



## IEA WIND TASK 28

# SOCIAL ACCEPTANCE OF WIND ENERGY PROJECTS "Winning Hearts and Minds" STATE-OF-THE-ART REPORT Country report of Finland

*Editor: Anna Koskinen and Olli Laitinen*

*Email: a.koskinen@wpa.fi, olli.laitinen@motiva.fi*

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## Abstract / Summary

Currently there is only 146 MW of installed wind power in whole Finland. Even though the first wind park was erected in 1990, since then the establishment of new wind parks has been very slow. This is mainly due to the old investment support system that made the whole industry unattractive. Scientific discussion concerning wind power has been focusing much on the technical aspects of wind power. From the realized wind parks point of view the industry is very small and thus only some studies, surveys mainly, have been made concerning the social acceptance.

## Framing the issue

### 0. Introduction

#### a. Introduction by the Operating Agent of IEA Wind Task 28

In 2009, many governments and organizations set new targets for CO<sub>2</sub> reductions, renewable energies in general, as well as specific targets for wind energy deployment. All these targets require many single projects to be carried out both onshore and offshore that necessitate hundreds of siting decisions and therefore hundreds of communities accepting a wind project nearby.

Research and projects are ongoing in many countries on how acceptance could be fostered, but we need to look beyond national borders to learn from each other and to complement each other's approaches. While Denmark has one of the longest traditions of co-operatively owned wind farms, Japan may bring its expertise in generating additional benefits for the communities hosting the turbines. While Ireland and Canada know about the effects of wind parks on tourism, Norway has conducted actual research on communication between society and science, e.g. concerning bird risks with wind farms.

In the framework of the IEA Wind Implementing Agreement, Task 28 collects and disseminates the current knowledge on how to increase acceptance of wind energy projects with the aim of facilitating implementation of wind energy and climate targets.

Ten countries have officially committed to Task 28 and have provided an input for cross-national comparison and discussion by writing a national report such as the one on hand. The Finish report has been incorporated into the international State-of-the-Art Report by IEA Wind Task 28, available also on [www.socialacceptance.ch](http://www.socialacceptance.ch).

#### b. The issue: Social Acceptance of Wind Energy Projects in Finland

Wind power is relatively new thing in Finland if the amount of installed capacity is concerned. As we had only 142 MW of installed capacity at the end of 2008, it means that in comparison with 27 EU counties we are on place 17. (EWEA 2009). That is why wind power and especially the social acceptance aspect of it are very little researched. However, some studies of people's opinions towards wind power and wind power projects have been taken.

## 1. Definitions

In this chapter the purpose is to clarify the key terms of this report and how they are defined in Finland.

### a. Social Acceptance

Social acceptance can be divided into three dimensions according to Würstenhaagen (2007). This so called triangle model distinguishes the following dimensions:

- Socio-political acceptance
- Community acceptance
- Market acceptance.

From Finland's point of view every aspect of social acceptance is crucial. Socio-political acceptance refers to acceptance of key stakeholders and policymakers. Their level of acceptance becomes crucial when addressing for example planning issues. Community acceptance is acceptance of specific projects at the local level, including potentially affected populations, key local stakeholders and local authorities. By market acceptance Würstenhaagen means the process by which market parties adopt and support the energy innovation. Key actors include for example consumers and investors.

### b. On-Shore / Off-Shore

In Finland wind parks have mainly been built onshore, except for couple of near shore turbines. Projects have usually been relatively small being less than 10 turbines. Total capacity of installed wind power is currently 146 MW. (VTT 2010). Within few years plans for building offshore wind farms have occurred.

Social acceptance towards onshore and offshore wind power varies. Offshore wind parks from community acceptance point of view tend to have a little bit higher acceptance than onshore wind parks, mainly because of landscape issues. (Koskinen 2008). Socio-political acceptance is higher with onshore projects at least when it comes to policy makers. In their opinion offshore wind power is too expensive. In general level public seems to more support than oppose wind power whether it was onshore or offshore. (Eurobarometer 2006). From market acceptance point of view can be assumed that there is no difference between onshore or offshore.

### c. Large Scale / Small Scale

In Finland there is no legislation that would define what is large or what are small scale turbines. The law about the feed in tariff for electricity produced by wind energy is proposing tariff only for turbines bigger than 1 MW. In that perspective it could be outlined that below 1 MW are small scale and more effective ones are large scale. But Motiva, specialist company for energy and material efficiency, suggest that small scale wind power is classified as turbines under 20 kW i.e. turbines that are designed for individual or agricultural use.

