

Overview of recent developments in sustainable biomass certification -DRAFT
International conference on biofuels, UNIDO/MPOB, 5 – 6 July 2007, KL, Malaysia.

Overview of recent developments in sustainable biomass certification

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ABSTRACT

The objective of this paper is to give a comprehensive review of initiatives on biomass sustainability criteria and certification from different viewpoints of stakeholders, including NGOs, companies, national governments and international bodies. Special attention is given to recent developments in the Netherlands, the UK and the EU up until June 2007. Furthermore, opportunities and restrictions in the development of biomass certification are described, including lack of adequate methodologies, stakeholder involvement requirements and certification costs.

It is concluded that criteria to ensure the sustainable production of biomass are needed urgently. To some extent criteria categories can be covered using existing systems, but others (such as GHG and energy balances, changing land-use) require the development of new methodologies. A gradual development of certification systems with learning (through pilot studies and research) and expansion over time, linked to the development of advanced methodologies can provide valuable experience, and further improve the feasibility and reliability of biomass certification systems. However, better international coordination between initiatives is required to improve coherence and efficiency in the development of sustainable biomass certification systems, to avoid the proliferation of standards and to provide a clearer direction in the approach to be taken. Finally, next to certification, alternative policy tools should be considered as well to ensure sustainable biomass production.

1. Introduction

Increases in the price of fossil fuels, growing environmental concerns regarding their use and impacts (including climate change) and considerations regarding the security and diversification of energy supply have driven the increased use of biomass worldwide. Expectations for the coming years, based on energy scenarios and various policy objectives, indicate a growing increase in the global production of biomass on a global scale and for many nations.

The global production of liquid biofuels is now estimated to be over 35 billion litres (EC 2006). Ethanol currently accounts for more than 90% of total biofuel production. Global fuel ethanol production more than doubled between 2000 and 2005, while production of biodiesel, starting from a much smaller base, expanded nearly fourfold (WWI 2006). Some examples: Brazil has exported in 2004 2.5 billion litres of ethanol (same in 2005) with main destinations India (23.1%) and USA (20.2%) (Walter *et al.* 2006). The rapidly changing character of worldwide biofuel production capabilities is also illustrated by recent trends in the United States. In 1995, U.S. biodiesel production was 1.9 million litres; by 2005 this was more than 280 million litres (WWI 2006).

Beside the strong increase in liquid biofuels, trade and production in pellet and solid biomass production is also rising. Total Canadian exports of wood pellets was around 625,000 tonnes in 2006 (Swaan 2006). In the Netherlands, imports for electricity production have increased by a factor of seven from 2003 to 2005, and nowadays about 80% of all electricity produced from biomass is imported. For 2004, Essent, the largest user of biomass in the Netherlands, reported that approximately 30% of the biomass originated from North America, 25% from Western Europe and 20% from Asia, with the remainder from Africa, Eastern Europe, Russia and South America (Junginger *et al.* 2006).

The growing use and production of biomass as a renewable energy source has created an international biomass market and leads to increasing trade in biomass resources. International trade in biofuels and related feedstock may provide win-win opportunities to all countries: for several importing countries it is a necessary precondition for meeting self-imposed targets. For exporting countries, especially small and medium developing countries, export markets are necessary to initiate their industries (Zarrilli 2006).

However, the production¹ of biomass energy crops and the removal of biomass residues from forest and agricultural systems for energy production can also result in negative ecological impacts, changing land-use patterns, socio-economic impacts and GHG emissions (e.g. for transport and vs. alternative use on-site). With considerable increase in feedstock and biofuels expected, sustainable production is becoming a key concern and is currently being considered as a possible requirement for market access, e.g. in the first draft of the EU biofuels directive (Zarrilli 2006, EC 2006). Setting standards and establishing certification schemes are possible strategies that can help ensure that biofuels are produced in a sustainable manner (WWI 2006).

Setting standards and establishing certification schemes are possible strategies that can help ensure that biofuels are produced in a sustainable manner (WWI 2006). Recently, policy makers, scientists and others have recognized these aspects. Certification is the process whereby an independent third party assesses the quality of management in relation to a set of predetermined requirements (standards). These are mostly formulated as criteria that have to be fulfilled for the certification of a product or a production process. To use criteria for the formulation of a certification standard they have to be operational and measurable. For this purpose, indicators and verifiers are used (Lewandowski *et al.* 2005).

¹ Note that also the end use of biomass can cause negative environmental effects, e.g. the combustion of contaminated waste wood. However, in many countries already (strict) environmental regulations ensure the sustainable end-use of biomass.

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Over the last years, various efforts have been undertaken as steps towards certification for imported biomass. Key documents have been published by Lewandowski *et al.* (2005), Fritsche *et al.* (2006a), WWI (2006) and Zarrilli (2006). These studies focus on specific aspects in the discussion of biomass certification and include in their discussion relevant initiatives related to their studies.

The objective of this paper is to give a comprehensive outline of initiatives on biomass certification from different viewpoints of stakeholders. The paper focuses on initiatives up until the end of 2006, though developments for the Netherlands, the EU, the UK and Germany are updated until June 2007. A second objective of the paper is to identify opportunities and limitations in the development of biomass certification and based on this overview provide some recommendations and conclusions.

This paper is a shortened and somewhat updated version of a comprehensive review paper written by Jinke van Dam, Andre Faaij, Ingmar Juergens, Gustavo Best and Uwe Fritsche (see van Dam *et al.* 2007) in the frame of IEA Bioenergy Task 40 on sustainable international bioenergy trade. While these authors are all members of IEA Bioenergy Task 40, the issues, positions, and strategies described are not necessarily those of all members of the Task or the members of the IEA Bioenergy agreement.

2. Key actors in the development of biomass certification

Different stakeholder groups have recognized the need for biomass sustainability criteria and various groups started with on the development of a biomass certification system or on principles and criteria to describe sustainable biomass trade. Stakeholder groups have different interest in biomass certification (Lewandowski *et al.* 2005). In this paper, developments in biomass certification from the viewpoint of four stakeholder groups are described: national governments and trans-national organizations (in this specific case the EU), companies, non-governmental organizations (NGOs) and international organizations and initiatives, see also Table 1. The initiatives are discussed per stakeholder group and no distinction is made in the phases of development (starting with principles, to criteria and indicators to the development of the system for implementation) from the initiatives.

Table 1: Stakeholder groups and interests in certification, partly based on Lewandowski *et al.* (2005):

Stakeholders	Some interests for biomass certification
National governments and transnational organizations	Policy instrument to promote sustainable management and sustainable consumption pattern, provides information for policy consultancy. The EU, as the most powerful player for establishing international standards in Europe has a special role in this.
Intergovernmental Organizations	The UN and FAO in particular play an important (potential) role as a neutral forum for negotiations between all kinds of stakeholders (particularly countries).
Companies (producers, trade, industry)	Instrument for environmental marketing and market access, tool for controlling origin and quality of raw materials, products or services, provides information for optimization of production processes, allows for product differentiation
NGOs	Provides information on the impacts of products, provides information whether the product meets quality or technical standards, instrument to promote sustainable management
International bodies and initiatives	Instrument to promote sustainable management and sustainable consumption pattern, information for policy consultancy and collaboration

3.1 Inventory of viewpoints of national governments

Many national governments in the world are promoting the use of biomass and the production of biofuels and renewable energy in their countries. Few of them have taken initiatives to work on the development of a biomass certification system or on principles and criteria to describe sustainable

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biomass trade. The countries with most advanced plans are, the Netherlands, United Kingdom, Germany and Belgium. On supra national level, the European Commission is considering the development of sustainability criteria and a European biomass certification system. Beside, most countries have indirectly included some sustainability criteria in their policies, as e.g. sustainable harvesting of crops. Although these criteria are relevant for sustainable biomass production, they fall out of the scope of this paper and are not discussed here.

