DEO_day 13/6/06: Bio-Energy and Sustainability, can we have both?

Chairman of the day José van Eijndhoven opens the session, introducing the subject. Bioenergy is the " holy grail" for reaching the Kyoto targets. Lately an impetus has been provide by the mixing of biofuels in regular fuel.

Presentations

1st Presentation

Global Techno-Economic Potential for Bio-energy
André Faaij, Copernicus Institute

Even Paul Wolfowitz is talking about biofuels now!
Why is biomass so hot now?

- High oil prices
- Bioenergy is developing. The volumes are doubling each year. Because of this change in scale, biomass is not only the concern of farmers anymore. An international market is developing, as opposed to only local markets up to now.

Currently internationally traded biomass comes from agricultural residues. This is a limited resource. Some markets (Scandinavia) are close to full utilization of residues. However to produce more biomass, land and space is needed.
Because the world population is growing and also getting richer, more land will be needed for food and more land for other things like construction. In addition to this there is mismanagement, leading to soil degradation, which limits future uses of the land. However, land use efficiency will grow in the future.

How can space for energy crops be created?
The most extreme scenario:

- The whole world adopts intensive, high input agriculture, in which animals are kept indoors ("landless" production).

In this case the world potential for biofuel production is over 1000 EJ/yr, compared to the current total energy use of 430 EJ/yr.

The least extreme scenario:

- Extensification of agriculture (ecological agriculture)

In the least extreme scenario the potential in Europe for energy crops is zero. Worldwide, the potential is still 100-150 EJ, mostly in developing countries in South America and Africa.

According to scenario studies, under some conditions there could be significant amounts of abandoned croplands by 2050 that would be suitable for biofuel production.

Types of crops to produce this biomass:
Perennial crops would be a better choice than annuals, since they give a larger net energy yield, require less inputs and provide year round soil cover. Hence they should provide cheaper energy, but there is little commercial experience with them

Marginal lands could be used for growing biomass, while at the same time improving the soil.

Conclusion: Biomass could be competitive in price with fossil fuels. Even with sustainability criteria, while more expensive, it could still compete. There is a large potential for biomass import. Faaij acknowledges however the problem of the biomass streams between for example Brazil and Asia, where no policies on sustainability exist.

2nd Presentation

Consequences for Biodiversity of Large Scale Biomass Production
Rob Alkemade, MNP

Faaij's talk showed that large-scale production of biofuels is possible. Here he will show what would be the effects on biodiversity if this is done. MNP recently undertook a study for the UNEP convention on biodiversity on "What are the costs of using biomass in terms of biodiversity". The question asked in the study was how to reduce biodiversity loss.

What is biodiversity loss? In natural systems there are many different species, but only small numbers of individuals of most of them. In degraded systems with low biodiversity there are huge numbers of individuals of a few species (For instance, a sea full of jellyfish)

MNP has a model calculating biodiversity around the world based on data of biodiversity in natural forests vs. in agricultural lands. In this model the effect of climate change on biodiversity is also calculated. In the baseline run of the model (calculating what will happen in future if current trends continue), increased efficiency of agriculture is assumed, so that no new agricultural land is needed. A model run was also done for a scenario in which the climate is stabilized at +2°C. One of the ways in which this goal is reached is through the use of large amounts of biofuels. The model assumes that biofuels are grown on abandoned land, and after this is fully utilized marginal lands are also used. In this scenario there is a net reduction in biodiversity compared to the baseline, as a result of the use of land for growing biomass. Although the reduction of biodiversity due to climate change is smaller than in the baseline, this does not fully compensate for the other losses.

The conclusions reached depend on what assumptions are made. It is possible that in the far future (2100), the reduction of biodiversity in a scenario with less biofuel use and more climate change would be larger than the reduction of biodiversity in a scenario in which the use of large amounts of biofuel reduces climate change.

Questions

How can you explain the reduction of biodiversity loss as a result of using biomass after 2050?
It is assumed that after 2050 no more land will be needed for biomass than before 2050. Climate change, however, will continue, and continue to reduce biodiversity, after 2050.

