

# EXPLOITATION OF BIOMASS IN FINLAND



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## **Background**

Finland is the world leader in the utilisation of bioenergy and in the development of biomass combustion technologies and efficient fuel supply chains. The expertise extends from the forests to heating or power plants, from root to soot.

One of the strengths of Finland's energy economy is the varied nature of the energy production structure. Wood and wood based fuels play an important role in the decentralised and diversified energy system. Finland's geographic and climatic features, as well as the important role energy-intensive industries play in the economy have spurred the development of efficient energy systems. The pulp and paper industry supplies over two fifths of the heat and electricity it needs by utilising its solid and liquid wood residues. This has created a natural context for the development of relevant bioenergy technology. The chemical recovery boilers and solid wood residue fired boilers required by the forest industry have supported the development of solid fuel power boiler technology which is suited for a variety of biomass and waste fuels.

## **Biomass, An important role in the Finnish energy system**

Renewable energy sources accounted for 25 % of the total consumption of energy in Finland in 2000, which was 31.2 Mtoe. In addition to wood and wood based fuels such as solid wood residues and black liquors from the forest industry, this calculation includes hydropower, wind power and recycled fuels.

The National Climate Strategy, launched by the Finnish Government in 2000, highlights the targets and measures to meet the Kyoto commitments in Finland. By the years 2008–2012 emissions of greenhouse gases should be reduced to the level of 1990, when they were equivalent to around 76.5 million tons of carbon dioxide. In order to meet the target, it is necessary to implement an energy conservation programme and a programme promoting renewable energy sources. Together these two programmes may account for about half of the targeted emission reduction.

The Finnish Action Plan for Renewable Energy Sources launched in 1999 has the objective of doubling utilisation of renewable energy sources (12.3 Mtoe) by 2025, as compared to the situation in 1995 (6.1 Mtoe), when their share was 21 per cent of the total energy consumption. By 2010, the use of renewable energy sources should be 50 per cent higher (3 Mtoe) than in the reference year 1995. Their proportion will be roughly 27 per cent of the total consumption. The target for 2010 was confirmed in the National Climate Strategy in June 2001. In the attempt to reach the targets, wood based fuels and recovered fuels play a leading role in Finland. The increase in the use of renewable energy sources will be obtained almost entirely from bioenergy.

## **Measures to maintain biofuel competitiveness**

Production and utilisation of renewable energy have been promoted for a fairly long time by providing funds for research and development and by introducing financial and fiscal measures, such as energy taxation of fossil fuels and grants for investments or support for electricity production from renewable energy sources. In 1990 Finland was the first in Europe to introduce CO<sub>2</sub> taxation. In heat generation biofuels are not taxed, because net CO<sub>2</sub> emissions from their use are small, even including the harvesting and transport. To maintain biofuel competitiveness in power generation, a tax subsidy was introduced in 1997, when fuel taxes were replaced by taxes on electricity consumption.

Bionergy plays a central role with global warming and the need to stabilise CO<sub>2</sub> emissions being made renewable energy sources more and more attractive. Finland aims to increase the use of bioenergy sources by 50 per cent by 2010. This target is demanding – Finland being one of the leading bioenergy countries among the industrialised world, the share of bioenergy in the total energy consumption is already as high as 20 per cent. In addition to environmental considerations, there is another aspect; the use of bioenergy will be important for the local economy in sparsely populated rural areas. Fuel procurement especially can boost employment. In Finland, the development of energy technology has been made the cornerstone for future energy and climate change policies. R&D is regarded the most efficient way to achieve solutions that are of great importance to environment and economy in the long run as well. The Finnish bioenergy expertise and know-how provide a solid base for the advanced technological solutions. Most certainly, they will have applications in the countries where reduction of CO<sub>2</sub> emissions will be crucial. The most challenging goal in increasing the use of bioenergy and in the development of technologies is to minimise costs of fuel procurement. Sustainable forestry with emphasis on the entire forest ecosystem and biological diversity as well as a sustainable energy economy focusing on environmental solutions in fuel harvesting and transport will be the challenges in the future.

**List of literature:**

TEKES and VTT Publications:

- Growing Power, Advanced solutions for bioenergy technology from Finland
- Energy statistics in Finland 2000

These publications are available on the internet at [www.tekes.fi](http://www.tekes.fi)