



Renewable Energy Policy Review

Finland

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FINLAND

1. General information

Population and geography

Finland is situated in northern Europe between the 60th and 70th parallels of latitude. A quarter of its total area lies north of the Arctic Circle. Finland's neighbouring countries are Sweden, Norway and Russia, which have land borders with Finland, and Estonia across the Gulf of Finland. Forests cover three quarters of the country's surface area of 338 000 square kilometers. Other outstanding features of Finland's scenery are some 190 000 lakes and approximately as many islands.

The population of Finland is approximately 5 200 000. Finland is the sixth largest country in Europe in area, with a low population density of 17 persons per square kilometer. Most Finns, some 65 %, now live in urban areas, while 35% remain in a rural environment. The three cities of Helsinki, the capital, population 555 500, Espoo, 213 300, and Vantaa, 178 500, form the fast growing Helsinki metropolitan region, which is now home to roughly a sixth of the country's total population. Other important cities are Tampere, 195 500, Turku, 172 500, and in the north Oulu, 120 800.

Region	Population	GDP per capita
		Whole country = 100
	31.12.2002 1)	*2001
Mainland Finland:	5 180 038	100
Uusimaa	1 329 004	138
Itä-Uusimaa	90 934	85
Varsinais-Suomi	450 968	106
Satakunta	235 416	87
Kanta-Häme	165 886	79
Pirkanmaa	453 978	93
Päijät-Häme	198 088	79
Kymenlaakso	186 111	97
South Karelia	136 694	98
Etelä-Savo	163 276	69
Pohjois-Savo	251 976	76
North Karelia	169 722	72
Central Finland	265 078	85
South Ostrobothnia	194 105	71
Ostrobothnia	173 006	92
Central Ostrobothnia	70 674	76
North Ostrobothnia	369 974	92
Kainuu	87 371	68
Lapland	187 777	81
Åland	26 257	138
Whole country	5 206 295	100

Source Statistics Finland website

Finland (Finnish name Suomi) is a republic, which became a member of the European Union in 1995.

Four levels of legislation in Finland coexist:

1. Parliamentary Acts constitute the framework of legislation in Finland. Acts are approved by the Parliament. After Acts have been approved by the Parliament the President decides with the Council of Ministers when they come into force.
2. Decrees are approved by the President together with the Council of Ministers. The competence to give decrees is based on Parliamentary Acts.
3. Council of States Decisions are approved by the Council of Ministers. The competence to give Council States Decisions is based on Parliamentary Acts or State Budget (state aids). The State Budget is approved by the Parliament.
4. Ministerial Decision are approved by the Minister. The competence to give Ministerial Decisions is based on Parliamentary Acts or the State Budget (state aids).

All legislation in Finland is on the national level. The regional or local authorities have no competence to give legislation.

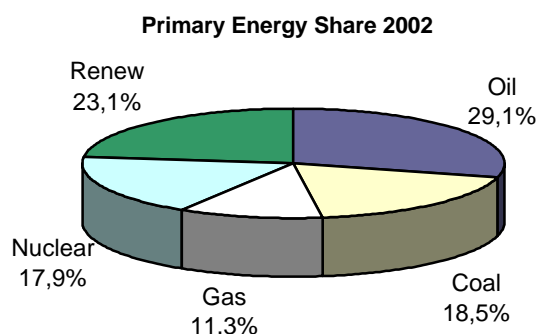
Finland's road to industrialization started in the 19th century with the harnessing of forest resources. Forests are still Finland's most crucial raw material resource, although the engineering and high technology industries, led by **Nokia**, have long been the leading branches of manufacturing. The most important export product today is the mobile phone and Finland is one of the few European countries whose exports exceed imports in data and communications technology. Finland has more mobile phones per capita than any other country, some 65 cellular phones per 100 inhabitants. Today, Finland has a typically advanced industrial economy. The net wealth of Finnish households is at the average level for member states of the European Union. In 2000, Finland's GNP per capita was around 25 500 euros (ca. 22 600 USD). The proportion of expts in GDP was 40% in 2001 (Statistics Finland 2002) Around 75% of foreign trade (import and export) takes place with other European countries.