3.1.1 The Netherlands

The last years, **The Netherlands** has been importing wood pellets, agricultural residues and bio-oil for electricity production (Junginger *et al.* 2006). The Dutch government has expressed its intention to incorporate sustainability criteria for biomass in relevant policy instruments. On the longer term a broader application of these sustainability criteria is envisaged. A project group “Sustainable Production of Biomass” was established in 2006 by the Interdepartmental Programme Management Energy Transition to develop a system for biomass sustainability criteria for the Netherlands for the production and conversion of biomass for energy, fuels and chemistry. This project group published a testing framework for sustainable biomass (Cramer *et al.*, 2007).

General starting points of the commission (and the framework) are:

1. The testing framework must be a universal framework that is in line as much as possible with international initiatives

- The testing framework will be generic and broadly applicable. The emphasis is on non-food applications (chemistry, transportation fuels and the generation of energy), since energy subsidies and environmental tax on energy will stimulate the production of biomass for these applications. But the testing framework can also be of importance to assess food production with regard to its sustainability aspects.
- The testing framework is applicable to biomass of all origins, both from the Netherlands and imported, and to both the harvested crops and the manufactured products, such as biodiesel and bio-ethanol.
- The testing framework fits in as much as possible with international initiatives, such as existing legislation, international conventions and hallmarks. In addition it also helps to comply with the desire for uniform sustainability criteria for biomass, which was expressed by the European Energy Council in June 2006. It must also fit in with developments on a EU level.
- The testing framework has been formulated in such a way that it will be valid for all biomass flows and countries. It would not seem desirable to exclude product or country combinations from the outset. However, the testing framework can be a reason to exclude specific biomass flows, because they do not meet the minimum requirements. The testing of this generic framework requires country specific information or information specific for raw materials; for this a dialogue with local parties will be necessary.

2. The testing framework must be practicable and verifiable.

- The system to be developed must in the long term offer certainty about the desired direction. This means that it will be indicated how the system will be adjusted or extended in the future.
- The testing framework must be manageable. By only asking for necessary information, it avoids an unnecessary administrative burden.
- The testing framework must be applied to the major sustainability problems and opportunities that occur at the moment in the production and trade of biomass, or those anticipated for the future.
- The testing framework is intended for biomass that is applied in the Netherlands or is subsidized in the Netherlands.
- The sustainability criteria within the testing framework must be easy to check and to maintain. The best way to achieve this would seem to be by means of (international)

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certification of biomass flows. If the producing company does not meet all the basic conditions, it will not be issued a certificate.

- The provider of the bio-energy or biofuel in the Netherlands (for instance the applicant for subsidy or a party that has a biofuel obligation) will have to prove that he meets the (basic) conditions. The sustainability criteria describe minimum requirements. Parties are at liberty to distinguish themselves with higher requirements than this lower limit.

The group identified six sustainability themes, and developed criteria for each of the, which is summarized below:

1. Greenhouse gas emissions

Calculated over the whole chain, the use of biomass must produce fewer emissions of greenhouse gases net than on average with fossil fuel. For electricity production the emission reduction must now amount to at least 50-70%, for the application in transportation fuels at least 30%. These percentages must increase further by innovation in the future. The percentages are minimum requirements. The development of new acreage for the planting of biomass for energy must not lead in the longer term to the release of large quantities of carbon that had been stored there (in soil or vegetation).

2. Competition with food or other local applications

The production of biomass for energy must not endanger the food supply and other local applications (such as for medicines or building materials). Criteria for this have not been determined yet; reporting on changes in land use in the region and in prices for food and land is of great importance here.

3. Biodiversity

Biomass production must not affect protected or vulnerable biodiversity and will, where possible, have to strengthen biodiversity. Often local laws and regulations have already been grafted on international agreements about biodiversity. Vulnerable areas and areas with a high value for biodiversity must be spared, where possible restoration of biodiversity is desirable.

4. Environment

In the production and processing of biomass, the quality of soil, surface and ground water and air must be retained or even increased. This makes demands, for example, on the use of fertilizers and pesticides, but it also requires the application of the 'best practices' for instance to prevent erosion or additional emission of harmful substances.

5. Prosperity

The production of biomass must contribute towards local prosperity. Criteria for this have not yet been developed. Reports that fit in with descriptions according to the Global Reporting Initiative can indicate if, for instance, the economic value of the biomass production will directly benefit the local community.

6. Social Well-being

The production of biomass must contribute towards the social well-being of the employees and the local population. The production of biomass must at least comply with international principles that have been laid down by the International Labour Organisation, in the UN Universal Declaration of Human Rights and in other treaties. Reports must also bring to light any violations of property rights or corruption.

More details about the exact criteria, indicators and reporting obligations can be found in the framework document (Cramer et al, 2007).

In general, for 2007, *minimum criteria* have been formulated, which have to comply with present international obligations and local jurisdiction, in addition to other specific indicators. Obligatory

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reports are required when indicators are lacking. Some criteria are currently not yet testable. For these criteria reporting is required. In the years up to 2011 efforts will have to be concentrated on converting these reports into scientific, well substantiated indicators.

Also a number of criteria can only be tested on the *macro-level*, i.e. not a single producer can be held accountable for e.g. rising food prices. Criteria which have to be addressed on a macro-level are amongst other the greenhouse gas balance, biodiversity and competition with food and other biomass applications criteria. Primary, it is the responsibility of Dutch government, (preferably coordinated in EU context) to start the dialogue with producing countries, aiming at responsible land-use planning.

The aim of the framework is also to keep as *much as possible in line with existing certification systems* such as e.g. FSC, RSPO or EUREPGAP. Comparison between these the certification systems involved and the Dutch testing framework can lead to a declaration of equivalence. GHG so far included in none of the existing certification systems, so additional test are so far in all cases required.

The framework report was published in April 2007 and presented to the Dutch government. Currently the implementation of these guidelines into policy measures and/or laws is discussed taking into account (inter)national legislation and EU developments (see also 3.1.5). At the moment of writing (June 2007) the working groups on a.o. GHG methodology were still working on finalizing their methodologies.

For the coming years, the Dutch government plans to test the developed set of criteria using pilot projects, to perform research to further underpin indicators, and to support supporting the private sector in starting the certification process.

3.1.2 United Kingdom

The **United Kingdom** announced in November 2005 the introduction of a new policy to ensure the inclusion of biofuels and, potentially in the future, other renewable fuels in UK transport fuels. The 'Renewable Transport Fuel Obligation' (RTFO) is the UK's primary mechanism to deliver the objectives of the Biofuels Directive and will place a legal requirement on transport fuel suppliers to ensure that a specified percentage of their overall fuel sales are from a renewable source. The obligation will commence in April 2008 with targets for 2.5% (by volume) of renewable fuels to be supplied in the first year rising to 5% in 2010/11. A carbon and sustainability reporting scheme is under development and will be piloted in spring 2007 (Archer, 2006).

The UK and Dutch Governments are cooperating on the development of sustainability requirements beginning with bilateral discussions in 2006 and leading to joint working and a common approach on many issues. The aim of this cooperation is to harmonize scheme design, reduce administration for business and demonstrate how such systems could be developed on an EU-wide basis. The European Commission and German and Belgian governments have also been involved in this process.

The sustainability assurance schemes developed in the UK and the Netherlands have complementary features, although the starting principles were different, and the scope of the RTFO is slightly more limited. In the UK, the focus has been on devising a practical scheme that can be operated by businesses supplying biofuels for transportation through the RTFO. Criteria categories are the same as in the Netherlands, with the exception of social welfare and competition for food and other materials. For criteria included in the RTFO, mandatory reporting is required from individual companies sourcing or supplying fuels or feedstock. Most recently, a draft methodology for Carbon Reporting under the RTFO (Bauen et al, 2006) and a framework report on sustainability reporting within the RTFO (Dehue et al. 2006) have been produced. In the latter, a so-called "Meta-Standard" approach seeks to make maximum use of existing standards where these exists, to

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stimulate existing initiatives such as RTRS and BSI (see section 3.4.2) and to encourage harmonization of criteria in the long term. Expected levels of reporting have been defined for the period 2008-2011 and the various permissible Chain of Custody methodologies for RTFO sustainability reporting have been described. Finally, methods for verification of company reporting have been proposed. The next steps are peer review and piloting of the approaches between April and June 2007. The final guidance that companies will follow to deliver their reporting requirements will be issued in the autumn 2007; reporting will commence in April 2008 (Archer 2006).

