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## **FINLAND'S REPORT ON THE IMPLEMENTATION OF DIRECTIVE 2001/77/EC (PROMOTION OF ELECTRICITY PRODUCED FROM RENEWABLE ENERGY SOURCES)**

### **Summary**

Article 3(3) of Directive 2001/77/EC requires the Member States to publish a report which includes an analysis of success in meeting the national indicative targets.

For Finland, the indicative target for the share of electricity produced from renewable energy sources is 31.5% of gross domestic energy consumption by 2010. Depending on the situation with hydropower, this share has varied between 24% and 30% in recent years. In 2004, the share of electricity produced from renewable energy sources was 28.8%. It is challenging to achieve the target indicated in the Directive. During the years 1998–2004 the output of power plants using biofuel increased by over 600 MW, hydropower by approximately 80 MW, and wind power by approximately 65 MW.

The guarantee of origin scheme for electricity has been implemented through an Act and a Government Decree. The Electricity Market Act guarantees the right of access to the grid system to all electricity-producing power plants, including those producing from renewable energy sources, by imposing on transmission and distribution system operators an obligation with regard to transmission and connection as well as development of the grid system. Efforts have been made to reduce administrative barriers to the building of wind power plants through reserving suitable areas for wind power in provincial plans.

Emissions trading has already raised the price of electricity, which contributes to the creation of more competitive conditions for building capacity for emission-free electricity production from renewable energy sources.

At this stage there are no schemes based on green certificates or purchase obligations in operation in Finland. Promotion of electricity produced from renewable energy sources is based on tax subsidies and discretionary investment subsidies. The introduction of green certificates will be reconsidered should the incentives created by the emission trading scheme and the current system based on investment and tax subsidies fail to promote renewable energy sufficiently.

## 1. Report under Article 3(3)

### 1.1 Estimate of the degree of success in meeting the national indicative targets

According to the energy statistics of Statistics Finland, the production of electricity from renewable energy sources was 25 026 GWh in 2004. This is 24% more than in 2003. Gross consumption of electricity was 87 025 GWh in 2004, i.e. 2% more than in the previous year. The remarkable growth of electricity production from renewable energy sources resulted from a favourable situation with regard to hydropower production.