Industry accounts for about half of total energy use and its share is increasing over time. The forest industry is the largest energy consumer but it produces more than 40% of its needs from waste wood and other by products (ie black liquor) The proportion of wood and derived products of total energy supply is the highest in Europe, 327 PJ in 2000 and 384 PJ if peat were considered renewable. 20% of total consumption is used by space heating. The role of District Heating is important, 49% of consumption (source BASE Finland country report <http://base.energyprojects.net/links/Finland.pdf>)

2. Renewable Energy Policy

Energy and Renewable energy country profile

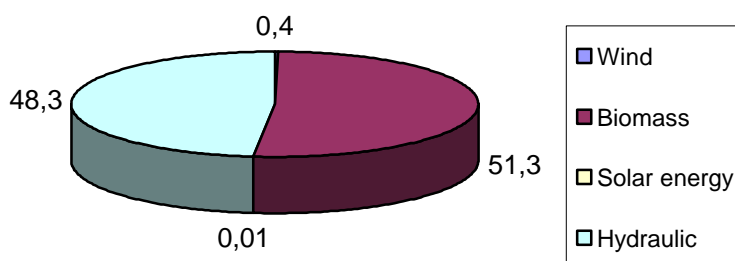
Population	5.17	Millio
Area	337,030	ns
Total Primary Energy Supply	34.7	Mtoe
Electricity Production	74.45	TWh
Electricity Prod. by source		
Fossil	40.3	%
Hydro	17.7	%
Nuclear	30.6	%
Other	11.4	%
Renew		



Source: EUROSTAT 2003

In the long term, energy dependence, calculated as the share of imported energy of the TPES, has decreased from the level of 80% in the late 70s to 67%. If nuclear energy is considered an indigenous energy source, energy dependence today is 50%. The incontestable domestic energy sources are wood-based fuels, hydropower, wind power and peat. (Energy Trends in 2003, Ministry of Trade and Industry)

**Share of RES in the electricity production
(%) 2003**



Finland has a national target of reducing carbon dioxide emissions by 20 per cent by 2005, compared with their 1988 levels. In the context of the EU's burden sharing arrangements, Finland has committed itself to curbing its average emissions of greenhouse gases between 2008 and 2012 back down to their 1990 levels. Renewable energy contributed 23% of Finland's total energy supply and 29.1% of total electricity supply in 2001 compared to EU averages of 5,8% and 15.5% respectively. (IEA Renewables Information 2003)

Renewable energy sources maintained their 23% coverage of TPES in 2002. In spite of the fluctuation in hydropower, renewables are on an uptrend. This development is mostly due to the increased use of biofuels originating in industrial wood processing. Combined heat and power production (CHP) provides opportunities for cost-effective use of renewables, both in industry and at district heat plants.

The extensive use of biomass in the forest and paper industries means that Finland is now a world leader in biomass technologies. Biomass, including peat, accounts for about 17% of primary energy, and supplies a wide range of energy systems, including over 200 district heating and cogeneration plants, serving 72% of Finnish communities. In addition, hydropower accounted for 20% of total electricity generation in the same year.

Hydro

1995-2002, hydroelectric power production ranged from a high of 14.8 TWh in 1998 to as little as 10.6 TWh in 2002. According to the preliminary data for 2003, it has further dropped to 9.3 TWh. Production in an average hydrological year may be reckoned to be around 12.7 TWh.

Small Hydropower remained quite stable during the years 1990-2001. Installed capacity of SHP increased by 4% and electricity generation from SHP increased by 19% over this period. Hydropower in Finland accounted for about 20% of the country's electricity generation. The SHP sector represented about 2% of the total electricity generation and about 9% of the hydropower generation in 2001. (source Report on Small Hydropower Statistics: General Overview of the last Decade 1990-2001 ESHA)

Biomass

The largest user of biomass energy was industry, with residential and electricity/heat production accounting for the remainder. Biomass contributed about 25 % of total energy production in 2000. From 1997 to 2000 the use of wood as an energy source increased from 5.7 Mtoe in 1997 to 7.5 Mtoe in 2000. Finland has an ambitious aim: the use of bioenergy sources will be increased by 50 per cent by 2010. This target is demanding – Finland being one of the leading bioenergy countries among the industrialized world, the share of bioenergy in the total energy consumption is already as high as 20 per cent (Growing power, Tekes 2002)

The Valtioneuvosto report (2001) presents a summary of the production possibilities of renewable energy sources in Finland by 2030. Based on existing resources, the use of biofuels could be increased by 17– 38 TWhl by the year 2025. Of this figure, the additional use of wood fuels accounts for approximately 12– 26 TWhl, recycled fuels for 5– 10 TWhl, and agricultural biomasses for 0– 2 TWhl.