The UK Government has published a consultation on the carbon and sustainability reporting requirements for biofuels. This consultation forms part of the work on the Renewable Transport Fuel Obligation (RTFO), which means that by 2010, 5% of all the fuel sold on UK forecourts should come from biofuels. Government expects this to save 1 million tonnes of carbon a year, the equivalent of taking 1 million cars off the road.

The consultation document sets out the proposed methodology that transport fuel suppliers will have to follow to receive certificates under the RTFO and provides guidance on how they can report against this methodology. It also provides default carbon saving values for the majority of fuel chains that will exist for the UK market.

Note that Government has also committed itself to a package of measures as follows (also available from the press release above):

- To reward biofuels under the RTFO in accordance with the carbon savings that they offer from April 2010, provided that this is compatible with World Trade Organisation rules and EU Technical Standards requirements, and is consistent with the policy framework being developed by the European Commission as part of the review of the Biofuels Directive, and subject to consultation on its environmental and economic impacts
- To reward biofuels under the RTFO only if the feedstocks from which they are produced meet appropriate sustainability standards from April 2011, subject to the same provisos and consultation as above and subject to the development of such standards for the relevant feedstocks.
- To continue to work closely with partners at a national, European and international level to develop robust standards for ensuring the sustainability of biofuels and to ensure that early consideration is given to the WTO implications of the UK's policy intentions.
- To ask the RTFO Administrator to report to the Secretary of State every three months on the effectiveness of the RTFO's environmental reporting mechanisms, and on the carbon and sustainability effects of the RTFO. The Government will keep the RTFO under review in the light of these reports.
- To set stretching indicative targets for the level of carbon and sustainability performance expected from all transport fuel suppliers claiming certificates for biofuels in the early years of the RTFO. These targets, which are included in the consultation paper we are publishing today, cover:
 - the level of greenhouse gas savings that we expect to see from the biofuels used to meet the RTFO;
 - the proportion of those biofuels that we expect to come from feedstocks grown to recognised sustainability standards; and
 - the amount of specific information that we expect to be included in sustainability reports.
- Has asked the Low Carbon Vehicle Partnership (LowCVP) to explore the feasibility of a voluntary labelling scheme to allow responsible retailers to show that their biofuels are genuinely sustainable. Any scheme would need to be compatible with WTO rules.

3.1.3. Germany

In **Germany**, the Biofuel Quota Act came into force in 2007, mapping out admixture quotas for biofuels by promoting legally defined mixture quotas, which will increase over time. This national regulation includes a provision, which empowers the German government to establish sustainability requirements for biofuels that are eligible to participate in the quota system. German Parliament called on the government to make use of this provision and to draft such an ordinance for minimum sustainability standards by mid 2007, and the German Government announced to comply with that request (Fritsche *et al.* 2006). The German Renewable Energy Act (EEG) which specifies feed-in tariffs for renewables - including bioenergy - will be under revision in 2008, and several stakeholders already formulated sustainability requirements for bioenergy to be included in the EEG revision. Beside, the German Technical Cooperation (GTZ) has carried out case studies on the potential and implications on agriculture and sustainability by liquid transport biofuels in four developing countries² (Kashyap *et al.* 2005). The study includes an analysis of the sustainability of biofuel development relating environmental, social and economic criteria to the Indian context.

3.1.4 Belgium

Belgium, currently importing wood pellets for power production (about 700 kton in 2005), has ambitious targets for green electricity production. Sustainability energy is a regional competence in Belgium and certificate systems are implemented in three regions (Brussels, Flanders, Wallonia) for renewable energy sources and for combined heat and power. The different regions have chosen to apply different certificate systems (Verhaegen *et al.* 2005). The system in Flanders is based upon the energy balance and the use of fossil energy along the supply chain that is then subtracted 'pro rata' from the granted certificate per MWh of green electricity. The system in Wallonia is compatible with the one in the Brussels region and is based upon avoided fossil CO₂ emissions according to a LCA with respect to the reference of the combined cycle power plant firing natural gas with an efficiency of (for now) 55% (Marchal *et al.* 2006). Walloon authority imposes that each supplier undergoes an audit within six months for certification of imported biomass, which examines the sustainability of the wood sourcing as well as detail the energy balance (through an energy audit including GHG emissions) of the whole supply chain. The sustainability of the wood sourcing can be delivered according to 1) forest certificates as FSC, 2) a traceable chain management system at the suppliers end or, in absence of such certification, 3) all public documents originating from independent bodies making a review of forest management or control in the considered country. SGS international, accepted as independent body by all Belgian authorities for granting green certificates, analyzes for each producer the global supply chain. If the product would appear in contradiction with the sustainability principle, the CwaPE (energy regulator in Wallonia) has the right to cancel the granted green certificates. So far, Flanders authorities have not requested audits or a certification procedure for imported biomass by law (Marchal *et al.* 2006).

3.1.5 Developments on EU-level

On supra-national level, the **European Commission (EC)** is active in the development of biomass certification. The Biomass Action Plan (EC 2006) mentions that, in the context of the review of the Biofuels Directive³, carried out by end 2006, the assessment and monitoring of the full environmental impact of biofuels will receive attention. One of the issues in the review report will be the requirement that, through a system of certificates, only biofuels whose cultivation complies with minimum sustainability standards will count towards the targets. The EC also considers how this could be applied for biomass used for other energy purposes. The system of certificates would

² Brazil (Kaltner *et al.* 2005), China (Gehua *et al.* 2006), India (Kashyap *et al.* 2005) and Tanzania (Janssen *et al.* 2005)

³ Directive 2003/30/EC of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport

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need to apply in a non-discriminatory way to domestically produced biofuels and imports (EC 2005). Some practical issues that need to be further looked at are (Hodson 2006):

- What are the characteristics of biofuel production the EU wants to discourage / encourage?
- How to measure these characteristics?
- How should the procedural / institutional structure to set incentives for biofuels look like?
- How to ensure compliance for this mechanism?

Mid 2006, the EC launched an invitation to tender for a study on sustainability criteria and certification systems for biomass production that have been developed or proposed by various organizations at European and international level (E.U. Center 2006). It is likely that the Commission will, based on the review report, aim at an amended Biofuels directive in 2007. If a new draft is proposed, some form of certification system is likely to be included (Prins 2006).

An additional Communication from the EC (EC 2006) focuses more on trade issues for biofuels and the role of developing countries. The report recommends a regulated market approach and favours a balanced approach in trade negotiations concerning biofuels, in its approach to balance domestic production and/or imports (EC 2006). The EC recognizes that the production of biofuels from suitable feedstock could generate economic and environmental benefits in a number of developing countries, create additional employment, reduce energy import bills and open up potential export markets. The EC will support developing countries that wish to produce biofuels and develop their domestic markets and its EU development policy aims to help suitable developing countries capture the benefits offered by biofuels, while addressing the concerns in an appropriate way (EC 2006). The EC will take these objectives forward in bilateral and multilateral negotiations (EC 2005).

Summarizing, national governments worldwide are developing new biomass policies. Most of these policies relate to targets or incentives to stimulate the use of renewable energy sources. A few national governments (Netherlands, UK, Belgium, with Germany coming up in 2007) and EC on supra-national level have taken the initiative to start developing a policy framework to guarantee sustainable biomass. The systems in Belgium and UK have as main criteria reduction of GHG emissions for sustainable biomass feedstock, as most probably Germany will include as well. For UK this is possibly later extended with other criteria. Only the Netherlands has developed a wider set of principles including environmental, social and economic criteria. A framework for implementation is still in process. Belgium has coupled the criteria with the granting of green certificates. The UK aims to develop carbon certification schemes for environmental assurance. The EC intends to develop a system of certificates so that only biofuels whose cultivation complies with minimum sustainability standards will count towards the targets.

3.2 Inventory of the viewpoints of companies

Nowadays, different support systems (e.g. feed-in tariffs, certificates) have been initiated and implemented to accomplish national targets on the use of renewable energy sources and biofuels. Recent developments in the field of biomass certification show that this has stimulated companies, involved in the supply, finance or use of electricity from biomass or biofuels, to initiate initiatives in this field.

