Non-cost barriers to renewable – *AEON* study

National report Finland

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Table of contents

Introduction 7
Method of the study 7
Brief review of the Finnish RES and energy policy 9

1 Issue 1 Administrative Procedures 13
1.1 Introduction 13
1.2 Description of barriers & solutions 14
1.2.1 Detailed description of the barriers and solutions 14
1.3 Best Practice Elements and Indicators 15
1.4 Literature 16

2 Issue 2 Technical Specifications 17
2.1 Introduction 17
2.2 Description of possible barriers & solutions 17
2.2.1 Best Practice Elements and Indicators 18
2.3 Literature 18

3 Issue 3 Building integrated technologies 19
3.1 Description of barriers & solutions 19
3.1.1 Detailed description of the Barriers and solutions 19
3.1.2 Best practice elements and indicators 20
3.2 Literature 20

4 Issue 4 – Promotion of energy efficient renewable energy equipment 21
4.1 Introduction 21
4.1.1 Best Practice Elements and Indicators 21

5 Issue 5 Information/awareness raising 23
5.1 Introduction 23
5.2 Description of barriers & solutions 23
5.2.1 Detailed description of the Barriers and solutions 23
5.2.2 Best Practice Elements and Indicators 24
5.3 Literature 24

6 Issue 6 Certification of installers 25
6.1 Introduction 25
6.2 Description of barriers & solutions 25
6.2.1 Best Practice Elements and Indicators 25

7 Issue 7 Infrastructure Development 27
7.1 Introduction 27
7.2 Description of barriers & solutions 27
7.2.1 Detailed description of the Barriers and solution 27
7.2.2 Best Practice Elements and Indicators 28
7.3 Literature 28

8 Issue 8 Power Grid Issues 29
8.1 Introduction 29
8.2 Description of the barrier 29
8.2.1 Detailed description of the Barriers and solutions 29
8.2.2 Best Practice Elements and Indicators 30
8.3 Literature 30

9 Issue 9 Gas Network Issues 31
9.1 Introduction 31
9.2 Description of barriers & solutions 31
9.2.1 Detailed description of the Barriers and solutions 31
9.2.2 Best Practice Elements and Indicators 32
9.3 Literature 32

10 Issue 10 District Heating 33
10.1 Introduction 33
10.2 Description of barriers & solutions 33
10.2.1 Detailed description of the Barriers and solutions 33
10.2.2 Best Practice Elements and Indicators 34
10.3 Literature and Sources 34

Introduction

Method of the study

This study was done by interviewing and/or sending the list of questions to in total 23 institutes or stakeholders. Totally 26 individual stakeholders were contacted. The contact was taken to following stakeholders:

- Policy makers:
  - The Ministry of Environment.
- Administrative stakeholders:
  - Finnish Environment Institute;
  - The Energy Market Authority;
  - City of Helsinki;
  - City of Turku;
- Association:
  - Finnish Energy Industries (registered association)
- Research Centers, NGO's and Project Developers:
  - VTT;
  - Metsähallitus;
  - Jyväskylä Innovation ltd.;
  - Hermia ltd.;
  - Benet Ltd.;
  - Jyväskylä University of Applied Sciences;
  - Keulink Ltd.;
  - Finnish Railroads.
- Investors and Produces of Technologies
  - Fortum Ltd.;
  - Vattenfall Ltd.;
  - ST 1 Ltd.;
  - Helsingin Energia Ltd.;
  - Turun Energia Ltd.;
  - ABB Ltd.;
  - Wärtsilä Ltd.;
  - MW Power;
  - Kone Ltd.
- Transmission System Operators
  - Finngrid Ltd.;
  - Turku Energia Sähköverkot Ltd.

In total 13 stakeholders submitted their answers to our questions by returning the file of questions with their answers or answering the questions by phone.

A lot if information was also gathered from the websites and official notice of the Ministry of Employment and Economy.

The national legislation of Finland in the field of energy production was reviewed. The following national laws and regulations were reviewed:

- Regulation no. 1313/2007 (Valtioneuvoston asetus energiatuen myöntämisen yleisista ehdoista 12.12.2007/1313 – Regulation on the Allocation of Subsidies)
- Act no. 688/2001 (Valtionavustuslaki 27.7.2001/688 – Act on the Allocation of Subsidies)
- Act no. 1260/1996 (Laki sähkön ja eräiden polttoaineiden valmisteverosta 30.12.1996/1260 – Act on the Electricity Tax)
- Act no. 322/2007 (Laki polttoturpeesta lauhdutusvoimalaitoksissa tuotetun sähkön syöttötariffista 30.3.2007/322 - Act on the Price Regulation for Electricity from Peat)
- Law no. 386/1995 (Sähkömarkkinalaki 17.3.1995/386 – Electricity Market Act)
- Regulation no. 1000 / 2009 (Valtioneuvoston asetus maatilan energiasuunnitelmatuesta 3.12.2009. Regulation of the State Subsity for the farms).
- Act no. 86/2000 (Ympäristönsuojelulaki 4.2.2000 - Environmental Protection Act)
- Regulation 169/2000 (Ympäristönsuojeluasetus 18.2.2000 - Environmental Protection Decree).
- Act 200/2005 (Laki viranomaisten suunnitelmien ja ohjelmien ympäristönvaikutusten arvioinnista 8.4.2010 – EIA Act.)
- Regulation 347 / 2005 (Valtioneuvoston asetus viranomaisten suunnitelmien ja ohjelmien ympäristönvaikutusten arvioinnista 19.5.2005. – EIA regulation).
- Law no. 1059/2008 (Laki asuntojen korjaus-, energia- ja terveyshaitta-avustuksista annetun lain muuttamisesta - Law on Energy Grants for Residual Buildings).
- Law no. 446/2007 (Laki biopolttoaineiden käytön edistämisestä liikenteessä – Law on the promotion of biofuels in transport).
- Law no. 1211/2009 (Laki energiamarkkinoilla toimivien yritysten energiatehokkuuspalveluista- The law on energy efficiency services of companies operating in the energy market).
- Law no. 132/1999 (Maankäyttö- ja rakennuslaki - Land Use and Building Act)

