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THE CERTIFICATION OF SUSTAINABILITY AND GREEN HOUSE GAS SAVINGS OF BIOFUELS

by Dr. Norbert Schmitz[*]

Introduction

Following the recent sharp rise in criticism of biofuels, current proposals reorientating biofuels policy in Europe require that certification of the sustainability of biofuels is ensured.[1] In addition to the assurance of the sustainability of biomass produced for bioenergy, the reduction of Green House Gas (GHG) emissions is also being strongly emphasised. The tendency is no longer to set mere volume or energy quotas for the use of biofuels. Instead, it has become quite apparent that in future policies, targets for total GHG savings or at least a minimum percentage of GHG savings through the use of biofuels, which can be accounted for within the quota system or through tax benefits, will dominate.

German Federal Government and European Commission proposals include default values for achievable GHG savings for several biofuels from different feedstocks and regions. Graph 1 shows the default values set by the German Sustainability Order. It is apparent that the impact of land use change on the overall GHG emissions is significant. If the impact of land use change is not excluded, all biofuels will not meet the minimum GHG savings of 0%. Thus, proof of sustainable biomass and biofuel production becomes a precondition for market access. The instrument to prove this is certification.

Biofuel manufacturers have the option to allow the certification of their output and thus the determination of the actual GHG reduction achieved by their operations. Where this alternative is chosen, default values would no longer be used. This option

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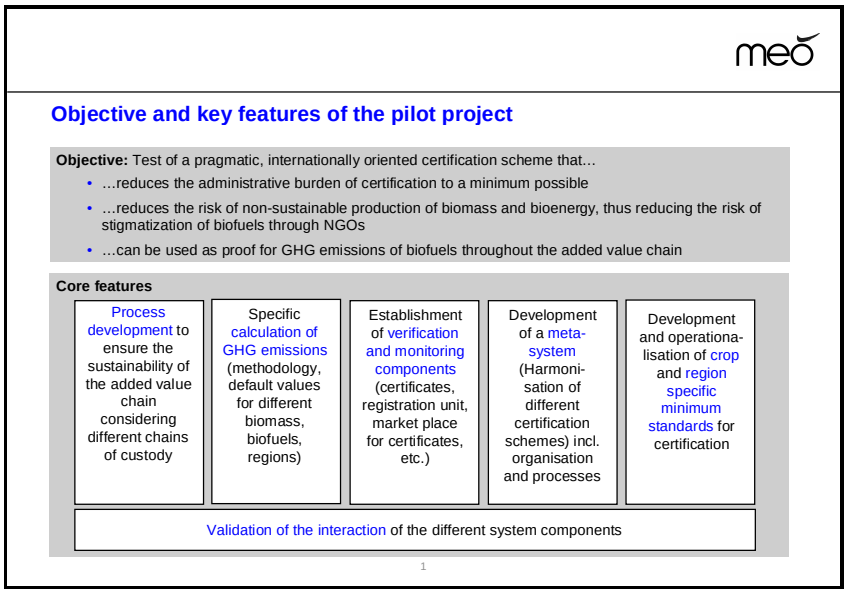
[1] European Parliament and Council Directive proposal supporting the use of energy from renewable resources. Both, the Renewable Energy Directive and the Fuel Quality Directive are aiming at sustainable biomass production and GHG savings. In Germany, a regulation requiring sustainable biomass production and minimum GHG savings of biofuels (Sustainable Biomass Regulation – BioNachV) was approved by the Government in December 2007 and was sent to the EU Commission for notification. In March 2008, the Commission decided to put the process on hold to avoid a situation in which various member countries implement different sustainability regulations. Instead, in the light of the common market, a unified EU approach with similar sustainability and GHG regulations in all 27 member countries is favoured.

is particularly attractive for companies that are not converting land or that are using special biomass feedstocks and innovative production processes which are optimised in terms of GHG/energy savings. Thus, GHG saving levels become a characteristic which differentiates between products, leading also to market price differentials.