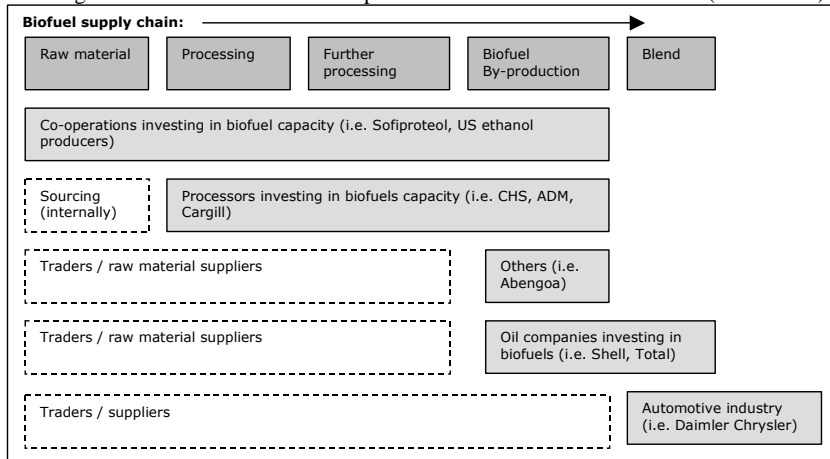
3.2.1 Parties in the biofuel / biomass supply chain

National initiatives and legislation (see 3.1) have triggered initiatives on biomass certification at companies active in the biofuel and biomass supply chain. For biomass, the supply and processing chain leads to chain interaction of various parties, depending on the economic segments in which they are active (see figure 2). Various companies are involved in the discussion of biomass certification and their initiatives tend to focus on the part of the chain in which they are responsible.

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A number of companies who recently included the sustainable production of biofuels are listed below⁴.

Figure 2: Companies active in different economic segments of the liquid biofuel supply chain, resulting in differences in focus and responsibilities for biomass certification (Vaals 2006):



⁴ Given the current rapid development of new initiatives, this list of examples should not be considered exhaustive.

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Both the companies **CARGILL B.V.** and **CEFETRA** (*traders, raw material suppliers*) are members of the Dutch project group 'Sustainable Production of Biomass'. CEFETRA plays a coordinating and organizational role in several supply chains. It is important for the company to secure its (independent) sourcing and get as close as possible to the primary production / producer to get direct influence on factors as e.g. quality, track & tracing, the use of GMOs and sustainability. An integrated pricing system with a shortened supply system will increase the steering power of CEFETRA on these issues (Stam 2006). CARGILL is also a member of RSPO (see section 3.4) as well as the company **UNILEVER** (*processing and supply*). Unilever has expressed its concerns about current biofuel policies (Mortished 2006), further explained in a 'Biofuels Unilever Position Statement' (Unilever 2006). Concerns relate to, among others, a decrease in availability of raw materials and sustainability aspects due to increased pressure on land and environmental, cost and energy yield aspects of low-performance biofuels (Unilever 2006).

SHELL (*oil company*) is one of the larger blenders of transport biofuels. In 2004, foundation Shell Research and Probos Foundation have invited a group of experts to take place in the 'Biomass Upstream Steering Group' (BUS), enabling Shell to identify opportunities and threats of biomass use, learn about sustainability and acceptability and make the right choices (Voss 2004).

Volkswagen (*automobile company*) has developed a fuel concept based on second-generation biofuels, which can be produced from biomass, are to a large extent CO₂ neutral and do not compete with food production. Volkswagen is calling on politicians to develop a sustainable tax model providing a secure network for investing in the development and market launch of new fuels. Apart from taking CO₂ efficiency as criteria, also other sustainability criteria should be included in fuel taxation. Volkswagen has developed a tax model catering for both CO₂ efficiency (primary criteria) and a set of additional sustainability criteria (Volkswagen 2006).

DaimlerChrysler (*automobile company*) signed in 2005 the Magdeburg Declaration with UNEP stating to promote sustainable mobility by supporting activities and further tap the potential of biofuels. This was further agreed upon in a MoU in February 2006. The two organizations call on producers for biofuels to take environmental and sustainability aspects into account in their cultivation processes and intend to support the development of a 'sustainability seal' (similar to what FSC provides for wood products) for the cultivation of biomass for biofuels. Other activities of the partnership include conducting engine tests, promoting a Jatropha project in India, organizing the biennial Magdeburg Environmental Forum (platform for experts) and the development of second-generation biofuels (DaimlerChrysler 2006). See also 3.4.1.

BioX, a company for liquid biomass from palm oil imported from Malaysia, is RSPO member and has its own Code of Conduct and position paper of palm oil for energy generation. BioX, together with Control Union is currently evaluating RSPO-criteria for auditing and certification purposes. It has developed a questionnaire and pre-auditing document to audit palm oil production locations on RSPO-criteria and will audit palm oil producers to verify if they comply with the RSPO sustainability principles and criteria. BioX started a study to determine the CO₂-emissions related to the growing, production and transportation of palm oil; an issue that has not been covered by the RSPO-criteria. Since 2006, BioX is joining the GGL program (see 3.2.2) (BioX 2006).

Financing companies also play a role in the discussion of sustainable biomass production. The bank **Rabobank International** is a member of the Dutch project group 'Sustainable production of Biomass' and RSPO member. Recommendations given by the bank (Fresco *et al.* 2006) related to sustainable bio-energy are e.g. indicating that bio-energy projects should be judged on a case-by-case basis taking into account ecological, social and economic criteria.

3.2.2 Companies in the electricity supply chain

Demand on using RES is stimulated by obliging end-users to produce a share of their electricity (imposed by a quota obligation) by RES. In practice, this obligation is usually not imposed on the consumer but on electricity suppliers or distribution companies. This has introduced market mechanisms and trade in sustainable energy production and has stimulated electricity suppliers in

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Europe, using biomass as feedstock, to start initiatives to develop their own biomass certification systems (Verhaegen *et al.* 2005).

Electrabel label is a certification procedure for imported biomass and developed by Electrabel, a European energy company. For Electrabel, it is necessary to inform a potential supplier of all requirements made by Electrabel concerning the sustainability criteria for being accepted within the Belgian green certificate systems (see 3.1) and the technical specifications of the product for firing it in a thermal power plant (Marchal *et al.* 2006). Electrabel applies similar certification procedures in the different Belgian regions, gathering the auditing requirements for the import of biomass of Flanders and Wallonia. The requirements for biomass to be accepted according to Electrabel's standards are concentrated in a document called "Supplier Declaration" (Electrabel 2006). This document is signed by a representative of the producer and verified and stamped by a certified inspection body before being delivered to the Belgian authority. The Inspection Company SGS is in charge of checking the document and carrying out a full audit of the plant and of the supply chain within the 6 months following the first time the biomass is fired (Marchal *et al.* 2006). Annex 6 shows how and where in the supply chain independent verifications take place for, as example, wood pellets.

For calculating the number of granted certificates Flemish authorities require the knowledge of a list of parameters related to the plant. Therefore, the supplier must fill in an informative questionnaire that consists of three functional parts (Electrabel 2006), which are: 1) sourcing and management: origin of biomass, 2) production chain, including energy consumptions and 3) transport and storage, including rail and sea transport. The questionnaire, dedicated to the suppliers of the biomass products, includes both mandatory questions as well as informative (non-mandatory) questions. The questionnaire for part 1 is included in annex 6 (Electrabel 2006).

The largest Dutch user of biomass, **Essent** (also RPSO member), has developed the biomass certification system **Green Gold Label** (GGL) in cooperation with Peterson Bulk Logistics and Control Union Certifications. This development started in 2002 and aims at a track and trace system for biomass from (by-) products from the power plant (and its green power it produces) back to the sustainable source. In this system mixing or contamination with non-intrinsic or environmentally harmful materials is prohibited. In every link of the chain written proof must be available that the GGL quality system is supported, sustained and maintained. The system consists of six different standards covering the complete biomass chain from production till end-use including the bio-energy plant. Annex 7 shows an example for standard 1 on chain of custody and processing (GGL 2005). The standards define amongst others chain-of-custody standards, criteria for forest management and criteria for agricultural products (Control Union 2006).

