Report**: Competitiveness of Dutch energy wood (D10)**
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The competitiveness of Dutch energy wood

1. Problem

Dutch energy companies are using large volumes of woody biomass for their energy production. Most of this woody biomass is imported as energy pellets from Sweden, Finland and Canada. In 2003 a total of 400 kton of energy pellets were co-combusted in conventional coal plants, 80% of which (320 kton) were imported. In 2004 the import of pellets increased to a volume of 420 kton.
The average price that is paid for these pellets is about 100 euros per ton delivered at the gate. This price is much higher than the price of, for instance a cubic meter of fresh wood from the forests in the Netherlands delivered at the gate of the energy plant. Of course there will be costs involved in making this fresh forestry biomass suitable for co-combustion (e.g. drying, palletizing). However, given the huge difference in price between energy pellets and wood from forestry (approximately 80 euro/ton), the upgrading of fresh forestry biomass could be an interesting option. The more so, because the current upper price level for wood pellets (100 €/ton) is expected to increase in the near future due to increasing demand and limited production capacity on the supply side to satisfy this demand.

2. Questions

1. Why is it difficult to sell Dutch energy wood in comparison with imported energy wood? Is this caused by:
    - Low market price (e.g. energy pellets)
    - Scale
    - Quality
    - Availability
    - Logistics
2. In what way should Dutch energy wood be offered to the market in order to be able to compete with imported woody biomass?
3. Why isn't there a Dutch company that jumps into the market to produce large amounts of energy pellets?

3. Approach

Literature study and expert consultation.

4. Results

4.1 Dutch energy wood and its availability

There are four main sources of energy wood in the Netherlands: (1) wood processing residues, (2) energy pellets (3) used wood (a-quality and b-quality), (4) fresh wood from forestry, landscaping and prunings.

(1) Wood processing residues

The supply-side of wood processing residues and energy pellets consists of "small" family owned companies. The amount of wood from the Dutch wood processors which is traded by these companies is approximately 522,000 odt of residues per year (Probos, 2005). A result of the small-sized private-ownership of these companies is that high investments necessary to be able to produce e.g. large amounts of energy pellets cannot be made. Furthermore, these companies are not willing to sell their whole production volume to one energy company only. For instance: Labee Group Moerdijk B.V. produces 70,000 tons of energy pellets per year, but they are not willing to sell more than 30,000 tons

to a single Dutch buyer. The rest of their production is sold to foreign companies (especially in Germany) in order to secure their future sales and minimize the risk of sudden changes in the subsidy system in a particular country (Labee, pers.com., 2006).
The traded amount (522,000 odt) of wood processing residues seems large, but most of these wood processing residues already find there way to end users. For this reason, only a limited volume of wood processing residues are available for energy production.

(2) Energy pellets
According to the Witt and Thrän (2005) the total amount of energy pellets produced in the Netherlands in 2004 was 100 kton per year. The market for energy pellets is a global market dominated by a few countries such as Sweden and Canada. The demand for energy pellets is high resulting in an increase in the number op pellet producing countries. During the last 2 years Eastern European countries (e.g. Poland, Estonia and Lithuania) have increase their production capacity. Pettes are being produced mainly from wood processing residues (saw dust, shavings), but the technology is available and even being commercialized on a small scale, e.g. in Germany, to make energy pellets from fresh wood. Unfortunately, the investment costs are high (Holz-Zentralblatt, 2005). The Dutch company Labee Group Moerdijk B.V. is producing energy pellets from forest chips in Germany. The reason why they have developed this activity in Germany and not in the Netherlands is a matter of supply and demand. In Germany the demand for energy pellets is stable and secure for the next 20 years and they have a constant supply of forest chips due to their relation with the largest private forest owner in Germany. The only thing that Labee had to do was to use their experience in pelletizing. Note that the raw material for the pellets produced by Labee in Germany is not 100% fresh wood, but is a mixture of wood processing residues and fresh wood. This reduces the production costs, because the raw material doesn't have to be dried so much.
Mr. Schouwenberg from Essent Energy explained that Essent only uses clean energy pellets (made from saw dust and shavings): about 800 kton per year (2005 data). Essent imports these pellets from Sweden, Canada and Finland. There is no problem yet to obtain large amounts of clean energy pellets and the availability of contaminated energy pellets is even larger. Contaminated pellets are in general made of used wood, but for instance Labee is also using a fraction of fresh branches for the production of these pellets.

(3) Used wood
Dutch companies trading in used wood have exported 970 kton of used wood in 2004 (table 1), 401 kton of which went to foreign energy companies; the remainder went to the board industry in Belgium, Germany and Italy. Most of the exported volume of used wood for energy purposes is exported to Germany (88%) (B-quality wood[1]); the remainder, mainly consisting of C-quality wood,[2] went to Sweden. The reason for these exports is that the price in Germany is higher, but another advantage is that the German utilities will pay a fixed price for a period of 20 years. This guarantees continuity and offers companies the opportunities to anticipate to the increase in demand by increasing their production capacity. The average consumer price that is paid for the green electricity produced from biomass by the German utilities is on average 8,9 cents per kWh. This is three times the European market value of a kWh of electricity.
An other reason for the export of the B-quality used wood for energy purposes to Germany instead of using it in the Netherlands, is that co-firing this type of (contaminated) wood is limited due to environmental legislation which requires higher investment cost for emission reduction. Therefore, the maximum price that can be paid for the fuel is lower. The emission standards in the Netherlands have been developed for energy plants that use fine and clean powder coal. The emission standards for old coal fired and brown coal fired energy plants in Germany are lower due to their age and the type of fuel they use. The emission standards for new power plants in Germany can be compared with those in the Netherlands and for this reason they don't have an advantage in this area.
A further complicating factor is the discussion in the Netherlands whether B-quality wood should be considered a raw material or a waste product. If it is considered waste, an energy plant needs a differ-

[1] B-quality wood: slightly contaminated, e. g. with paints, glues and coats
[2] C-quality wood: hazardous wood waste contaminated with heavy metals, fire retardants and wood preservatives

ent permit to be able to co-fire the B-quality wood and it is in most cases difficult to get this kind of a permit.