If the scale of the projects is discussed there are no guidelines existing to determine whether a project is small or large. Good defining would be whether a project that needs to go through EIA process or not. As it still varies region by region if the authority requires EIA or not, it is impossible to draw the line between small scale projects that don't need to go through EIA or large scale projects that need to do EIA. In Koskinen's studies (Koskinen 2008, 2009, 2009b) projects less than 20 turbines were defined as small scale projects.

### d. Transmission lines

Finland's grid system consists of national grid and regional grids and local distribution grids. The national grid is maintained by Fingrid Oy, company owned by government (12 %), two large energy companies and institutional owners (38 %) (Fingrid, 2010). Other grids are owned by regional and local grid companies.

Acceptance of transmission lines in socio-political level is supposed to be quite high, but on community acceptance level building new transmission lines can face opposition. Opponents can be divided in three categories: those who fear those who hesitate and those who are fearless. (Fingrid, 2004)

## Industry Status and Stakeholders

### 2. National Wind Energy Concepts

#### a. Policies and strategies for wind energy

In national climate and energy strategy, Finnish government chose wind power as one of the key energy forms to achieve Finland's 2020 renewable energy target (38 %). The goal is to increase the capacity to approximately 2000 megawatts (currently 150 MW). The supporting measures, so far, have mostly been technical (e.g. new wind atlas) or financial (feed-in tariff preparations). So far there haven't been major efforts to influence the social acceptance by the government. Ministry of Employment and Economy has financed smaller projects (e.g. Motiva's wind power tour) that increase knowledge of wind power among general public and improve social acceptance.

#### b. Incentive programs for wind energy

Companies have been able to apply for investment support for renewable energy and energy efficiency projects. The maximum support for renewables has been 40 percent of the investment costs. The total amount of investment support has risen in recent years. In 2009, it was 90 million Euros. (TEM, 2009).

The feed-in tariff system is also under construction. The system was originally planned to be taken into use in 2010, but it is postponed due to the problems in legislative process. Although investment support has risen in the last years, most the developers see feed-in tariff as an only way to increase the capacity dramatically.

There hasn't been much support for small scale wind power. The installation cost can be partially used in tax reductions.

#### c. Spatial planning

The reviewing of national spatial planning guidelines in 2008 included an obligation for regional planners to investigate the possibilities to find places for wind power in inland. The new wind atlas, which was published in November 2009, is an important tool in this work.

Ministry of environment is currently reviewing legislation and guidance in spatial planning and EIA procedure in order to unify local officials' work.

#### d. Strategies: From policy to local acceptance

The national renewable energy and GHG reduction targets have inspired some communities to switch to renewable energy sources in their energy use. There is currently a project underway in which five municipalities are aiming to become carbon neutral. Some other communities have also announced similar goals.

### **3. Stakeholders / target groups**

#### **a. Utilities / grid owners**

Fingrid is the national grid operator in Finland, and is responsible for the functioning of the power system. According to its own research, 2000 megawatts of wind power can be added to Finnish network if the production is geographically spread. The company has stated that larger capacity increase would need new investments in the grid system.

The attitudes of local grid owners towards wind power vary. Especially the small-scale wind turbines that are connected to grid have not received a positive acceptance among some local grid operators.

#### **b. Developers / investors**

There are many developers in Finland compared to installed capacity. Most of the developers are energy companies that have operated in Finland for a long time. These companies have also created consortiums and started new companies. There are also some developers, domestic and foreign, that are focused only in wind power.

Among all parties involved, developers have been one of the most active groups to enhance social acceptance in wind power. EIA procedure requires companies to inform local public

#### **c. National opinion makers, policy makers and general opinion**

None of the larger NGOs have taken a negative approach towards increasing the wind power capacity in Finland. Some of the environmental groups, such as Greenpeace, have lobbied for major increase of wind power in Finnish energy pallet. However, some of the groups have been suggesting new conditions in choosing the suitable wind park areas. The Finnish association for nature conservation, for example, suggests that the major travel, resting and nesting areas should be excluded in spatial planning of wind power. This would narrow down many potential wind park locations. WWF has raised their concern on effects that off-shore wind power has on underwater currencies and fauna.