However, the question arises as to how the required certification process should be implemented. Currently, there are no approved certification systems which cover all the varying sources of biomass as well as different biofuels produced in various regions and at the same time provide reliable information on sustainable manufacture and specific GHG savings. Of particular relevance for producers of biofuels is the need to demonstrate that their output is not linked to land use change, which is particularly relevant in the context of GHG savings. The transformation of grazing land or woods into arable crop land leads to substantial carbon releases, which have a major impact on the GHG balance of biofuels. To avoid this, critics, including Non Governmental Organisations (NGOs), maintain that it is essential that biomass production does not lead to direct or indirect change in land utilisation.

To counter this, biofuels producers should be in a position to prove that no change in land use has taken place. According to the proposed German Sustainabiltiy Decree, e.g. ethanol from Brazil would not be marketable in the German market as it would not fulfil the minimum GHG savings required due to the impact of land use change (see graph 1). Ultimately, if certification is not seen to be working, then biofuels will not be seriously marketable in the future.

Certification is not new for agricultural products but certifying biofuels is a challenge. To prove sustainable biomass and biofuels manufacture and at the same time to provide reliable information about GHG savings of a specific biofuel is a very complex undertaking if the workings of global commodity markets are



taken into account. This is in contrast to, for example, the organic food market in which certification and even verifiable "hard identity preservation" are already practiced. The products in question are multi purpose commodities, ending up in a variety of applications. Calculation of GHG emissions for the whole manufacturing and processing chain has not been included in any certification system so far. Furthermore, as GHG calculations will be decisive in establishing the accountability and economic value of biofuels, they must have a high degree of reliability.

While there are several studies which have looked closely at different aspects of sustainability, projects which focus on practical implementation and at the same time combine the different components in one system remain few. An appropriate certification system fulfilling these requirements is therefore required. Moreover, it cannot be theoretical and will require "road testing".

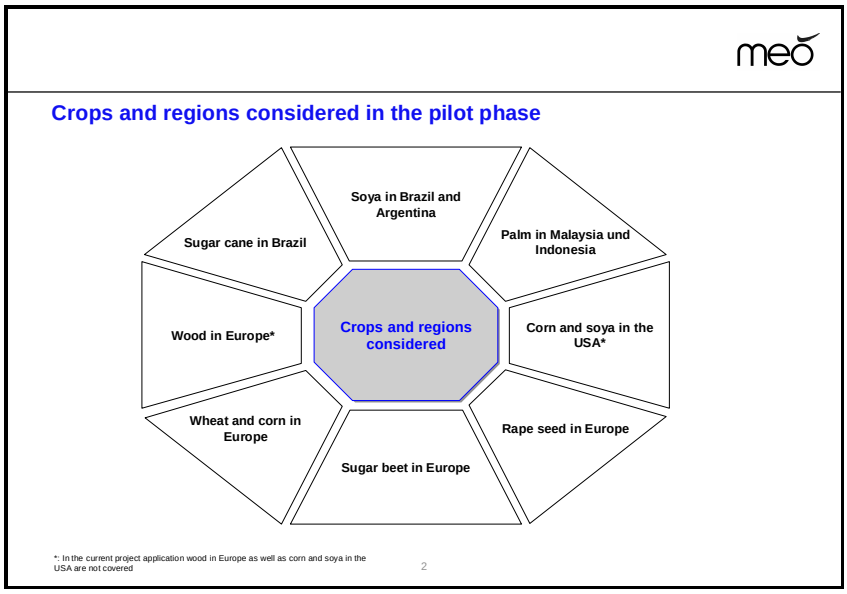
Objectives and content of the pilot project

Against this background, the German Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) - Agency for Renewable Resources (FNR) decided to support an international pilot project to carry out this "road test". Even though the scheme is supported by the German Government, it is not a German undertaking but an international project with the active involvement of a number of stakeholders from Europe, Latin America and South East Asia.

