

CE Delft

**Solutions for
environment,
economy and
technology**

Oude Delft 180

2611 HH Delft

The Netherlands

tel: +31 15 2150 150

fax: +31 15 2150 151

e-mail: ce@ce.nl

website: www.ce.nl

KvK 27251086

Biofuel issues in the new legislation on the promotion of renewable energy

Response CE Delft on the
Public Consultation Exercise

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Author(s): Bettina Kampman
Geert Bergsma

1 How should a biofuel sustainability system be designed?

Question 1.1: Do you think the "possible way forward" described above is feasible?

Yes, this strategy is, in our opinion, feasible and necessary.

The best proof for this is the system implemented as part of the bio-electricity and heat policy in the three regions of Belgium. In these obligations concrete sustainability criteria are incorporated and a greenhouse calculation is actually used. Although these criteria and the GHG calculation are still not perfect it proves that sustainability criteria can work for countries with support of industry (mainly Electrabel), government and NGO's.

Various other EU Member States (Netherlands, the UK, Germany) are currently developing sustainability criteria for biofuels. These systems differ somewhat, but from the discussions between the developers of criteria and the governments of the UK, NL and Germany are constructive. Developing and enforcing these type of criteria on a EU level would be much more effective from a sustainability point of view, and would create a harmonized and transparent EU market for (sustainable) biofuels.

Question 1.2: What do you think the administrative burden of an approach like the "possible way forward" would be? (If possible, please quantify your answer.)

In general, one could expect that the administrative burden will be comparable to that of existing certification systems such as FSC. Mr. Yves Ryckmans of Laborelec, the Electrabel company which developed the certification system in Belgium, reports that the cost are rather low for bioelectricity. This means lower than € 0,5 per ton imported biomass which is lower than one percent of the cost of the biomass.

Question 1.3: Please give your general comments on the "possible way forward", and on how it could be implemented. Does it give an adequate level of assurance that biofuels will be sustainably produced?

If you think the problem should be tackled in a different way, please say how, giving details of the procedures that would be used.

In general we support the criteria of the Dutch Cramer Commission which CE Delft helped to develop. These criteria are broader than the proposed list. In addition, we propose to include the following:

- A quantitative biodiversity criterion, for example based on the biodiversity calculations of the MNP for the biodiversity convention¹.
- A first order estimate for indirect land use change like the Öko-Institut proposes for the German GHG calculations calibrated with the MNP model to steer to use marginal land instead of already used agricultural land.
- A minimum GHG saving per hectare land use.

¹ <http://www.mnp.nl/en/publications/2006/BiodiversityFurtherDeterioratesInTheNext50Years.html>

We would also like to comment on sustainability criterion 1, as described in Box 1. Based on studies such as the JRC/EUCAR/Concawe “well-to-wheel” report, we conclude that even the current biofuels achieve on average 40-50% GHG reduction, compared to fossil petrol or diesel, and that a significant part of the biofuels on the market are expected to score better. It would thus be much more effective to set a minimum amount of GHG savings (much) higher than the 0 of 10% suggested in Box 1. We would rather suggest a minimum of at least 30% in the first year of operation of the sustainability criterion, and raising that level in subsequent years². Preferably, this minimum requirement is combined with a mandatory average GHG saving that is set at a higher level and increases over the years, for example to 70% in 2015. This would clearly increase the greenhouse gas benefits of EU biofuel policy, rewarding and promoting investments and R&D into the reduction of the GHG emissions of biofuels on the EU market. It would make clear to all stakeholders involved that biofuels with limited GHG reduction will be phased out in the coming years, and R&D and investments in biofuels with better GHG performance are necessary, and will be profitable in the long term.

It is furthermore essential that all three criteria should take into account GHG emissions and biodiversity loss due to land use changes, both direct and indirect. Therefore, indirect effects due to displacement of feedstock production for other customers should be included. For example, in the past years former large scale users of rapeseed oil (such as margarine producers) have now resorted to import more palm and/or soy oil, in response to the strong increase in demand of rapeseed oil by biodiesel producers. The environmental effects of this increased palm and/or soy oil production is due to increased biofuel demand, and should thus be included in the environmental assessment of the biofuels.

