading of information about wind power.<sup>163</sup> Hörby does not use a predetermined detail or area decision plan for wind power, just the wind power policy and map, which adequately addresses wind power issues.<sup>164</sup>

### *Wind Power Application Process in Hörby*

There is no pre-compiled list of which laws and applications apply to wind power; it is felt that a discussion between the workers and the developer is more necessary so that the parties can look together at the policy and map together. The informality at the beginning of the process is very important because it helps to get the process started and makes for easy introductions of the parties. The municipality has not actively sought help from the national or county governments for designing its application process. Applications for wind turbine installations follow the same rules as other building structures, plus what is in the wind power policy.<sup>165</sup> All respondents felt that the application process is structured correctly, but that it could be made to work more quickly, especially in regards to non-municipal factors.<sup>166</sup>

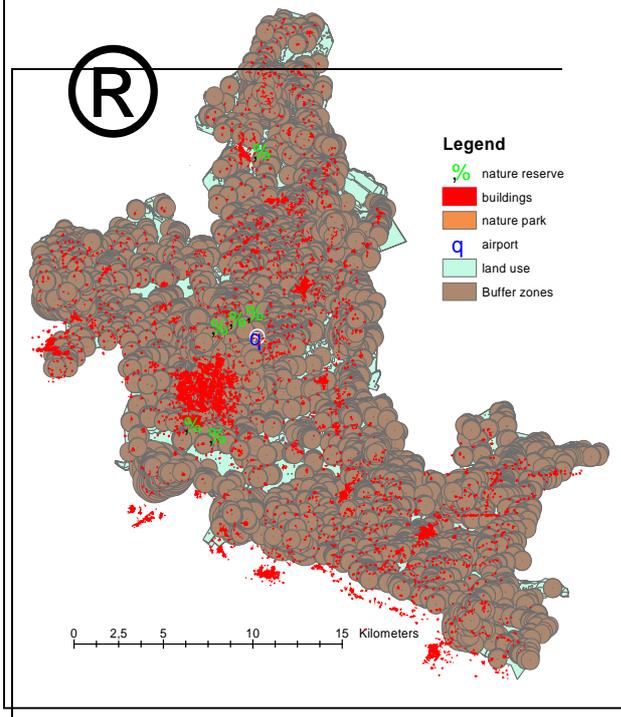
From the municipal side, an application can take up to two months to be processed. There is no time-limit for handling applications; however, all respondents like to handle the applications as quickly as possible.<sup>167</sup> The county has taken up to 1.5 years to make final decisions on applications in the past. If this were changed so that there was a time-limit enacted, the process would move along better.<sup>168</sup> The Swedish military has also been responsible for delays with applications in the past, sometimes pro-longing the process for lengthy periods of time (over a year).<sup>169</sup> The electrical net owner also needs time to make an analysis of the application, which can sometimes cause delays.<sup>170</sup> Other factors that can slow down the application process include the Swedish aviation authority, the Swedish communications authority, and neighboring municipalities (if the application lies in an area near or on the municipal border), who all need to approve before an application can receive the final go-ahead.<sup>171</sup>

It would be helpful to the application process if the national government took a stand and made universal guidelines to be followed by the municipality.<sup>172</sup> The area south of the

**Map of Eslöv with areas of feasible wind power development in blue cross-hatching.**



**Map of Eslöv with buildings (red) and buffer zones (brown) as policy specified.**



**Figure 7: Maps of Eslöv**

maps of Eslöv are presented. Figure 7 displays the areas for wind power development, as set aside by the municipality.<sup>181</sup> These sections are marked in blue cross hatching. Figure 8 applies the appropriate buffer zones, as stated in the wind power policy, around homes by use of the Geographical information Systems (GIS) program, ArcView.<sup>182</sup> The areas left

wind power development area is very unlikely to have an application approved due to the military prioritization of that area.<sup>173</sup> There is usually communication between the county and municipal environmental offices regarding the project, even for larger projects over 1 MWh in size<sup>174</sup>, which means that, at least informally, the municipal environmental office can influence the decision concerning environmental aspects of a proposed project outside its jurisdiction. An application for wind power outside of the area for wind power development still has a reasonable chance to be approved if all the aspects of the wind power policy are met.<sup>175</sup> Some of the strong points in the application process are the discussions with neighbors which allow for a more democratic format<sup>176</sup>, and the check and balance provided by the parallel process where the county becomes involved.<sup>177</sup>

### 6.3 Eslöv

#### 6.3.1 Wind power situation and policy

As of November 2004, Eslöv has 29 turbines erected within its borders.<sup>178</sup> The approval rating today is about 50%, as space is running out.<sup>179</sup>

Eslöv's oversight plan (2001) has a section specifically about wind power, which includes their wind power policy. Some of the objectives of Eslöv are to keep track of statistics regarding acceptance problems in both developed and undeveloped (wind power) areas within the municipality, as well as to further understanding of how wind turbine size affects acceptance, and the relationship between turbines and unique environments.<sup>180</sup> The wind power policy, as taken from the oversight plan is summarized in appendix 2.

In the two following figures, two

showing blue are feasible areas for wind power development, per the municipal policy. The result is that there is not a lot of land available for wind power development.

### **6.3.2 Application Process in Eslöv (projects up to 1 MW)**

The information accounted for was provided through the interviews with the city architect and public health manager. Both employees verified this portrayal during their interviews. This information is not specifically available anywhere on the internet or in printed form from the municipality of Eslöv.<sup>183</sup>

The first step in the application process in Eslöv is usually an informal discussion between the developer and the municipal workers (usually the public health manager and the city architect). During the discussion, the project is discussed in general terms, and the actors speak to each other about the project. If the project is over 125 kWh in scope, then a county representative also takes part (as stated in the wind power policy) due to their expertise with wind power.

The second, formal step, entails the project description. A written project description is turned in by the developer to the municipality. The project description includes a map showing the location of the project.

During the third step, information is sent out to the people who might be affected by the project. This includes land owners, tenants, associations, and inhabitants. These people have the option to voice their concerns regarding the development. The information sent out is both informatory and participatory in that it asks for input from the people who receive the information.

During the fourth step, the municipal employees review the input they have received from various people, as well as the developer. The municipal employees who review the application at this point are the city architect (planning issues), public health manager (health issues) and the environmental department manager (environmental issues). During this review the employees determine if they will support the application's approval, and they may make suggestions to the developer on minor issues such as possibly moving the exact location of the structure by no more than a few hundred meters or other small logistical matters. A notice of their decisions is sent to the developer.

The fifth step allows the developer to be heard on the matter. If the developer received a decision of non support, they can appeal the issue at this time with the municipal employees and try to convince them to change their minds. If the municipal employee's decision favored approval, with minor changes, a discussion takes place addressing these issues between the employees and the developer. After these issues are cleared up, the application is sent to the environmental and community committee with the municipal employee suggestions.

The environmental and community committee (handles both building permit and environmental testing) reviews the application material and the municipal workers' suggestions regarding the project. The environmental and community committee work with the applications by 1) reviewing the submitted documents 2) discussing the issue at party meetings 3) listening to presentations by the municipal workers 4) Checking the sight (usually) 5) voting on the application. As stated earlier, national law mandates that the committee take up the building permit issue separately from the environmental permit. The environmental aspect is heard first, and if the project is approved, then the building permit issue is heard and voted on. Even if the permit is approved by the municipality, it must also be approved by the military, aviation authority, communications authority, road administration and county, as well as there being no objections from the other various government agencies which have the right to object before construction may begin.