Did you use a model to pinpoint the places in the world where the biomass will be grown?
Yes, a macro-economic model was used for this.

3th Presentation

Sustainable Biomass: Background, Principles and Tools
Wolfgang Richert, AIDenvironment

The presentation is based on a report written for a coalition of NGO's. The presenter notes that their aim was to write an objective report.

In his presentation, Richert tries to broaden the discussion, including also sociological aspects.

Some factors favoring the import of biomass:
- Reduction of emissions of greenhouse gases.
- Waste management: turning wastes into an energy resource
- European agricultural policy
- In rich countries there is great resistance to reducing energy use

The general feeling nowadays is that biomass is good. In the Netherlands there are a large number of policy instruments stimulating biomass use. The biomass market exists because of these stimulating instruments and is thus not a free market. Richert calls this public procurement.

His position is that biomass is necessary for sustainable development. The question is how to do this?

There are several levels of principles and criteria for sustainable biomass. But principles are no use if politicians do not translate them to actions.

A coalition of Dutch NGO's wrote a letter to the government, which included a long list of criteria for sustainable import of biofuels. The report mentioned earlier was an attempt to give structure to the issues mentioned in this letter.

The issues can be split into three levels:
- Ethics (the most difficult issues)
- Efficiency
- Changes: opportunities and risks

Ethics: Biomass export to the north interferes with other land uses such as agriculture for food, preservation of water and local use of the biomass as energy source in the south.

Efficiency: Over the whole lifecycle bio-energy use should reduce CO_2 emissions compared to conventional energy sources. However, we do not know how much CO_2 is emitted when land is converted to agriculture. Another issue is that efficiency of material use indicates they should be used as materials first and only incinerated after that.

Changes: When one thing is built, another thing must always be destroyed. Degraded lands are also used for something. And the usual argument in favour of the Kuznets curve, that in the process of development things must first be harmed in order to be improved later (as with air and water pollution first increasing and then decreasing as a country gets richer), is not valid here, since once a forest is gone it's gone forever.

From the issues on these levels, three types of principles were developed for biomass import:

- 'Do not harm'
- 'Do more good'
- 'Enable governance context'

Do not harm: The typical attitude of environmental NGOs. The focus is on preventing extreme, irreversible harm, such as depriving indigenous peoples of their land rights.
Do more good: Typical for development workers. This necessitates looking at the issues from a wider perspective. For instance, if people had to leave their homes and move somewhere else this should not cause their impoverishment.

We need to decide according to which of these principles we try to act. If the desired end is improvement, then criteria only are not enough.

Questions

Do you see a tendency towards a free market?
Richert doesn't know. Today the market would not function without subsidies, and even more policy instruments are planned for the future.

Faaij adds that today the market is only for solid biomass. Wood pellets are popular because they can be used for co-firing in regular power stations, this is a low-risk market, in which a free market would be possible. Companies don't know how the market will develop. Biofuels like ethanol are cheaper but are kept away form the market by tariffs. Theoretically there could in future be a free market in ethanol.

Debate

Jorrit Dingemans (Triodos Bank) opens the debate by explaining that Triodos Bank believes that money can be used to build a better society. With this aim the bank is investing in renewable energy and organic farming. He poses some questions for the speakers.

To Faaij: *Do you see a conflict between organic farming and the use of biomass?*
Faaij believes that the principles behind organic farming are not rational. LCAs should be used to weigh the pros and cons. People have to think about the negative effects of organic farming, i.e. the need to give up land for farming. In Europe people will have to choose between extensive farming and production of biomass for energy.
You said you're in favour of using perennial crops and that you think this will lower the costs of bioenergy. We see however no finance requests for this type, what is the reason for this?
For perennial crops a stable subsidy policy is needed. You can see these projects in Sweden and Poland where there is that kind of policy.

To Alkemade: *How will your comparison of the effects of using biomass look if you would include the use of other types of renewable energy in the future?*
Other renewable energy options were included in the base-case scenario.
Is it possible to use improved methods in agriculture, such as multicropping, to prevent biodiversity loss?
Mixed systems are better than a mono-culture, but still have lower biodiversity than for example primary forest.