It will be practically impossible to determine this chain of effects for each individual batch of biofuel sold in the EU. However, in view of the potentially large effects and thus the importance of this issue to a fair treatment of different biofuels, we do feel that at least a first order estimate of these effects should be included in the GHG calculation methodology. In the GHG calculation method appendix of the Dutch commission Cramer³ it is emphasized that this factor is very important and a concrete plan is proposed how to develop GHG burden figures for this with the help of global analyses. This paragraph has been attached to this document as an Appendix. The recent proposal of the Öko-Institut for a “Risk Adder” is based on the same idea and is currently being developed further. We support to introduce this methodology as a start, and make it more sophisticated with further research. To this end, the market effects of various types of feedstock/biofuel chains should be determined, and the resulting environmental effects should be estimated.

² This is in line with the Dutch approach, advised by the commission Cramer
http://www.senternovem.nl/mmfiles/Criteria_voor_duurzame_biomassa_productie_Eindrapport_Engelse_versie_tcm24-205854.pdf.

³ http://www.senternovem.nl/mmfiles/The_greenhouse_gas_calculation_methodology_for_biomass-based_electricity_heat_and_fuels_tcm24-221151.pdf



We are further in favour of expanding the list of sustainability criteria. First of all, other environmental criteria should be included, regarding issues such as pesticides use, soil depletion and water management. In addition, criteria should be included that ensure social sustainability.

Question 1.4: Carbon stock differences between land uses would be taken into account under criterion 2. Should they also be taken into account under criterion 1? If so, what method should be used to determine how the land in question would have been used if it had not been used to produce raw material for biofuels?

Yes, carbon stock differences should be taken into account in the GHG savings calculation of biofuels, since the GHG emissions from land use changes can be very significant in some cases. Not taking these emissions into account would thus lead to a significant overestimation of GHG reduction of these chains, undermining the effectiveness of the criterion.

Again, we propose to follow the methodology proposed in the GHG calculation appendix of the commission Cramer (see appendix to this questionnaire, or paragraph 5.8 of the Cramer report, footnote 3). Until this is possible, the Risk Adder approach of the German Öko-Institut could be used as a first order estimate.

Question 1.5: As described in the "possible way forward", criterion 3 focusses on land uses associated with exceptional biodiversity. Should the criterion be extended to apply to land that is adjacent to land uses associated with exceptional biodiversity? If so, why? How could this land be defined?

We propose to use the MNP biodiversity calculation method developed for the Biodiversity Convention (mentioned earlier) to be used for all land. Land with exceptional biodiversity should be excluded from biofuel and food production. Other land changes should be reported so that biodiversity loss can be calculated, monitored and reported. We also propose to define a criterion defined as the maximum biodiversity loss per GHG reduction.

If this is too difficult to implement in the short term, a minimum distance should be required between a biofuel production area and an area of exceptional biodiversity.

Question 1.6: How could the term "exceptional biodiversity" (in criterion 3) be defined in a way that is scientifically based, transparent and non-discriminatory?

We propose to discuss this with the experts supporting the biodiversity convention.

How should overall effects on land use be monitored?

Question 2.1: Please give your comments on the "possible way forward" described above. If you think the problem should be tackled in a different way, please say how.

An increase of biofuel demand will lead to an increase in feedstock demand, since the biofuel feedstock is additional to current food, feed and bio-energy demand. One of the potential effects of this is indeed an increase of the existing (global) agricultural area, by using marginal or set-aside land for feedstock production, and/or by converting land that was previously not in use. Apart from this, existing agriculture could be intensified, improving the yield of current agricultural land. Thirdly, biofuels could be produced from feedstock that is currently not used, such as waste wood from forests. All three effects may cause negative environmental impacts, and should thus be monitored or, if necessary, regulated.

Regarding land use change, reports show that the negative environmental impacts due to land use change could be significant (see, for example, the reference in footnote 1). Monitoring these effects as proposed thus seems necessary. In addition to the land use change, however, the environmental effects of this land use change should also be monitored and reported, such as the impact on sensitive nature reserves, on water tables in sensitive regions, etc. As is stated in the problem definition in the consultation document, the environmental effects of land use change may differ significantly, depending on the type of land is converted to agriculture. The analysis of the environmental impact might not be an easy task, but can be based on the market analysis described earlier.