The future development of Finland's indigenous biomass resources has been shaped significantly by commitments made in the government's May 1997 Energy Strategy. This strategy reinforces a long-standing Finnish commitment to increase use of bioenergy and other indigenous forms of energy.

Wind

The use of wind energy is currently very small in Finland. Wind electricity was first reported in 1993, at 4 GWh, and grew to 11 GWh by 1996. Growth will need to continue rapidly if the government is to meet its target of 100 MW by 2010: capacity at the end of 2003 was 51 MW. (source EWEA http://www.ewea.org/documents/europe_windata_jan20041.pdf). Wind energy only contributed 0.1 % to the total electricity production in 2000. However, as a consequence of liberalisation of the electricity markets, there has been an increase in the demand for wind power. The installed capacity in 2000 was three times that existing in 1997.

Solar Thermal

The solar thermal market in Finland is relatively small. In 2000 collector sales were at the level of 1.000m²/a. No official statistics on the installed solar collector area and systems exist. The sales figures are based on information provided by the major manufacturers. The total collector area installed during the period 1982-2000 is some 7.800m². In addition to this, it is estimated that around 90.000m² of unglazed perforated absorber plates have been installed in crop and hay drying applications. During the last few years, from 1995 to 2000, the annual sales of flat plate collectors increased from 500m² to 1.000m². Some larger scale demonstration projects of high visibility have been implemented with subsidies, often within the framework of various EU-programs. These projects normally have 100-200m² of collector area and are combined with district heating. One larger project, Eko-Viikki with 1.000m² of collector area, was implemented in Helsinki in 2001-2002. The recent price increase of traditional energy sources, in particular electricity and fuel oil, has resulted in an increased interest in alternative energy sources, including solar energy. This, in combination with increased subsidies of up to 40% for demonstration projects, is likely to result in a market growth. A Finnish Solar Industries (FSI) group was established in 2001 to activate companies and activities in the solar energy field. Some 20 organizations are involved in the FSI group.

Solar Photovoltaic

The photovoltaic sector is in Finland a fairly small sector. Earlier the focus has been on research and development but the Action Plan for Renewable Energy Sources, launched by the Ministry of Trade and Industry, more emphasis is given on market issues. The PV market is dominated by solar home systems for vacation houses, but over the last couple of years building integrated applications are gradually becoming a new important market segment. The annual installations have been in the range of 200 kW meaning an increase of approximately 10% in the cumulative installed capacity. The annual sales typically show a modest increase of < 5%. Prices of PV installations have not shown any remarkable changes in the recent years. Public budgets on photovoltaics are dominated by R&D expenditures (in the range of 0,5 Million €), whereas investment subsidies play a minor role. The investment level has been risen from the previous value of 30% to 40%. Another change sought is to make subsidies available for private persons and households. In the present situation only companies, communities, enterprises and organisations are able to receive public subsidies. (source IEA Photovoltaic Power Systems, National Status Report, Finland 2002). The objective for installed photovoltaic capacity in 2010 is 40 MWp; meaning a 20-fold increase when compared with the 1998 situation. The prognosis for 2025 is 500 MWp. Thus, the main emphasis in the coming decade is in creating the needed infrastructure (awareness, information dissemination, export, industrial activities) whereas volume effects are sought for later. (source Finland Photovoltaic technology status and prospects Leena Grandell, Motiva Oy, on IEA Photovoltaic Systems website, Annual Report 2003)

RE Policy Outlook

Targets/Strategy /Climate Change

The developments in the last few years are not moving in the direction of achieving this target. The main factor behind this trend is that at least up until 2001 the Nordic countries were characterized by an extremely good hydroelectric situation, which kept the price of electricity on the Nordic electricity market very low. Given the prevailing low price level, there was little investment in Finland in new electricity production capacity. Record quantities of electricity were being produced. A large portion of the investments made went into power plants using bio-energy. The electrical power produced in these places increased to over 500 MW over the period 1998-2003. Wind power capacity grew to around 30 MW. Recently the market price of electricity has risen considerably from the level at the end of the 90s and it is possible that in the future there will be more impetus for investment in electricity production, including renewable electricity production. Against this background, achieving the renewable electricity target still looks perfectly feasible.