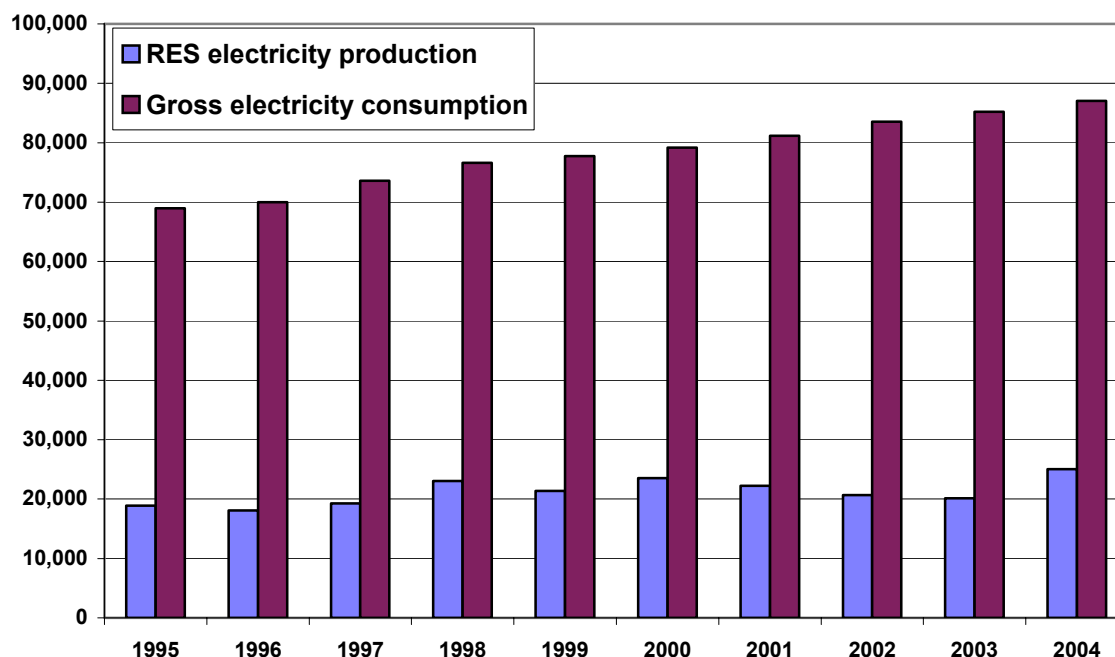


Figure 1. Gross consumption of electricity and electricity produced from renewable energy sources, GWh

The total amount of electricity produced from renewable energy sources has fluctuated significantly from year to year, depending on the conditions for hydropower production. During the reference period 1995–2004, hydropower production was 14.9 TWh at its peak in 2004 and 9.5 TWh at its lowest in 2003. Average annual production of hydropower is approximately 12.7 TWh.

Along with hydropower, biomass is an important renewable energy source for electricity production. Electricity production from biomass has been growing steadily. Statistics on renewable energies have been gathered since 1995, and since then the production of electricity from biomass has increased by approximately 65%. In 2004 there seems to have been a slight decline in the production of electricity from biomass.

Operating times of industries have a significant influence on the use of wood fuel. Moreover, fluctuations in the use of wood fuel can be partly explained by the availability of electricity from hydropower. The influence of changing water conditions on the use of biomass fuel can be illustrated by an example: in 2004, electricity produced from hydropower was available at a competitive price, and this had a slightly negative impact on the production of electricity from other sources. The reverse was seen in 2002 and 2003: the scarcity of hydropower led to increased electricity production from biomass and other

sources. Renewable energy statistics for the most recent years, namely 2003–2004, are still under special review and are therefore subject to change. Reviews are being carried out by Statistics Finland and Adato Energia Oy.

The third renewable source for electricity production in Finland is wind power, the share of which is for the time being rather marginal compared to hydropower and biomass. Wind power capacity has shown rather weak growth since 2000, and output has even declined at times due to poor wind conditions. In 2004 wind power hit its record to date: 120 GWh.