Apart from monitoring and reporting, the EU should agree on a strategy on how to act in case the indirect land use effects are severe. Both the UN and NGO's have warned that negative effects of an increased demand for biofuels might be large in cases where feedstock production is not done in a sustainable way, we would think that this may also be true for the indirect effects. These should thus be taken as seriously as the direct effects.

Question 2.2: Do you think it is possible to link indirect land use effects to individual consignments of biofuel? If so, please say how.

We expect that it is possible to link indirect land use effects to various specific types of feedstock/biofuel/region combinations. In our opinion, the feedstock used strongly determines the indirect land use effect. For example, an increased use of rapeseed oil for European biodiesel production will cause an increased demand for other edible oils to satisfy the demand from the food industry, the previous users of rapeseed oil. This may be an equal amount of palm oil or soy oil. The expansion of palm oil and/or soy oil plantation area can thus be estimated. The environmental effects of these additional plantation can be linked to rapeseed biodiesel. Similar analyses may be carried out for other types of feedstocks.



We thus propose a two step approach to link land use effects to specific feedstock/biofuel chains. Firstly, the global agricultural market for the feedstocks used to produce European biofuels should be analysed, in order to determine what the additional demand has changed in the market. Secondly, the environmental effects of these changes should be determined.

In addition, we propose to also aim for biofuels that require minimum land area, by not only steering for GHG-reduction per litre, but also (or, perhaps, instead) to promote biofuels with high GHG-reduction per hectare. This measure could be implemented quickly, together with the GHG-emission monitoring system discussed in question 1, and would ensure that both the direct and indirect impact of growing biofuels demand is minimised.

3 How should the use of second-generation biofuels be encouraged?

Question 3.1: How should second-generation biofuels be defined? Should the definition be based on:

- a The type of raw materials from which biofuels are made (for example, "biofuel from cellulosic material")?**
- b The type of technology used to produce the biofuel (for example, "biofuels produced using a production technique that is capable of handling cellulosic material")?**
- c Other criteria (please give details)?**

We would be in favour of the first option, defining second-generation biofuels as biofuels that are produced from cellulosic material.

In our view, the main benefit of second generation biofuels is that they use feedstock that can not also be used for food or fodder. Compared to current, first generation biofuels, they will thus reduce competition with the food and fodder sector⁴. When only the type of technology is defined (option b), producers are free to use their production facilities to process the cheapest available material. This may not always be cellulosic materials, it could still be feedstock that can also be used for food production.

Encouraging the production and use of biofuels from cellulosic material will automatically encourage the development of the technologies needed to convert cellulosic biomass.

Please note that this does not mean that we are not in favour of supporting R&D of the *technology* with which second generation biofuels can be produced. The technology is still in an early development stage, and needs (financial) support to mature and reduce cost. This would be a temporary measure, though, specifically aimed at technology development.

⁴ Please note that some form of competition will remain also when second generation biofuels are used, since they are also expected to be produced from cultivated wood, thereby competing with these sectors for land.

Question 3.2: Please give your comments on the "possible way forward" described above. If you think the problem should be tackled in a different way, please say how.

The suggested support systems could indeed be effective means to support the R&D and market introduction of second generation. This type of policy would justify investments in second generation biofuels, since a market advantage is created that can compensate (fully or partly) for the higher cost and business risk involved with R&D and market implementation of new technology such as second generation biofuels. Furthermore, it allows the market to respond to market and industry developments, since oil companies will be free to choose the biofuel mix that they want to bring on the market.

However, we would prefer that the EU would consider not to promote second-generation biofuels as such, but rather implement a more general policy, aimed at the promotion of fuels that perform significantly better than average, in terms of GHG reduction from well to wheel per litre fossil fuel replaced *and* in terms of GHG reduction per hectare land. This would ensure that two important policy goals would be met, namely minimisation of both GHG emissions and land use. Companies are then free to develop fuels that meet the set criteria, either by investing in second generation biofuels that meet both criteria (for example, by using waste wood as feedstock and a second generation conversion process), or by further optimising first generation biofuels (for example, by using feedstock with high yield per hectare, low fertiliser use and efficient conversion processes).

The cost of new technology (such as second generation biofuels) is inevitably high in the beginning, but can be expected to reduce quickly after large scale market implementation. Policies should take this into account, by offering a relatively large advantage to second generation biofuels in the first years. This advantage should then be slowly reduced over time.