### 6.3.3 Interview results from Eslöv

Three interviews with municipal employees were conducted for this portion of the study. The city architect, the public health manager, and the geographic information systems (GIS) coordinator were interviewed. An attempt to interview the environmental department manager and the agenda-21 coordinator was made as well. The environmental department manager was on leave and unavailable, however, this did not present a problem as the information received from the city architect and the public health manager more than adequately provided the information needed. After discussion with the agenda-21 coordinator as to the possibility of an interview, it was determined that it would not be necessary as her job functions did not directly work with wind power in any manner. The interview with the GIS coordinator was scheduled in order to talk about the wind power development area map, but it was learned that the map was made by a consulting company, and did not provide any other relevant information; thus, was not of value.<sup>184</sup> The interviews were structured into four parts; 1) Development 2) Energy 3) Wind Power and 4) Wind Power Application Process.

#### *Development*

There are municipal and environmental goals. Some of the questions include land use, such as how to become pollution free and how to use the land optimally. Eslöv has a development goals for wind power in that it (wind power) should be “fully developed”.<sup>185</sup> Sustainable development is emphasized as a part of the municipal goals, and there are time plans for the different goals.<sup>186</sup> From discussions with both workers, it became apparent that agenda-21 is not really discussed in relation to development goals, and that it is not marketed as a tool for relating wind power with the residents of the municipality, even though they actively work with agenda-21 within the municipality.<sup>187</sup>

#### *Energy*

There is an energy goal that states that energy production facilities should be completely built out by 2030. Every entity within the municipality works with agenda-21 and a part of that is building an overall healthy environment to include all aspects (including energy), so this conscious choice to work in this manner may explain why Eslöv has achieved more success in these terms. It requires many wind turbines to make a significant impact on electricity production.<sup>188</sup> Renewable energy sources are important to the community. There is an energy plan for Eslöv which covers many issues such as, but not only, how to choose heating systems for homes (old and new), various energy issues such as energy savings, production methods including bio gas and wind power, and the possibility of converting the municipal fleet of autos to bio gas vehicles.<sup>189</sup> Further, the energy plan states a goal of 5% of electricity coming from wind power within the municipality.<sup>190</sup>

#### *Wind Power*

Some people may not realize the winnings from wind power, such as environmental and public health.<sup>191</sup> People are overall positive towards wind power, yet there is a noticeable feeling that many believe there may be enough wind turbines now in place. Some of the politicians do not really want more turbines erected. The political prioritization towards wind power may be decreasing now, due the large amount of turbines already in place. It is peculiar that the national government does not take a more active position on wind power because they appear to have a strong interest in it.<sup>192</sup>

There has never been a discussion about making an information portal specifically about wind power for would-be developers and the general public, the only source is oversight plan.<sup>193</sup> The oversight plan contains the wind power policy and map for wind power

development. The wind power policy works well because it is visible and can be shown.<sup>194</sup> Eslöv does not use a prior area decision or detail plan for wind power development.

#### *Wind Power Application Process in Eslöv*

When Eslöv first designed its application process and procedures (approximately 5-6 years ago) they collaborated with the county, which was both positive and helpful.<sup>195</sup> The municipality has not actively sought help from the national government with the design of its application process.<sup>196</sup> There is no pre-compiled list of which laws and applications apply to wind power; it is felt that a discussion between the workers and the developer is more necessary so that the parties can look together at the policy and map.<sup>197</sup> Both respondents felt that the application process fulfilled its target and that it is a well functioning process, owing to the good structure and openness of the wind power policy.<sup>198</sup>

This process usually takes about one and a half months and not usually more than two months.<sup>199</sup> The environmental aspect of the application process is exactly the same as the county's procedure.<sup>200</sup> There is no time-table for the municipality regarding the length of time the different aspects of the application process should take to process.<sup>201</sup> The municipality tries to work as fast as possible, but the required parallel processes of the municipality and county means that a lot of different parties need to be heard from on the issue, and, thus, extra time is required.<sup>202</sup>

It is important to follow the map (apply inside the area for wind power development) when making an application to increase the chances for success.<sup>203</sup> However, applications just over border areas of the development map still have a better chance than others far outside of the maps.<sup>204</sup> If a proposed project goes over the sound limitations it is very unlikely it would be approved. It is very important to the process that those affected (neighbors) have the chance to voice their concerns.<sup>205</sup>

## 6.4 Summary of Case Studies

**Table 5** General comparisons of Eslöv and Hörby

	Eslöv	Hörby
average income in thousand krona: women/men age 35-44 <sup>206</sup>	210 / 285	196 / 271
Population density people per square km	70	33
Land area (square km.)	422	422.5
average age of politicians on:	-	-
▫ building committee (Eslöv = 1 com.)	54	59
▫ environmental committee	-	56
Wind power goals (% production)	5%	no
number of turbines	29	2
wind turbine applications (since 2001)		18
▫ % building permits approved (since 2001)		33%
Party orientation (general):	-	-
▫ public or private interests	public	private
general wind power attitude	positive	positive
Energy Plan (year)	2000	1986
Agenda 21 work	yes	no
▫ including wind power	no	-
% cropland	73%	40%
% grazing land	-	10%
% forest	-	34%

Table 5 shows comparisons of the two municipalities' in terms of many of the attributes of concern regarding wind power. As the purpose is for general comprehension only, the average ages of the politicians on the deciding committees is also included<sup>207</sup>, as well as average income of men and women age 34-45, as this is felt to be the best indicator of group income.<sup>208</sup> Hörby has a lower average income for this group of men and women than Eslöv. Hörby also has a higher average age of politicians on the deciding committees than does Eslöv.

The basic structure of the application process is seen as good in both municipalities. The transparency of the application process in the municipalities is limited, as they are not available in printed format or on the internet.

Active participation between developers and the municipalities is considered highly important by the municipal workers in order to establish contact and a working relationship with the developers.

The collaboration meetings with neighbors are highly thought of as they allow for participation, as well as the separate environmental testing creating a check and balance.

There are no time-frame guidelines in either municipality for processing an application. It is, however, generally felt that an application should be processed in a timely manner. There was also reference to the other actors needing to work more quickly, such as the county.

Neither municipality has sought help from the national government to design its application process. There was a general feeling that the national government ought to be more involved with wind power than it is now, owing to national development goals.

## **7.0 Analysis and Discussion**

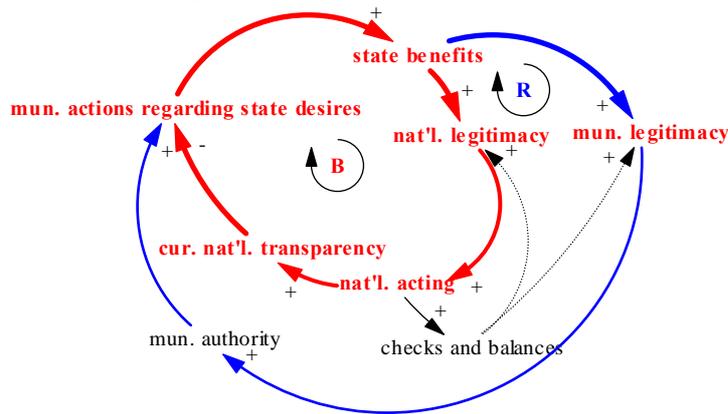
### **7.1 The problem of lack of national transparency**

On a theoretical note, binding policies are seen as an ideal means to achieving legitimacy. This research has brought forth that there is a desire for more involvement from the national government in the wind power application process. Most people believe that the process could definitely be improved. The Swedish government has then the responsibility to improve the wind power application process, especially in the case where they have already acknowledged that the process is hindering expansion of the industry and there is a desire for expansion.