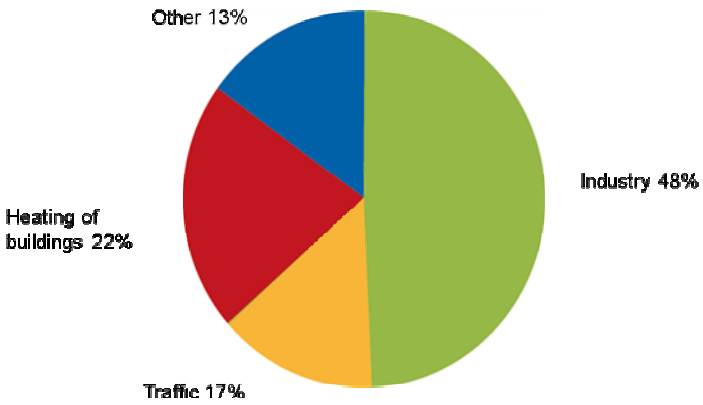
Hence all information presented in this document is based on the opinions of the stakeholders and the information available from written documents. No personal interpretation has been made by the authors. In case of contradictory information from stakeholders, the “worst case” scenario has been noticed and written down.

Increasing use of wood-based biomass is the most important thing in Finland, when it comes to promoting the use of renewable energy and to reach the target of the Directive (Ministry of Employment and the Economy, 2010, see chapter 1.2). Bioenergy is used for heating as well as for power and heat cogeneration. There are 15 bioenergy plants, either under construction or finalised after the parliamentary decision about the new nuclear power plant was made. The value of the investments is over € 700 million. According to estimates, forest chip consumption will reach 5 million m^3 by 2010. In 2007 the consumption of forest chip was over 3 million m^3 (Finnish Energy Industries, 2007).

Hence major part of this study is focused to the biomass and a lot of barriers are recognized for the utilization of biomass in the energy production. Also the use of wind technology will increase dramatically during the next decade or two, and was recognized by many stakeholders. Other RES energy sources are not significant if one looks the way to gain the target defined in the Directive 28 / 2009.

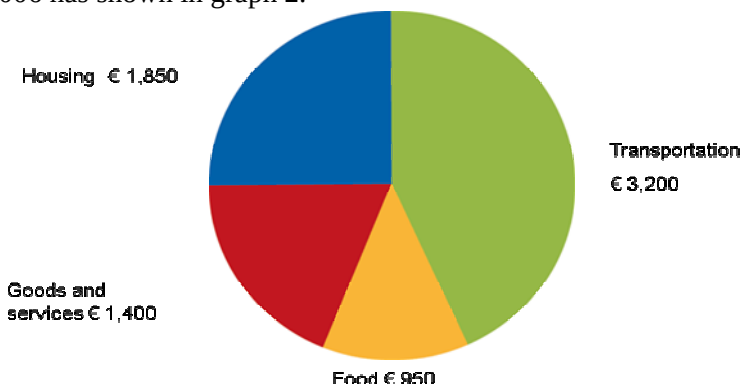
Brief review of the Finnish RES and energy policy

The long-term national climate and energy strategy section displays the strategies for 2001, 2005 and 2008. The latest strategy was accepted by the Government on 6th November 2008. This strategy covers climate and energy policy measures in great detail up to 2020, and in brief thereafter, up to 2050 (Ministry of Employment and the Economy, 2010).
The annual Finnish energy consumption corresponds to 32.4 million tonnes of oil, 6.2 tonnes per capita. Industry accounts for about half of the Finnish energy consumption. The breakdown of end consumption of energy in Finland by consumption sector in 2005 has shown in graph 1.



Graph 1. Breakdown of end consumption of energy in Finland by consumption sector in 2005 (Finnish Energy Industries, 2007).

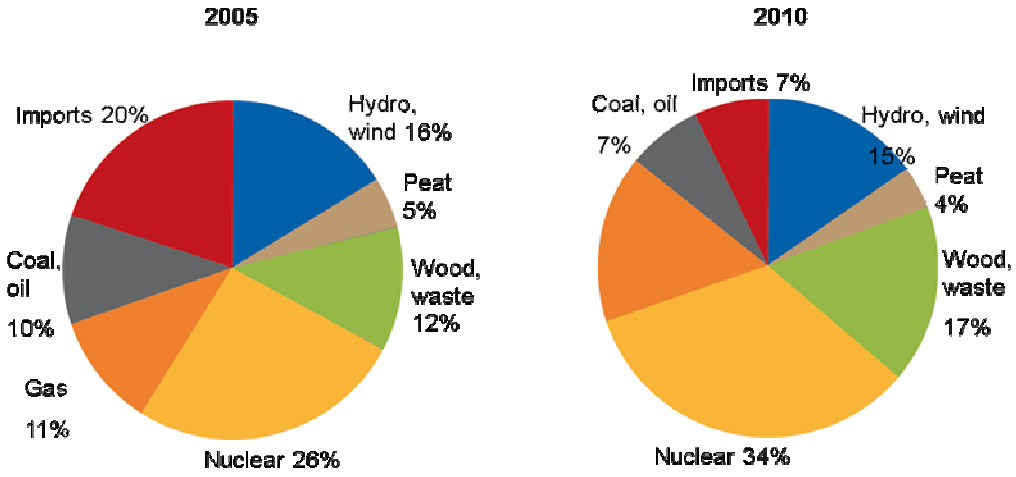
The cost for a typical Finnish family of four is about € 7,400 for their annual direct and indirect consumption of energy. Taxes account for 45% of the whole, or for € 3,300. The family transportation, including the use of their car, accounts for over 40% of the bill (Finnish Energy Industries, 2007). The paragraph of the energy costs of a four-member family in 2006 has shown in graph 2.