A media survey was conducted in April 2009. It included most of the largest newspapers in Finland. The results showed that the number of positive articles (about wind power) was much greater that number of negative ones.

#### **d. Educators**

Several universities teach electrical engineering and energy technology. Still, wind power has fairly marginal role in the courses.

Finnish wind energy association estimates that there will be shortage of professionals in all levels by the end of this decade (if the 2020 target is reached). The association emphasize that more teaching is needed especially among construction engineers and installers.

#### **e. National, regional and local administration**

Few of the municipalities have made decisions about cutting their GHG emissions and becoming more energy self-sufficient. For example, island municipality Kemiö is planning to become energy independent. Wind power would be a major source of the electricity there.

#### **f. Local population**

The projects, that are already underway, are mostly located in coastal and in fell (mountain) region in Lapland. The attitudes of the population are divided in many places. The NIMBY-effect can be found in some extend in all of the places. See more of the acceptance of locals in chapter 4.

**g. Visitors / tourists**

A tourist survey is underway in Lapland and one issue is their views on wind power, and its effects on nature and landscape. The results will be published in summer 2010.

Some of the tourism businesses are concerned about changes in landscape and the effects on tourism. On the other hand, some companies in coastal area have been interested in the offshore parks and possibilities of using them in attracting tourists.

## Variables Influencing Social Acceptance

### 4. Well-being

In this chapter the purpose is to find out the negative and the positive impacts of wind energy on people. Negative impacts are possible to reduce by careful planning, involving the locals and sharing information. (Hammarlund, 2002).

#### a. Standard of Living, Quality of Life and Health

People are most worried about wind power project changing the landscape. Some people are worried, that wind power project has a negative impact to everyday life or the preconditions of their work, but equally some of them sees that wind power project has positive impacts. Usually majority of the people think that there is no impact. Majority also believe that wind turbines are not dangerous. (Herkkola, 2009; Koskinen 2008, 2009, 2009b).

#### b. Lights, Noise, Shadow

Noise of wind turbines is usually one of the first things people mention when discussing the negative impacts of wind turbines. However majority of people don't feel that the noise coming from wind turbines is loud. Same kind of opinions applies to the attitudes towards the lights installed into wind turbines, only small minority thinks the lights are disturbing. Some of the people thought that flickering would be irritating. (Koskinen 2008, 2009, 2009b).

#### c. Dynamic of regional identity, place attachment

Mostly people tend to think that the image of the municipality gets better rather than worse. (Herkkola, 2009; Koskinen 2008, 2009, 2009b). Those who thought the impact would be positive argument that the green image will be positive for the whole municipality. Some people replied that there was certain emotions and memories attached to the area where the wind power park was planned. Most people didn't attach any emotions or feelings to these places, (Koskinen 2008, 2009, 2009b) but those who did probably have more difficulties in acceptance of the specific project.

#### d. Valuation of ecosystems

When talking about negative impacts on flora and fauna, people usually mention the negative impacts on birds, sometimes to mooses, reindeers or when discussing of offshore, to fishes and other species living in the ocean. People also see wind parks decreasing or changing the natural environment by for example cutting of the trees or shaping the bottom of the ocean. Most of the people are still not worried about the changes that projects are causing in the area. (Koskinen 2008, 2009, 2009b).

## 5. Distributional justice

### a. Distributional justice

By distributional justice term it's meant how the benefits of certain project are distributed to locals. In Finland there is no law or suggestions how this distributional justice should be implemented while planning or establishing a project.

### b. Ownership models

In Finland there is only two ownership models existing at the moment. Usually all the established wind parks are built and owned by energy companies. The ownership structure of these energy companies varies, but most common form of this kind of company is joint share company. Shares can be owned by companies or individuals. There is also couple of companies, owned by individuals, who have built one turbine and producing cheaper energy to the share holders.(Lumituuli 2010). In Åland island, which is the autonomous region of Finland, a co-operative company has been found and the company is owned by local consumers. Also some plans to build more privately owned turbines have been established.

### c. Welfare

Impacts on local people's welfare due to wind power project are quite minimal. As there is no specific law or suggestion how the negative impacts of wind turbine/park should be compensated to local people, it depends on the developer if it wants to support for example local nature protection or recreation activities. In Finland, research concerning distributional justice hasn't been done.

