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KAUPPA- JA TEOLLISUUS-MINISTERIÖ

REPORT

27.11.2007

REPORT BY FINLAND ON IMPLEMENTATION OF DIRECTIVE 2001/77/EC (Directive on the promotion of electricity produced from renewable energy sources in the internal electricity market)

Background

Article 3(3) of Directive 2001/77/EC requires the Member States to publish a *biennial report which includes an analysis of success in meeting the national indicative targets*. In 2007 the Member States must also adopt and publish a report pursuant to Article 3(2) *setting national indicative targets for the next ten years*. The reports must outline the measures taken or planned to achieve these targets.

In Finland a climate and energy strategy is being prepared in accordance with the plan drawn up by Prime Minister Vanhanen's second government that will set targets for the use of renewable energy up to the year 2020 in accordance with the guidelines drawn up at the 2007 spring European Council. The strategy should be ready by 2008 and will be submitted to Parliament as a government report. The sectoral objectives such as the promotion of energy to be generated from renewable resources form part of this strategy. The strategy will also strengthen Finland's commitment to the indicative target on the use of renewable energy for the production of electricity. We are therefore now reporting on the measures taken and the results obtained as required by Article 3(3). It makes sense to produce the report provided for in Article 3(2) only once this strategy has been completed.

Finland's indicative target for electricity generated from renewable energy sources is 31.5% of gross domestic electricity consumption by 2010. To date, this portion has fluctuated between 24 and 30% in recent years depending on the hydroelectric power situation. In 2006, the portion of electricity generated from renewable sources was 24% owing to the lower-than-average volume of HEP. Standardised to an average hydro year (Nordel), the portion was 26% HEP .

The target of 31.5% set for Finland by the Directive is ambitious, given the conditions that obtain in Finland. Approximately 60% of the electricity generated from renewable energy sources in Finland is HEP, the amount of which cannot really be increased for environmental reasons. Hydroelectric production depends on the hydrological situation, and year-on-year differences may be as high as 30 to 50 %.

The second main source of renewable energy is the wood-based fuels obtained as by-products from forestry (black liquor, wood residues and the like). Accordingly, the amount of electricity generated from biomass depends primarily on the output of forestry, which varies according to the market.

In all, the amount of energy generated from biomass has grown by a quarter since 2000. The impact of subsidies is particularly discernable in the use of wind power and new bio energies (biogas, arable energy, recycled fuels).

Emissions trading has already pushed up the price of electricity and is creating the conditions for building up emissions-free electricity production based on renewable energy sources. The new trading period that starts in 2008 is expected to push up electricity prices further still and thus make renewable electricity even more competitive.

The introduction of emissions trading in 2005 prompted changes to the subsidy mechanisms for renewable energy production in Finland. The tax benefit for electricity generated using wood and wood-based fuels, waste gas from metallurgical processes and chemical reaction heat was discontinued in early 2007. Other electricity production subsidies such as subsidies for wind power, small-scale HEP, recycled fuels, forest processed chips and biogas were retained.

In 2006, new guidelines were introduced the State energy aid scheme for investments in renewable energy. Under the guidelines, aid for investments in the emissions trading sector was discontinued other than for innovative technology projects. Aid continues to be granted outside the emissions trading sector, including for investment projects using conventional technology. It should be noted that aid for wind energy investment continues, but only for projects using innovative technology.

The "guarantee of origin" system for electricity has been implemented by an act and a government decree. The Electricity Market Act safeguards network access for all electricity generation facilities, including those based on renewable energy, by laying down transmission, connection and network development obligations for transmission and distribution network operators.

Finland has not so far made use of schemes based on green certificates or feed-in tariffs. In Finland, promotion of electricity produced from renewable energy sources is based on tax benefits and discretionary investment subsidies. However, under the government's programme, preparations have started for implementing a feed-in tariff for biogas installations under 20 MW.

When the climate and energy strategy comes up for review, thought will be given to the possibility of expanding the feed-in tariff mechanism and introducing green certificates if the incentives created by the emissions trading system and the current system based on investment grants and tax benefits fail to promote new energy sufficiently.

