

## Implementation of Renewable Energy Sources in Finland

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The EU directive on Renewable Energy Sources (RES) came into effect in 2009. The main target was to add the consumption of renewable energy sources used in the EU to 20 % of total by 2020. All the member countries have their own national targets, which they should achieve on the share of renewable energy sources before the year 2020. It is also included in the directive that the target for increasing the share of biofuels for transport should be at least 10 % of the total. Considering the ways to achieve these targets, it is restricted that biofuels counted to the national targets on renewable energy should be produced sustainably, meaning that they fulfill the limits imposed in the directive. Also it is stated about biofuels that so called second generation fuels, meaning biofuels produced on uneatable origins like felling waste etc. should be weighted strongly in the usage for transportation and energy.

In Finland the target is that the share of renewable energy in the final consumption would be at least 38 % of total in 2020. It would make the increasing obligation 9,5 percentage points since the agreement came into effect. In Finland the most important ones of the renewable energy sources are bioenergy, water-, wind- and solar energy and geothermal heating. In addition to the mandatory limits, Finland has set its own goal to that at least 20 % of all fuels used in transportation would be biofuels by the same year.

Naturally, being famous for its forests, in Finland bioenergy forms the biggest share of the renewable energy used, and the most of the bioenergy is produced from wood and wood based fuels. Great share of those are side products and waste from the effective production of forestry. These include woodchips, byproducts and spent liquors formed in the different phases of processing the wood into finer products like paper, for example. Other possible and already used sources of bioenergy are for example field biomass, biogas and biodegradable parts of bio and waste fuels, together with pellets as another wood-based fuel. The use of these is anyhow just a fraction compared to the wood-based products since no other field of technology considering biomass has been in large scale use for as long time and as effectively as forests and wood in Finland.

When talking about government's ways to guide the consumers and companies towards fulfilling the targets considering the RES, the subsidies are one of the first things to mention. In Finland those subsidies consist mainly of four categories: feed-in tariffs, investment subsidies, subsidies for the agriculture and energy subsidies for the consumer. The feed-in tariff is an aid that is targeted for power plants and their renewable energy forms. It is granted for maximum of twelve years and is paid to keep the price of so called "green energy" on affordable rate for consumers. The investment subsidy is the second biggest category of subsidies in Finland and is meant for companies for investments for facilities striving to reduce the amount of greenhouse gas emissions and to promote innovations on green, renewable technology. The last ones, subsidies for agriculture and consumers are much smaller ones when measured by euros, though important for the applicants. These subsidies are mostly granted for changing the heating plants and systems to ones that are utilizing sources of renewable energy instead of fossil fuels.

The consumers and companies are also guided to use renewable energy by taxing the forms of energy that produce greenhouse gasses more compared to the renewable ones. Energy taxes are collected on liquid fuels, electricity, coal, natural gas, fuel peat and tall oil, the percentage being the highest with coal based fuels and petrol.

As said, In Finland the bioenergy is indisputably the biggest source of renewable energy since the circumstances are not exactly ideal for solar energy production etc., at least not at the moment and with the existing technology. So mostly this bioenergy is produced from different types of biomass, of which, in this case, a great share consists of the wooden byproducts like branches and tree stumps collected off the ground after cutting down the forest. Understandably this arouses a lot of conversation considering for example the biodiversity and vitality of the soil. Since the branches etc. have for a long been an easy, natural way to fertilize the areas that have been cut down lately, it is important to discuss about how are we going to revitalize the ground after cutting down the trees if we collect all the original materials that would normally stay in the ground as fertilizers. Also many species of insects and polypores, for example, cannot survive without decay. Since nowadays most of our forests are commercial ones and well taken care of, there are not too many places for decay to spread in. So at the moment, the tree stumps left in the ground are one of the few objects in the nature actually left to rotten and get decayed and as the same serve those species one of the last places to live in. Lately though the collecting of the stumps is all the time getting more and more usual and more effective.

There has been talk about replacing some of these wood-based energy sources with ones taken of the fields, but same kinds of issues are facing the energy production in that direction too. First of all, many of the plants that could be grown just for the purpose of bioenergy would normally take growing area from the plants cultivated for nutritious uses. In other cases, like reed canary grass for example, the plants might grow on soil where no nutrient species would, but growing those plants might impoverish the soil radically or otherwise pollute the surroundings or harvesting it might not just be efficient enough for marketing purposes. When it comes to making use of the waste originating from the production for nutrition, for example the straws of wheat after harvesting, the discourse returns to the issues of biodiversity, fertilizers and health of the soil.

It does not matter which way Finland decides to head with these themes, it is always going to come across with a lot of discussion and options around these issues. Neither does it really matter if it is going to concentrate on developing the use and sources of biomass or to creating a technology effective enough for the use of solar- and wind energy, if it just does. The 38 % of the total energy being produced from renewable sources is a great start, but the need is most likely just going to grow further during the years. It would be wise for Finland, or any other country too, to invest in developing the sustainable use of renewable energy sources and the technology requisite for it, as much as possible now, and not to panic so much the day when the technology should have already been invented.

**Sources:**

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