GGL accepts existing certification systems (e.g. FSC standards), but has additional guidelines for pellets manufacturing and transportation. A major criterion within GGL is the requirement for tracking custody of the biomass. GGL label is continuously in development. It currently looks at possibilities to include social criteria in its certification system (Maris 2006). Beside Electrabel and Essent, also **other energy companies in Europe** (Fortum in Scandinavia, Eneco in the Netherlands, others) consider or develop at this moment their own biomass certification system (Maris 2006).

Thus, companies are actively involved in various parts of the biomass chain. Their interest in biomass certification depends on their role in the biomass chain. Energy companies have to justify the sustainability of their end product to the consumer, stimulating companies as Essent and Electrabel to develop a biomass certification system. Companies as DaimlerChrysler or Shell, also active on the end side of the chain, are involved in research and pilot projects related to new technologies and sustainability of their products. Companies on the production and transport side of biomass play a role in how to guarantee sustainable biomass production. For companies as Unilever or Cargill, trading products for food and/or energy production, the discussion on food security and change of economics for their products is highly relevant.

3.3 Inventory of the viewpoints of NGOs

Several NGOs have expressed their viewpoints on sustainable bio-energy production and started initiatives on biomass certification. In general, NGOs are positive about the possible opportunities offered by sustainable bio-energy production but also mention concerns on potential environmental and socio-economic harm due to increased bio-energy production. For example, Birdlife International “could not support further development of the Bioenergy crops industry without an appropriate certification scheme in ...” (Birdlife-International 2005). In the so-called ‘Bonn Declaration’ from 2004 several **civil organizations from Latin America and the Caribbean** express their viewpoints on renewable energy in general. They stress the need, among other things, of energy access to civilians in the region with minimal local, national and global environmental impacts. Financial incentives should be redirected to sustainable renewable energy sources as biomass, excluding projects with negative social and environmental impacts (Several 2004). **WWF Brazil** also stresses the need for a certification system in Brazil to better ensure that biofuels are produced in an environmentally and socially friendly way (Volpi 2006). These NGO viewpoints are written down in various position papers and reports.

Position papers, including sustainability principles or key concerns for sustainable biomass are developed by, as far as known, the following NGOs:

- **NGOs in South Africa**⁵ (Sugrue *et al.* 2006), see also annex 8
- **FBOMS in Brazil** (Moret *et al.* 2006), see also annex 9
- **WWF Germany** (Fritsche *et al.* 2006) see annex 10 (coincide with criteria WWF International)
- **NGOs in the Netherlands**⁷ (Verweij *et al.* 2006), (Richert *et al.* 2006), see annex 11
- **IATP in the USA** developed sustainability principles for bioindustrial crop production, see annex 12, (Kleinschmidt 2006)
- **Greenpeace** and **Birdlife International** (to limited extent)

Table 3 provides an overview of these sustainability criteria showing that, although there is a consensus on the need to develop criteria, there is variation among them. For example, FBOMS has included ‘gender equality’ as a separate criterion while this criterion is not or hardly mentioned in other lists. Also, there is a difference in priority (e.g. between environmental and socio-economic criteria), strictness (e.g. use of GMOs, GHG balance) and level of detail given to these criteria. These differences arise from the different backgrounds and aims of the NGO’s described. However, it would go beyond the scope of this paper to describe these aims as well. Furthermore, it was attempted to summarize all criteria in table 3 is as comprehensive as possible. However, NGO activities to promote sustainable biomass production develop fast and more principles may be developed or under way. A compiled list of concerns and issues indicated by organizations is also developed by Bramble (2006), aiming to bring those pieces together into a coherent international governance structure for sustainable biomass production and use.

Various NGOs have started pilot projects and case studies to learn more about the use of sustainability criteria and the impact of sustainable biomass production in developing countries. A group of Dutch NGOs (Lange *et al.* 2006; BothEnds 2006) has initiated three case studies with product/country combinations in developing countries (**Brazil, South Africa, Indonesia**) to gather information on risks and opportunities from export of biomass flows, analysed by a Sustainability Assessment Framework (see annex 13). The report also gathered opinions from stakeholders in these countries to include their viewpoints in the debate in the Netherlands. The report reflects a comparison between results derived from this project and criteria proposed by the Dutch project group on sustainability criteria (section 3.1) and provides recommendations for a further dialogue.

⁵ Developed by South African CURES network www.cures-network.org

⁶ FBOMS: Energy working group of the Brazilian Forum of NGOs and Social Movements for Environment and Development

⁷ NGOs include: Milieudefensie, BothEnds, WWF, Greenpeace, Natuur en Milieu, Oxfam Novib

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The NGO **Solidaridad** has initiated the fair trade label Utz Kapeh. Solidaridad is focusing in its program 'renewable energy' on biomass for export from developing countries and is implementing, together with the energy company Essent, a pilot biomass certification project for coffee husks from Brazil. The coffee husks originate from coffee plantations, certified by Utz Kapeh. An external monitoring of the pilot takes place according to the sustainability principles from (Cramer *et al.* 2006) (Solidaridad 2006). **German NGO representatives** from the environment and development sector (Maier *et al.* 2005), **WWF** (Fritsche *et al.* 2006), (WWF 2006b) and others also provide recommendations specifically related to approaches for the implementation of a certification system for sustainable biomass. These recommendations are further discussed in section 5.

Thus, various NGOs are actively involved in the development of a biomass certification system. Initiatives are taken to develop proposals on principles and criteria for sustainable biomass certification, including environmental, social and economic criteria. NGOs are mainly active on the production side of the biomass chain and have a strong concern about the environment and well being of the poor in rural areas. Some NGOs have provided suggestions on the implementation for a biomass certification system. NGOs play an active role in forums and have started pilot studies.

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Table 3: Summary of sustainability principles from various NGOs as mentioned in reports and position papers:

	South Africa	Dutch NGOs	IATP	Greenpeace	Birdlife	WWF Germany	FBOMS
GHG, energy balance	Full LCA, Energy balance crop > 1:3		Energy η and conservation		Include LCA carbon savings	Defined levels of GHG outputs and η (LCA)	Diversification of energy mix
Competition food, energy	No extension productive land, energy to the poor by own production	No violation of right to food security, concern for –indirect-land competition				Priority for food supply and food security, include regional impacts	Food security, no monocultures, crop diversity
Economic prosperity	Economic stimulus to rural communities, access to (rural) energy for poor	Promote (local) socio-economic development, no economic burden on vulnerable groups	Economic sustainability			Ensuring a share of proceeds	Rural credits, job income and generation, diversification, decentralization of activities
Working conditions		Labour conditions, human health impacts	Safe and healthy conditions			Health impacts, worker rights, share of proceeds	Organization of production, labour relations
Human rights		No violation, right of children				No violation	Gender equality
Property rights and rights of use	Indigenous land ownership, land redistribution	Equitable land ownership, land-tenure conflicts to be avoided				Rights to land use clearly defined	
Social conditions		Revenues invested in social well-being	Respect social, cultural heritage				Social inclusion Participation in decision making
Integrity							Social accountability
Environment	<i>See for details below</i>	<i>Revenues invested in environment</i>		<i>See for details below</i>	<i>Environmental impacts general</i>	<i>See for details below</i>	<i>See for details below</i>
Origin of biomass	Crop types, no annual crops						
Biodiversity	Maintained	Maintained, production energy crops increases ecological quality, risk conversion land use	Promote biological diversity, nature	Concern: burning wood from ancient forests	Include criteria on biodiversity	No additional negative biodiversity impacts, no negative land use changes	Crop diversity, no monocultures Defined limits for occupation of biomes; comply with economic, ecological zoning;
Waste	EIA on potential waste						
Use of agro-chemicals			Sound nutrient management	No / limit use of fertilizer, pesticide		Avoiding negative impacts	Minimization or elimination of pesticide use;
Farming practices	Conservation farming techniques, intercropping	Associated farming practices to protect environment				Production practices	Use of best available practices; diversity of crops;
Soil quality	Maintained	Sustainable use of soil resources	Strengthening the soil	Concern: loss of topsoil		No additional soil erosion and degradation	Reduction of soil loss
Water quality and quantity	No extension irrigated land, measures	Sustainable use of water resources	Protecting water	Concern: risk for increase in salinity		Protection of water bodies	
Emissions to air	EIA to determine potential pollution		Protecting air	Concern: toxic emissions			
No GMOs	Prohibited	Currently not allowed	Prohibit GMO	No Use of GMOs		Exclusion GMO	No priority
Training	Included						Training, technology transfer
Institutional, governance	Included	Good governance, government context included, land use planning	Stakeholder participation, transparency			Land use planning, EIA of biomass production	Regulatory compliance, region classified by EIA