1. Confirming the renewable energy targets

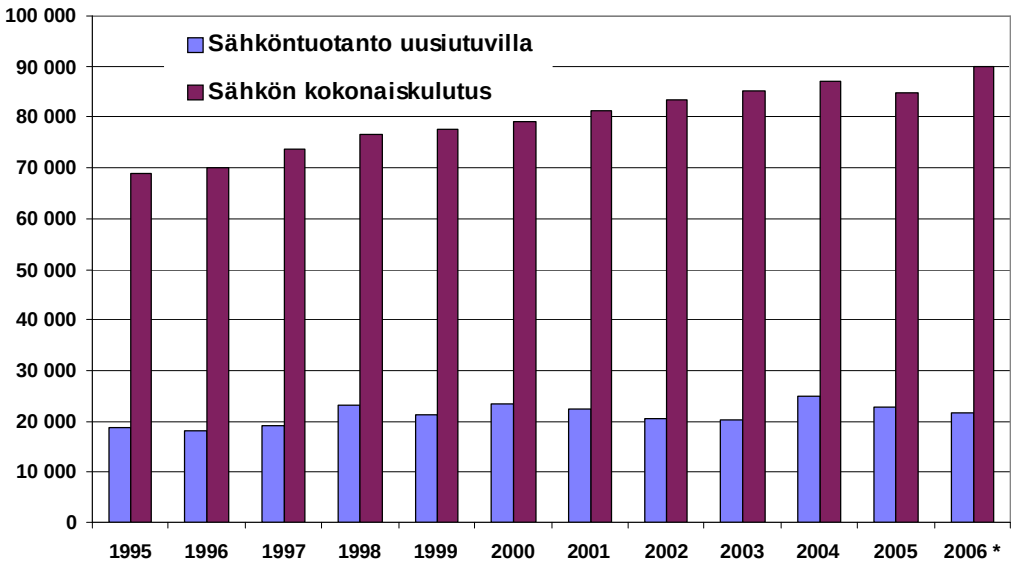
Finland is preparing a climate and energy strategy in accordance with the plan drawn up by the second government of Prime Minster Vanhanen. The new strategy sets out Finland's main climate and energy policy targets and measures for the next ten years as part of the European Union and in view of the latter's targets. The object is to significantly increase the use of renewable energy from the current level, which is already 25% of total energy consumption. Discussing the forms of aid for the generation of electricity based on renewable energy sources forms part of this strategy. The strategy should be ready by 2008, when the government will submit a report to Parliament.

The government submitted the previous report to Parliament on 24 November 2005. This was entitled "Short-term energy and climate policy guidelines – the national strategy for implementing the Kyoto protocol". Renewable energy sources and energy savings are crucial to the strategy as ways of reducing carbon dioxide emissions.

2. Meeting the national indicative targets

Generation of electricity by means of renewable energy

According to the energy statistics published by Statistics Finland, in 2005 Finland generated 22 738 GWh of electricity from renewable energy sources, or 27% of consumption, whilst advance estimates indicate that the corresponding figure for 2006 is 21 760 GWh in total, or 24% of total electricity consumption. In other words, the amount of electricity produced from renewable energy fell by 5% compared with the previous year, mainly as a result of the poor HEP situation.



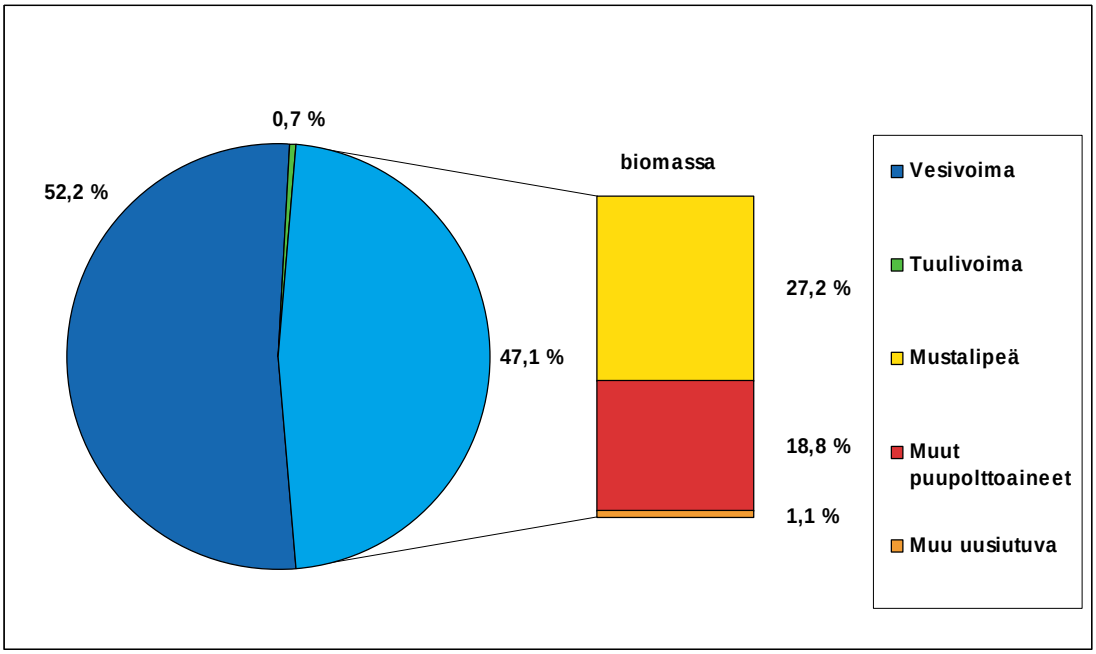
Key reads: Electricity production from renewables
Total electricity consumption