To Richert: *Don't you think this extensive list of principles makes the development of biomass impossible? Is there a way out of the dilemma you pose, to build a functioning set of criteria?*
Extant systems have dozens of criteria. For some goals criteria and certification are not the answer, different approaches are needed to reach those goals. Certification will be at the site level and there are important effects beyond the site itself.

Dingemans finishes with the statement that he believes biomass can be used in a sustainable way, but every project is different, some are good and some are bad. He believes that the Dutch policy towards small scale projects is good but with large scale projects there are problems.

Questions from the audience

Faaij stated that every project is individual, but also that biomass is a commodity. Aren't these two statements contradictory?
Part of the market can become a commodity market, part could be certified. The market is still developing and the question is what will drive it. In the Netherlands a basic framework is being developed in which there are minimum criteria, and in which there will be continuous improvement.
Wissema: There are no precedents, much will need to be developed. Not all problems can be solved with criteria. There is a problem with the WTO to develop a sustainable commodity market: we seek principles to ensure sustainability, but this might be in conflict with the WTO. For the WTO, sustainability of biomass is not an issue.

A question to Wissema: *why do you not start with specific sustainable projects instead of thinking about principles for all projects?*
Dingemans wants to know which product chains are fully sustainable.
Richert states that some projects are more sustainable than others, but he doesn't know examples of sustainable projects.
The problem won't be solved tomorrow, first steps should be taken, with a policy of transparency and while setting minimum criteria. Those production chains which are known to be less bad should be chosen. Instead of trying to cover all options, certain production chains should be looked at. For example, soya from the Amazon region is a disaster, soya from the US and Europe is less bad.

The RSPO published a long list of principles but there is no case yet where these have been implemented, because the standards are too high. For example, the standard for wages is too high. Shouldn't local actors be involved in developing the criteria in order to prevent this?
Richert: The producers are already included in the discussions. People should also be aware of who they talk to from local NGOs because they don't all tell the truth. And in answer to the first statement - pilot projects as a result of the RSPO are now starting.
The question was whether locals shouldn't be more involved in the discussions about principles.
Richert: Locals are not needed to measure indicators which already exist.

<u>General conclusion by Ms van Eijndhoven:</u>

This was a good debate giving different opinions on where the certainties and uncertainties are in the field of biomass import.

Workshops

Criteria for Sustainable Biomass
Erik Wissema (Ministry of Economic Affairs / Transition Directorate)

Erik Wissema is the project leader of a working commission (Commission Cramer) of the Dutch Ministry of Economic Affairs concerning the energy transition. He is working on criteria for sustainable biomass.

The workshop starts with a short description of the problem and with the background of the project. There has been huge growth in the amount of biomass imported to the Netherlands for energy, transportation fuel and chemicals. Up to now there were no checks and balances on the sustainability of the whole chain of (certain) biomass sources. The problems in recent years with palm oil and soy oil made the topic, sustainability of biomass, an important public and political item. So there was a sense of urgency to come with good (regulatory) policy.

The assignment of the project group was to organise a stable structure for discussion between different stakeholders. They started with a vision on sustainable biomass and back-casted to present time. There should be broadly supported criteria for imported biomass. These criteria should be tested in field projects and recommendations on the follow-up and certification should follow. The deadline for the first stage is the 15th of July 2006. The discussion should be broader than only on government policy. It does not concern only the MEP and biofuels but should also convince stakeholders to participate in the process.

Next Wissema turns to the criteria. They are introduced in three stages. In 2007 they will be implemented in policy for bio-energy and biofuels. In 2011 there should be significant improvement in the criteria. The third stage is the long term perspective: sustainable biomass. In the longer term there should be a certification system at the European level.

The last slide shows that at this moment there are 8 criteria with indicators. These are the greenhouse gas balance, competition with food, biodiversity, welfare and wellbeing, working conditions, environmental care, water management and soil and nutrition balance.