The overall objective of the pilot is to test a pragmatic, internationally oriented certification system which will reduce the administrative burden of certification to a minimum (e.g. by avoiding double and triple certifications of a single producer). In addition, the project should contribute to reducing the risk of non-sustainable production of biomass and bioenergy. This should go a long way towards satisfying the demands of NGOs. Finally, GHG emissions from biofuels throughout the added-value chain should be covered by the scheme, thus providing proof of GHG emissions to the relevant authorities in different states.

The project is being managed by meó, the Cologne-based consultancy. In essence, the pilot is based on the results of a study in 2006 and 2007 carried out by meó in cooperation with several stakeholders from a variety of countries and institutions. Practical implementation during the two-year pilot phase will show how workable the concept actually is, and will pinpoint any aspects in need of"tweaking".

As with the previous scheme, the pilot will be carried out in collaboration with companies from agriculture, trade, the biofuel, automotive



and oil industries as well as research and environmental institutions. The contribution from NGOs to the development of the certification system is also important. In addition to the EU, some important suppliers of raw materials and biofuels are included in the field test, namely Argentina, Brazil, Indonesia and Malaysia.

The BMELV - pilot phase can be divided into six areas:

- Selecting an appropriate certification method to ensure sustainability throughout the entire value chain for processes used both nationally and internationally.
- Verification of GHG emissions throughout the value chain.
- Establishment of instruments for monitoring verification.
- Developing a meta scheme in order to integrate other certification systems.
- Developing and implementing minimum standards for certification for each region and resource.
- Scrutinising the interaction of the different components of the system.

The following chart shows the crops and regions to be covered in the pilot. The objective is to focus as a first step on the most market-relevant biomass. Later, crops such as Jatropha as a raw material for biodiesel production or woodchips for manufacturing BtL (biomass-to-liquids) can also be included.

Conceptual features

The following requirements which must be fulfilled are the starting points for the discussion of the certification system. If these are not met, a certification scheme cannot be effective.

- The certification system must cover all biomass (regardless of the end-use) and all relevant bioenergy. If issues relating to leakage are not addressed, the entire system will forfeit all relevance, as would be the case, for example, of palm oil production, most of which is currently used in the food sector. If the relatively small quantities of palm oil used for biodiesel manufacture are produced in a sustainable manner but the large volumes consumed by the food sectors are still being processed in an unsustainable manner, all the effort expended would be invalid.
- Only a global approach is effective as market-relevant biomass and bioenergy sources are commodities which are traded internationally. Schemes which simply focus on national or EU-wide implementation will not help solve major issues of sustainability.
- The certification system must be able to take into account the existing framework, i.e. national and international laws, global trade rules or domestic conditions etc.
- The overall certification process should be designed as a meta system to avoid additional certification wherever possible.
- Timely implementation of the certification system is essential in order that the pressing sustainability problems can be rapidly addressed.
- The certification system must be able to be used to prove the use of sustainable biofuels.
- The certification scheme must be adaptable so that it will work within the framework of future conditions such as the carbon-reduction strategy of the EU.

The system developed by the meó project group fulfils these requirements. However, realistic expectations regarding the possibilities and limitations of a certification scheme should be recognised. Certification systems are not a substitute for good governance and regulation, and it is unlikely that such schemes will solve all environmental problems and conflicts over resources. For example, they do not protect smallholders against discrimination and cannot prevent criminal activities. In forestry, certification systems have not led to tangible reductions in deforestation. Nevertheless, certification schemes can provide the operational framework for verifying whether biomass and biofuels are cultivated and processed in a sustainable manner. In addition, they can provide incentives for the production and use of sustainable biomass and biofuels.

It is the intention of the project that the establishment of the certification system should not hamper international trade. The system must not become a non-tariff trade barrier as several biomass and bioenergy producers outside Europe fear may happen.

