

Electricity from biomass in the European Union: Hi targets - low status

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Bioelectricity targets in the EU

According to the EU “White Paper for Renewable Energy” biomass should contribute 230 TWh_e bioelectricity per annum by the year 2010 within the EU. This corresponds to 10 % of the 1995 total electricity production in Europe or 8 % for the target year 2010.

Allocating 230 TWh_e to the 15 EU-member states

This work attempts to allocate the above total amount of biopower to the 15 EU- member countries and comment on the progress made thus far. Four different scenarios were investigated according to typical power plants sizes that might suit better each member country’s infrastructure. The allocation of bioelectricity among the EU counties was based on an algorithm (Figure 1) which takes into account each EU-member state present progress of biomass-to-energy utilisation, their overall biomass potential and the extent of their CO₂ emissions deriving from electricity production. This factor represents the different greenhouse gas emissions abatement efforts allocated within the EU member states to achieve the overall Kyoto protocol CO₂ reduction obligation of the EU (-8% in year 2010 compared to 1990).

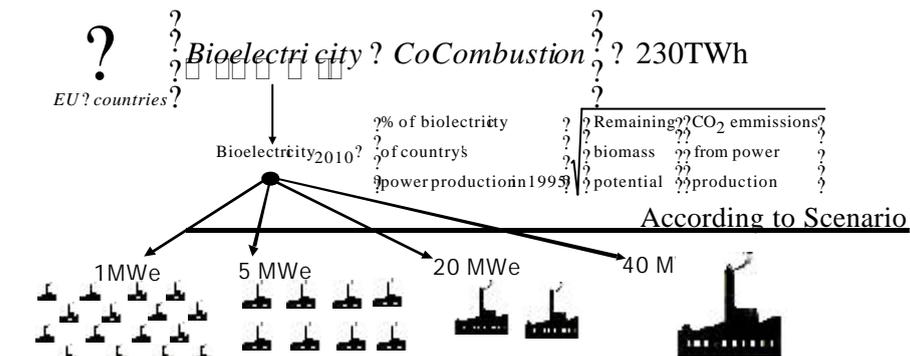


Figure 1. The methodology for allocating 230 TWh_e to each EU member state.

Each EU member country shows a different profile of available biofuels (Figure 2). The sources of biomass taken into account are existing residues and future energy crops. Examples of possible European energy crops are Giant Reed, Eucalyptus, Miscanthus, Sweet and Fibre Sorghum, Switchgrass, Wild Artichoke, Arundo Donax etc. As a first step, these could be cultivated in present fallow lands. Following the Common Agricultural Policy in the EU incentives, the food crop’s cultivation is going to be cut down in the years to come thus allowing even more non-food crop’s implementation (one kind of which are energy crops) [2]. The existing potential is evaluated according each country’s cultivated and forestry land, recorded annually, and the amounts of MSW (recorded annually for each member state [3] [4]). The potential evaluated for each EU – member country is shown in Figure 2. In total, the EU could produce 719 TWh_e of bioelectricity annually.

Scenarios for the implementation of the EU- target for bioelectricity in 2010

Four scenarios were investigated about the distribution of bioelectricity in each member state and the distribution of power station sizes and technology choice. Each scenario favours a biopower station size and accordingly one technology. The bioelectricity markets and business opportunities are evaluated and discussed.

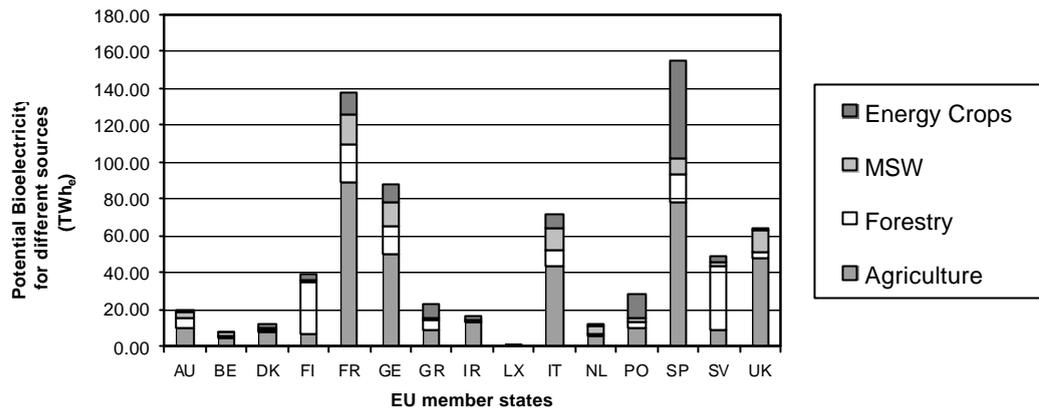


Figure 2. Biomass-to-Electricity Potential of each EU member state.

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A balanced scenario between the different power plant sizes is illustrated in Figure 3. Only Finland,

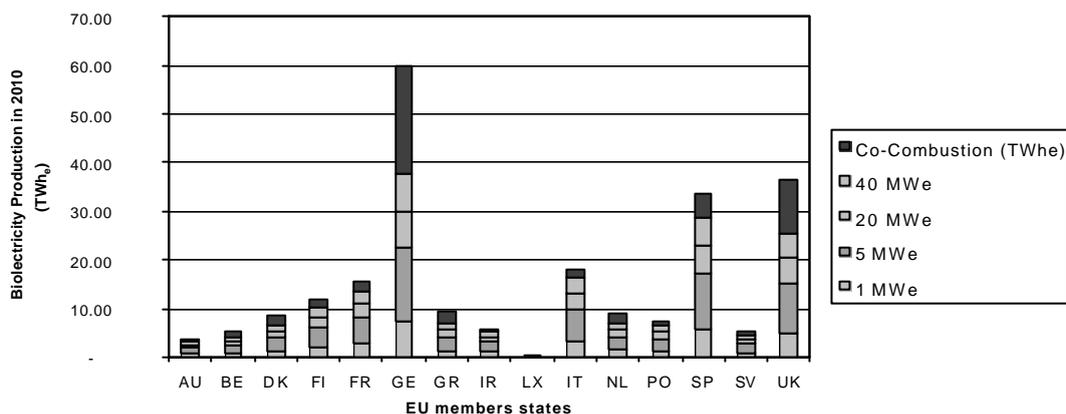


Figure 3. Balanced Scenario biopower station size distribution in the EU- member countries.

and Sweden are already close to their allocated targets. It can be seen that Germany and the UK would have to produce 22.5 TWh_e and 11.06 TWh_e by co-firing respectively. Spain, Italy as well as France, due to their small present dependence on coal do not show great co-firing future. They would have to rely mostly on power stations of around 5 MW_e i.e. more than 280, 160, and 130 biopower stations of that size range, respectively. In cases of countries like France, which has already based its electricity production in nuclear power and has a surplus, the planning of many biopower stations is not expected unless the electricity market in the EU is opened completely and bioelectricity from France could, for example, be sold to other member states implemented via a Kyoto emission trading system.

References

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