Finland's goals of ensuring a secure, safe and environmentally acceptable energy supply have resulted in a commitment to develop diversified energy production capacity. Renewable energy promotion is therefore one of the main options to increase energy self-sufficiency open to Finland. There are no targets for total renewable energy use.

However, the following programmes and plans have been implemented:

- The Finnish Government brought out the Action programme for the promotion of bioenergy 7 April 1991 that aims to increase the use of bioenergy at least one quarter by year 2005. The programme aims to increase use of bioenergy by 30% in 2005 (compared with 1993). This is equivalent to an increase in bioenergy production of around 1.5 Mtoe per annum. The Government's approach to bioenergy subsidies, taxation and exemptions is explicitly linked to regional employment and social issues..
- The Ministry of Trade and Industry launched in 1999 an Action Plan for renewable Energy Sources. The program objective is to enhance the penetration of various renewable energy technologies on the market and increase the consumption of renewable energy sources in absolute terms by 50% from year 1995 until 2010. The objective for electricity is 31% of the total energy consumption to come from RES in 2010. (source Ministry of Trade and Industry, Energy Department, Report in Compliance with the RES-E Directive on the National Objectives concerning electricity produced from renewable energy sources and the implemented as well as planned measures in Finland which will achieve these objectives.20/01/2003)
- The national wind energy program is to erect a total of 100 MW capacity in Finland until 2005. In the view of the present market situation this target will be reached possibly even one or two years earlier.

Economic and fiscal incentives and R&D are the two central policy approaches used to promote renewable energy in Finland. However, changes in Finland's Value Added Tax (VAT) system in order to harmonize it with the EU resulted in a higher VAT rate for biomass, which was previously exempt. Besides taxes, the Finnish Government has also set up subsidies of up to 30% of the investment costs to renewable energy technologies. For wind energy the subsidy level is 40% at maximum. The investor is required to be a legal entity in order to receive subsidies.

The Energy Department of the Ministry of Trade and Industry is responsible for managing and planning national energy strategies. Several means such as taxation, subsidies, information dissemination and education aim at reaching the goals of the national energy strategy. Tekes, the National Technology Agency, administrates research programs among other topics also in the field of energy technology. In the beginning of 1998 the field of expertise of Motiva, the national energy information center, has been expanded to cover renewable energy technologies beside energy efficiency. The national administration and information dissemination of the ALTENER Program is the responsibility of VTT Energy. OPET Finland is a consortium consisting of Tekes (Co-ordinator) , VTT Energy and Motiva. Within the consortium, VTT Energy carries the responsibility for biomass projects whereas Motiva co-ordinates projects in the fields of solar and wind energy as well as heat pumps. (source Finland: Overview of Renewable Energy Policy from red folder)The main emphasis is laid on biomass due to the national energy resources.

Electricity

According to Statistics, Finland produced 20 209 GWh of electricity from renewable sources in 2002. The figure is 9% down on the previous year. The RES-E Directive sets the national indicative target for the share of gross electricity consumption to be met from renewable energy sources at 31,5% in 2010;

Market reform in the domestic electricity sector, and increased integration into the Nordic electricity market is likely to have an effect on future renewable electricity developments: even the smallest consumers will be able to choose their electricity supplier, and this could help support Finland's wind and possibly bioenergy programmes (if consumers can choose "green power"). Nowadays and in accordance with the Electricity Law (having gone into effect in the beginning of 1997), electricity taxes are based on the total electricity consumption, not on the carbon content of the primary energy carriers used for electricity production.

Electricity producers pay an annual electricity tax. The producers generally pass this charge on to their customers. These electricity taxes are returned back to renewable electricity producers. That is, producers of electricity from certain renewable energy sources (wind power, small scale hydropower, wood and wood based fuels) are given a tax refund at the end of the year. This is between 0.42 cents €/kWh and 0.69 cents €/kWh. On the other hand, RES are exempted from the carbon-based tax.