Goals and procedures have a large impact on transparency because they can be rather easily seen and evaluated by others. They also supply a guiding voice to be heard by others. As stated in figure 1, the relationship between transparency and legitimacy is positive, as they increase or decrease together. An assumption has been made: a democratic government prefers to be as legitimate as possible; hence it supports the ideal of increased transparency. This assumption is made because longevity of a government/regime is likely increased by enhanced legitimacy, which will help the regime maintain authority and be reelected.

Figure 9 has incorporated the principles from the theoretical section and the model of governance in Sweden (where there is a preference for municipal autonomy) to display the role that the current level of national transparency (*cur. nat'l. transparency*) plays in regards to national and municipal legitimacy. For simplification, many attributes from figure 1 have been left out to keep critical focus on the role of transparency in the model. The national (*nat'l.*) government has used the legitimacy granted to it to create checks and balances in the form of a high degree of municipal (*mun.*) legitimacy (+). As a stipulation of their legitimacy, municipalities should exercise authority with a high regard for national policies (thus a (+) relationship between *mun. authority* and *mun. actions regarding state desires*). If municipal actions regarding state desires increase, so too do state benefits; (+). More state benefits create more legitimacy (+). If the municipalities to not carry out actions to create state

benefits, their legitimacy, as well as the national government's legitimacy are decreased, still maintaining a positive relationship (+) between these factors in the model.

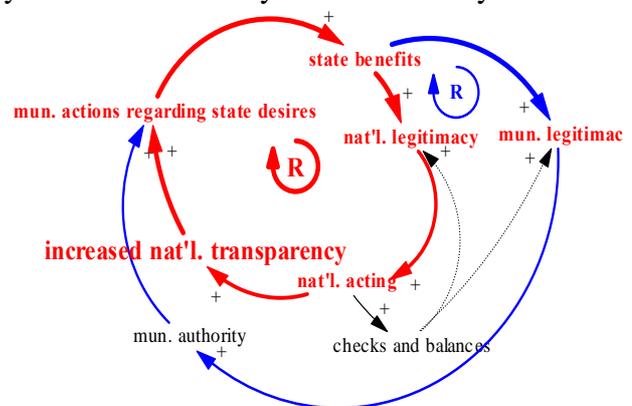


**Figure 8: The effects of lack of national transparency on national and municipal legitimacy**

national government. This has been denoted by a negative value applied to municipal actions regarding state desires (-). This negative value is applied because the current level of transparency has left confusion at the municipal level as to the importance of wind power. The current national transparency derives less state benefits because of hampered development, which, in turn decreases the legitimacy of the national government; denoting a balancing loop **B** in the system, meaning there is a net negative impact in this case.

This net negative impact is also resulting in a perpetuation by the municipalities not to be able to provide national and municipal legitimacy from not providing state benefits (+); denoting a reinforcing loop **R**, which will likely continue inevitably in the current system.

The analysis has indicated that current national transparency is suffering due to a nonbinding wind power goal and lack of desires communicated to the municipalities on how to structure the application process. Increased transparency of these two attributes would enlighten the municipalities as to how they are expected to proceed with wind power and increase the legitimacy of the application process. Figure 10 shows how increased national transparency would create more municipal actions regarding state desires (+). What happens in this scenario is that the transparency leads to more municipal actions regarding state desires, and thus results in a reinforcing loop **R**. The system reinforces itself and will likely continue indefinitely, while the reinforcing loop for municipal legitimacy is left intact; only now it is a good attribute because more state benefits are likely to be created.



**Figure 9: The effect of increased national transparency**

## 7.2 The wind power application process

This research has found that while there is a general consensus that the wind power application process basically structured correct, there are also problems prevalent in the process that need remedying. Some of the complimentary attributes of the application process

include the importance of the developers and municipal workers establishing working relationships through the initial, informal meetings, the significance of separate environmental testing, checks and balances provided through the different actors' involvement, and the different collaboration meetings that are held to communicate with the actors.

The negative attributes of the application process focus largely on time delays in many areas of processing an application. The current level of municipal transparency also presents problems because it leads to confusion; especially for the wind power developers.

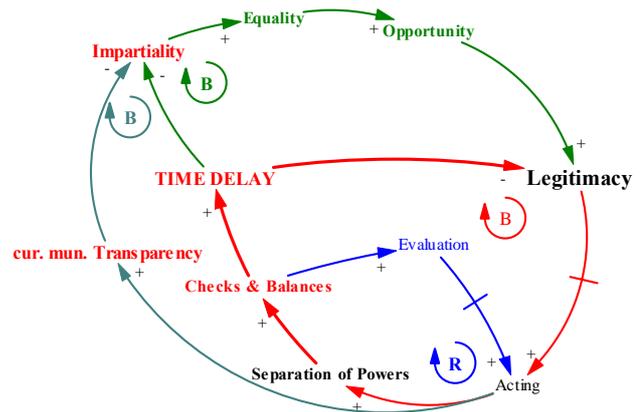


Figure 10: Flaws in the application process

Figure 11 demonstrates how the defects in the system have negatively affected legitimacy of the application process. The CLD is based on the democratic model in figure 1, but has been simplified to ease comprehension while the important aspects for this context have remained intact.

If we follow the red circle, starting with checks and balances having a positive effect on *TIME DELAY* because the multiple opportunities for participation; both individual and intra-governmental, the dual applications, and long appeals times have all made for an overly bureaucratic and lengthy application process and is denoted as a positive relationship where both have increased at the same time (+). Checks and balances are important, but in their current format, they are hurting the system. The time delay has decreased legitimacy, as noted by the unhappiness and regard for timely processing of applications by the actors; thus more time delay means less legitimacy (-). Impartiality is decreased by more time delays (-) because the system appears to favor failure of an application through too many checks and balances, as noted especially by the wind power developers. Thus, the red circle becomes a balancing loop (B), indicating a need to restore the positive impact on legitimacy.

In the aqua colored circle, we see that the current level of municipal transparency (*cur. mun. Transparency*) is having a negative impact on impartiality because their documentation, though varied, is not presenting a written description of how the application process works in the municipalities. Confusion results as it is difficult for the developers to know the expectations of the municipalities. This mandates that direct contact is made in order to learn about the application process. This has created another balancing loop that will continue until municipal transparency is changed.

The green circle starts from the time delay and follows partly the course of the red circle (from legitimacy through time delay). As explained, time delay is decreasing impartiality, and through decreased equality and opportunity, legitimacy is decreased. This results in another balancing loop in the system. The loop will likely remain until the time delay is changed to not have a negative impact on impartiality.

