Fast-growing wood for more biomass energy

Italy and Scandinavia have a long-established record of cultivating rapidly growing wood varieties for energy on short-rotation plantations. Germany and Austria still have the training wheels on when it comes to cultivating and harvesting poplar and willow. But rising demand for wood is likely to change all that in the near future.

Cultivating rapidly growing wood varieties on farmland in short rotation could sustainably expand wood potential in Europe. Sounds tempting. After all, wood and waste wood products currently make up 80% of European biomass energy production. The number of biomass heating systems is growing rapidly. Increasing numbers of biomass cogeneration plants demand enormous amounts of wood, wood chips and pellets. In future, even cars are supposed to be running on liquid wood fuels. The seller’s market for wood has become a buyer’s market in recent years. According to studies by energy experts, it is only a matter of time until wood from domestic forests will no longer be adequate to quell the European hunger for energy. The EU commission estimates that 26 million hectares of land will be needed to cultivate biomass for energy production by 2020. The commission figures that half of that will be used for biofuels. In order to reach such ambitious goals, timber has to be increased. There is no way around it. But wood does not necessarily have to come out of the forest. One alternative is short-rotation plantations.

What is a short-rotation plantation?

When fast-growing trees, such as poplars or willows, are cultivated on agricultural land, we speak of short-rotation plantations. Farmers produce wood for energy on the plantations after just a few years. Once harvested, most of the wood is processed into wood chips and fired in biomass heating plants or woodchip heating systems. The approximately 20 cm high saplings planted in spring grow in rows and look like normal agricultural crops. Soon, however, they grow faster, higher, and much longer. The 7 to 10 m high timber is only harvested every 2 to 10 years with special harvesting equipment. Following the initial harvest, a new rotation of the plants can grow; hence,
The wood chips produced by a single hectare of an energy timber plantation can produce a three-year fuel reserve for a typical single-family home. Energy forest potential is still theoretical. So far, researchers have cultivated the fast-growing timber on a small scale. Now, European farmers will plant energy timber on a large scale.

The search is on for energy farmers

2009 saw a boom in conferences and meetings, where politicians, energy companies, and harvesting equipment providers sought to recruit farmers for short-rotation plantations. But the energy farmers of the future still have a number of reservations. They see financial risks for their businesses associated with cultivating energy timber. Planting fields with timber is highly labour intensive. Planting and harvesting requires expensive special machinery, such as wood chippers and tree harvesting equipment used in the timber industry. While this heavy machinery can also be rented, planting timber is only profitable on large tracts of land, preferably on several farms adjacent to one another. Should the timber plantations that grow over several years fall victim to insects or storms, the financial damage would be significantly greater than if the same thing happened to the year’s grain harvest, for instance. Politicians are trying to mitigate the risk to farmers by providing subsidies. The European Union subsidizes 40 to 50% of eligible costs for short-rotation plantations through a Common Agricultural Policy (CAP) programme passed in 2008 within the framework of the CAP Health Check. In 2009, a change in agricultural policy provides even more incentives for short-rotation plantations. As a result of reforms to the way the European wine market is organised, permanent crops are considered “eligible land”. The European Union has also waived the fallow requirement, which results in less bureaucracy for farmers wishing to apply to grow energy timber on their land. In Scandinavia, Italy, and Poland today, farmers and companies have already begun widely cultivating short-rotation plantations.

Scandinavia in the lead

Sweden is the leader in energy plantation cultivation and marketing. Since the beginning of the 1990s, the Swedes have been cultivating fast-growing willow clones on large plantations. Sweden's 1995 entry into the European Union put a halt to the short-rotation plantations in the country, as they were no longer profitable for farmers. Since 2000, Swedish willow cultivation has begun a gradual recovery. After all, the demand for wood chips is increasing due to the country's numerous biomass cogeneration plants. Today, the largest short-rotation plantations are found in Sweden. By 2010, the amount of land used for timber plantations is expected to rise to 30,000 ha. Swedish agricultural service providers deliver willow clones throughout Europe and even offer farmers...
advice on cultivation and harvesting techniques. Neighboring Denmark also has numerous woodchip-fired cogeneration plants. To meet the demand of the plants – 1 million tons of wood chips per year – the Danes have also been cultivating fast-growing timber for the past 20 years. The amount of land dedicated to timber plantations in Denmark has been growing since the price of fossil fuels started rising at the beginning of the new millennium. While farmers do not receive any state aid for their timber stands, they do receive bonuses from power companies. Like the Swedes, the Danes primarily plant willow saplings.

Germany is not a country of short-rotation crops

Germany’s current cultivated area of some 2,000 ha is relatively small. Its timber stands have not gone beyond the experimental cultivation stage since the 1970s. By the mid-1990s, land dedicated to short-rotation plantations amounted to a mere 80 ha. The small cultivated area is due to a long period of low oil prices and a limited market for wood chips. But the situation is slowly changing as the cost of fossil fuels rises. Theoretically, some 1 million hectares of energy forests could be planted. One obstacle is that Germany has missed the boat on developing new energy timber varieties. It can take up to ten years to develop a new variety. Hence, the Swedes dominate the German market. The German biomass action plan calls for an increase in the share of bioenergy in the energy supply, specifically through short-rotation plantations. Increasingly, power companies – not to mention heating system and pellet manufacturers – are getting involved in short-rotation plantations. Pellet producer Schellinger, for instance, intends to begin pelletizing willow wood within the next few years from its own short-rotation plantations in Baden-Württemberg. By 2015, the company expects to have 5,000 ha of energy forest providing raw materials for pellets.

Austria: land of experimentation

Austrians are experimenting with short-rotation energy forests using willow and poplar trees. Currently, energy forests are only being cultivated on some 1,000 ha in Austria. Biomass heating system provider KWB is intensifying its short-rotation timber cultivation. The manufacturer sees pelletizing energy timber as a way to cut its dependence on large-scale pellet producers. KWB says that Austria has a potential cultivation area of 60,000 to 70,000 ha for short-rotation plantations, enough area to produce current domestic pellet consumption twice over. And so, the boiler manufacturer is currently travelling around the country recruiting farmers for regional pellet cultivation. Engineers at the KWB boiler factory have already been developing pellet heating systems especially for short-rotation energy timber for some time.

Italy plants poplars

In Italy, some 6,000 ha of land are devoted to short-rotation plantations planted with poplars. The Italian climate is ideal for rapid growth of poplar clones. The plantations are primarily located in the Po Valley - 3,500 ha of the total is in the Lombardy region and another 1,600 ha is in the Veneto region. Most of the poplar clones were planted between 2000 and 2006. Initially, communities paid subsidies to farmers to plant the energy forests. Land devoted to the plantations is growing, despite the discontinuation of subsidies in 2007. Now, power companies that use biomass have started luring new plantation owners with financial incentives. The price of wood chips from short-rotation plantations has climbed so high in Italy that cultivating energy timber is worthwhile for farmers even without state subsidies.