Electricity regulations – incentives – compensations scheme

Act No 1129 on certification and notification of the origin of electricity December 2003 and Government Decree No 1357 on certification of the origin of electricity introduced the electricity guarantee of origin system to Finland. Under Section 3 of the Act, the grid operator designated as responsible for the system (Fingrid Oyj) is required to provide electricity origin guarantees in respect of the parties involved in the electricity market in an equitable and impartial manner. The electricity guarantee of origin system is overseen by the Energy Market Authority in accordance with Section 12 of the Act. The legality of the marketing of the electricity to consumers is governed by the Consumer Protection Act No 38/1978. Under Section 13 of the Act, the Energy Market Authority is entitled to be given information by the party applying for or having already obtained a guarantee of origin concerning the power plant's production method and energy sources and the quantities of electricity it produces. The body granting the guarantees of origin, Fingrid Oyj, and the assessment body are required to provide the Energy Market Authority, on request, with the data needed to check the validity of the guarantees of origin.

The Electricity Market Act No 385/1995 safeguards grid access for all electricity users and electricity production plants, including those based on renewable energy. Access to the grid has been ensured by means of the following obligations imposed on transmission and distribution network operators:

- *transmission obligation* - Section 10(1): Network operators must, for a reasonable charge, sell electricity transmission services to parties, requiring them, within the limits of the transmission capacity of their network;
- *connection obligation* - Section 9(2): Network operators must, on request and for a reasonable charge, connect electricity-powered premises and electricity production plants that meet the technical requirements in their operating area; and
- *network development obligation* - Section 9(1): Network operators must maintain, utilise and develop their electricity network and connections to other networks in accordance with the reasonable requirements of customers and ensure in respect of them that customers are provided with sufficiently good-quality electricity.

In Finland production plants using renewable sources of energy are not given priority over other electricity production. A system like that would obviously require some party in the electricity market or network operator to be required to purchase renewable electricity at a guaranteed price. In Finland support for renewable energy is not based on a feed-in system like that. Instead, the competitiveness of renewable electricity production is supported by means of tax and investment aid. In the electricity market, producers, buyers and sellers of electricity are free to agree on how the electricity trade is conducted. This means that the parties involved may, for example, introduce systems based on bidirectional metering.

Reduced fiscal incentives towards renewable energy, notably the removal of special VAT exemptions on bioenergy sources, came into effect from 1 January 1995 following requirements to harmonise with EU policy. This, and the 1997 energy tax system reform, have resulted in the favourable tax treatment of biomass inputs to electricity generation being removed.. The need for further significant electricity supply capacity (estimated at 4800 MW above 1994 capacity by 2005) provides significant potential for the development of renewables, particularly biomass-based electricity generation. Impending decisions on how to expand base-load capacity will have an important impact on the prospects for renewable energy development. Investment subsidies are also given to renewable electricity (small hydro, biomass, solar PV and wind). They cover between 30% and 40% of the total investment and are awarded on a case by case basis. Finally, there are green pricing schemes in operation for renewable electricity. Around 0.8 cents €/kWh are given to existing hydro, wind, solar PV and biomass.

Heating and Cooling

However, the 1997 tax reform maintained the incentives for biomass-based heat generation, as taxes on heat are based on the net carbon emissions from input fuels, and are zero for renewable energy sources. Previously, the carbon/energy tax was based 60% on the carbon content of the fuel and 40% on the energy content.

In addition, renewable energy sources are still subject to favourable tax treatment and direct bioenergy investment support to assist deployment and commercialisation.

The *National Building Code of Finland*, which applies to all new building projects (both residential and non-residential), is supervised by the local building authorities. The current standards are prescriptive thermal insulation requirements for walls, roofs and windows, thermal conductivity values for building materials, and requirements related to indoor air quality, ventilation rates, equipment and design.

The Ministry of the Environment is revising the Building Code to improve the energy efficiency of new buildings. These new regulations should come into force in 2003. (am unable to find more up to date info) The aim is a 30% reduction in energy consumption in new buildings compared to buildings constructed on the basis of today's regulations.

MTI and the Finnish Association of Building Owners and Construction Clients signed an Energy Conservation Agreement in May 1999 relating to the real estate and construction business. This agreement provides the commercial sector, for example shops, banks, insurance companies and media, with the opportunity to join the energy conservation agreement and the activities subject to it. By the end of 2001, the coverage of the agreement was 73%.