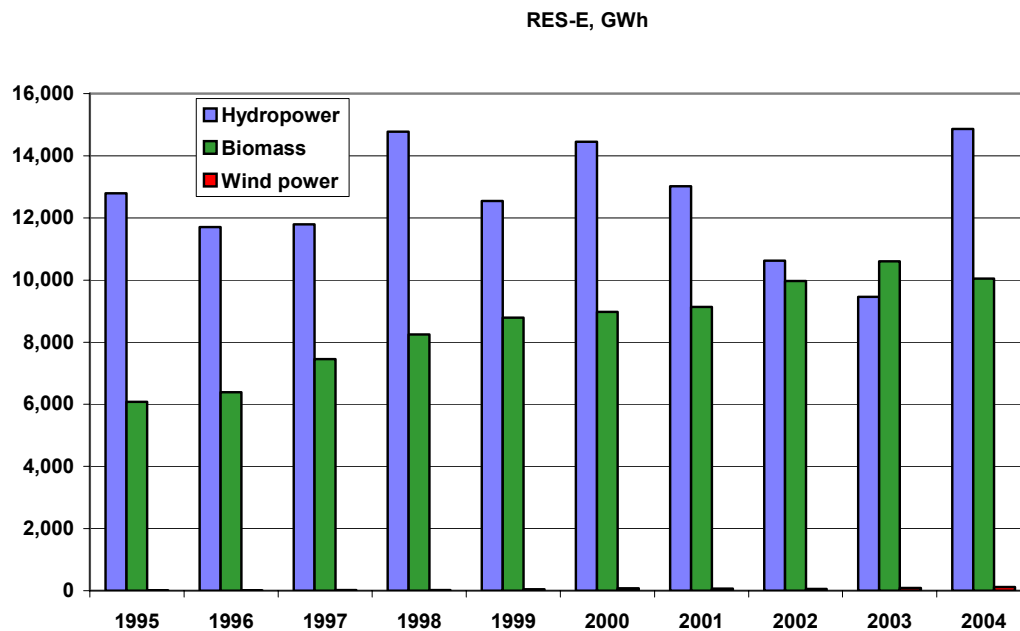
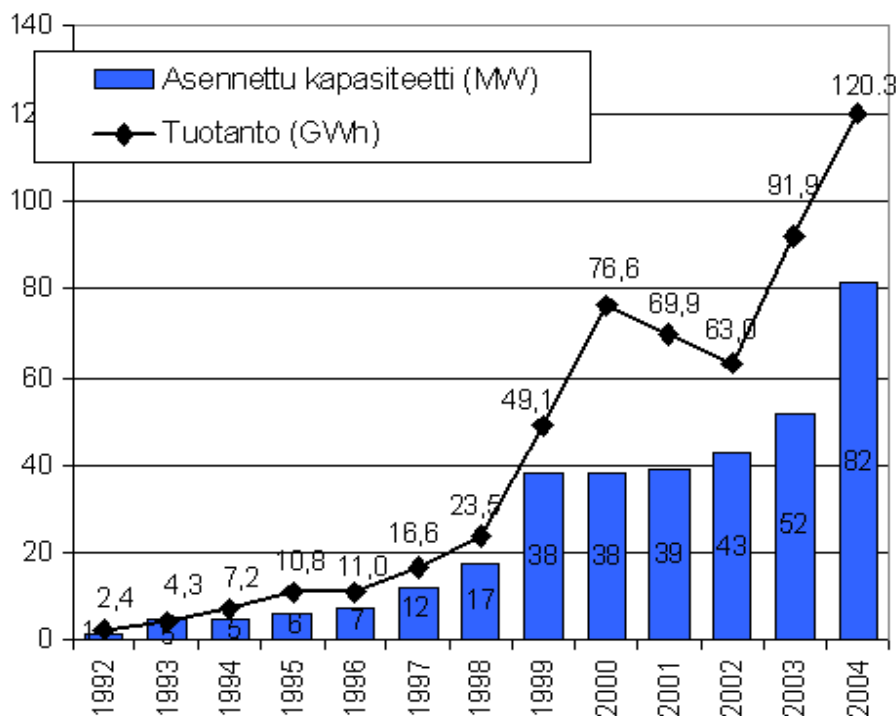


Figure 2. Electricity produced from renewable energy sources, GWh



Asennettu kapasiteetti = Capacity installed  
 Tuotanto = Production

Figure 3. Development of wind power production and capacity (Source: VTT)

The target set by the Directive for Finland is challenging in Finnish conditions, since production from the leading domestic renewable energy source, hydropower, can hardly be increased, and hydropower production is very dependent on the water situation each year. Annual variations can be as high as 30–50%.

In the light of actual production figures, the amount of electricity produced from renewable energy sources correlates strongly with the amount of electricity produced from hydropower. A good example of this is the over 50% difference between the hydropower production figures of 2003 and 2004. At its peak, the share of production from renewable sources was approximately 30% in both 1998 and 2000, while the share was only 24.2% in 2002. This was obviously due to changes in production from hydropower. When the trend is examined — by setting annual hydropower production at the level of a constant average of 12.7 TWh — it appears that the share of electricity produced from renewable energy sources has remained more or less stable at approximately 27%. In the long term, the amount of electricity produced from renewable sources has increased, but electricity consumption has increased even more rapidly.

Until 2001, the situation with regard to hydropower was very favourable in the Nordic countries, and this kept the market price of electricity very low on the Nordic free electricity market. As long as the price was low, investment in new electricity production capacity was also low. Instead, electricity imports hit record levels. However, a significant share of investment was directed to power plants using bioenergy. Their capacity increased by over 600 MW in the years 1998–2004. Wind power capacity increased by approximately 65 MW. In addition, new small-scale hydropower plants were constructed and the capacity of existing hydropower plants was increased by approximately 80 MW during the same period. As a result of emission trading, the market price of electricity has recently risen sharply. This will stimulate greater investment in electricity production, including from renewable energy sources, in the future. Against this background, it still seems entirely possible to achieve the target for electricity production from renewable energy sources.