Interestingly, we see that the blue circle is a reinforcing loop. However, the relationship between evaluation and acting is intricate because reason tells us that more evaluation will lead to more acting, but there is also a need for a certain amount of evaluation to occur before the “right” actions are taken. There has currently not been the “right” amount of evaluation, which can be seen from the lack of effort to analyze and alter (act) the application process in such a manner so as to limit time delays. This supports the need for more evaluation of the

application process that will result in changes being made. As seen here, changes to increase municipal transparency and decrease time delays are important if the system is to reinforce legitimacy.

Figure 12 demonstrates how the creation of a time limit and increasing the current level of municipal transparency could have the affect of creating reinforcing loops in the system. The creation of the time limit decreases the time delay resulting in a negative relationship

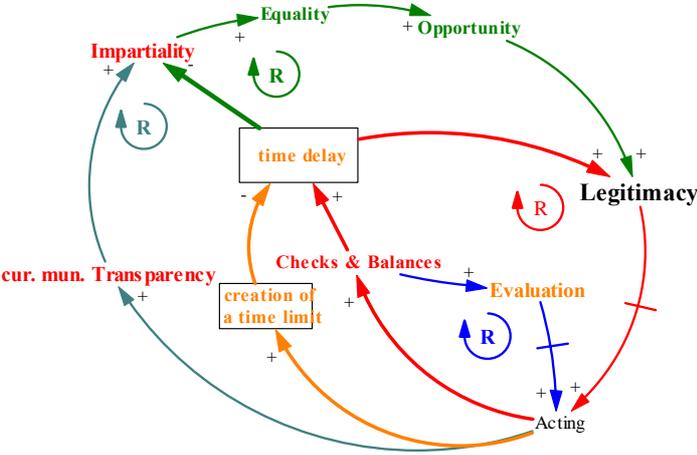


Figure 11: Time limit for checks and balances

between the two attributes (-). The time delay still negatively impacts impartiality because as the time delay decreases, impartiality increases (-). This results in a reinforcing loop (shown in green) because the values have a net positive effect  $[(-) (-) = (+)$ .

As checks and balances create a necessary time delay, the impact of the time limit has made the time delay “appropriate”, as the actors recognize the necessity of some time delays for the sake of democracy. Hence the impact of the time delay on legitimacy is now positive, creating the reinforcing loop (shown in red).

Noting that in the previous model the national transparency was increased to create more municipal actions regarding national desires, the municipal transparency is increased because of this, as well as another solution being the option for the municipalities to increase their transparency on their own initiative, the result will be more impartiality (+) from clear communication of policies alleviating confusion. A reinforcing loop will be created with more impartiality.

**7.3 Amount of wind power needed to equalize wind power production and electricity consumption in Hörby and Eslöv**

Each of the two case study municipalities has the theoretical ability to produce enough electricity from wind power to equal their consumption of electricity. Table 6 displays the amount of turbines of various sizes that would be needed to reach this equalization by analysis of the figures presented in figure 2 and table 4; based on year 2002 electricity consumption.

Table 6: Calculation for amount of wind turbines needed to equalize production with consumption of electricity

Based on 2002 totals, where Eslöv had 17 turbines, the result would mean that the average sized turbine then was approximately 500 kW. The calculation does not factor in wind power production that occurred in the municipalities in order to give a perspective on what is needed based on theoretical potentials of today.

	Hörby	Eslöv
2002		
electricity consumption	166520	367563
Total needed turbines:		
* 1 MW	67	147
* 2 MW	28	61
* 3 MW	19	41
* 4.5 MW	14	31

Hörby has less wind power than Eslöv, and subsequently needs less total wind power to achieve total sustainability of electrical production. In this aspect, their slower development

of wind power has put them in a better position to be able to achieve an equalization of production and consumption of electricity.

Eslöv, with 29 turbines in place already, probably can not achieve this equalization unless the old turbines are demolished and replaced with the most current models. This seems highly unlikely for the near future. Perhaps after the old turbines reach the end of their life cycles they will be replaced with the newest turbines; possibly allowing for this equalization to occur.

Difficulties arrive in giving a concrete answer as to whether or not the application process has limited sustainable development. One thing that is certain in general terms is that the more turbines in operation mean more environmental sustainability. Hörby is less sustainable now in this respect, but has a more likely chance of increasing sustainability sooner; whereas Eslöv is more sustainable now, but less likely to increase its sustainability in the near future.

#### **7.4 Lessons learned from the municipalities**

The case studies in this essay have highlighted some of the interesting aspects regarding wind power in a comparative manner so as possibly providing a basic understanding of how these aspect effect the wind power application process in each municipality. Of most appearance are the differences that have resulted. Transparency of the application process in each municipality is less than it could be today because one must interact directly with the municipalities in order to receive a description of how the application process works. Both have cited the reason for this as a preference for direct contact with would be developers to increase understanding through discussion.

This case study has showed signs of how the political culture is very important to how wind power is dealt with by municipalities. Hörby is more politically conservative and older in this case; and less active in development with regards towards energy, wind power and Agenda 21. The background towards party opinions regarding wind power supports this supposition.

Of course, acknowledgement that the two case study municipalities could be anomalies must be considered, and that any conclusions drawn are subjective at best. In order to make objective conclusions regarding how and why wind power is handled in different manners in municipalities, a much more comprehensive evaluation would be required.

The understanding learned from these case studies is that even though they are neighboring communities with similar cultural heritages due to their proximities, they are nonetheless different from each other and unique regarding how they work with wind power.

This leads back to the one point that the case study can support: All municipalities are different. The reasons are less important than the general comprehension of this phenomenon. If we accept that municipalities react to and handle wind power differently and perhaps with bias, then measures can be instituted that will ensure that at least wind power applications are treated in a more similar manner which will result in increased impartiality from a more nationally uniform and transparent application process.

#### **7.5 Sustainable Development**

Due to Sweden's high per capita electrical consumption, the need for sustainable development in this sector has a pronounced urgency. Technological improvements with wind power are making it possible to produce more electricity than ever, including opening up of new physical areas, such as forests. Wind power is the best environmental choice of electricity production in terms of effects on air pollution. Increased wind power production is ideal from an environmental impact point of view.

Wind power production will not likely replace nuclear power entirely in Sweden today, nor is likely to do so in the future. The decision has been made to abandon nuclear power in Sweden, however.

Making efforts to increase renewables will help the Swedish economy, society, and environment. Increasing legitimacy of the wind power application process will aid sustainable development if it leads to increased wind power production. If the process is easier to comprehend and less time consuming, it is plausible there will be a more rapid expansion of the wind power industry.

Although one may say that the current economical situation regarding wind power is not ideal, it can be seen as a very strong step towards fulfilling the economic aspect of sustainable development since subsidies have made wind power the cheapest source of electricity production in Sweden today. Wind turbines are also profitable enterprises. The economic aspect of sustainable development is more stable than the societal aspect, which has been the most limiting aspect of sustainable development for wind power.

The societal aspect has also been limiting the environmental aspect, because more turbines are needed in order to achieve more sustainable development in the electrical production industry. Sustainable development will likely increase even more in electrical production when the societal aspect is addressed for wind power applications. The municipalities, however, highlight that it may have been good for sustainable development that the application process has been limiting expansion of the wind power industry because of the paradox presented where production possibilities today are much greater than even a few years ago. Today's turbines can, at the least, make a reasonable impact towards consumption needs of electricity; signifying an enhanced urgency remove the hindrances present in the wind power application process today.