The state supports the renovation of housing by, for instance, the repair grant scheme, prepared each year by the Ministry of the Environment. The basic grant is 10-20% of total repair costs. These grants fund actions such as the adjustment of heating systems, cleaning and adjustment of ventilation systems and construction of heat recovery systems for exhaust air. (source IEA Energy Efficiency Update 2003)

Transport

The Ministry of Transport and Communication has had an environmental management programme of transport policy since 1994. A new programme was adopted in July 1999, which is a standardised environmental management programme based on ISO standard 14 001. The programme defines the environmental objectives, responsibilities of various actors and concrete measures to reach the objectives. Moreover, the programme contains a monitoring and follow-up mechanism. This new programme provides a practical tool for the environmental management of transport policy. The Ministry of Transport and Communications has also published a long-term strategic programme called "Towards a sustainable and intelligent transport sector". The strategy aims at reaching a transport system in which the demand for road transport (passenger car traffic and road freight traffic) should peak by the year 2020 and gradually start to decrease thereafter. With the aim of promoting the attractiveness and market share of sustainable modes of transport and in accordance with the National Climate Strategy and the Environmental Management Programme, the Ministry of Transport and Communications has adopted the following programmes:

- 1) National Cycling Policy Programme with the aim of doubling cycling from the 1998-99 level by 2020. An annual cycling week is held at the beginning of May.
- 2) National Walking Policy Programme with the aim of incorporating walking into transport policy and planning.
- 3) Public Transport Strategy with the aim of increasing the attractiveness and competitiveness of public transport, e.g. with the help of door-to-door travel chains and the introduction of travel centres.

Since 2001 a Fuel economy labelling of new passenger cars sold in Finland, in accordance with the EC Directive, has been in force. A guide for choosing a car with fuel consumption and emission data published by the Vehicle Administration and Motiva's electronic database helps consumers to compare consumption and carbon dioxide emission data for passenger cars.

There are two voluntary agreements ongoing, one for trucks and vans and the other for buses.

The target is to achieve an average of 5-10 % savings in energy consumption by 2005. The most significant savings potential is in fuel consumption, which can best be decreased through economical driving habits. Motiva is responsible for the administration and monitoring of the agreements.

The coverage of the agreement in the truck and van sector is some 15% of the vehicle stock in the agreement scheme, i.e. 400 companies and 2 380 vehicles.

The implementation of an energy conservation agreement in the bus and coach sector in mid 2001 obtained 34 % coverage with 2300 vehicles and 54 companies by the end of the first agreement year.

(IEA Energy Efficiency Report Finland 2003)

Hardly any renewable fuels are used in the transportation sector except some research and demonstration project.

Research and Development

The National Technology Agency Tekes is the main public financier of the technology R&D. Renewable energy technologies, belonging to the sustainable development solutions, are in the strategic focus of Tekes. Various national technology programmes and projects have involved RES technologies, the main focus being in bioenergy. Tekes funding for the renewable energy R&D amounts to € 10 million annually. The ongoing technology programmes in 2002 involved with RES are the Wood energy, Waste management and recycling, Fine particles – technology, environment and health,

Modelling tools of combustion process development and Technology and Climate change /58, 59/.

Research on renewable energy sources is carried out by governmental contract research centre, VTT and several universities in Finland (App. A). VTT Processes has established in 2002 a special service on Renewable Energy Sources, VTT Renewables portal. VTT Renewables offers a gateway with 140 experts to all R&D services of bioenergy, REF and wind technologies and market opportunities.

(source http://www.tekes.fi/opet/pdf/OPET_report9.pdf)

A set of eight national energy technology programmes was launched in 1993 by the National Technology Agency TEKES. Four programmes - Liekki 2, Bioenergia, NEMO 2 and SIHTI 2 - are directly related or have strong links with the promotion of renewable energy. Around one sixth or 2000 M FIM per year of total R&D expenditure is directed towards TEKES activities, of which 200 M FIM supports the energy sector. The funds for renewables is about 60 M FIM. The Advanced Energy Systems and Technologies research programme (NEMO2) is one of the energy research programmes of (TEKES) for the period of 1993-1998. The main emphasis is on solar energy and wind power. The total budget is about 120 M FIM TEKES also, supports and organises R&D projects in the construction and building sector. For example INFRA – Construction and Services Technology Programme for the years 2001-2005. The national public research institute, the Technical Research Centre of Finland, VTT, carries out R&D and offers expertise on technical building services, structures and building systems. Source for last paragraph IEA Energy Efficiency Update 2003)

Climate Change

The stipulations on environmental protection are now combined in the new Environmental Protection Act. It is a general act on the prevention of pollution, which is applied to all activities that cause or may cause environmental damage.