The concept does not try to integrate all possible sustainability issues into the scheme, but instead, focuses

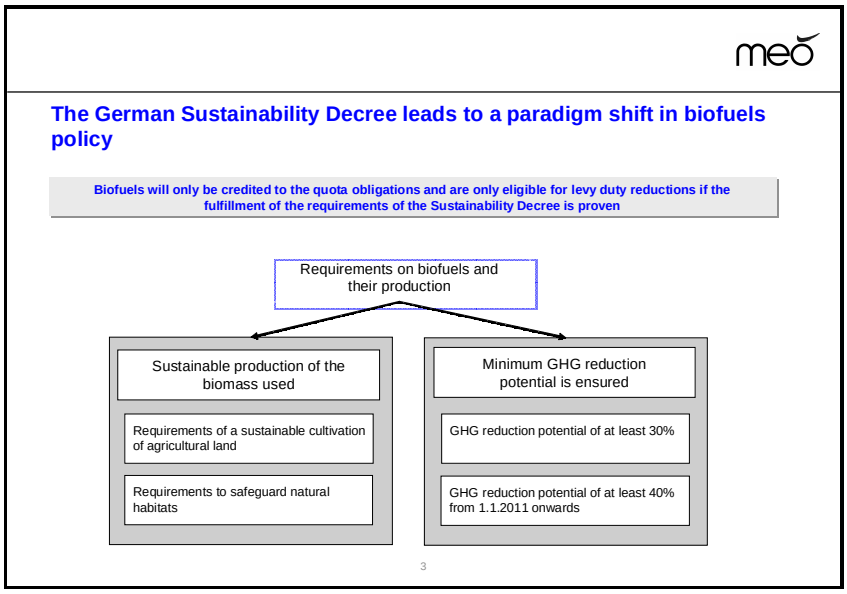
on the most urgent problems in order to deal with them rigorously. The criteria chosen must therefore be measurable and verifiable.

Meta System approach

Certification itself should be implemented through a lean and cost-effective organisation. Its structure is based on standard added-value chains and already existing certification systems. Therefore, to run a global certification scheme efficiently, the establishment of a meta system is required. A meta scheme, which in addition to direct certification of producers, should also allow the endorsement of already existing certification systems. The advantage of the endorsement of third party schemes is the reduction in the amount of administration required and the costs incurred by producers as they will not have to apply for certification under several regimes. An additional benefit is that this also reduces international trade barriers. A meta system will increase the speed of implementation and propagation of standards. Finally, a meta scheme which can incorporate other countries' systems avoids the "not invented here" syndrome and boosts acceptability.

Transparency, participation and democratic processes (stamped by a "Multi-Stakeholder") are essential in order to set up a long lasting and successful certification scheme. The system will only be recognised if is reliable, incorruptible, and unbureaucratic. The meta scheme approach meets this requirement as it reduces the amount of administration required and allows the use of already existing standards and procedures, i.e. Good Agricultural Practices and Cross Compliance. The umbrella system must therefore be valid for biomass, irrespective of its further use, e.g. for fuel, feedstock or food, in order to avoid leakage from the scheme.

The certification system will be optimised through a process of continuous improvement. It will start as a B2B (Business to Business) scheme under the aegis of an international organization,and later, if successful, it could be turned into a mandatory system. The partners in the Project agree that a certification scheme which is based on these principles can function successfully.



Sustainability challenges

The greatest sustainability risks in agricultural production lie in:

- the logging of rain and primary forests,
- the loss of biodiversity,
- the conversion of high carbon land,
- the social area (i.e. where there is child employment and forced labour).

All of these risks primarily relate to agricultural production and therefore the consideration of the entire value chain is therefore not necessary and evaluation and certification of the agricultural output is sufficient.