Graph 2. Energy costs of a four-member family in 2006 (Statistics Finland and Finnish Energy Industries, 2007).

In 2005, total electricity procurement was 85 TWh and in 2010 it is estimated to be about 96 TWh. In future, the share of imports is expected to diminish while nuclear power will

grow in importance. The share of emission-free energy sources will grow from 54 to 66%. The eelectricity procurement by source of energy in Finland in 2005 and 2010 has shown in graph 3 (Finnish Energy Industries, 2007).
Finland is one of the world's leading users of renewable sources of energy, especially bioenergy. Renewable energy sources provide one fourth of Finland's total energy consumption and account for more than one fourth of its power generation. The country's most important renewable sources of energy include bioenergy – wood and wood-based fuels in particular –, hydropower, wind power, ground heat and solar energy (Ministry of Employment and the Economy, 2007).

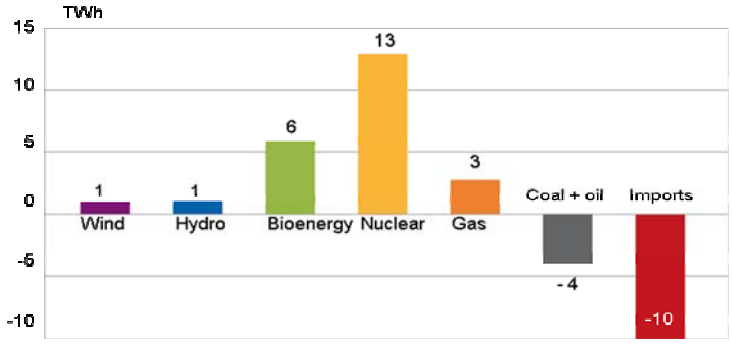


Graph 3. The electricity procurement by source of energy in Finland in 2005 and 2010 (Finnish Energy Industries, 2007).

The objective of the national energy and climate strategy is to increase the use of renewable sources of energy and their share of energy consumption. In addition to energy conservation, this is one of the most significant means by which Finland's climate targets can be achieved. In practice, renewable energy sources do not increase carbon dioxide emissions, while promoting employment and regional policy goals and enhancing the reliability of the supply chain. The strategy also supports technology exports for the industry, which is already becoming an important part of Finnish exports (Ministry of Employment and the Economy, 2010).
In 2007 the "Finnish model of Power Production 2025- shared view" was released by Confederation of Finnish Industries EK, the Central Organisation of Finnish Trade Unions SAK, Finnish Energy Industries and Electrical Workers' Union. The model points out four major subjects:

- The share of non-emission forms of energy will grow from 54 to 75%;
- The share of domestic energy forms will grow – and imports will diminish;
- Price stability will be enhanced;
- Future $C0_2$ emissions from power production will account for less than one fifth of all Finnish emissions.

The increases and decreases in power production to 2025 by sources of energy in accordance with the Finnish model have shown in graph 4.



Graph 4. The increases and decreases in power production to 2025 by sources of energy in accordance with the Finnish model (Finnish Energy Industries, 2007).

In Finland, peat is classified as a slowly renewable bio mass fuel. With a share of approximately 6 per cent, it holds a significant position in our energy balance. As a domestic fuel, peat has an important impact on regional policy and employment, and is having a growing effect on security of energy supply. The national energy and climate strategy aims to maintain the position of peat as a competitive alternative in energy production (Ministry of Employment and the Economy, 2010).

The target for the share of RES in gross final consumption of energy in 2020 for Finland is 38 %. The share of RES in 2005 in Finland was 28,5%. According to the latest notifications (March 2010) of the Ministry of Employment and the Economy, Finland might not reach their target. There are two main reasons for this:

- The depression of the global economy has had an impact on the woodworking industry as well. This has lead to a situation where mills have been closed. This means that the capacity of the use wood based biomass energy has decreased;
- Even thought the wind based RES is growing very fast, there is not enough time to grow to the level that the wind power would be a significant RES in 2020.

The Government of Finland promotes all forms of use of renewable energy. In Finland, electricity from renewable sources is promoted through a price regulation for electricity from peat, subsidies for investment and research projects, and electricity tax refunds. The feed-in tariff exists for the use of peat only. The Government has made a draft for the new regulation of feed-in tariffs for the wind and biogas on the 11th March 2010. It is assumed that the draft will soon enter into force.

The RES-E technology up to 40% of investment costs may be subsidised. The maximum subsidies amount is following:

- 40 % for investment projects regarding wind and PV;
- 40 % for investment projects that employ new technologies for the generation and use of RES;
- 30 % for investment projects that employ traditional technologies for the generation and use of RES.

The maximum amount of the subsidy is 250 000 € but it can be extended by the Ministry of Employment and Economy.

1 Issue 1 Administrative Procedures

1.1 Introduction

Stakeholders identified the complaints process as one of the major barriers in using RES, especially in biomass and wind projects. As a concrete impact of the time consuming complaints process, the commissioning of one waste burning plant and a few wind mill plants have significantly been delayed.