## **7.6 Problems with the application process and policy choices**

If current application process for wind power in Sweden was built with a policy making model in mind, it appears to have been built at least partially from the rational model because of its comprehensive nature, especially regarding checks and balances: the cause of time delays. On a positive note, this model tries to appease everyone, which is good in theory. However, as stated, the results can be disastrous – and though it may be going too far to say the current policy is a disaster, it is not functioning in coherence with the ideals of democracy because of the legitimacy problems present. The current structure of the application process is considered adequate according to the actors. System analysis also supports that the fundamental structure is correct; whereas the functioning of the application process system is not performing to full potential.

Therefore, the attributes of the incremental model take focus if a policy making model were to be followed. This approach is evolutionary, and works in steps. As discussed, some changes in the application process would probably yield better results for functionality, while reinforcing democratic principles. The incremental approach takes into consideration the points of views of the actors: governments, government agencies and their workers, as well as developers, and citizens. If the creation of a good policy where all the actors can agree upon the end result of an application process that functions well and upholds democratic principles is the goal, then the incremental model may be an apt approach in this case.

## **7.7 Structuring the actors' roles**

An argument for stronger national involvement with wind power is found the fact that energy production is a national concern. Impacts of energy affect Swedish society and the environment as a whole, usually nationally and internationally. The *National Strategy for*

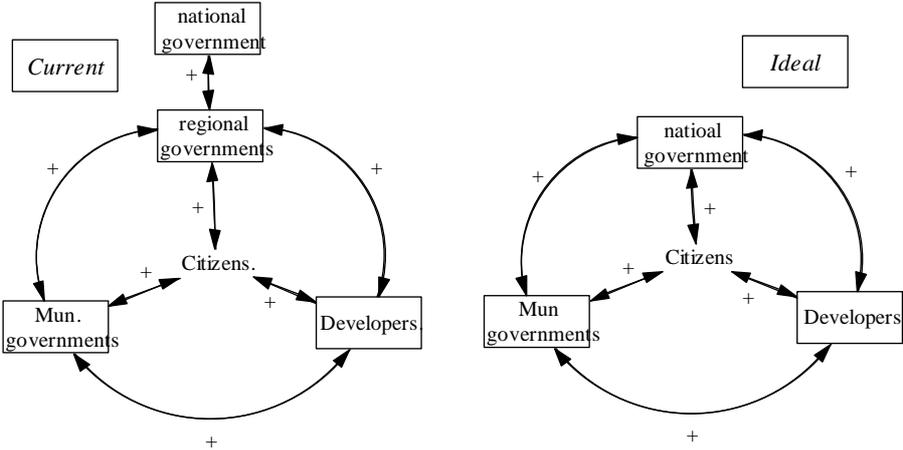
*Sustainable Development* also provides the basis for creating new and stronger policies and laws regarding sustainable development from the national government. All of these factors provide the basis for the argument of the Swedish government altering the structure of the wind power application process.

The argument of whether or not Agenda 21 is significant in Sweden is not really of importance in this discussion because Agenda 21 does exist in Sweden and, therefore, can be utilized as a basis for building a new application process. Agenda 21 says that participation is of key importance in the transition towards sustainable development, and further, governments at the appropriate level are responsible for coordination of participation.

Following this line of reasoning, the focal point becomes defining the appropriate levels of government that should be involved in the application process. Although the regional government is seen as more positive towards wind power than municipalities, it may be more effective in the Swedish context to provide a direct link between the major actors inside of the wind power branch: national, municipal governments, developers, and citizens.

One reason to not include the regional government in actual handling of applications is because of the probability of the incursion of interpretation errors and goal differences; regional governments are elected bodies, and thus serve a constituency, the region. A high regional government importance would also distance the national government from the process in part because the regional government would be performing the act as a representative of the national government. Electricity has a high national prioritization in Sweden, as seen from the state goals, and Sweden’s democratic format aims for high municipal autonomy. Thus, concentrated regional involvement also creates an extra participant who may not necessarily be the right actor for this situation. An extra participant also increases the probability of time delays.

Creating a mutual link between the municipal, national government, developers and citizens may improve transparency and decrease time delays. The figure below displays how the emphasis on regional governments may distance the national government from the application process.



**Figure 12 Scenarios for structuring involvement in the application process**

The lines in the diagram signify communication channels. Both scenarios function and allow information to flow back and forth between the actors; however, the scenario on the left places a filter on the national government through the regional governments, and subsequently goes against the desires of stronger national involvement in the application process. The scenario on the right is very similar to the relationship of attributes in sustainable development; emphasizing a positive relationship between all the actors. Due to complications in the past and present regarding wind power applications, the scenario on the

right is the best choice because it allows for direct involvement by the national government, as well as opening communication channels between appropriate actors.

## **7.8 Solutions**

Sections 7.1 and 7.2 have demonstrated how solutions for the problems associated with the wind power application process could be made in a manner to achieve reinforcing feedback loops, and create more legitimacy for the wind power application process. There are many ways that the solutions can be implemented, such as through minor policy adjustments, incremental changes, or even creation of new laws for wind power.

### **7.8.1 A national wind power law**

Due to wind power applications' requirement of dual testing procedures as stipulated in the PBL and MB, as well as issues over transparency, impartiality and time delays, and consideration for the *national strategy for sustainable development*, the idea for a national wind power law (*vindkraft lag, i.e. VKL*) begins to materialize. A VKL could do what the current laws do not; mitigate problems with the wind power application process and uphold democratic principles to the highest possible potential.

The importance of the PBL and the MB is vast, and therefore, I suggest that the proposed VKL be based on them. Also, the VKL should take regard for Swedish governing preferences; strong municipal autonomy with regard for national policies. A new law should also seek to correct the deficiencies with the current application process such as time delays, transparency, and impartiality, as indicated in the analysis. Further, the new law could streamline the application process and thus decrease unnecessary extra or double work, as indicated in the following box.

**Box 2: A new proposal for a national wind power law (VKL) to make the wind power application process more time efficient and democratic, while preserving the good aspects of the current process.**

1. A national office for wind power development be established, creating national wind power coordinators assigned to specific regions with the purpose of facilitation of communication of national perspectives in each project case.
2. The first, initial step of the application process, localization, includes collaboration with the newly instated national wind power coordinators, as well as being able to be appealed directly to the national government instead of the county.
3. All environmental testing for all projects up to 10 MW be carried out by the municipality, with appeals going to the environmental court.
4. Combing the current applications to one all-inclusive application that includes the requirements of both the PBL and MB as shown in boxes 2 and 3 to avoid redundancy wherever possible.
5. Combining the testing of PBL step 2 and MB step 2 to one meeting where the environmental testing authority and planning and building authority are present. Each authority would retain their jurisdictions, and the meeting would be divided into two parts: one for planning and building, and one for environmental aspects
6. Combining the testing of PBL step 3 and MB step 4 to one meeting where the environmental testing authority and planning and building authority are present. Each authority would retain their jurisdictions, and the meeting would be divided into two parts: one for planning and building, and one for environmental aspects
7. The application process as defined in the VKL will replace all municipal application processes for wind power, and therefore be the same process in every municipality in Sweden with a result of increased impartiality.
8. The VKL will be as transparent as possible, and therefore be made available directly from the municipalities, the national wind power coordinating offices, as well as on the internet
9. Reasonable time limits for each aspect of testing shall be imposed on the application process. The whole application process should be limited to taking no more than three years from start to finish.