## 6. Procedural Design

### a. Communication strategies, public consultation

One of the key things has been informing locals in the very beginning of the projects. If the project needs to implement EIA process, informing the local people is mandatory part of the process.

### b. Cultural relationship, local context

The local specialities have to be taken into account as early as possible. In Lapland, for example, reindeer herding is important livelihood and it has to be noticed in planning. Unless these measures are taken into account, the developer may be seen as "an outsider", who doesn't understand, or doesn't care, about local issues and concerns.



## 7. Implementation Strategies

### a. Visual impacts, photomontage, Communication campaigns

Many of the projects that have completed the EIA-program have produced photomontages describing the visual effects in landscape. Seeing “the end result” may reduce some false ideas and complaints. It may be wise to show these images as early as possible.

### b. Communication strategies, Social marketing

All the benefits (tax income, employment, land rentals) for locals should be mentioned in marketing. Downplaying effects on environment and wildlife can actually slow down project schedule. It may raise suspicion among locals and increase the number of complaints and analysis required. In later stage of the planning, new analysis may prevent the proceeding of the project.

### c. Scientific results and practical application

One of the key issues has been the need of new regulating power and cost of it, if wind power capacity would increase as planned (2000 MW in 2020). Wind power sceptics have often referred to expenses of building new regulating power. A couple of studies have been conducted to calculate the need of new regulating power. This is very important, because without specific numbers there is always scepticism that cannot be totally ruled out. (Holttinen, 2008; Holttinen et al 2008, 2006).

According to VTT's (largest technical research centre in Finland) studies, the changes of wind power production can be balanced with regulating power from Nordic electricity markets in normal situations. The results show that Nordic electricity market can have 10 percent share of wind power without the need for more regulating power. However, if the balancing in Finland has to be made with the Finnish power sources, the need for new regulating power is estimated to be 80-160 MW. This number rises 2-3 times, if the used production estimations are from the previous day. Re-evaluation of the estimations has to be made in the last hours before actual use of the electricity in order to avoid this. VTT's calculations are based on the assumption that 2000-4000 MW of new wind power capacity would be added to Finnish power system. (Holttinen, 2008; Holttinen et al 2008, 2006).

The System operator Fingrid has evaluated the need for transmission upgrades and reserve capacity in Finland for year 2020 and they end up with a total of 1.6 billion euros investments, mainly to new grid. Both wind power and nuclear power as well as need for new interconnections are mentioned as main causes for the investment programme. (Holttinen, 2008; Holttinen et al 2008, 2006).

## Summary and Conclusions

### 8. Conclusions

As this report shows, wind power in Finland is still quite immature business area, even though the first wind park was built here in 1990. Since 1986 when the first single wind turbine was erected only 146 MW of wind power has been built and in comparison to most EU 27 countries, we are among the last. As wind power is slowly making a move due to planned feed-in tariff, it has lifted the capacity of planned projects up to 7000 MW. How much of it will be realised in the future when the government's aim for 2020 is 200 MW, will be seen.

Social acceptance in every aspect is hopefully increasing while the industry grows, more wind parks are built and people are getting familiar with the turbines in their landscape.

#### a. What we know already

What we know is that on socio-political level the attitudes are slowly getting more positive towards wind power. Policy makers are finally replacing the investment incentives with feed in tariff and the strong belief in the branch has created some industry as well. Current recession makes it hard to cope in any industry and thus the companies related to wind power has also faced some difficulties.

Community acceptance is most widely studied in Finland, but researches have only been made prior to building the wind park. Only one research has been made after the building, but as there is no data prior to building, it's hard to say in which direction people's perceptions have been changed to. The research showed that local people were more in favour of wind power than people who owned a summer cabin in the area. Random visitors thought also more positively about wind power than the summer house owners. (Koskinen, 2007).

#### b. What needs to be done yet

Besides the community acceptance the other aspects of social acceptance are very little research in Finland. In the future interest will hopefully be directed to research what is the state of socio-political and market acceptance in Finland. Interesting would be also to know in community acceptance point of view, how people's opinions change after the wind parks have been built.

## 9. References

Eurobarometer (2006). Energy Technologies; Knowledge, Perception, Measures.