Then the discussion starts. The discussion focuses on two main issues. *How to implement and check the criteria? And are all criteria equally important?*

Questions are raised on how the criteria should be implemented. Certification is done by the market and is a process of 5 to 10 years. How does it work in practice? Is there going to be a “brand” as with FSC-wood? *Are there going to be import limitations?* EW answers that import limitations are not an issue because in the WTO this would not be legal. In the current WTO-round sustainability is not an issue. The government just wants to set a basis that the market can work with.

Another point is that the criteria are not very surprising. And *who will implement the criteria if you can still make money without that?*

EW: The criteria are at least going to be there for the Dutch energy companies. But they are also going to be valid for the small farmers with a biogas installation. *Does the*

Netherlands stand alone in the development of criteria? EW: The UK is also working on sustainable biomass and also Belgium is looking into it (mainly wood). The EU has a consultation on the subject. Before you can work together on certain subjects you have to do your homework and that's what we're doing right now.

There are going to be criteria for palmoil for energy use. What about the food-sector? EW: there are already some criteria developed by the RSPO (Round Table on Sustainable Palmoil). They are guiding in this case.
Why are there going to be criteria for biomass and not for other energy sources. Won't that make biomass less competitive? EW: of course you want the energy from biomass to be sustainable…renewable energy.

Are all criteria equally important? The GHG-criterion seems to be the most important. EW: if you don't live up to one of the criteria your biomass is not sustainable. The criteria are based on various international systems, of which OESO guidelines are one. The GHG-balance will be introduced in steps. The first step is a proposed 30% less CO_2 emissions than from conventional sources, and this will increase later. Above this level you can make a difference as a market party.

Biomass Import
Geert Bergsma, CE Delft

CE Delft did research for Electrabel on buying biomass in the EU and/or worldwide, regarding the CO2 balance / emissions (co-firing) and sustainability issues (effect on biodiversity, social, water, nutrients) for:
- rice husks
- eucalyptus wood
- corn residues
- palm oil residue
- palm pit kernels

In general, the market related to these types of biomass proved to be most important. Regarding emissions the local political framework and the worldwide shadow price for emissions are important.
Examples of biomass import that were discussed:

Rice husk from Thailand:
Rice husk is now used as a fertilizer. If the rice husk is used as energy source, farmers will need artificial fertilizer. Electrabel has taken into account compensation of the farmers for higher fertilizer costs.

Corn residue:
Corn residue is used as cattle feed. In this case too, shifting to use for energy will have an impact on the local market.

Eucalyptus wood from South Africa:
Coal is cheap in SA, so it is interesting to export eucalyptus wood. It turns out that the EU-subsidy for biomass is 10 times higher than what is paid for CDM (the Common Development Mechanism, one of the instruments for the reduction of CO_2 emissions in the Kyoto Protocol).

Palm oil residues from Indonesia and Malaysia:
Palm oil residues are used as cattle-feed. Electrabel did not want to investigate this option because of the indirect risk of deforestation.

Palm kernel from Nigeria:
Palm kernels are used as fertilizer or cattle feed, but are also just burned in open fields, with a lot of smoke and emissions. These different uses made it difficult to estimate the impact of biomass import in NL. It could be positive if the open burning is reduced.

Conclusions:
- EU subsidies are much higher than CDM
- charcoal for the South?
- local market shifting effects because of uses as cattle feed or fertilizer and extra costs for compensation.
- certification could work, but it is complex to realize.

Discussion:
1. Need for policy because of competition of biomass with local uses as food, fertilizer and cattle feed
2. Bio energy in EU goals conflicting with CDM?

3. 10 million people in the South provided with energy is not accomplished with bio energy.
4. Farmers in Thailand should be compensated
5. Reduce meat consumption in Europe to enable the import of biofuels.

Further questions and remarks:

- *Are there not more business and markets for rice husk in Thailand, even biomass energy in Thailand?* Electrabel wanted to inform their European customers about green energy. The energy balance costs are about 10% in this case.