Additionally, the time from the application to the receipt of permit is quite long (12-36 months), although it is possible to get a permission in 3 months, especially in biomass projects.

Regarding wind projects, one stakeholder named the planning to be a barrier. There is no national planning available for the areas of the use of wind energy. Also the decision of building one waste burning plant was cancelled because the complaining of the change of the plan.

According to one stakeholder the information provided for all the RES related administrative processes are not sufficient, and in wind energy processes it is not clear enough who is the responsible body in the administrative process. Also the requested requirements may not be appropriate for every RES technology.

Separate procedures for EIA and building permits were also identified as barriers.

The way to one stop shopping has been initiated by physically merging some state administration services as of the 1st of January 2010. Also the administrative process has been centralized. Hopefully these significant changes will have a positive effect on the time of handling the permit process.

The national planning or screening for the areas suitable for RES, and especially for the use wind energy, should be done. The idea would be that the areas suitable for RES energy should be ready for potential operators. Now the operators have to find the areas and go through the whole planning process (including complaints process). The national planning or screening would decrease the administrative times significantly.

The environmental protection act has created a barrier for new plants of medium to small (1 to 10 MW) and large (over 10 MW) hydro power plants. However, no barriers have been detected in respect to building mini-size (< 1 MW) hydro power plants. Basically all water bodies, which have not been used for hydro power production, are protected by law (Oy Vesirakentaja, 2008). One solution to increase the utilisation of the water power is to

construct additional hydro power plants in those water bodies that already are chained to the hydro power generation. Another target is also the utilisation of the flooding in the rivers. Every year, energy of nearly one terawatt-hour is lost due to the bypassing of the flood waters around the hydro power plants (Finnish Energy Industries, 2007).

1.2 Description of barriers & solutions

1.2.1 Detailed description of the barriers and solutions

Barrier 1.1 – Inefficient general administrative procedures (including no/insufficient specific rules for building integrated/small scale RES installations)
Stakeholders identified the complaints process to be one of the major barriers in using RES. In Finland anybody can make a complaint against any project, even thought the project has nothing to do with the interest of complainer. This has been noticed as a barrier in biomass and wind projects.

According to one stakeholder, the information provided for all the RES related administrative processes are not sufficient. In on-shore and off-shore wind energy projects, it is not clear enough who has the responsibility for administrating the process. Additionally, the requested requirements may not be appropriate for geothermal, on-shore, off shore or hydro energy.

The environmental protection act has created a barrier for new plants of medium to small (1 to 10 MW) and large (over 10 MW) hydro power plants. However, no barriers have been detected in respect to building mini-size (< 1 MW) hydro power plants. Basically all water bodies, which have not been used for hydro power production, are protected by law (Oy Vesirakentaja, 2008). One solution to increase the utilisation of the water power is to construct additional hydro power plants in those water bodies that already are chained to the hydro power generation. Another target is also the utilisation of the flooding in the rivers. Every year, energy of nearly one terawatt-hour is lost due to the bypassing of the flood waters around the hydro power plants (Finnish Energy Industries, 2007).

Barrier 1.2 – Inexistent or insufficient spatial planning
Regarding wind projects, one stakeholder named the planning to be a barrier. There is no national planning available for the areas of the wind energy utilisation. Hence one has to screen the possible areas for wind energy separately for every project. Other stakeholders didn’t see the planning process as a barrier.

Barrier 1.3 – Competing public interests
The time from the application to the receipt of permit is quite long (12-36 months) although it is possible to get a permission in 3 months, especially in biomass project. The duration time varies geographically. According to one stakeholder, the legislation process for removing the existing barriers is felt to be too long, as well. One concrete example is that the changes in legislation, regarding the wind energy, have lead to the situation where energy producers has not started the construction process even thought they have a go ahead permit and contractors ready for the project.

Barrier 1.4 – Other Barriers

The big challenge is the availability of biomass. There is enough wood, but the market does not function (Finnish Energy Industry, 2010). The problems occur at least in the following administrative issues:

- Lack of workforce is a future threat. Solution: more education needed;
- Measuring of biomass units. There are no established ways to determine what unit should be used in measuring the amount of energy wood. The measurement of energy wood is not the same as the one governing the general wood trade. Solution: The measurement unit for energy wood should be solid cubic meter (Ministry of Employment and the Economy, 2010)
- The development of the services for the wood market place. Solution: The establishment of electronic market place for energy wood producers and buyers (Ministry of Employment and the Economy, 2010). More information available for all actors of the supply chain.

Two main barriers for the use and manufacturing of biodiesel from renewable sources have been recognized:

- The excise tax still exists in Finland, unlike many other EU countries. It is 34,59 c/l for the vehicles used in public traffic. For power tools (e.g. tractors used purely for farming) and for heating, this excise tax doesn't exist. The Ministry of Finance has given exemptions from the excise tax for Neste Oil Ltd for an experimental project for the preparing of biodiesel. Hence there is a need for a reform, considering the excise tax of biodiesel;
- The tax free (bio)diesel is only meant for private use in work machines and it is cheaper to buy than the "normal" diesel fuel for cars and trucks, which is subject to an excise tax in Finland. This is why the diesel fuel for work machines has to be marked and easily recognized during a potential field inspection. There are a number of additives available, which easily can be added to diesel fuels produced from fossil raw materials, and thus the inspection can be made based on the colour of the fuel. Similar substances for marking diesel fuels made from biomaterials are not available, which causes problems to the control of the use of these bio fuels.