These measures should, in any case, be combined with the sustainability criteria discussed earlier. Not every second generation biofuel should be supported in this way, only the ones that adhere to the minimum sustainability criteria. This will prevent investments in feedstocks and conversion processes that do not provide the sustainability that we are aiming for.

Question 3.3: Should second-generation biofuels only be able to benefit from these advantages if they also achieve a defined level of greenhouse gas savings?

Yes. This will minimise negative environmental impact, and ensure that biofuel companies will not invest in biofuel routes that are not sustainable.



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Oude Delft 180
2611 HH Delft
The Netherlands
tel: +31 15 2150 150
fax: +31 15 2150 151
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Appendix

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Author(s): Bettina Kampman
Geert Bergsma



Appendix

Paragraph 5.8 of the GHG calculation appendix of the Commission Cramer report on sustainable biomass, 2007.

The greenhouse gas calculation methodology for biomass-based electricity, heat and fuels, Geert Bergsma (CE Delft), Jan Vroonhof (CE Delft), Veronika Dornburg (University of Utrecht), 2007.

5.8 Emissions due to displacement of prior production

One complex but important issue in the GHG calculation methodology is how to factor in the reference production of biomass used for different purposes, e.g. food, timber, biofuels. In the Cramer Commission's earlier report this is cited as a topic to be investigated after 2011. Land-use changes may be direct as well as indirect (i.e. due to dislocation of other production) and including a reference production system in the analysis means indirect land use changes will, in principle, be duly accounted for.

Including a factor for the reference production system might encourage the use of set-aside land and marginal land over good agricultural land. With such a factor, set-aside and marginal land would get no penalty for reference production, leading to improved GHG reduction performance, as generally desired by biofuel policy-makers. It would also mean preference for agricultural intensification and avoidance of competition with food crops. Another important argument for including this aspect is the fact that CDM and JI explicitly include this factor in their GHG calculations by determining 'baselines'. If such a factor is not included in a calculator for bio-energy use in the EU, European biomass usage might be at an unfair advantage compared to CDM biomass projects in non-EU countries.

Land use change and reference production as an indicator of displacement (leakage) effects is another important aspect. Although in the longer term this might also be included in the GHG calculator, it is too complex, according to the Commission Cramer, to do so at the moment. As this impact may be substantial, results calculated with the GHG calculation tool must always be presented with a clear disclaimer that "the displacement effects of production have not been included in the calculation"

Displacement effects in the relevant markets can more readily be monitored on a larger scale and the Dutch and British governments therefore intend to monitor them at the national and/or European level. The results of these monitoring efforts will be used to adjust biofuels policies, possibly being incorporated in a GHG index at a later stage.

NGO's suggests to include displacement

Dutch NGO's find this neglecting of the displacement effect unacceptable. They do not support the general opinion of the commission that inclusion in the methodology is one step to far and that macro monitoring is a good alternative.

Monitoring macro (displacement) effects of national and European biofuel policies

In broad brush-strokes, the monitoring scheme for displacement effects could take the following form:

- 1 Determine the relevant markets/areas delivering biofuels to the country/EU.
- 2 Determine the expansion of each of these markets due to biofuels, due to food/feed and in total.
- 3 Determine how the additional demand is being met (e.g. by intensifying current agricultural production, extending farmland acreage, etc.)
- 4 Determine the GHG and biodiversity impacts of expansion of these markets (varying from almost no effect if yields are improved to large effects if deforestation is occurring).
- 5 Distribute the impacts of market expansion over biofuels and food/feed.
- 6 Divide these effects by the amount of biofuels per market.

To this end market statistics and satellite photographs can be used, as well as the model built by MNP and others for the Biodiversity convention (MNP, 2006).

This displacement monitoring scheme could examine developments and effects in 2004, 2005 and 2006, for example, publishing its results in 2007. This could lead to:

- Excluding some sources of biofuels because of major negative displacement effects.
- Introducing a displacement GHG penalty for some biofuel sources with moderately negative displacement effects.
- Neglecting displacement in the GHG calculator for sources with only a minor displacement effect.

This monitoring scheme should ideally be integrated by the EU into a Strategic Environmental Impact Assessment for the Biofuel Directive.