*Total consumption of electricity in Finland and electricity generation from renewable energy sources, in GWh. (*estimate; source: Statistics Finland; hydropower non-standardised)*

Total energy consumption in 2006 according to estimates was a good 90 000 GWh, representing a growth of 6% over the previous year. This major increase was attributable to the previous year's lengthy lock-out in the forestry industry, which considerably skews the figures for 2005. Over the past ten years consumption of electricity has grown by around 2.5% per year, and consumption of energy generated from renewable resources slightly more slowly.

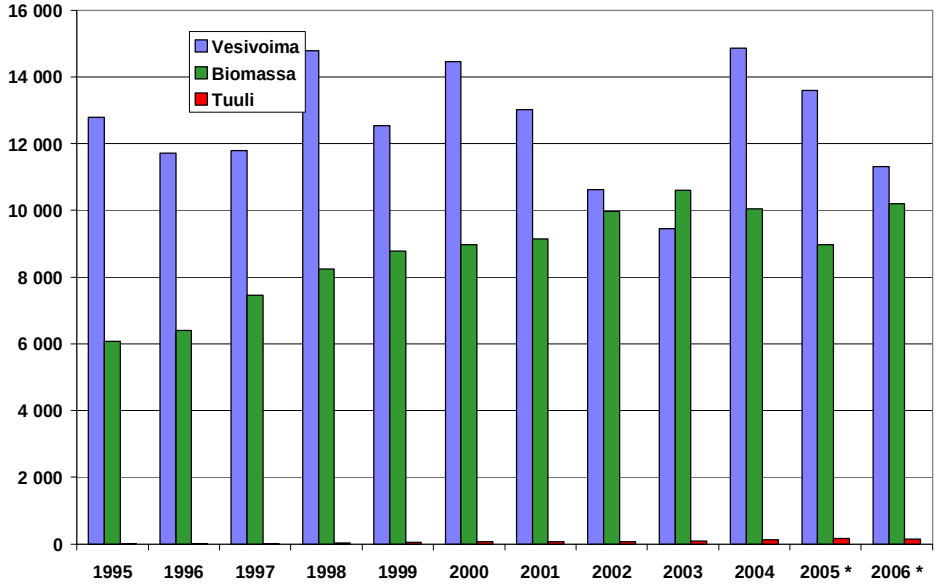
The reduction in electricity generated from renewable energy in 2006 is attributable to HEP, which fell by 2.3 TWh compared with the previous year. If the amount of hydroelectric power is standardised (Nordel), then the portion of electricity generated from renewables is 26%. Between 1998 and 2006, small hydropower plants were built and the capacity of hydroelectric plants was raised to the tune of around 117 MW.

After HEP, the second largest source of renewable electricity production in Finland is biomass, chiefly by-products of the forestry industry (black liquor, wood residues). The amount of electricity generated from biomass has increased by a quarter since 2000. Biomass-based electricity production has increased steadily with the exception of 2005, when the production of the forestry industry fell temporarily owing to a labour dispute. In 2006, total electricity generated from biomass was 10.2 TWh. There has also been a good deal of investment in power stations using bio-energy, the capacity of which grew by over 600 MW between 1998 and 2004.