1.3 Best Practice Elements and Indicators

No.	Benchmark	Result
1	Is one stop-shopping possible?	No
2	Do authorisation procedures take into account the specificities of those renewable energy technologies?	Yes
3	Are timetables and deadlines usually communicated and respected?	Yes
4	Amount of money to be invested in administrative process (including cost of work and costs like fees) (in EURO)	50 to 200 k€
5	Time to be spent for administrative process (duration to get the main permits) (in weeks)	12 to144
6	Number of administrators to be contacted	1 to 4

1.4 Literature

Työ-ja elinkeinoministeriö. Metsäalan strateginen ohjelma. Puuenergian käytön lisääminen – työryhmän kehittämisehdotukset. 2010 (Ministry of Employment and the Economy. The strategic plan for wood industry, 2010)

Energiateollisuus ry. Energiatuotannon investoinnit ja investoinipäätökset 2000-2009. Pöyry Management Consulting, 2010. (Finnish Energy Industries Registered Association. The investment of the energy production 2000-2009. Pöyry Management Consulting, 2010).

Voimaa vedestä 2007 – selvitys vesivoiman lisäämismahdollisuuksista. Oy Vesirakentajat, 2008 (Power form water 2007 – Report of possibilities of incresing hydropower. Ltd. Vesirakentajat, 2008).

Turku Energia. Vuosikertomus 2008. (Turku Energy – Annual report 2008).

Syöttötariffityöryhmän loppuraportti. Ehdotus tuulivoimalla ja biokaasulla tuotetun sähkön syöttötariffiksi. Työ- ja elinkeinoministeriö, 2009. (The final report of the working team of the feed in tariff. Ministry of Employment and the Economy, 2009).

Energy and Climate – The Finnish model from now to 2025. Finnish Energy Industries, 2007.

2 Issue 2 Technical Specifications

2.1 Introduction

Biomass: The European standards exist, but most of them are not in use in Finland. The significant barriers reported here were following:

- The separate technology and promoting system for energy wood harvesting and "normal" wood harvesting. An impact of this is that the efficiency of harvesting is not at the level it should be;
- Logistical problems of energy wood. There are not enough terminal areas for energy wood storage along main transportation routes.

According to the Ministry of Employment and the Economy, the promotion system promotes only national RES projects. One cannot get subventions for projects outside the Finnish borders. This might be a barrier.

The following possible solutions have been presented:

- Public promotion system should be allocated to the improving of the harvesting machines. One should also investigate the grounds of the energy promotion program:
- The need for energy wood terminal areas should be recognized, when planning the transportation infrastructure:
- Create a standardized model of the information on wood for all stakeholders. The aim is to reduce and enhance the efficiency of the information exchange between the stakeholders.

It may be worth of thinking if promotion system should be changed to the way that one could get promotion even the work is done abroad.

No other RES barriers detected.

2.2 Description of possible barriers & solutions

Barrier 2.1 – Weak definitions
No barrier detected.

Barrier 2.2 – no EU standards applied
No barriers detected. In biomass, most of the standards are not in use. However 100% of the stakeholders feel that the lack of use of the standards is not a barrier.

Barrier 2.3 – Specified locations for testing and/or certification
No barriers detected.

Barrier 2.4 – Barrier to trade
No barriers detected.

2.2.1 Best Practice Elements and Indicators

No.	Benchmark	Result
1	Are specifications expressed in terms of European standards (including eco-labels, energy labels and other technical reference systems), though such European references exist?	Yes

2.3 Literature

Työ-ja elinkeinoministeriö. Metsäalan strateginen ohjelma. Puuenergian käytön lisääminen – työryhmän kehittämisehdotukset. 2010 (Ministry of Employment and the Economy. The strategic plan for wood industry, 2010)

3 Issue 3 Building integrated technologies

Administrative barriers (permitting and planning etc.) are covered under Issue 1, also when they relate to buildings.

The permit process for small scale RES technology buildings (for example individual wind mills in urban areas) may not be clear in every municipality. For example the communal building regulations have not been updated with regard to the RES technology.

The architectural standpoints have created a barrier to build small scale wind power plants in populated areas. Also existing underground utilities might cause problems to the construction of geothermal energy installations in urban areas.

No significant barriers detected.

3.1 Description of barriers & solutions

3.1.1 Detailed description of the Barriers and solutions

No significant, national level barriers detected.

Barrier 3.1 – Inefficient general administrative procedures
No barriers detected.

Barrier 3.2 – No/insufficient specific rules for building integrated/small scale RES installations
Unclear rules may cause a barrier to small scale constructions in relation to the RES technology, for example erecting a wind turbine in urban areas. There is no need for EIA or for environmental permits and the only permit needed is the building permit. The author is the municipality. However, the applying process of the building permit for RES technology is not clear and municipalities have no experience in solving practical problems. Also the communal building regulations do not include any instructions for RES technology in most municipalities.

The communal building regulations need to be update. Also more experience communal authorities get clearer the process come.

Barrier 3.3 – Competing public interests
No barriers detected.

Barrier 3.4 – Renewables obligations insufficient
No barriers detected.

Barrier 3.5 – Exemplary role of public buildings neglected
No barriers detected.

Barrier 3.6 – RES deployment hindered by spatial planning matters
No barriers detected, especially in new areas where planning will be done according to the so called “project planning” rules.

Barrier 3.7 – Tenancy law and ownership law impedes development of Building Integrated RES technologies
No barriers detected.

Barrier 3.8 – Other barriers
No barriers detected.

3.1.2 Best practice elements and indicators

No.	Benchmark	Result
1	Is this installation type in normal cases exempted from an authorization procedure (building permit)?	No
2	Are legal-administrative requirements inadequate for this installation type?	Positive
3	Number of administrations that must be contacted	1 to 4

3.2 Literature

4 Issue 4 – Promotion of energy efficient renewable energy equipment

4.1 Introduction

According to some stakeholders, the European energy efficiency labels exist and those are nationally promoted and this information is easily available.