Based on the current most urgent sustainability risks, a list of major and minor "must" criteria has been developed by the project group. The team has agreed on the following major "must" criteria:

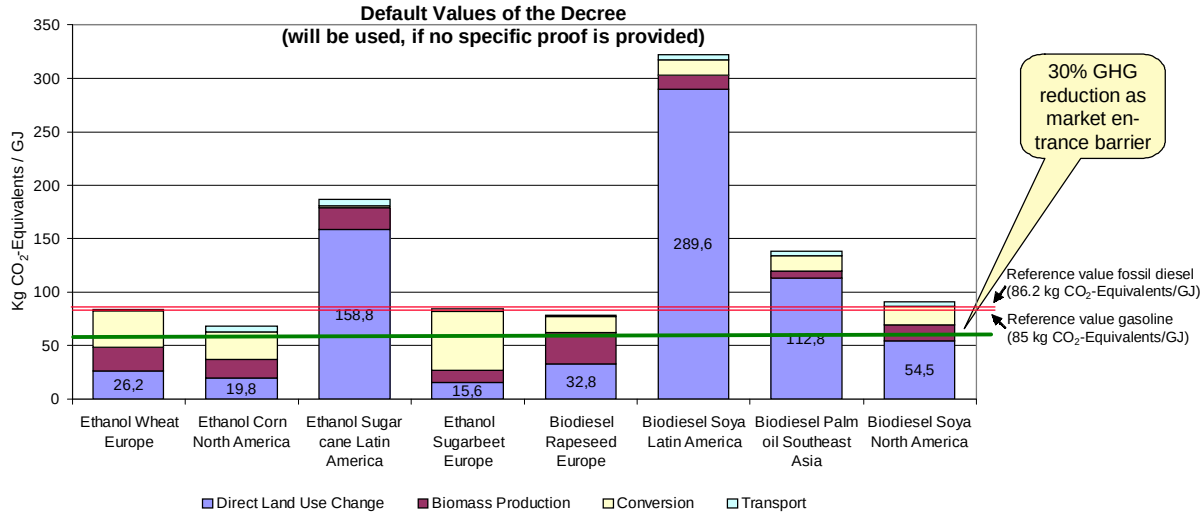
- No conversion of high carbon density land and land of significant worth from the point of view of its value to nature.
- No activities within primary forests and secondary forests with high biodiversity (e.g. the rainforests of Borneo).
- No child labour.
- No forced labour.
- Minimum GHG savings (proven by default values) and gradual increases of the minimum amounts to be achieved.
- The addition of country or biomass specific aspects, e.g. "soil erosion" issues, which are important in the case of certain states.

The minor "musts" comprise sustainability criteria such as fulfilment of additional International Labor Organisation (ILO) labour standards, safeguarding productive soil capacity and appropriate water and waste treatment. Gradually, more and more of these minor "musts" will become major "musts".

However, in the pilot phase, sustainability requirements as established under various countries' laws and regulations will be used as a basis for the certification process, e.g. the sustainability requirements defined in the proposed Renewable Energy Directive of the EU Commission or the German Sustainability Orderwhich has set specific requirements for sustainability. Good Agricultural Practice and regulations for Cross Compliance are prerequisites for sustainable land cultivation according to the German Sustainability Order. The requirements for sustainable land cultivation are met in non-EU countries if rules such as Good Agricultural Practice or other com-

GHG emissions have to be proven on a biomass and conversion specific basis

The default values quoted in the Sustainability Decree are not sufficient to achieve the minimum GHG savings (30% rising to 40% from 2011 onwards). Therefore, a specific proof has to be provided by the biofuels producers



Source: meó, based on NVO

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parable parameters exist, and the biomass is produced according to their conditions. If no similar requirements exist, the prerequisites are met if the following conditions relating to the impact on global natural habitats are fulfilled:

- No significant increase in emissions of acidic, eutrophic, ozone-reducing or toxic substances.
- No substantial deterioration of soil functions and soil fertility (e.g. safeguarding organic substances and avoiding erosion).
- No significant downgrading of water quality and the water balance.
- No major reduction in species and biological diversity.
- Pesticides and fertiliser use is in accordance with environmental requirements.