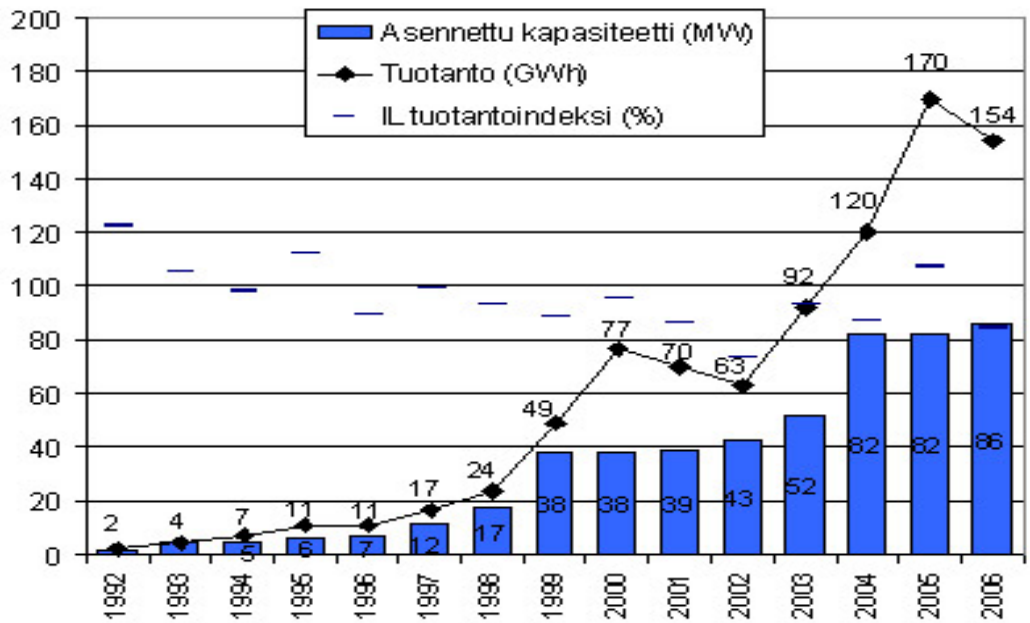
Key reads, top to bottom:
Hydroelectric power
Wind energy
Black liquor
Other wood-based fuels
Other renewables

Production of electricity from renewables by source, 2006 (22.7 TWh), %
(source: Statistics Finland)



Key reads, top to bottom:
Hydroelectric power
Biomass
Wind energy

*Production of electricity from renewable energy 1995- 2006, GWh (*estimate; source: Statistics Finland)*



Key reads, top to bottom:
Installed capacity (MW)
Output
Dashed line: Finnish Meteorological Institute production index (%)

Development of wind energy production and capacity (Source: VTT)

At the end of 2006, Finland's wind energy capacity was 86 MW (96 plants). Wind energy generated 154 GWh, which corresponds to approximately 0.2% of Finland's annual electricity consumption. 2006 was much calmer than average, which explains the reduced annual production. (source: VTT). However, wind energy production has grown significantly over the past few years. In 2007 capacity exceeded the 100 MW threshold.