In certain EU Member States, electricity produced from renewable energy sources is promoted through feed-in tariffs based on purchase obligations or green certificates. The introduction of both schemes is also being examined in Finland, taking into account international experiences and the development of the Swedish and Norwegian joint certificate scheme in particular. Both schemes involve various problems related to practical implementation and the Finnish and Nordic electricity markets. The introduction of the green certificate scheme will be reconsidered if the incentives created by the emission trading scheme and the current system based on investment and tax subsidies fail to promote renewable energies sufficiently. The rise in the market price of electricity and the rise in costs related to pollution-emitting fuels as a result of the emission trading scheme both clearly improve the competitiveness of e.g. wood fuel more than the traditional investment grants and tax subsidies.

On 24 November 2005 the Government submitted to Parliament a report on short-term orientations for energy and climate policy, a national strategy for the implementation of the Kyoto Protocol (“Lähiajan energia- ja ilmastopolitiikan linjauksia – kansallinen strategia Kioton pöytäkirjan toimeenpanemiseksi”). The strategy sets targets for the forthcoming years and actions to lower CO<sub>2</sub> emissions. The strategy gives a prominent role to renewable energy sources and energy savings in reducing CO<sub>2</sub> emissions. The strategy is currently being discussed by Parliament, which is likely to deliver its opinion by the summer of 2006.

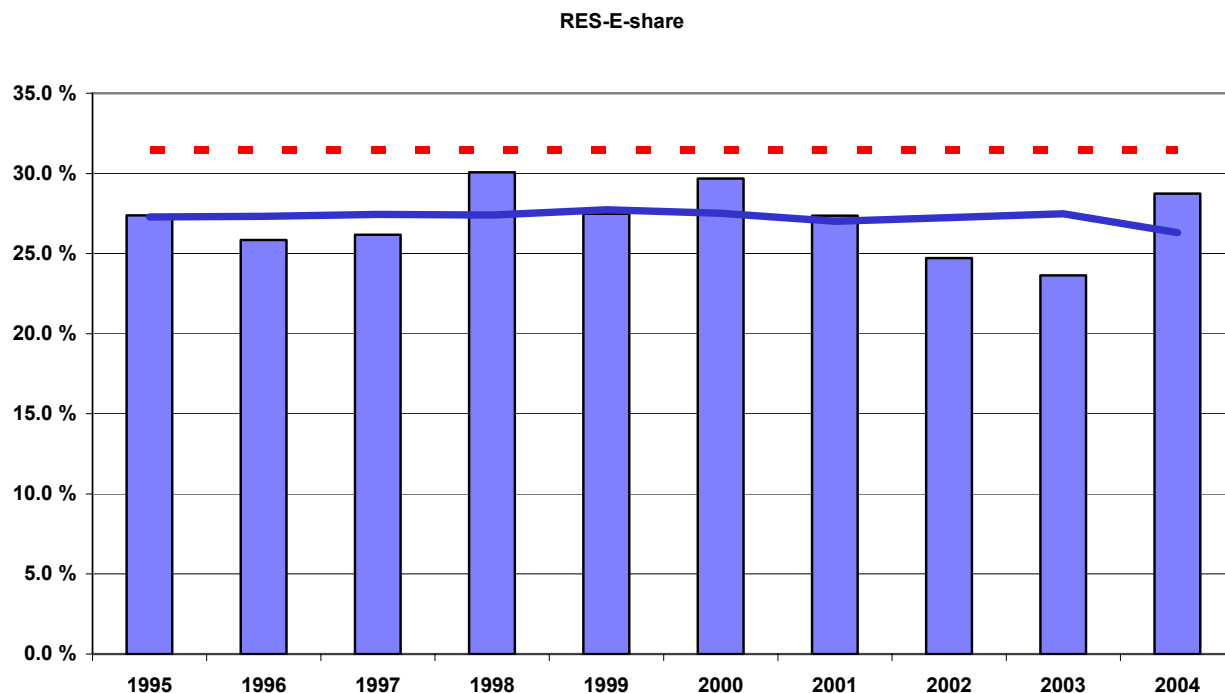


Figure 4. Electricity produced from renewable energy sources as a proportion of gross electricity consumption.