In addition, the necessary steps needed to safeguard natural habitats are defined by the German Sustainability Decree. Biomass for biofuels manufacture should not be produced in protected areas or in regions with "a high natural value". These are areas with rare ecosystems which are valuable for nature conservation or provide habitats for rare animal and plant species. The requirements for safeguarding natural habitats are fulfilled if the biomass used is not cultivated in protected areas or in regions which have been designated as having this high natural value on January 1, 2005 or subsequently.

GHG emissions have to be proved on biomass and conversion specific bases. Initial GHG savings have to be 30%, rising to 40%. In the case of the Community, the European Commission's proposal is for GHG savings of 35% and biofuels not achieving this minimum value will not be credited to quota obligations. In reality, the expectation is that there will be no demand from the fuel industry for unsustainable biofuels.

Certification will be carried out by accredited, independent certifiers. Based on a "check list", the certifier will verify compliance with the prescribed indicators. If the certifier uncovers a contravention of the established criteria, the certification process is immediately terminated. If all criteria are fulfilled, a certificate will be provided indicating the quantity of GHG released by the agricultural biomass operation in question.

Chains of Custody

Certification can be based on three principal types of "chains of custody" which provide a link between the physical product and certification information. Under this, all relevant stages in the supply chain have been inspected or certified as appropriate and a system of tracking certified products is in place. Under the "Book & Claim" Scheme, a full decoupling of the biofuel traded from the certification information takes place. With a certificate, a certain quantity of sustainable biofuel or biomass is booked and can be sold to the market. The buyer of the certificate can claim sustainability independent of the product which he receives. The certificates are traded separately from the products and no traceability is thus possible.

The"Book & Claim" System seems to be well suited to the certification of biomass and biofuels. In the case of bulk commodities, the traceability of specific goods is almost impossible. Alternative schemes include *Inventory and Control*, which allows controlled mixing of certified products with non-certified products, and *Full Segregation* under which product and information are linked throughout the supply chain. In this case segregation from non-certified products would be required.

Segregation of certified from non-certified products may lead to higher costs, is not as transparent and offers less security and protection against fraud. Due to its noted effectiveness and efficiency, the "Book & Claim" scheme has a high degree of acceptance among industrial and trading enterprises and can be relatively swiftly implemented. The costs for registration equipment and the requisite commercial organisation are considered low. However, in the pilot phase, all systems will be analysed to prove their effectiveness and efficiency in practice.

The GHG performance of different biofuels must be covered by certification in order to meet the objective of GHG emission reductions. GHG balances allow comparison with fossil fuels and the opportunity of comparing different biofuels with each other. Detailed calculations can be made which will help develop specific GHG balances for various biofuels produced in different regions from a variety of feedstocks. This approach requires a substantial and costly effort and in some cases, it might not even be possible to assemble the required information. In particular during the early stages of certification, it is unlikely that producers will be able to provide a detailed GHG balance. Therefore, the use of default values will be necessary to guarantee a quick start to the process. Different default values will be required in order to take account of land use changes, different feedstocks, agricultural production and conversion processes and various regions. At a later stage it is plannedto foster innovation by allowing producers to provide detailed calculations of emissions for specific manufacturing methods. If plantations or biofuels producers use innovative manufacturing processes which result in higher than average GHG savings, then the company in question should be entitled to additional credit because of the incremental improvement.

Concluding observations

Certification must start quickly in order to tackle the enormous sustainability problems associated with certain types of biomass and bioenergy production. Efforts at a national level will not solve these problems; a global approach is required. Social and political acceptance of biofuels may depend on a credible certification system which can efficiently and effectively confirm the sustainable output of biomass and biofuels. Furthermore, it is also important to prevent production of biomass for biofuels becoming sustainable with non-sustainable production merely being relocated to other areas. Thus, the approach which is already being used to some extent establishes sustainability requirements not only for biofuels but for all energy uses of biomass and eventually also for other sectors of biomass use (food, feed and biomass for industrial use) is heading in the right direction.