Table 1: Availability of used wood in The Netherlands (Probos, 2004)

Categories	Total, kton	Use in NL, kton	Exports, kton
A-quality	495	215	280
B-quality	705	50	655
C-quality	50	15	35
Total	**1.250**	**280**	**970**

Table 2: Exports of Dutch used wood (Probos, 2004)

Country exported to	Board industry, kton	Energy companies, kton
Germany	168	353
Belgium	148	0
Sweden	0	48
Italy	250	0
Total	**566**	**401**

(4) Fresh energy wood from forests

The volume (70,000 metric tons) of fresh wood from the forest used for energy purposes is increasing somewhat in the Netherlands, but still it is of minor importance. Most of the fresh woodchips that are used for energy purposes are derived from landscape maintenance and from prunings. The price paid for energy wood chips from the forest is approximately 30 euro per metric ton[3] at the gate of the energy plant. If this is compared to the price for chips from landscaping and prunings (i.e. 17,5 euro per metric ton) it is obvious why the focus is mainly on the procurement of these chips (Ecofys, 2004).

The price is the main driving force for the amount of wood that is extracted from the forest for energy purposes, but other factors are also important. The Dutch forest area is owned by al large number of forest owners owning small pieces of forest land. Consequently, the scale of forest management activities is also limited and efficiency is rather low.

Most of the Dutch fiber wood (round wood and chips) is exported to board producers in Belgium and Germany. Apparently it is economically viable to do so, but transportation costs are quite high. For this reason one would expect it to be possible to use at least part of this fiber wood for energy purposes. The price (app. 40-70 euro/ton) paid for fiber wood at the gate of the board plant evidently is higher than the price which can be paid by the power plant.

A drawback of using fresh wood for co-firing in conventional coal plants is that it should be upgraded first in order to meat the fuel requirements. Different technologies are available (e.g. torrefaction) to upgrade fresh wood. However, this upgrading involves high costs, which is partially due to the high water content of fresh wood. The upgrading of wood processing residues and used wood is much cheaper (if needed al all).Thus, fresh wood from forests cannot compete yet with other sources of woody biomass.

4.2 Unstable and immature market

[3] Two cubic meters of coniferous woodchips go into one metric ton

The market for biomass at the moment is not very transparent and not stable due to the relatively small volumes of biomass that are traded, which makes it difficult to obtain long term, large volume contracts. Consequently, the production and logistics are not optimal. The certainty of frequent, large transports makes it possible to invest in adequate production-, transportation- and handling facilities. Furthermore, the demand for biomass has to be long lasting. This is only possible if energy companies as well as the government commit themselves to the longtime use of biomass. The current problems with obtaining emission permits and insufficient financial support and security for co-firing biomass create uncertainty. For this reason this commitment is not expressed by the energy companies (Junginger and Faaij, 2005).

5. Conclusions

The competitiveness of Dutch energy wood against imports cannot explained by a single factor; there are many factors involved:

- Long term, stable financial support such as in Germany and clarity about emission permits could result in a more stable market for energy wood in the Netherlands. If these preconditions are met, energy companies are able to offer long term, large volume contracts for the supply of woody biomass (e.g. energy pellets). Dutch pellet producers will be able to invest money to increase their production capacity and they will be in a better financial position to handle different kinds of biomass (e.g. saw dust combined with fresh wood chips)
- Stable production volumes and a continuous supply are the essential elements for a pellet production company to be able to sell large volumes of energy pellets to the market.
- The use of B-quality wood for co-firing in the Netherlands has to compete with the outlet to German energy plants. If the financial support by the Dutch government doesn't change, the use of B-quality wood for co-firing in Dutch energy plants will certainly not increase.
- Furthermore, the board industry in Belgium and Germany is increasing the use of B-quality wood as a "cheap" raw material in order to compete with board producers in countries with low wages.
- As a consequence of a further increase in the competition between different users of biomass, especially for clean wood residues (A-wood and B-wood), the market price will further increase. This may result in a situation in which energy pellets made from fresh wood can compete with these rather "cheap" sources of biomass.

6. Follow up?

A number of questions still remain unanswered:

- What can be done to make fresh wood from the forestry and landscaping (20 euro/ton) more competitive with import (upgrading, increase in scale, security of supply)?
- Which parties should be involved in this process (e.g. Bioenerco: Staatsbosbeheer Dienstverlening (Energiehout b.v.), Van der Wiel, Van Werven and Vagroen (biomassa) B.V.)?
- Which amounts of biomass could than become available?

Consulted experts

- Alex Labee, Labee Group Moerdijk B.V. / Energy pellets Moerdijk B.V.
- Peter-Paul Schouwenberg, Essent Energie
- Cor Siero, Ecopellets BV and Ecochips BV

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