3.4 Inventory from viewpoints of international bodies, organizations and initiatives

On international level, activities to develop a biomass certification system are initiated by international bodies and organizations (3.4.1). International networks and roundtables in which various stakeholders (NGOs, companies, government) participate also promote initiatives (3.4.2)

3.4.1 International bodies and initiatives

Different international bodies have recognized the need for biomass sustainability criteria. Within the UN, **UN-Energy**, created in 2004 as a follow-up to the World Summit on Sustainable Development (WSSD), is the principal interagency mechanism in the field of energy. Its aim is to promote coherence in the UN system's response to the WSSD and to collectively engage non-UN stakeholders. An overview of activities from UN-Energy and its members (e.g. World Bank, various UN organizations) can be found in (UN-Energy 2006). Next to this, the **UN Biofuels Initiative** (UNBI) is established to promote sustainable production, trade and use of biofuels in developing countries, under conditions that can attract foreign and domestic investment. UNBI aims to assess biofuels potentials within developing countries and work with national decision-makers and private-sector groups to develop country-specific strategies (National Biofuels Action Programs) for the production and use of biofuels. The initiative is coordinated by UNCTAD (UNF 2006).

As UNBI is more focused on trade, the **International Bioenergy Platform IBEP** (established by the FAO) is more focused on knowledge management and transfer. IBEP provides expertise and advice for governments and private operators to formulate bioenergy policies and strategies. It also assists developing tools to quantify bioenergy resources and implications for sustainable development in general and food security in particular, on a country-by-country basis. IBEP has developed a proposed plan of action. One of the activities mentioned is to assist in the development of an international scheme to develop workable assurances and certification bases principles, methodologies, criteria and verifiable indicators (FAO 2006). One of the activities planned by IBEP and starting in December 2006 is the development of an analytical framework to assess the implications of different types of bioenergy systems on for a set of different food security contexts., resulting in the formulation of national strategies, based on recommendations on how to undertake bioenergy development.

The **FAO Forestry Department** is working on biomass certification, in cooperation with **IEA Task 31**⁸, by evaluating principles, criteria and indicators for both biomass from forest used for energy as well as for wood fuel and charcoal production systems. The study includes a review of existing forest certification schemes. Based on this, criteria are developed to cover forest biomass for energy. These will be tested in the field using case studies, which are planned to start end 2006. For the production systems (including transport from the forest site), key factors influencing the production chain are assessed as well as an evaluation of the impact of the various steps of that chain in ecological, social and economic terms. The project is also analyzing the legal and institutional framework under which wood fuel production systems fall. Using the results of the assessment a set of criteria covering ecological and socio-economic aspects of the production cycle will be developed and eventually be tested in the field (Rose 2006).

UNEP started the Certification of Biomass Project, as outcome on the 4th Environmental Forum in Magdeburg (in cooperation with DaimlerChrysler, see section 3.2). One of the activities in this partnership is the development of sustainability criteria for biomass cultivation used for biofuels production. A core-working group (also with UNEP, WWF, others) was formed to pursue this initiative on investigating criteria and indicators for ensuring sustainability pathways for biomass production. For this initiative, preparatory activities (as in September 2006) include (Ernest 2006):

- Review of existing certification systems linked to biomass certification;
- Compilation of certification labels (forestry, bioenergy and palm oil, agricultural and trade labels)
- Compilation of ongoing initiatives by international communities and country policies on biofuels.
- A crop assessment for biofuels understanding different requirement of crops

UNEP was asked to lead the development of a collective programme of work on bioenergy sustainability under the G8's Global Bioenergy Partnership. UNEP has proposed a way forward which is currently under review by the

⁸ IEA Tasks are heading under the bioenergy agreement of the International Energy Agency. Task 31: Conventional forestry systems for sustainable production of biomass

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GBEP members. Part of the suggestion is an initial set of recommendations for decision makers in governments and industry as well as a set of sustainability criteria covering the sustainability of the entire life-cycle, i.e. production, conversion and use of bioenergy. Both are open for discussion, amendment and review by the GBEP members (Otto, 2007).

Furthermore, UNEP joined forces with DaimlerChrysler, WWF Germany, BP, and the Ministry of Agriculture of Baden Wuerttemberg to develop sustainability criteria for production of biomass for liquid biofuels with the aim of designing an assurance system (certification or other). In an initial phase, the following outputs were produced (Otto 2007):

- Review of existing certification systems linked to biomass certification.
- Compilation of certification labels (forestry, bioenergy and palm oil, agricultural and trade labels) - understanding the technical processes, structure, etc.
- Compilation of ongoing initiatives by the international communities and country policies on biofuels.
- Assessment of the requirement of different crops.

It is now planned to open up the process through stakeholder consultations in the different regions of the world, and to feed this work into the GBEP process. Other activities of the partnership include conducting engine tests, promoting a Jatropha project in India, organizing the biennial Magdeburg Environmental Forum (platform for experts) and the development of second-generation biofuels (DaimlerChrysler 2006). See also 3.4.1.

Bioenergy has a large number of registered projects (32.5% of total) in the pipeline for the Clean Development Mechanism, administered by the **United Nations Framework Convention on Climate Change** (UNFCCC). UNFCCC has as one of its objectives the development of monitoring and baseline methodologies for CDM projects. Until now only few methodologies for biofuels are approved because of uncertainties in determining 'leakage' (Fritsche *et al.* 2006), lack of capacity in CDM project development in many developing countries, and a limited availability of CDM baseline methodology specifically developed for biofuels projects (UNCTAD 2006).

The **IEA Bioenergy Task 40** (www.bioenergytrade.org) on International Sustainable Bioenergy Trade aims to investigate what is needed to create a commodity market for bioenergy. Parties as industry, NGOs, governmental bodies and FAO participate in this task. Key priorities of the task are (amongst others) sustainability criteria, standardization and terminology for biomass trade (Faaij 2006). Main recommendations from a workshop, organized in 2005 in Brazil in cooperation with IEA Bio-energy Tasks 30 and 31, related to biomass certification were:

- The aim should be an internationally accepted framework based on existing experiences;
- Great diversity of competing systems should be avoided. A certification system could be created by initiating a gradual process for certification procedures, starting at regional level;
- A certification system should include a wide variety of stakeholders to ensure credibility.
- It could be based on current best practices and supported with high quality scientific knowledge.
- A gradual development is needed as such a certification system should not create new barriers, i.e. negative experiences as gained with the CDM (e.g. in terms of complexity, required time and formulation costs) should be avoided.
- Crucial in a system is the build-up of credibility by verification and accreditation of the data.

Studies from Task 40 members on biomass certification relate to e.g. certification system development for sustainable bio-energy trade (Lewandowski *et al.* 2005) and to case studies on impacts of sustainability criteria on costs and potentials of bioenergy production in Brazil and Ukraine (Smeets *et al.* 2005).

The **G8 Global Bioenergy Partnership, (GBEP)**, launched in May 2006, will provide a framework for the G8 countries to ensure better coordination of ongoing activities on the issue of bioenergy, as well as a more efficient use of the financial and technical resources involved (ETAP 2006). A White Paper has indicated barriers for bioenergy development, areas for action and possible roles for the Global Bioenergy Partnership in these identified areas (Clini *et al.* 2005). The Secretariat of GBEP is hosted at FAO.

