Introduction

The purpose of this paper is to look at the possibilities of using peat as a raw material for biodiesel. On 23 January 2008, the EU Commission proposed a new Directive on the promotion of the use of energy from renewable energy sources. The overall target for renewables is 20% of the final energy consumption by 2020. This target varies between the member countries, depending on the renewable energy sources, but every country has a binding target of 10% for traffic biofuels by 2020 (Commission of the European Communities 2008). The target means that the amount of total renewable energy should increase from 100 Mtoe up to 351 Mtoe by 2020, and there should be no increase in the use of energy in the EU (Ragwitz et al., 2005). In the next 12 years, the use of biomass should increase from 70 Mtoe up to 195 Mtoe, which is nearly three times the amount used today. The biggest resources of biomass in the EU are agriculture (46 Mtoe), waste (100 Mtoe) and forestry (47 Mtoe). Growth can only be seen in agriculture, and the target for 2020 is 95.8 Mtoe. The total sustainable biomass potential is 234.7 Mtoe by 2020 (AEBIOM 2007). This means that almost all the potential should be used and the growth would come from agriculture. It is very likely that there will be a shortage of biomass in the EU. Peat resources were not included in this inventory.

Requirements for biofuels

The new directive sets sustainability requirements for biofuels, based on Life Cycle Analysis. There will also be a Fuel Quality Directive which will set fuel quality criteria for biofuels. Biofuels should fulfil the following criteria:

- Greenhouse gas reduction should be at least 35% in the well-to-wheel chain.
- The production of biofuels should not endanger biodiversity.
- The production of biofuels should not decrease the production of food.
- The production of biofuels should not significantly decrease the carbon stock of the land area (land use change).
- Biofuels should fit into the distribution chain of the present traffic fuels, and they should be suitable for use in vehicle engines.
- Biofuels should increase the security of supply and self-sufficiency.
- The production of biofuels should create jobs in the countryside.
- The production of biofuels should be cost efficient.
- The production of biofuels should be certified.

Biofuel production methods

Biofuels are classified into first generation and second generation biofuels. The first generation biofuels are already on the market, and the second generation biofuels are at the demonstration phase. The first generation biofuels are: biogas from manure, waste and green plants, biodiesel from oil plants, and ethanol from sugar plants, grain and potatoes. The problems rising from the first generation biofuels are as follows:
PEAT IN ENERGY

Availability

Even within the EU, there are huge reserves of peat, especially in Finland, Sweden, Estonia and Latvia. Also Ireland has a lot of peat. For instance in Finland, there are 9.4 million ha of peatland, which is about 30% of the land area. About 50% of the peatland area is drained for forestry and agriculture, about 45% is pristine peatlands, and only 0.6% is used for peat production. The energy content of the Finnish peatlands is 58 000 TWh, which is 6-7 times more than the energy content of the Finnish forests. According to Virtanen et al. (2003), technically exploitable peat reserves are as big as 12 800 TWh, which equals the known North Sea oil reserves. These peat reserves, however, only account for 14% of the total peatland area. Sweden has about 10 million ha of peatlands and Estonia 1 million ha, which means that there are good possibilities to use peat as raw material for biofuel.

Technical aspects

The economy of a Fischer-Tropsch plant is better if the plant is large enough. The minimum commercial size is estimated at 260 MW fuel capacity. This means that the raw material requirement of the plant is about 2 TWh/a. If forest residue is used as raw material, it is very difficult to guarantee the supply of raw material for the life time of the investment. Peat deliveries, on the other hand, can easily be guaranteed for 15-20 years even if the demand is heavy. If the plant uses both wood and peat, the availability of raw material would be secured.

Conclusions

Peat is an extremely suitable raw material for biofuel for the following reasons:
- Peat is a good raw material for biodiesel.
- There is a lot of peat in the Nordic and Baltic Region countries, in Russia, and in Canada.
- According to Life Cycle Analysis, peat harvested from drained peatlands can achieve a reduction of 35% in greenhouse gases.
- Peat harvesting in drained areas does not endanger biodiversity; besides, peat harvesting areas remain small in any case.
- As a raw material for biofuel, peat does not endanger food production.
- The use of peat increases the energy self-sufficiency in countries like Finland. If Finland uses 2% of its peatland areas for biofuel production, the country could produce 50% of its traffic fuels for 50 years.

References