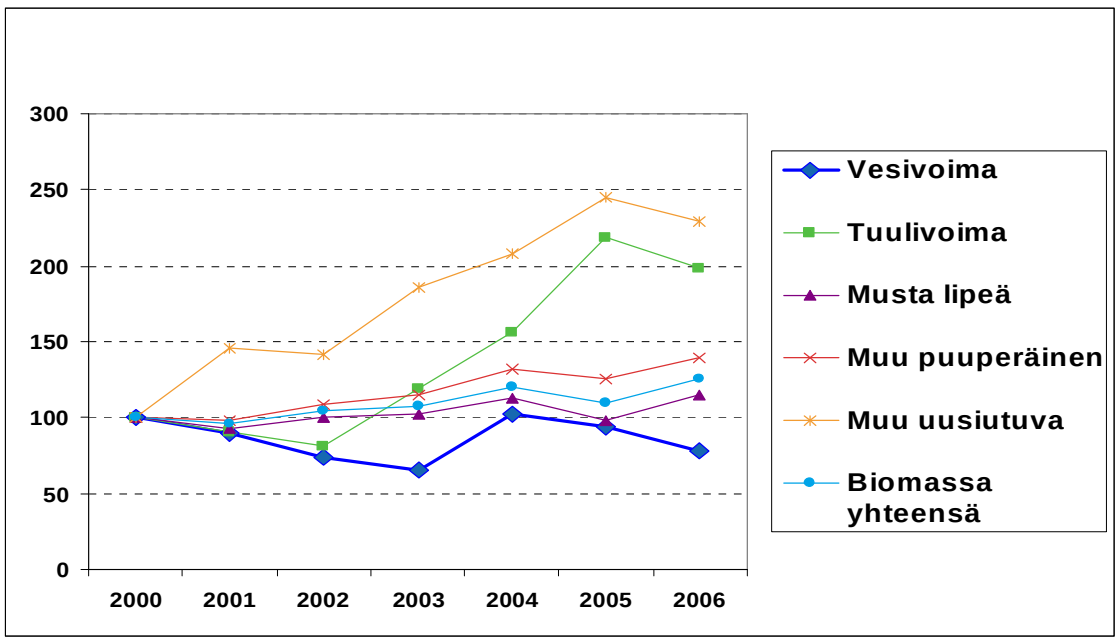
Target achievement assessment

The target of 31.5% laid down for Finland by the Directive for the proportion of renewable energy generation is an ambitious one, given the conditions that obtain in the country. Environmental reasons mean that the amount of electricity produced using the country's most important source of renewable energy, hydroelectric power, cannot really be increased, and HEP is also dependent on each year's hydrological conditions. Year-on-year differences may be as much as 30 to 50 %. In addition the amount of electricity generated by biomass is linked primarily to the output of forestry, which varies according to the market.

If hydroelectric power is assumed to remain constant in the longer term at 13TWh annual average output, the portion of renewable electricity appears to stay fairly stable at around 28%. The amount of electricity produced from renewable energy sources has in the long term increased, but consumption of electricity has increased faster still.

Until 2001, the situation regarding hydroelectric power was fairly favourable in the Nordic countries, and this kept the market price of electricity very low on their free electricity market. As a result of the low price level, investment in new electricity generation capacity in Finland was very low, and record amounts of electricity were imported.

Biomass-based electricity production has made remarkable progress in recent years. Sources of renewable energy which are independent of forestry production and which qualify for aid - such as biogas and arable energy – have posted particularly rapid growth. The fastest growth can be seen in the use of wind energy and new biomass sources (biogas, arable energy and recycled fuels, though their contribution to production is fairly marginal.



Key reads, top to bottom:
Hydroelectric power
Wind energy
Black liquor
Other wood-based
Other renewable
Biomass in general

Production trends for renewables, by source (1990 = 100)

The market price of electricity has increased considerably, *inter alia* as a result of emissions trading, and it is thought that the price will rise further still when the new emissions trading period starts in 2008. This will speed up investment in electricity production, including investment in the production of electricity from renewable energy. The climate and energy strategy being drawn up will assess the relevant aid measures.

3. Support schemes

The introduction of emissions trading in 2005 prompted changes to the support schemes for renewable electricity production in Finland. The tax benefit for electricity generated using wood and wood-based fuels, waste gas from metallurgical processes and chemical reaction heat was discontinued in early 2007. Other electricity production subsidies such as subsidies for wind power, small-scale HEP, recycled fuels, forest processed chips and biogas were retained..

New guidelines were introduced in 2006 for State benefits for renewable energy investments. Under the guidelines, investment subsidies in the emissions trading sector were suspended other than for innovative technology projects. Aid continues to be granted outside the emissions trading sector, including for investment projects using conventional technology. It should also be noted that aid for wind energy investment continues, but only in respect of projects using innovative technology..

The use of new support schemes or a possible extension will be reconsidered if the incentives created by emissions trading and the current scheme based on investment grants and tax benefits fail to promote renewable energy sufficiently. The rise in the market price of electricity and the rise in costs relating to emission-producing fuels sparked by the emissions trading scheme both clearly do more to improve the competitiveness of wood fuel than traditional investment grants and tax benefits. The new emissions trading period that starts in 2008 is expected to further increase the price of electricity and thus further improve the competitiveness of renewable electricity.

Electricity generated from renewable sources is being promoted in many EU countries by means of green certificates and feed-in tariffs based on compulsory purchasing.

Finland's first feed-in tariff project for the production of renewable energy is the introduction of the feed-in tariff mentioned in the government programme for biogas plants with a capacity of under 20 MW. The scheme is to include plants using field biomass, slaughterhouse waste, various manures or municipal waste as fuel. Preparation of the scheme began in summer 2007, and the plan is to have the bill submitted to Parliament during the spring 2008 session.