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3.4.2. International networks and roundtables

EUGENE, an independent network of environmental and consumer organizations and research institutes, promotes green electricity labelling as a market-tool to facilitate and stimulate additional production of renewable and energy efficient services. The EUGENE label applies to geothermal, wind, solar, electric, hydropower and biomass energy and is given to defined 'eligible sources'. Eligible sources for biomass are, e.g., dedicated energy crops, residual straw from agriculture etc. More specific criteria for eligible biomass resources, like e.g. production methods, are not provided (Lewandowski *et al.* 2005). A study from EUGENE, meant as support for possible certification of biomass, includes a proposal of biomass criteria for application by EUGENE standard. The criteria are subdivided in two groups (Oehme 2006), see table 4.

Issues surrounding the production of large commodities as palm oil, soybeans or sugarcane (which can all be used as biofuel feedstock) in Asia and South America have triggered initiatives as the establishment of round tables where all stakeholders in the chain are represented. The **Roundtable on Sustainable Palm Oil (RSPO)** is created by organizations carrying out their activities in and around the entire supply chain for palm oil. RSPO has developed a set of 8 principles and 48 criteria for sustainable palm oil production, which were adopted end 2005 (RSPO 2005), see also table 5 and annex 14. The principles relate to social, economic, ecological and general criteria. RSPO criteria are now in a 2-year trial phase. Third party verification arrangements are needed for evaluation of compliance with RSPO principles and criteria, and in supply chain audits to verify compliance with requirements for sustainable palm oil traceability. The RSPO Verification Working Group is established and published preliminary recommendations on verification arrangements (RSPO 2006).

Table 4: Summary of proposal biomass criteria for application by EUGENE (Oehme 2006):

<p>Criteria, which can easily become operational and monitored / verified:</p> <ul style="list-style-type: none"> Eligibility of sources (including e.g. woody, herbaceous and fruit biomass) Requirements on the origin of wood fuel (sustainable forest management, certification for plantations) Use of Genetically Modified Organisms (GMO) is not permitted Energy crops and SRC crops shall not be produced on converted land Emissions of CH₄, N₂O and NH₃ by usage of manure have to be reduced In the annual average, the plant need to meet an overall efficiency of at least 60% Co-firing of solid biomass is permitted under conditions (e.g. required efficiency of 70%)
<p>Criteria for which further elaboration is needed to become operational:</p> <ul style="list-style-type: none"> Wood fuel from non-certified forest has to meet a set of criteria Maintenance of soil fertility Biomass from dedicated cultivation on arable land needs to comply with guidelines for integrated crop protection, livestock waste should comply with principles of integrated farming The non-renewable proportion of the energy that is used for extraction, transportation and processing, and also balancing, is not permitted to be greater than 10% of the electricity supplied with the label.

Table 5: Summary RSPO principles to promote sustainable oil palm production (RSPO 2005):

<p>Principles RSPO</p> <ul style="list-style-type: none"> Commitment to transparency Compliance with applicable laws and regulations Commitment to long-term economic and financial viability Use of appropriate best practices by growers and millers Environmental responsibility and conservation of natural resources and biodiversity Responsible consideration of employees and of individuals and communities affected by growers and mills Responsible development of new plantings Commitment to continuous improvement in key areas of activity

The **Roundtable on Sustainable Soy (RTRS)** has as one of its objectives to develop and promote criteria for the production of soy on an economically viable, socially equitable and environmentally sustainable basis. The 2nd Conference of the RTRS in 2006 includes several presentations with examples of responsible production models and an overview of certification options (RTRS 2006). The developed 'Basel Criteria for responsible Soy production'⁹

⁹ The purpose of the Basel Criteria for Responsible Soy Production was to provide a working definition of acceptable soy production to be used by individual retailers or producers. Criteria were developed by Proforest (also involved in RSPO).

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forms a relevant background document in the light of these developments, see also (ProForest 2004). A similar initiative has started for sugarcane by the establishment of the **Better Sugarcane Initiative** (BSI). One of the aims of the BSI is to determine principles and to define globally applicable performance-based standards for 'better sugarcane' with respect to its environmental and social impacts (WWF 2006a).

Finally, in November 2006, the **Ecole Polytechnique Federale de Lausanne** (EPFL) initiated a multi-stakeholder workshop to investigate the potential for developing internationally accepted and implementable standards for sustainable biofuels (Opal, 2006).

Summarizing, initiatives initiated by international bodies focus on a wide range of activities as coherence, support of developing countries and exchange and transfer of information. Some of these international bodies have formulated specific projects, often in collaboration with more partners, to gain better insight in the development of a biomass certification system. International networks and roundtables are based on a voluntary basis. They have started their own activities for the development of a certification system for their specific target product.

Table 6 provides a summarized overview of initiatives from stakeholder groups in the field of biomass certification. Table 7 shows that various biomass certification systems exist or are under development to guarantee the eligibility of the biomass source and its transport or to guarantee the sustainability of its production (woody biomass, palm oil or soy). These systems show some coherence but differ in the inclusion of the type of biomass, time frame, system (mandatory / voluntary) and demands of their criteria.

Table 6: Summarized overview of involvement of stakeholders in process of biomass certification

Initiatives	Principles	I & C ¹⁰	Status	Organization	Platform function	
National Governments						
Netherlands	Yes (environment, socio-economic)	Yes	Pilot studies	Working group set up by government	Stakeholder consultation	
Belgium	Yes (GHG, sourcing)	Yes	Criteria coupled to green certificate	Independent body in coop. with authorities	Stakeholder consultation	
UK	Yes (GHG, more possibly in future)	Yes	Certification expected in 2008	Legislation development (RTFO)		
Canada	ECOLOGO (general), also for biomass	Yes	Since 2005	Government owned label		
Brazil	Social Seal for biodiesel	Yes	In implementation	Government regulation	Partner in debate	
Germany	Expected in Mid 2007	No	Draft expected	National regulation		
Others ¹¹	No	No	Not applicable	Not applicable		
E.C.	Yes, in development	No	Tender in September 2006	Policy development within EU	Partner in debate	
Companies						
Essent	Yes (Environmental criteria, social criteria in development)	Yes	Green Gold Label	Independent body: Control Union	IEA Task 40 member	
Electrabel	Yes (Sourcing, energy / GHG balance)	Yes	Electrabel label	Independent body: SGS	Member IEA Task 40	
BioX	Based on RSPO criteria	n.a.	Auditing palm oil locations	In cooperation with Control Union	RSPO member	
Daimler-Chrysler	In development	No	Studies, discussion, forum	Initiative in coop. with UNEP	Forum for environment	
Volkswagen	Tax model incl. criteria	Yes	Model development	Under framework of BUS initiative	Partner in debate	
Shell	Studies on sustainability biomass	No	Studies, small projects		Financing partner	BUS Forum of experts
Rabobank	No	No	Position papers		Not applicable	Partner in debate
Others ¹²					Partner in debate	
NGOs						
WWF	Yes	Yes	Road map	Approaches, see study WWF Germany	RSPO member	

¹⁰ I & C: Indicators and Criteria

¹¹ Various governments have started policy developments on biomass and biofuels, mainly focusing on stimulating the use of it by defining targets or policy incentives, see section 3.1

¹² Companies as Unilever, Cargill and CEFETRA are actively involved in the discussion on biomass certification issues.