The principles of the Environmental Protection Act are:

- the prevention or the restriction of damages to a minimum caution and precaution - principle
- the application of the best available technology (BAT)
- the best practice from the perspective of the environment (BEP)
- the polluter pays - principle

The integration of the environmental permits system was one of the most important aims of the revision. With the integration of the environmental legislation, pollution can be prevented efficiently since the environment is considered as a whole.

Applications for the environmental permits are made to one authority, and all the environmental effects of the activity will be assessed during the consideration of the permit. Technological solutions that save energy as much as possible and that are at the lowest possible cost will be applied to reduce emissions.

The act defines more explicitly, and in a more integrated manner, the requirements of environmental permits and the prerequisites for granting a permit. The permit requirements are not, however, stricter and activities that require a permit have not been added. There are three environmental permits authorities which decide on the most important environmental permit. These authorities replace the three Water Courts that were abolished in Helsinki, Kuopio and Oulu. Environmental permits of regional significance are still dealt with at the 13 regional environment centres. Other environmental permits will be decided by the environmental protection authority of the municipality. Citizens have greater opportunity to influence the decision-making since the right to appeal has been extended. In addition to the parties involved (applicants for a permit and the party suffering inconveniences), associations and foundations that promote the protection of the environment, health and nature or that improve the living environment have the right to appeal. (source <http://www.ymparisto.fi/default.asp?node=6469&lan=en>)

The Act on Environmental Impact Assessment Procedure (EIA) (468/1994) came into force on 1 September 1994 (amended 1999). Its aim is to further the assessment of environmental impact and the consistent consideration of this impact in planning and decision-making, and at the same time to increase the information available to citizens and their opportunities to participate in decision-making.

The act is applied to projects where compliance with international agreements involving Finland requires assessment to be carried out, or which may have significant adverse environmental impacts on Finnish wildlife or other special features of the environment. The environmental impact of programmes, policies and plans by the authorities must be assessed and taken into account, which requires all spheres of government to re-assess their own operations. Certain projects always require an EIA procedure. These include oil refineries, pulp, paper and board mills, large harbour projects, motorways and major hazardous waste disposal facilities. The procedure can also be applied in individual cases to a specific project or in the case of an essential change in an already completed project. In such cases, the Ministry of the Environment decides on the need for an EIA.

3. RE Highlights

National Success Story

Finland — Biomass power

Combined heat and power (CHP) is used extensively in Finland to provide both heat and electricity for domestic and industrial purposes. CHP plants make use of a range of biomass resources, burning wood waste and agricultural biomass, as well as peat and black liquor. Much of the biomass resource is derived from Finland's pulp and paper industries, which account for about half the country's industrial energy consumption. There is also a well developed biomass supply industry. District heating systems are also common, with about half the population connected to a district heating network. These are increasingly using biomass as fuel, as well as coal and natural gas. The Forssa biomass plant is the first CHP district heating plant in Finland fuelled entirely by wood. The plant's boiler is specially adapted for the use of solid biofuels and other biomass fuels. The plant can generate up to 66 MW heat, and started operating in September 1996. The plant produces all the heat and one third of the electrical power required by the city of Forssa for almost the whole year.

Success factors:

- **Political: Finland has an energy strategy that supports the development of renewable energy, especially biomass**

Finland's national biomass strategy was launched in 1994 and aimed to increase biomass use by 25 % (1.5 mtoe) by 2005 from the 1992 level. The action plan for renewable energy sources of 1999, has the objective of increasing the use of renewable energy, including biomass, by 50 % from the 1995 level, when renewable energy contributed over 20 % of total primary energy demand, by 2010. Energy planning is actively supported at regional and local levels, with regional strategies updated regularly.