The national coordinators for wind power could liaise between the other actors to communicate the national goals for wind power, much like the current regional governments are supposed to do. The difference being that these coordinators would be directly appointed from the national level and their sole purpose would be to represent the issues of wind power from the national perspective.

Creating an appeals process for every step of the application process increases checks and balances, which is good for the legitimacy of the application process. Establishing reasonable time limits for all aspects of the application process also feeds back through the system to create more transparency, as everyone knows how long said aspects take to be resolved, furthering legitimacy of the application process.

The current environmental guidelines as shown in table 1 were implemented in 1998; when the largest land based turbines were around 2 MW, whereas today's models can have an individual output of up to 4.5 MW. If the guidelines made it so that municipalities were responsible for environmental testing of projects up to 10 MW in size, a result would be a strengthened municipal involvement in the application.

Combing redundant process would save time and work. If this can be accomplished while preserving the independence of environmental and planning and building testing, then it would be illogical not to do so.

Increased transparency and impartiality is desirable by democratic principles, therefore establishing a uniform application process for the municipalities to follow also makes logical sense because the municipalities would know how to handle applications, developers would

know what is expected for every application, and the legitimacy is increased through equality and opportunity.

## **8. Conclusions**

This research was undertaken to further understand the wind power application process and to investigate the limitations and hindrances present that are hampering development of land based wind power. While focus has been on the process, it has also revealed that the non binding policy goal for wind power development may be limiting development as well.

The democratic principles utilized in this analysis have also brought forth some of the possible hindrances in the application process. The amount of checks and balances present today are causing significant time delays to occur in the application process. Municipalities are also not receiving clear guidance on how the application process should function, resulting in differences between municipalities' methods for handling applications. These different methods are making the process as a whole less impartial. The end result of this research pertaining to the democratic process aspect is that are ways to increase the legitimacy of the wind power application process while simultaneously limiting hindrances.

The initial hypothesis that the municipal employee and developer perspectives could play a telling point for how the issues affecting the application process play out seems to have been sound. The interviews brought forth a magnitude of information that most likely could only be found from this type of research. The municipal case studies have demonstrated that different outcomes occur even in likely similar places; this increases the need for a single, nationally determined application process in order to increase legitimacy of the democratic process.

While it is hard to give a concrete answer as to whether the current application process has limited sustainable development, it is rather clear that improvements in the process will contribute to more sustainable development of electricity production in Sweden.

The need for future research has also become evident. While a scenario has been presented for a possible solution, the wind power law, future research will need to be conducted as to how to implement changes and under which format it is best suitable to increase national and municipal transparency, increase impartiality, and to invoke a time limit on the different testing attributes of the application process. Checks and balances are necessary and determining what exactly appropriate time delays are is also vital for the success of alterations to the application process.

The municipal case study has highlighted differences in decision making, and a future study of what factors affect municipalities' decisions regarding wind power might want to include an analysis of the incomes of the politicians on the deciding committees in order to better understand their voting behaviors. A comprehensive case study involving significantly more municipalities would also benefit understanding of why outcomes are different.

This research could also be used as a basis for comparative analysis in the future, perhaps regarding how other sustainable development goals could be reached in Sweden, and elsewhere through utilization of the argument of increased democracy to limit obstacles lying in their paths. Future works, such as studies of air pollution mitigation policies or other renewable energy production facility application processes may find usefulness in the lessons learned here.

Political influence at the local level will likely always play a significant role in the application process and is an integrate component of the democratic process. One argument is that local political influence should not be able discredit national interests and politicians should be aware of their obligations to the national government, nor should national

objectives rule the course and inhibit local autonomy. What is also apparent is that municipalities need guidance from the national government in order to correctly address national policy goals; therefore, I suggest that the wind power law (VKL) be created to support these two facets of Swedish democracy.

If Sweden can become stronger in commitment, continuity, and a clear strategy and approach for establishment and expansion of wind power is realized, then the stigma of being otherwise “lacking” regarding wind power can become a memory. Removing the hindrances will get the stone rolling again, and the moss will fall off the wind power application process.

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## Appendix 1: Planning and Building guidelines for a wind power projects (1-10 MW)<sup>3</sup>

- 1) **Position establishment:** The first step is for the municipality is to determine if a detail or area decision plan applies to the case, and also if an environmental impact assessment is required (this assessment can differ from the one required by the national environmental law). It is at the discretion of the municipality to decide if and when an environmental impact assessment is necessary.
- 2) **Program collaboration:** The second step is to have a program meeting to collaborate with the following actors (who must be notified of the meeting prior to its occurrence) to discuss the application; 1) The county 2) Affected municipalities 3) Surveying office(s) 4) Other afflicted governmental agencies 5) The general public, land owners, tenants, associations, and inhabitants.
- 3) **Planning collaboration:** The third step is to have a plan meeting to discuss possible changes to the application with the following actors (who must be notified of the meeting prior to its occurrence) to discuss the application; 1) The county 2) Affected municipalities 3) Surveying office(s) 4) Other afflicted governmental agencies 5) The general public, land owners, tenants, associations, and inhabitants. The municipality makes documentation of the meeting's undertakings.
- 4) **Exhibition:** The fourth step is exhibitory, where the municipality displays the suggested plan publicly for at least three weeks on the municipal display board, while also sending the information to the known land owners, tenants, associations, inhabitants, and others with vested interest in the matter for feedback. The municipality then compiles the feedback and sends it to the above mentioned participants.
- 5) **Reception and Decision:** The fifth step is where the municipal council receives the application for consideration at the council meeting. Public notice must be given in forehand on the municipal display board and in the regional newspaper, as well as a written letter to the applicant(s) stating the date of the meeting. The council then votes on the application.
- 6) **Appeals:** The parties whom can appeal are listed in the Planning and Building Law, chapter 13. Intervention by the county follows guise of the Planning and Building law, chapter 12:1.
- 7) The last step is where legal force is tendered. Compensation entitlements to the municipality, county, and surveying office(s) are rendered.

## Appendix 2: Environmental testing guidelines for wind power projects (1-10 MW)<sup>4</sup>

- 1) **Starting phase:** Project developer begins the environmental impact assessment and receives detailed guidelines of what the completed assessment should include.
- 2) **Early collaboration:** The developer must conduct an early meeting with county, and the anticipated affected people. It is also highly suggested that the meeting include the municipality, but is not required. Before the meeting, the developer is to provide all parties with information about the planned development
- 3) **County decision over considerable environmental impacts:** The county investigates statements from the various governmental agencies with an interest in the issue before deciding if considerable environmental impacts should be expected. If considerable environmental impacts are expected, then an in-depth collaboration meeting is to be carried out.
- 4) **In-depth collaboration meeting:** The project developer has a meeting with the county, affected municipalities and governmental agencies, the general public and concerned organizations. If the project is anticipated to affect the environment in another country, the respective country's governmental agencies shall be invited to participate. The project developer shall give a written account of the meeting.
- 5) **Examination:** The county examines the matter. The environmental impact assessment and application is announced and made available to the general public. The general public also is given the opportunity to comment on the project before the matter is decided on.
- 6) **Decision:** The county environmental envoy decides over the application. The decision is announced publicly. Also, it is decided how the information regarding the contents of the decision will be made available to the public.
- 7) **Appeals:** Those who can appeal are listed in the national environmental code 16:12. The decision if the environmental impact assessment fills the requirements can only be appealed in connection to an appeal of the final decision (step 6).