- *Is it possible to grow biomass in a structural way?* Energy companies are usually not interested to invest in bio fuels for longer than 1 year ahead. The market may change a lot. In Germany it is more structural.

- *A comparison should be made where biomass can be used best (in the country of origin, in which way, etc.).* In regard to the question where biomass could be used best, this choice strongly depends on the systems in the exporting and importing countries. For example, in countries with large shares of coal in the energy mix, it may be best to use biomass locally or import biomass, while countries with high shares of renewables (e.g. hydropower) may benefit more from exporting biomass.

- *CDM prices per tonne of avoided CO_2 are much lower than the subsidies paid in several EU countries for renewable electricity. Thus biomass exports from developing countries can counteract the attempts to realize a sustainable energy supply in developing countries*. On the other hand, sales of biomass may also represent a valuable source of hard currency.

- *What are shadow prices?* Environmental effects on money: The amount of money the stakeholders pay to reduce or prevent environmental effects.

- Bio-energy and emissions always cause problems, especially in the case of burning palm residues in Nigeria. Electrabel was interested in knowing more about certification, success stories and 'no effects'. If there is a problem for a farmer as mentioned above, solving this problem can also be a success story. I some cases, emission regulations in the Netherlands can be a bottleneck for implementation: for example, by using palm residues from Nigeria, open air burning of these residues would be avoided, and thus significant reductions in VOCs, solid particles etc would be realized. However, burning palm residues in a power plant in the Netherlands would lead to slightly elevated NO_x emissions – which could be a problem under the current emission permits. Thus Electrabel decided not to utilize palm residues.

- CDM or bio-energy subsidies from EU?

- Emissions from the energy producing developing countries are being reduced. The effect of bio-energy instead of coal is more or less the same.

- Denmark says no to biofuels, but yes to bioelectricity. Problem is that the transport is too expensive. Perhaps the 2nd generation biofuels will offer more chances in 5 to 10 years. In policy the choices are about introducing criteria and goals for bio energy to one sector (e.g. transport) or a fixed percentage to every sector.

Certification
Ineke Vlot, SMK

Ineke Vlot, manager non-food at the Stichting MilieuKeur (SMK), starts with an introduction of her work at SMK. One of the types of certification SMK works on is 'Milieukeur'. This is a voluntary, supra-national certificate which may only be used if strict requirements are fulfilled. It is important for the credibility of a certificate that criteria definition and auditing of their implementation is done by different bodies. For SMK support from society is very important, therefore SMK only acts on request and does not by itself initiate new types of certification. Lessons can be learned for possible future certification of biomass from certification processes for other non-food products.

The discussion about certification of biomass starts with the question how to check if criteria are implemented. Is this only a task of bookkeeping, or are chemical analyses needed? Try, if possible, to use existing requirements (like BEES requirements) to save time and costs. If the requirements are already checked by another party and the outcomes are reliable, audit through bookkeeping will be sufficient. Usually this is not the case. It is always the task of the organisation that wants to get the certificate to prove that the requirements have been met. It can be concluded that it is very important not only to define criteria, but also to define how these criteria will be tested.

Another point for discussion is the costs. Is it feasible to define criteria for biomass, and who will pay the costs? The definition of criteria is a complex process and is therefore expensive. The costs in the definition phase will partly be covered by financing by the Ministry of VROM and partly by the involved parties. The costs of certifying a specific company will be paid for by this company (depending on the working hours needed for certification). The use of a certificate like Milieukeur also costs money after certification (e.g. costs can be related to turnover).

The next point is whether certification should be introduced at a national level. The conclusion is that this won't work, since it will drive producers to supply countries that have no certification system, or where the system is less strict. The Dutch government is a pioneer in Europe, but should realize that to introduce certification of biomass successfully at least a Europe-wide scale is required.

The last point for discussion is who should be involved in the definition of the criteria. It has been proved that sustainability projects realized in cooperation with local parties are more successful. Not all local parties can be involved, but representatives can participate in the definition process, as in the RSPO (Round table on Sustainable Palm Oil). The minimum should be respecting international laws. But a more active attitude should be to improve local circumstances in the producing country.