Still the labels, certificates and standards (e.g. CEN 303-5) are not in use in biomass industry. However this has not been seen a barrier because the energy efficiency in Finland is high and stakeholders see that national labels works better than EU labels. Hence no barriers detected.

4.1.1 Best Practice Elements and Indicators

No.	Benchmark	Result
4.1	Are the requirements of Art 13 (6) of the Directive concerning the promotion of efficient bioheat and heat pumps fulfilled? (yes/no)	Yes

5 Issue 5 Information/awareness raising

5.1 Introduction

The lack of information and/or awareness raising campaigns was recognized to be a significant barrier, at least for biomass and wind industry.

Biomass: The information regarding support for harvesting and chipping is unclear. The support is allocated for the harvesting and chipping of small size trunks. Hence the support system should be changed. The support should be directed to the harvesting and chipping for larger size trunks and thus increases the cost-efficiency of the work.

According to the stakeholders, there is not enough sufficient funding on national level and those are not effectively used by public authorities. The sufficient funding is depending on the EU and local authorities should use it more.

Complaints processes for waste burning occurs as well and this is mainly because of the word “waste”, not because of the knowhow or the technology.

Wind: In the off-shore wind related technology, there are no existing support measures. Additionally, in connection to both on and off shore wind technologies the information campaigns have not accurately been planned and there are no sufficient funds for campaigns.

5.2 Description of barriers & solutions

5.2.1 Detailed description of the Barriers and solutions

Barrier 5.1 – Insufficient availability of information on support measures
Biomass: Insufficient availability of information, regarding the support system for harvesting and chipping, has been recognized by stakeholders and from literature (Ministry of Employment and the Economy, 2010). The terms of the support system directs the harvesting and chipping of small size trunks and bushes to areas where silvicultural measures has not been done properly. Hence the support system should be changed. The stakeholders have requested that the support should cover the larger size trunks as well. Hence more energy wood would be available for harvest and the cost efficiency of the work would increase (partly: Ministry of Employment and the Economy, 2010)

If the support system will be changed to the way stakeholders want, there is a possibility that the wood of small size trunks will not be harvested and chipped at the same amount as nowadays. Hence the silvicultural measures would decrease. (Ministry of Employment and the Economy, 2010).

The economical use of energy wood must be the goal for all supporting systems. The goal will be reached by allocating the support to the harvesting and transportation technology (Ministry of Employment and the Economy, 2010). Hence more information is needed for the actors of the wood supply chain.

The information regarding tax grants for power generation was considered to be clear.

The lack of information has caused significant complaints processes towards the waste burning. According to the producers of energy and authorities, the word "waste" in every technology causes significant complaints. Hence more information raising campaigns is needed and the timing of the campaign should be carefully considered. According the stakeholders "the time will heal – attitude" exists among politicians. The waste burning process is still a new way of dealing with waste. Once it becomes a part of everyday life the complaining will degrease significantly.

Wind: According to one stakeholder, there are no supporting measures for the off-shore wind technology. More information is needed for supporting measures.

Barrier 5.2 – Insufficient funding for campaigns/programmes

According to the stakeholders, the national funding is insufficient, especially for biomass and wind technology. For biomass EU / IEE funding is available. On the other hand, the promoting policy is clear and the information is easily available. The problem seems to be the case that even authorities are not aware of this and are not using the funding opportunity, if it actually exists.

Barrier 5.3 – Insufficient campaign-/programme-design

All the wind technology related campaigns has been done by the industry. Hence the campaigns have not been considered to be very accurately planned by other stakeholders, except for the industry. More independent information is needed.

5.2.2 Best Practice Elements and Indicators

No.	Benchmark	Result
5.1	Is sufficient information on support measures available?	Average

5.3 Literature

Työ-ja elinkeinoministeriö. Metsäalan strateginen ohjelma. Puuenergian käytön lisääminen – työryhmän kehittämisehdotukset. 2010 (Ministry of Employment and the Economy. The strategic plan for wood industry, 2010).

6 Issue 6 Certification of installers

6.1 Introduction

Biomass: Finland doesn't have an applied and acknowledged certification scheme in this area. However, VTT (State Technical Research Centre) is the national certification body for boilers of 0 – 200 kW. The guidelines are insufficient and are difficult for actors to use. However, the unused standards make the education and certification useless (see chapter 4.1). Hence the following chapters 6.2.1 to 6.2.4 are irrelevant to this study.

6.2 Description of barriers & solutions

Barrier 6.1 - Lack of a Certification body
Barrier 6.2 - Lack of guidelines
Barrier 6.3 - Lack of training
Barrier 6.4 – Other Barriers

6.2.1 Best Practice Elements and Indicators

No.	Benchmark	Result
6.1	Are certification schemes or equivalent qualification schemes available for installers?	Yes
6.2	Is sufficient training on RES provided during the standard education curriculum of installers?	Average

7 Issue 7 Infrastructure Development

7.1 Introduction

The power grid business in Finland is based on a monopoly license which is controlled by the Energy Market Authority.

The grid operators, monopolies by definition, were given clear rules: the grid operators must make the grid available to any player who wants to use the grid against reasonable compensation. These developments have led to the birth of an authentic electricity market place, which use the grids as a common platform serving all of the competing players on the market (website: Finnish Energy Industries, 2010).

Fingrid Oyj owns and operates the Finnish high-voltage power transmission network comprising the 400 and 220 kV power lines and the major 110 kV lines and substations. Regional, local and distribution activities are the responsibility of the electric utilities, which are licensed to operate the grid by the State (website: Finnish Energy Industries, 2010).