4. Rules governing authorisation or other procedures applicable to electrical generation plants

In Finland, the problems regarding authorisation to build electricity generation plants relate chiefly to wind energy plants and, more recently, the construction of plants using recycled fuel for the production of energy. In a bid to eliminate these problems, efforts have been made to clarify and simplify planning and authorisation procedures. Finland has surveyed and identified suitable areas for the construction of wind power plants. The survey reports take account of both technical and economic points of view, as well as the environmental impact of building wind energy plants. The survey took in coastal areas, offshore areas and the uplands of Lapland. Most of the areas with the greatest potential in terms of wind energy have now been mapped. On the basis of these studies, the relevant areas have been included in the updated provincial plans and set aside for the construction of wind power facilities. This will considerably speed up the authorisation procedure for building wind power facilities. In accordance with the government's plan, a new wind atlas is being compiled for Finland. This is expected to provide more detailed information on wind conditions and on the possibilities of using wind energy also on inland sites.

The entry into force of the Directive on waste incineration has led to a halt in the construction of power plants using recycled waste because of repeated appeals against environmental and construction permits. Solutions to this, and a uniform interpretation of the law, will be sought via the hearings and rulings of the courts at various levels.

5. Grid access for electricity produced from renewable sources

The Electricity Market Act (385/1995) guarantees grid access for all electricity users and electricity generating plants, including those generating electricity from renewable energy. The law was described in detail in the report submitted in 2003.

In spite of the operational environment created by the Electricity Market Act, it has been noted, especially in connection with small generating plants, that their access to the grid and their transmission charges are such that the realisation of investments in small plants has been slowed down. The profitability of projects has suffered as a result. The Electricity Market Act has been amended to improve the situation. The changes will enter into force on 1 February 2008. The amendment is designed to facilitate the access of small electricity producers to the distribution grid and promote combined heat and energy production and the use of biofuels and renewable energy sources.

The amendment was effected by adding a special provision to the Electricity Market Act regarding network service charges for the production of electricity. This stipulates that distribution system operators may not include grid reinforcement costs in the connection fee for small-scale electricity production. It further provides that transmission payments chargeable on the production of electricity in the grid must cover a smaller portion of the grid costs than the transmission payments chargeable on electricity consumption. At the same time it establishes a common framework for electricity production transmission payments in electricity distribution networks.

Furthermore, a government decree sets out detailed rules governing transmission charges for the production of electricity and the way these are defined on the distribution network, as well as threshold values to be imposed on transmission charges for electricity production which are proportionate to the amount of energy supplied. These must be complied with by distribution system operators.

6. Guarantee of origin system

The "guarantee of origin" system for 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 descriptions of the act and the decree were given in the 2003 report. The guarantee of origin system will be extended in the near future, in accordance with the CHP Directive, to include more efficiently generated CHP electricity.

7. Other measures

TEKES, the Finnish Funding Agency for Technology and Innovation, has been running and has just completed the Distributed Energy Systems Technology Programme (DENSY). As part of the programme, low-capacity systems for energy conversion, production and storage have been developed, along with related services. Research has been carried out into, for example, the connection of distributed energy production to the grid. One of the products developed for this purpose is a simulation environment (software). In sparsely populated areas, the distributed production of electricity may safeguard the supply of electricity and generally reduce grid disruptions.

TEKES is currently running ClimBus, a wide-ranging technology programme focusing on business opportunities associated with controlling climate change. The programme covers the period 2004–2009, and its total budget is estimated at around 70 million euros. One of the main areas of study relates to clean energy production and fuels. The main sub-areas are replacement of coal with renewable energy sources in energy production (technology, products, overall concepts and services which increase the share of biomass in existing coal-dust boilers or which replace coal-based energy production with new technology), improvement of the efficiency and power-to-heat ratio of energy production (including the development of new solutions in boiler technology in order to improve the efficiency of electricity production and new electricity production solutions based on gasification of biomass) and management of the bio-energy production chains (development of operating models and of support services and techniques in order to improve the management of the entire bio-energy chain and thus cost-efficiency on markets that are central to Finnish businesses).

In addition to programme-based activities, TEKES also funds a large number of business R&D projects relating, amongst other things, to the production of electricity by means of renewable energy).