(The share corresponding to an average level of hydropower production, 12.7 TWh, is shown as a continuous line. The target for Finland, 31.5%, is shown as a dashed line.)

## 1.2 Measures taken to ensure the reliability of the system of guarantees of origin (Article 5(5))

The system of guarantees of origin of electricity has been implemented in Finland by means of the Act on the Verification and Notification of the Origin of Electricity (1129/2003) and the Government Decree on the Verification of the Origin of Electricity (1357/2003). Detailed information on these provisions was given in connection with the report submitted in 2003.

In 2006, the guarantee of origin scheme will be extended, in accordance with the CHP Directive, to include electricity produced efficiently through CHP.

## 2. Report under Article 6(2)

### 2.1 Evaluation of the legislation with regard to authorisation procedures or the other procedures which are applicable to electricity production plants (Article 6(1))

In Finland, the main problems concerning authorisations to build electricity production plants are related to wind power plants and, more recently, power plants using recycled fuel for energy production.

During the last two years, substantial efforts have been made in Finland to clarify and simplify planning and authorisation procedures for building wind power plants. Finland has mapped out and examined areas that are appropriate for wind power plants, taking into account technical and economic aspects as well as the environmental impact of wind power. The coastline, off-shore areas and Lapland have been examined. Most of the areas with the greatest potential for wind power were mapped out by the end of 2005. On the basis of these studies, the appropriate areas have been taken into account in the recently updated provincial

plans, and these areas have been reserved for building wind power plants. This will considerably speed up the authorisation procedures for building wind power plants.

The entry into force of the Directive on the incineration of waste has led to a halt in the building of power plants using recycled fuels due to repeated appeals against environmental and construction permits. Solutions to this, as well as ways to apply the legislation, will be sought through the legal processes and the forthcoming decisions by courts of various instances.

## **2.2 Measures to facilitate access to the grid system of electricity produced from renewable energy sources (Article 7(7))**

The Electricity Market Act (386/1995) guarantees access to the grid system for all electricity users and electricity-producing plants, including those producing from renewable energy sources. This Act was thoroughly described in connection with the report submitted in 2003.

It has been noted, however, that access to the grid system by small power plants and transmission fees applied to them have been at a level that has slowed down the implementation of investment projects. The profitability of projects has suffered as a consequence. It has therefore been decided to facilitate access to the grid system of small power plants by developing the regulation of the energy markets in order to promote cogeneration of heat and power and to boost the use of biofuels and renewable sources of energy. The resulting additional costs will be taken into account in the tariffs applied to other grid users. In connection with this, a working group was set up and it will make a proposal on how to correct the situation during the spring of 2006.

Tekes, the Finnish Funding Agency for Technology and Innovation, is currently working on the Distributed Energy Systems Technology Programme (DENSYS). The programme is developing local low capacity systems for energy conversion, production and storage as well as related services. The programme has examined the connection of distributed electricity production to the grid system and an environment for simulation (software) has been developed to this end. Distributed electricity production can help secure the availability of electricity in sparsely populated areas and more generally reduce energy loss in the grid. The estimated total budget of the programme is over €50 million.

Tekes is also working on the Business Opportunities in the Mitigation of Climate Change Technology Programme, which will be implemented in 2004–2009. The estimated total budget of the programme is approximately €70 million. One of the main areas of study is related to clean energy production and fuels. This divides into sub-areas of which the following are the most important: replacement of coal with renewable energy sources in energy production (technology, products, overall concepts and services that increase the share of biomass in the existing coal-dust boilers or that replace coal-based energy production with new technology); improvement of efficiency and construction rate of energy production (this includes the development of new solutions in boiler technology in order to improve the efficiency of electricity production as well as new electricity production solutions based on gasification of biomass); and management of the bioenergy production chains (development of operating modes and supporting services as well as techniques in order to improve the management of the entire bioenergy chain and consequently cost-efficiency on markets that are central to the business of Finnish companies).