[http://ec.europa.eu/research/energy/pdf/energy\\_tech\\_eurobarometer\\_en.pdf](http://ec.europa.eu/research/energy/pdf/energy_tech_eurobarometer_en.pdf)

EWEA (2009). Year 2008: Wind now leads EU power sector. <http://www.ewea.org/index.php?id=1665>

Fingrid (2010). Fingrid Oyj. <http://www.fingrid.fi/portal/suomeksi/yritysinfo/>

Fingrid (2004). 400kV voimajohto, Olkiluoto –Huittinen. Part of EIA report.

<http://www.ymparisto.fi/download.asp?contentid=10556&lan=FI>

Hammarlund Karin (2002). Society and wind power in Sweden.

[http://books.google.fi/books?id=vcnElw3HYUwC&pg=PA101&lpg=PA101&dq=karin+hammarlund&source=bl&ots=QBc-c8GNIW&sig=YgJZJ6c2X8Q8-RDl49sOQRdnmrg&hl=fi&ei=F29ZS8u9J4\\_KjAeX8tCZAg&sa=X&oi=book\\_result&ct=result&resnum=3&ved=0CBMQ6AEwAg#v=onepage&q=karin%20hammarlund&f=false](http://books.google.fi/books?id=vcnElw3HYUwC&pg=PA101&lpg=PA101&dq=karin+hammarlund&source=bl&ots=QBc-c8GNIW&sig=YgJZJ6c2X8Q8-RDl49sOQRdnmrg&hl=fi&ei=F29ZS8u9J4_KjAeX8tCZAg&sa=X&oi=book_result&ct=result&resnum=3&ved=0CBMQ6AEwAg#v=onepage&q=karin%20hammarlund&f=false)

Herkkola, Hanna (2009). Kristiinankaupungin merituulipuisto, asukaskyselyn tuloksia.

[http://projektit.ramboll.fi/yva/pvo/kristiinankaupunki/aineisto/kristiinankaupungin\\_merituulipuisto\\_asukaskyselyn\\_tuloksia\\_160209.pdf](http://projektit.ramboll.fi/yva/pvo/kristiinankaupunki/aineisto/kristiinankaupungin_merituulipuisto_asukaskyselyn_tuloksia_160209.pdf)

Holttinen, Hannele (2008), Tuulivoiman säätö- ja varavoimatarpeesta Suomessa, VTT.

[http://www.vtt.fi/liitetiedostot/cluster7\\_energia/Tuulivoiman%20saatotarve%20Suomessa%20VTT%20maaliskuuta2008.pdf](http://www.vtt.fi/liitetiedostot/cluster7_energia/Tuulivoiman%20saatotarve%20Suomessa%20VTT%20maaliskuuta2008.pdf)

Holttinen, Hannele, Milligan, Michael, Kirby, Brendan, Acker, Tom, Neimane, Viktoria, Molinski, Tom. 2008. Using standard deviation as a measure of increased operational reserve requirement for wind power. Wind Engineering, Vol. 32, Nr. 4,

Holttinen, Hannele, Saarikivi, Pirkko, Repo, Sami, Ikäheimo, Jussi, Koreneff, Göran. 2006. Prediction errors and balancing costs for wind power production in Finland. Proceedings. 6<sup>th</sup> International Workshop on Large-scale Integration of Wind Power and Transmission Networks for Offshore Wind Farms. Delft, NL, 26- 28 Oct. 2006

Koskinen, Anna (2008). Suurhiekkan merituulipuiston asukaskyselyn ja teemahaastattelujen loppuraportti. Report.

[http://www.wpd.de/fileadmin/pdf\\_s/Finland/14%20asukaskysely.pdf](http://www.wpd.de/fileadmin/pdf_s/Finland/14%20asukaskysely.pdf)

Koskinen, Anna (2009). Mielmukkavaaran tuulipuistohanke, asukaskyselyiden ja teemahaastattelujen loppuraportti. Report.

Koskinen, Anna (2009b). Koverharin tuulipuistohanke, asukaskyselyiden ja teemahaastattelujen loppuraportti. Report.

Lumituuli (2010). Lumituuli Oy. <http://www.lumituuli.fi/>

TEM (2009). Tuen enimmäismäärät. <http://www.tem.fi/index.phtml?s=3093>

VTT (2010). Suomen tuulivoimatilastot. <http://www.vtt.fi/proj/windenergystatistics/>

Wüstenhagen, Rolf, Maarten Wolsink und Mary-Jean Bürer (2007): "Social acceptance of renewable energy innovation: An introduction to the concept", Energy Policy 35: 2683 -2691.