Finnish electricity network is connected to the Nordic interconnected network.

The latest major fault situation of main grid was in the 70's (website: Finnish Energy Industries, 2010).

The Energy utility companies and TSO has made the availability and delivery of RES energy easy, both for the industry and individuals. For example Finnish Railroads has made a target that all electricity used for the train traffic is produced from RES. They have found no barriers when increasing the use of RES electricity, which is now 65 % from the electricity they use.

No barriers detected in this issue.

7.2 Description of barriers & solutions

7.2.1 Detailed description of the Barriers and solution

Barrier 7.1 - Problems concerning connection to existing electricity networks
No barriers detected. For example the biomass generated electricity is not intermittent as solar and wind power and hence grid problems are not a major issue for the producers.

Barrier 7.2 - Problems concerning development of electricity network infrastructures according to a long-term strategy
No barriers detected.

Barrier 7.3 - Problems concerning development of a Trans-European Electricity Network
No barriers detected.

Barrier 7.4 – Other Barriers
No barriers detected.

7.2.2 Best Practice Elements and Indicators

No.	Technology	Benchmark	Result
7.1		Presence of an efficient (in terms of capability of achieving its stated objectives) plan for the reinforcement of the interconnection capacity with neighbouring countries.	Positive
7.2		Presence of an efficient plan for the reinforcement of the connection capacity within the country.	Positive

7.3 Literature

8 Issue 8 Power Grid Issues

8.1 Introduction

Electricity transmission is priced using a so-called point tariff system in Finland. The user can procure electricity from anywhere in the country without restriction. The user pays one grid transmission fee at his grid point, which covers the transmission costs for the use of the entire grid, without any additional fees. The producer can feed power into the network using the same payment principle. The grid operator is responsible for running, maintaining and developing the network. The grid operator shall expand his grid according the needs of operator's customer. (the Electricity Market Act - Law no. 386/1995).

Because the electricity market is dependent on the fact that the producer has to have a buyer for the produced power (but no one has to buy it, nor even obliged to receive it into their private grid) the Electricity Market Act (Law no. 386/1995) leads to the fact, that the small scale energy production will be faced with barriers that will have a negative impact on this type of production increase. As far as stakeholders know, the influence of this legislation has not been revised. There will certainly be a need for changes in this legislation in the future.

No other significant barriers were recognized.

The time for getting grid connection is 1 to 2 months. To erect a new grid and get connected will take 2 to 4 years after permit has granted.

8.2 Description of the barrier

8.2.1 Detailed description of the Barriers and solutions

Barrier 8.1 - Problems concerning grid connection

If one wants to connect electricity to the grid, one has to pay excise tax and maintenance and supply security fee to the custom. One can transmit the electricity to the grid for free, as far as the capacity of the grid is sufficient and producer makes a deal with net operator. In this situation the "producer" will not get any benefit for leading electrify to the net.

Anybody has the possibility to join the grid, if the requirements set to the production are met. Correspondingly, anybody may produce electricity to the grid, if the producer has a buyer for the electricity. This mode of action may cause practical problems for the small or micro scale producer. The Electricity Market Act has defined power plants below 2

MVA as small. Those below 30 kVA are considered micro producers, which normally are of the size 1-10 kW and based on the wind or the sun. Because the legislation doesn't pose any obligations to neither (not even to the owner of the grid), it's difficult to find a buyer to the electricity produced by small plants, and with a variable effect and time. In addition, the income to the electricity producer will remain small, due to taxation obligations and the costs of equipments for measuring the energy (Finnish Energy Industries, 2008).

To remove this barrier, a change in the present legislation for accessing a existing power grid should be made more attractive and rewarding for small producers.

The excise tax and other payments is not a concern for the one who connects the electricity for its own consumption.

Barrier 8.2 - Problems concerning grid access
No barriers detected.

Barrier 8.3 (former barrier 9) - Problems concerning TSOs and DSOs
No barriers detected.

Barrier 8.4 – Other Barriers
No barriers detected.

8.2.2 Best Practice Elements and Indicators

No.	Technology	Benchmark	Result
8.1		Are the rules on cost sharing and bearing of grid connection objective, transparent and non-discriminatory?	Yes
8.2		Is the denial of grid connection by TSOs and DSOs a common problem, constituting an important barrier for RES development?	No
8.3		Number of months for getting grid connection (considering also approval of grid connection)	1 to 2
8.4		Estimated connection costs in Euros (in case producer pays)	app. 50 000 € (up to 5 MVA) after 5 MVA 10000 € for every MVA

8.3 Literature

Turku Energia. Vuosikertomus 2008. (Turku Energy – Annual report 2008).

Pienimuotoisen tuotannon verkkoon liittäminen – muistio verkonhaltijoiden käyttöön. Energiateollisuus, 2008. - Connecting a small scale production of electricity to the grid – a memorandum for the benefit of the grid owners. Finnish Energy Industries, 2008.

9 Issue 9 Gas Network Issues

9.1 Introduction

The gas network in Finland has been built for natural gas import from Russia. As far as we know there is no biogas network operating in Finland. The first one is under planning. Also none of the stakeholders neither answered nor knew about RES related gas network.

Hence no sufficient results or information are available in order to discuss this topic in this study.

The production of biogas is for the time being concentrated to private production plants (i.e. agriculture) and not connected to any gas transmission network. The Finnish state is promoting the building of plants for producing energy from biogas.

Gasum Oy is currently operating the existing national gas net and is supervised by Energiamarkkinavirasto (Energy Market Authority).