<sup>3</sup> Boverket. p. 124

<sup>4</sup> Ibid.

**Appendix 3: Hörby's Wind Power Policy**

Source: Hörby (a).

- Noise from wind turbines may not exceed 40 dBA (decibel amperes) in residential areas. Noise shall not exceed 35 dBA in recreation areas where experiencing nature is an important factor.
- Localization of wind turbines should principally take place within the area for wind power development, which was deemed feasible during preparatory work for the municipal oversight plan. The shown area has a protection buffer of at least 1000 meters to larger population centers and 500 meters to grouped building structures.
- Wind turbines should be grouped in clusters of at least 3, and follow the structure of the landscape while taking consideration for lines-of-sight and views. Turbines shall have similar appearances and may not be used for advertisement purposes
- Distance between different groups shall be at least 2000 meters.
- The area for wind power development shall be used optimally by, among others, using high towers for maximum effect and by placing the first tower in consideration for future expansion. Preferably, large capacity turbines should be used to minimize the total amount of turbines in a group.
- Early information with consultation meeting shall take place with the county, municipality and developer regarding localization of turbines larger than 125 kWh.
- All those within a distance of at least 700 meters (Municipality, developer, land owners, tenants, inhabitants, and associations) shall have the possibility to comment on the project. All others with an essential interest in the project shall also have a possibility to comment as well (this means essentially anyone can make comments).
- Certain nature reserves shall have a 1000 meter protection buffer zone.
- Distances to individual homes shall be judged on a case-by-case basis.
- Wind turbines of at least 1.5 MWh are preferred.
- Establishment of hobby scale turbines will be judged on a case-by-case basis and is deemed possible within the whole municipality.

**Appendix 4: Eslöv's Wind Power Policy.**

Source: Eslöv (c).

- Localization of wind turbines shall principally take place within the area for wind power development, as was determined feasible by the oversight plan. There shall be at least a 2 kilometer buffer zone around the city of Eslöv, circa 1 kilometer buffer zone around other villages, and approximately 500 meter buffer zone around other grouped building structures.
- In larger coherent areas which are relatively uninfluenced by development, wind power turbines shall not be erected.
- Wind turbines should be grouped in clusters of between 3 and 5 turbines and follow the structure of the landscape while taking consideration for lines-of-sight and views. Turbines shall have similar appearances and may not be used for advertisement purposes.
- A minimal distance of 3000 to 5000 meters shall exist between groups of turbines, depending on the size of the structures and characteristics of the landscape.
- The area for wind power development shall be used optimally by, among others, using high towers for maximum effect and by placing the first tower in consideration for future expansion. Preferably, large capacity turbines should be used to minimize the total amount of turbines in a group. This shall be addressed in the environmental impact assessment accompanying the application. The environmental impact assessment shall also address how the applied and the possible future turbine(s) will be connected to the electricity net.
- Early information with a consultation meeting shall take place with the county, municipality and developer regarding localization of turbines larger than 125 kWh.
- All those within a distance of at least 1000 meters (Municipality, developer, land owners, tenants, inhabitants, and associations) shall have the possibility to comment on the project. All others with an essential interest in the project shall also have a possibility to comment as well (this means essentially anyone can make comments).
- Noise from turbines shall not exceed 40 dBA night time and 45 dBA daytime for residential areas. Noise shall not exceed 35 dBA in recreation areas where experiencing nature is an important factor. The highest momentary dBA may not exceed 50 at any time.

## Footnotes

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- <sup>1</sup> Swedish Energy Agency 2003a.
- <sup>2</sup> Nilsson, et al 2004. p. 68.
- <sup>3</sup> SCB (a).
- <sup>4</sup> Swedish Ministry of the Environment.
- <sup>5</sup> Nilsson, et al 2004. p. 68.
- <sup>6</sup> Swedish Energy Agency 2003b.
- <sup>7</sup> Nilsson, et al 2004. p. 68.
- <sup>8</sup> Regeringskansliet 2002.
- <sup>9</sup> Swedish Energy Agency 2003b.
- <sup>10</sup> European Commission.
- <sup>11</sup> Vindstat.
- <sup>12</sup> Khan 2003. p. 563.
- <sup>13</sup> Åstrand & Neij 2003. p. 82.
- <sup>14</sup> SOU (a).
- <sup>15</sup> Khan 2004. p. 16.
- <sup>16</sup> Swedish Energy Agency 2002.
- <sup>17</sup> Åstrand & Neij 2003. p. 82.
- <sup>18</sup> Khan 2003. p. 564.
- <sup>19</sup> Ibid, p. 578.
- <sup>20</sup> Hague, et al. p. 180.
- <sup>21</sup> Ibid, p. 21
- <sup>22</sup> Hyland. p. 36.
- <sup>23</sup> Dahl 2000. p. 37.
- <sup>24</sup> Haraldsson 2004. p. 21.
- <sup>25</sup> Dahl 2000. p. 37.
- <sup>26</sup> Ibid, p. 37.
- <sup>27</sup> McLean. p. 281.
- <sup>28</sup> Ibid.
- <sup>29</sup> Huntington. pp. 50-1.
- <sup>30</sup> Hague, et al. p. 10
- <sup>31</sup> Hague, et al. p. 10
- <sup>32</sup> Goodin & Klingemann. p. 59.
- <sup>33</sup> He´ritier 2003. p. 821.
- <sup>34</sup> Ibid.
- <sup>35</sup> Haug 2001. p. 227
- <sup>36</sup> Hyland. p. 31.
- <sup>37</sup> McLean. p. 448.
- <sup>38</sup> Goodin & Klingemann. p. 61.
- <sup>39</sup> Haraldsson 2004. p. 5.
- <sup>40</sup> Ibid, p. 4.
- <sup>41</sup> Ibid, p. 5.
- <sup>42</sup> Ibid.
- <sup>43</sup> Ibid, p. 7.
- <sup>44</sup> Ibid, pp. 5, 20.
- <sup>45</sup> Hague, et al. p. 12.
- <sup>46</sup> Ibid, p. 273.
- <sup>47</sup> Ibid, p. 275.
- <sup>48</sup> Ibid, p. 272.
- <sup>49</sup> Ibid, p. 274.
- <sup>50</sup> Ibid.
- <sup>51</sup> Patton. p. 11.
- <sup>52</sup> Patton. p. 15.
- <sup>53</sup> Isaksson 2004. p. 9
- <sup>54</sup> Nilsson, et al 2004. p. 80.
- <sup>55</sup> Söderholm, et al. p. 8.
- <sup>56</sup> Sinclair Knight Merz Consulting.