- **Legislative: Transmission costs are fixed, and grid access is open to all producers**

Liberalisation of the electricity market in Finland started in 1995, and included opening grid access to all producers and consumers. The cost of transmission is fixed by law, ensuring transparency and predictability to producers.

- **Fiscal: Economic support measures act in favour of renewables compared with fossil fuels**

. The refund for Biomass from the taxation on electricity at the distribution level, which entered into force in 1997, is EUR 0.042/kWh. The heat production tax was retained. Small-scale (less than 1 MW) biomass plants also benefit from a reduction of value-added taxes payable on the plant. Finland is one of the leading European countries in the use of renewable energy, in particular through its extensive biomass resources. In 1993: 5 644.0 GWh In 1999: 8 341.0 GWh Increase 1993–99: 2 697.0 GWh , 47 %

- **Financial: Subsidies are available on investments and equipment relating to renewable energy production and use**

Public funding is important to support the building of new renewable energy plants and is made available through national, regional or local subsidies. National government subsidies of up to 30 % of the investment costs are available to renewable energy technologies, including biomass.

- **Technological development: Extensive research and development capabilities have formed the basis for the establishment of a strong Finnish biomass technology industry**

The Finnish government provides a high level of subsidy and support to research and development to develop an indigenous biomass technology industry. This has helped to create a strong domestic market and a thriving export industry, in particular in combustion technology, boilers and emissions control.

- **Information, education and training: Active promotion of biomass energy through associations, agencies, etc.**

This includes the establishment of regional energy management agencies, working closely with national energy information centres. Finnish associations produce information material and innovative information dissemination schemes, especially in biomass (e.g. the Finnish Bioenergy Association, the Wood Energy Association). These associations also work closely with organisations in other Member States to make Finnish capabilities in biomass widely known. For example, Finnish biomass organisations have formed close links with similar organisations in Wales in the UK to transfer their know-how to encourage uptake of biomass use there.

Regional or local best practice

Pohjolan Voima has, as a part of its bio-energy programme, started a new project in Ostrobothnia with the goal to launch the cultivation of reed canary grass for large-scale energy production. The aim is to cultivate reed canary grass on approximately 4,000 hectares before the end of 2005. The power plants included in the project are Alholmens Kraft, Vaskiluodon Voima Oy Seinäjoki, Kokkolan Voima and Vieskan Voima (Ylivieska).

As a substitute for peat, the reed canary grass will reduce the power plants' emissions of carbon dioxide by 40,000 metric tonnes and thus it improves the environmental friendliness of the plants. Reed canary grass is an excellent plant for energy production due to its rapid renewal, large yield per hectare and good burning properties.

The cultivation of reed canary grass secures the production condition of the fields. A field used for growing reed canary grass lies fallow with regard to food. It retains its productivity and can, if needed, be used for other cultivation. Since reed canary grass grows naturally on marshy ground, also unused areas like lake and river shores can be used. The cultivation of reed canary grass also creates opportunities for production and income for farms and entrepreneurs while the landscape is kept open. The cultivation of the plant is also suitable for peat bogs once the peat production has ended.

The aim is to make the harvest technique more effective during the project period to improve the competitiveness of reed canary grass. At the same time, we are also aiming to strengthen the position of reed canary grass in an agricultural and energy-political respect to create a long-term and profitable cultivation. (source Alholmens Kraft website <http://www.alholmenskraft.com/>)

4. Websites

Name	Description	Website
Energy Department of the Ministry of Trade and Industry	responsible for managing and planning national energy strategies	http://www.ktm.fi/
National Technology Agency of Finland (TEKES)	administrates research programs among other topics also in the field of energy technology	http://www.ktm.fi/
Motiva	An impartial service organisation promoting a market for renewable energy sources and efficient energy use.	http://www.motiva.fi/
VTT Energy	VTT is an impartial expert organisation that carries out technical and technoeconomic research and development work and produces information services.	http://www.vtt.fi/indexe.htm
Pohjolan Voima	Pohjolan Voima is a privately owned group of companies in the energy sector, which produces electricity and heat for its shareholders in Finland.	www.pvo.fi
Europa website	EU Commission website	http://europa.eu.int
European Commission – Directorate General for Transport and Energy		http://europa.eu.int/comm/energy/index_en.htm
Managenergy	Information service for local and regional energy actors	www.managenergy.net