The Finnish government has made a draft for a new regulation on the feed-in tariffs for biogas on March 11, 2010. It is assumed that the draft will enter into force shortly. Only the big biogas utilizing power plants with an effect of 300 kVA, are considered to be regulated by the proposal of the feed-in tariff. The proposal would not in this case involve the small producers, i.e. the agricultural producers. The biogas produced at the waste dumps will also remain outside of this feed tariff. In this case, the lack of a feed-in tariff might become a barrier for a increasing the numbers of small scale production and thus leading this biogas into the transmission network (Ministry of Environment, 2009).

9.2 Description of barriers & solutions

9.2.1 Detailed description of the Barriers and solutions

No sufficient results or information are available in order to discuss this topic in this study.

9.2.2 Best Practice Elements and Indicators

Please fill in here the results of the Benchmark indicators:

No.	Benchmark	Result
9.1	If green certificates and/or subsidies for biogas are in place, do they de facto make unattractive to feed green gas into the grid due to the high level of subsidy for biogas used for electricity generation?	No experience
9.2	Are the costs of grid connection for producers of gas from renewable energy sources objective, transparent and non-discriminatory?	Yes
9.3	Do transmission and distribution tariffs discriminate against gas from renewable energy sources?	No, because no tariffs in place yet.
9.4	Average time needed for grid connection approval (from application for grid connection to formal approval) in months (#).	No experience

9.3 Literature

Ympäristöministeriö;biokaasun syöttötariffit ulotettava laajemmalle. Lausunto uusiutuvan energian syttötariffityöryhmän loppuraporttiin. 5.10.2009. - Ministry of Environment; the feed-in tariff should be expanded further. A comment to the final report of the working group on the feed-in tariff.

10 Issue 10 District Heating

10.1 Introduction

There is no direct support to the production of electricity from RES. The using of RES in Distric heating and cooling is supported by investment subsidies and tax reliefs. Also State grants are available for investment and research projects. The maximum available investment subsidy is 30 %. The household can have Energy Grants for residential buildings up to 25 % of eligible costs. The taxes for using RES in heating are 0 %.

Totally the length of the DH net was about 11 400 km in Finland in 2008.

According to some stakeholders, there are no accurate or transparent rules available for an increase of the share of RES technology in district heating (DH).

However, the legislation (Act no. 132/1999, Land Use and Building Act) gives the communities the possibility to force the new residential areas to be connected into the DH network when and where ever a DH net exists. The communities have used this legislation in an effective way.

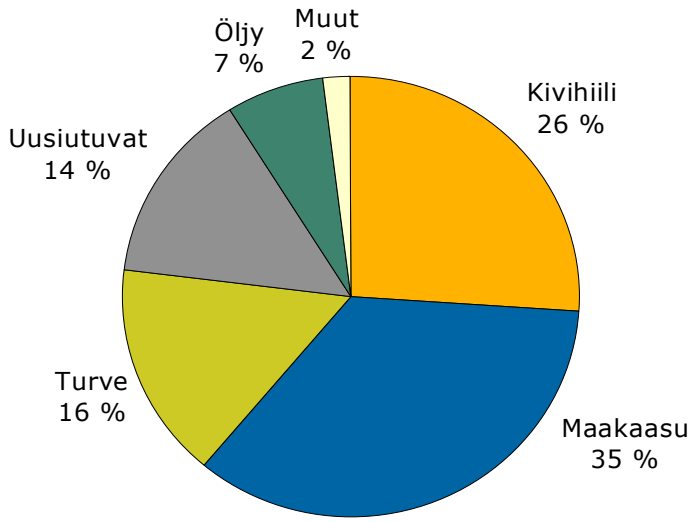
10.2 Description of barriers & solutions

10.2.1 Detailed description of the Barriers and solutions

Barrier 10.1and 10.2 – Lack of positive conditions for the increase of the share of renewable in existing DHC systems and lack of positive conditions for the initiation and expansion of DH systems largely based on renewable

These two barriers has been combined here because those overlaps each other so strongly.

In graph 5 one can see the percentile amounts of fuels used to create DH in Finland in 2009. Totally 30% of used fuels came from RES (Finnish Energy Industries, 2010).



Graph 5. The percentile of fuels used to create DH in Finland in 2009 (Finnish Energy Industries, 2010). Uusiutuvat - Renewables, öljy – oil, muut – others, kivihiili – coal, maakaasu – natural gas, turve – peat.

The share of the natural gas is major (35% in 2009) from all used fuels. To replace natural gas with renewable energy forms is difficult, because the availability of natural gas in the network region is very simple. This is why no major official pressures exist in starting or developing or increasing the use of renewable energy forms in connection to the DH. This is why the total use of RES in DH production varies from above 50% to below 10% in different provinces in Finland.

According to the stakeholders, there are no accurate or transparent rules available for a share increase of RES technology in DH.

Barrier 10.3 – Other Barriers
No other barriers detected.

10.2.2 Best Practice Elements and Indicators

No.	Benchmark	Result
10.1	Are there policies to promote the increase of the RES share in existing DH networks? (yes/no)	Yes
10.2	Are there policies to promote the initiation / expansion of DH networks? (yes/no)	Yes
10.3	Percentage present renewable share	14 (with peat, the number is 30)
10.4	Percentage CHP share (idem)	73

10.3 Literature and Sources

Turku Energia. Vuosikertomus 2008. (Turku Energy – Annual report 2008).

Energiavuosi 2009 – Kaukolämpö. Power Point esitys. Energiatellisuus, 2010. (The Energy year 2009 – District Heating. Power Point presentation. Finnish Energy Industries Registered Association)