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- <sup>57</sup> Boverket. p. 21., Halme, Rosenbäck.  
<sup>58</sup> Vattenfall.  
<sup>59</sup> Dagens Nyheter.  
<sup>60</sup> Khan 2003. p. 578.  
<sup>61</sup> AWEA  
<sup>62</sup> Regeringskansliet 2005.  
<sup>63</sup> Länsstyrelsen Skåne (a).  
<sup>64</sup> Montin 2004. p. 3.  
<sup>65</sup> Regeringskansliet 2005.  
<sup>66</sup> Hague, et al. p. 255..  
<sup>67</sup> Ibid, p. 256  
<sup>68</sup> Ibid.  
<sup>69</sup> Ibid..  
<sup>70</sup> Goodin & Klingemann. p. 613.  
<sup>71</sup> Hague, et al. p. 256  
<sup>72</sup> Ibid, p. 257  
<sup>73</sup> Ibid.  
<sup>74</sup> Ibid.  
<sup>75</sup> World Commission on Environment and Development.  
<sup>76</sup> Munasinghe. p. 2.  
<sup>77</sup> United Nations Division for Sustainable Development. 4.8.  
<sup>78</sup> Carter. p. 276  
<sup>79</sup> United Nations Division for Sustainable Development. 23.2.  
<sup>80</sup> United Nations Division for Sustainable Development. 10.10.  
<sup>81</sup> United Nations Division for Sustainable Development. 9.9-9.12.  
<sup>82</sup> Carlsson et. al.  
<sup>83</sup> Swedish Ministry of the Environment.  
<sup>84</sup> Ibid.  
<sup>85</sup> Ibid.  
<sup>86</sup> Eolus.  
<sup>87</sup> Åstrand & Neij. p.89  
<sup>88</sup> Khan 2004. p. 29.  
<sup>89</sup> Wolsink 2000. p. 49.  
<sup>90</sup> Ek 2005. p. 1677.  
<sup>91</sup> Khan 2004. p. 14.  
<sup>92</sup> Khan 2003. p. 578.  
<sup>93</sup> Boverket. p. 128.  
<sup>94</sup> Ibid, p. 131.  
<sup>95</sup> Ibid, p. 128.  
<sup>96</sup> Ibid.  
<sup>97</sup> Ibid, p. 20  
<sup>98</sup> Ibid.  
<sup>99</sup> Ibid, p. 134  
<sup>100</sup> Ibid.  
<sup>101</sup> Ibid.  
<sup>102</sup> Ibid, p. 136.  
<sup>103</sup> Ibid, p. 136.  
<sup>104</sup> Ibid, p. 77.  
<sup>105</sup> Ibid, p. 124.  
<sup>106</sup> Ibid.  
<sup>107</sup> Länsstyrelsen Skåne (b).  
<sup>108</sup> Boverket. p. 114.  
<sup>109</sup> Ibid, p. 121.  
<sup>110</sup> Ibid, p. 120.  
<sup>111</sup> Ibid, p. 151.  
<sup>112</sup> Ibid, p. 134.  
<sup>113</sup> Region Skåne 2004b. p. 10.  
<sup>114</sup> Ibid.

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<sup>115</sup> Boverket. pp. 150-1.  
<sup>116</sup> Swedish Energy Agency 2002.  
<sup>117</sup> SOU (b) pp. 45, 58..  
<sup>118</sup> Sydsvenskan.  
<sup>119</sup> Khan 2003. p. 578.  
<sup>120</sup> Eriksson.  
<sup>121</sup> Krueger.  
<sup>122</sup> Norén.  
<sup>123</sup> Dahlström.  
<sup>124</sup> Jesse, Kim, Terry.  
<sup>125</sup> Jesse.  
<sup>126</sup> Kim.  
<sup>127</sup> Boverket. p. 22.  
<sup>128</sup> SCB (c).  
<sup>129</sup> Eslöv  
<sup>130</sup> Brandt.  
<sup>131</sup> Eslöv (b).  
<sup>132</sup> Hörby (b).  
<sup>133</sup> Vänsterpartiet.  
<sup>134</sup> Miljöpartiet de Gröna.  
<sup>135</sup> Socialdemokraterna.  
<sup>136</sup> Centerpartiet.  
<sup>137</sup> Moderaterna.  
<sup>138</sup> Folkpartiet  
<sup>139</sup> Kristdemokraterna  
<sup>140</sup> Hörbypartiet  
<sup>141</sup> SCB (b).  
<sup>142</sup> Ibid.  
<sup>143</sup> Eslöv (a).  
<sup>144</sup> Swedish Energy Agency 2003b.  
<sup>145</sup> Lagerberg.  
<sup>146</sup> Nilsson.  
<sup>147</sup> Lagerberg.  
<sup>148</sup> Hörby (a).  
<sup>149</sup> Lagerberg.  
<sup>150</sup> Ibid.  
<sup>151</sup> Bergknut.  
<sup>152</sup> Ibid.  
<sup>153</sup> Ibid.  
<sup>154</sup> Lagerberg.  
<sup>155</sup> Bergknut, Brandt, Lagerberg, Tykesson.  
<sup>156</sup> Tykesson.  
<sup>157</sup> Bergknut, Brandt, Lagerberg, Tykesson.  
<sup>158</sup> Brandt.  
<sup>159</sup> Bergknut, Brandt, Lagerberg, Tykesson.  
<sup>160</sup> Lagerberg.  
<sup>161</sup> Lagerberg.  
<sup>162</sup> Bergknut, Brandt, Lagerberg, Tykesson.  
<sup>163</sup> Lagerberg, Tykesson  
<sup>164</sup> Bergknut, Brandt, Lagerberg, Tykesson.  
<sup>165</sup> Lagerberg, Tykesson.  
<sup>166</sup> Bergknut, Brandt, Lagerberg, Tykesson.  
<sup>167</sup> Bergknut, Brandt, Lagerberg, Tykesson.  
<sup>168</sup> Brandt.  
<sup>169</sup> Lagerberg, Tykesson.  
<sup>170</sup> Tykesson.  
<sup>171</sup> Lagerberg.  
<sup>172</sup> Brandt, Lagerberg, Tykesson

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- <sup>173</sup> Lagerberg.  
<sup>174</sup> Ibid.  
<sup>175</sup> Bergknut, Brandt, Lagerberg, Tykesson.  
<sup>176</sup> Brandt, Lagerberg, Tykesson.  
<sup>177</sup> Brandt.  
<sup>178</sup> Nyberg.  
<sup>179</sup> Fredriksson.  
<sup>180</sup> Eslöv (c).  
<sup>181</sup> Eslöv (a).  
<sup>182</sup> Ibid.  
<sup>183</sup> Fredriksson, Nyberg.  
<sup>184</sup> Larsson.  
<sup>185</sup> Nyberg.  
<sup>186</sup> Nyberg.  
<sup>187</sup> Fredriksson, Nyberg.  
<sup>188</sup> Fredriksson.  
<sup>189</sup> Fredriksson, Nyberg.  
<sup>190</sup> Eslöv (d).  
<sup>191</sup> Nyberg.  
<sup>192</sup> Lennart and Ingela  
<sup>193</sup> Fredriksson, Nyberg.  
<sup>194</sup> Ingela Nyberg  
<sup>195</sup> Nyberg.  
<sup>196</sup> Fredriksson, Nyberg.  
<sup>197</sup> Fredriksson.  
<sup>198</sup> Fredriksson, Nyberg.  
<sup>199</sup> Nyberg.  
<sup>200</sup> Nyberg.  
<sup>201</sup> Nyberg.  
<sup>202</sup> Fredriksson.  
<sup>203</sup> Fredriksson, Nyberg.  
<sup>204</sup> Fredriksson.  
<sup>205</sup> Fredriksson, Nyberg.  
<sup>206</sup> Region Skåne 2004a. p. 51.  
<sup>207</sup> Municipality of Eslöv, & Hörby.  
<sup>208</sup> Region Skåne 2004a. p. 51.