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Solidaridad	Yes (based on own label)	Yes	Project with case studies	Project in coop. with GGL (Essent)	Involvement stakeholders
NGOs Netherlands	Yes	Yes	Proposals for policy tools, pilot studies	Study assigned by Dutch NGOs	Participation in debate (RSPO)
NGOs South Africa	Standpoints on concerns biofuel production	No	Position paper	Working group representing NGOs	
NGOs Germany	Yes	No	Policy Paper	Study through stakeholder process	
NGOs Brazil	Sustainability criteria	Yes	Report	Developed by various NGOs	
IATP	Sustainability criteria	No	Criteria combined with good practice	Through stakeholder process	
Others	Limited	No	Position papers ¹³	Not applicable	Partner in debate
International organizations, initiatives					
UN-Energy	No	No	Not applicable	Platform (non-) UN organizations	Coordination, exchange info
UNBI	Background studies in trade & potential	No	In planning	UNCTAD chairs initiative	Coordination, support
FAO	Yes, for forest biomass	Yes	Pilot studies	Partner is IEA Task 31	Partner in debate
UNEP	In development	No	Preparatory studies	In coop. with others (e.g. G8 GBEP, DaimlerChrysler)	Partner in debate
IBEP	Background studies	No		FAO chairs initiative	Knowledge exchange
G8 GBEP	White Paper; mandated UNEP to develop I&C	(Yes)	in planning	Initiative within G8 countries + UNEP	Coordination
EUGENE	Yes (sourcing), additional P in process	Plan	Existing label, additional C&I	Network for green labels	Networking function
RSPO	Yes, for palm oil production	Yes	Pilot studies and working group	Roundtable on voluntary basis	Stakeholder process, platform
RTRS	Planned for soy production	Plan	No	Roundtable on voluntary basis	Stakeholder process, platform
BSI	Planned for sugarcane production	Plan	No	Roundtable on voluntary basis	Stakeholder process, platform

4. Limitations for the implementation of a biomass certification system and possible strategies to overcome them

Limitations mentioned on the development of a biomass certification system provide lessons learnt for future implementation. Not everyone sees certification as a means to guarantee sustainable biomass production and counter arguments are also heard in this section. Due to time and length constraints, the possible impact of WTO regulations on biomass certification is not discussed here, see van Dam et al (2007) for a review.

4.1.1 Lack of adequate criteria and indicators

There is no consensus yet which criteria should be included to guarantee sustainable biomass trade and how less quantifiable targets should be measured (WWI 2006). An implication mentioned for the development of a biomass certification system is how to make some of the concerns and sustainability principles operational into effective indicators and verifiers. There is experience in applying some and little to no experience of applying others. Better insight is e.g. required on the design of criteria and indicators according to the requirements of a region and how to include avoidance of leakage effects and the influence of land use dynamics (Faaij *et al.* 2006), with a first step for a “priority rule” being suggested by Fritsche *et al.* (2006a). Other issues mentioned by various organizations on how sustainability criteria can be translated into operational indicators and verifiers are included in annex 16 (BothEnds 2006, WWI 2006). Pilot studies are needed to build up experience of how sustainability criteria can be met under diverse conditions (Cramer *et al.* 2006). The development of new methodologies, to measure impacts, and valuation approaches on how to assess overall damage and benefits is recommended (Smeets *et al.* 2006).

¹³ Various NGOs (Greenpeace, Birdlife) have published a position paper to express their views on biomass and biofuels in the EU and worldwide. A lists of concerns is expressed in these papers, see section 3.3

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4.1.2. Requirement of effective control and monitoring system

Procedures and solid (documentation) systems are needed to implement a reliable certification system, see also (ProForest May 2006). Besides, establishing an effective, reliable international biomass certification system is further complicated due to large differences between regions in production and scale (monocultures, small scale, different crops), national context (legislation, stakeholders, their view on sustainability) and environmental vulnerability (drought, fire, soil) as also indicated in pilot studies from BothEnds (2006). Also, NGOs have indicated in several cases that the frequency of field visits is often too low. If stricter monitoring is required, this will also have an impact on the costs and feasibility of a system. How, in this light, a certification system would have to be given shape must be worked out further (Cramer *et al.* 2006).

It is advised to design and adopt specific, quantifiable criteria for sustainability indicators. Despite their specificity, they should be flexible enough to be adapted to the particular requirements of a region. Criteria have to be enforceable in practice, easily comprehended and controlled without generating high additional costs (WWI 2006). More insight is needed in the monitoring compliance and limitations of sustainability criteria developed for biomass (BothEnds 2006). Cramer *et al.* (2006) recommend that a biomass certification system must be based on a track-and-trace system, in which the traceability of biomass is guaranteed. The guarantee of complete traceability in the short term is still difficult, making a transition period necessary.

4.1.3 Open market limits effectiveness certification system

FASE-ES (2003) mentions that the open market for (in this case) FSC certification has transferred the responsibility for 'combating environmental and social crime from governments to consumers faced with hundreds of eco-labels, the vast majority of which are a result of opportunistic product marketing'. This competition has led some certifiers to lax application of FSC-standards, e.g. by including vague formulations that criteria have to be fulfilled 'within a certain timeframe' after the certificate had been issued. This resulted in abuse of the possibilities of the system. WWI (2006) indicates that open competition in certification schemes and –therefore- confusion for consumers has hampered efforts to develop meaningful certification systems in eco-tourism and organic foods. FASE-ES (2003) also mentions that certifiers often have a commercial relationship through direct contracts with the certification client, which results in an interest of the certifiers in a positive assessment that weakens the objectivity of the problem.

WWI (2006) recommends that a proliferation of standards, differing from one country or region to another, have to be avoided. Further coherence in biomass certification systems, possibly through promotion of international agreements and standardization of criteria, is needed.

4.1.4 Small stakeholders' limitations to implement requirements

Smallholders, often operating with limited resources and technical skills, may lack the capacity (knowledge, financial resources) to implement necessary changes required for transition to a new certification system (ProForest 2006). This may be, without transition period, too complicated for smaller companies. There is a risk that only larger producers can fulfil these new demands in short time which involves a risk for marked disturbance as only few producers can offer certified feedstock resulting in artificial high prices (Maris 2006). While a certification scheme should be thorough, and reliable, it should not create a hurdle for nascent industries (WWI 2006).

It is recommended to pair a certification scheme with assistance and incentives (WWI 2006) and to look for possibilities for group certification to guarantee that small producers are not excluded (Cramer *et al.* 2006). Using existing certification systems in the development of a biomass certification system, at least for the short term, may promote the involvement of smaller stakeholders. Existing systems may not cover all required criteria but it limits the risk for market disturbance. Including extra criteria in a certification system can then be achieved over time by mutual consultation (Maris 2006).

4.1.5 Stakeholder involvement required for a legitimate and reliable system

While expert judgment can flag the issues, alert the stakeholders to major concerns and provide methodologies for measuring, valuating and monitoring the different aspects, experts should not unilaterally decide which sustainability

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criteria to include and how to prioritize them. To a large extent, the judgement of local stakeholder is also crucial to take into account the circumstances and needs in specific situations.

Furthermore, ProForest (2006) and Ortiz (2006) mention that an adequate understanding and involvement of primary processors and workers in the field, often the ones controlling and monitoring the criteria, is required for successful implementation of a biomass certification system. Their involvement in the strategic development of the criteria, as e.g. currently developed in Europe, is however limited and often starts (too) late in the process (Ortiz 2006). Main arguments for participation failures in certification systems from FASE-ES (2003) are that the selection of consulted groups is often arbitrary, tending to include most influential actors while local groups are often neglected. Also, people without access to modern communication channels (e.g. rural people) are often not informed. Other limitations mentioned are the gap of 'technical expertise' between certifiers or specialists and the local population and, in case questions or problems are raised, the lack of budget in the certification assessment to include more detailed studies.

It is important that all concerned and affected in a participatory process (multi-stakeholder approach) set the certification criteria (Maier *et al.* 2005) and broad consensus about basic underlying principles in the certification process is achieved. Where strict, specific criteria and indicators are difficult to establish due to differing opinions of stakeholders, the use of "process indicators" that show continuous improvement may help facilitate progress in moving forward. Relying on existing certification systems should be approached with caution, as they may (be perceived to) represent only some of the stakeholders' interests (WWI 2006).

4.1.6 Limitations related to (inter-) national legislation and international trade

A biomass certification system needs to comply with international (see 4.1) and national legislation. The latter is a minimum requirement in most existing certification systems. Smeets *et al.* (2006) mention in a study on the sustainability of Brazilian bio-ethanol, that a weak government and law enforcement system is an implication related to national legislation. This is also acknowledged in case studies from Lange *et al.* (2006) mentioning that a lack of land-use planning can increase risks for local food security and leakage effects. Lack of land certification is another concern, limiting the position of local communities. Although legislation might be in place, a weak governmental law enforcement system in developing countries to ensure compliance of these laws may remain a problem (see also 4.2.2).

Additional control mechanisms might be required in countries with weak governmental and law enforcement system. Support is needed to national governments to improve their law and enforcement systems.

4.1.7 Cost levels of biomass certification

Compliance with criteria has to be controllable in practice, without incurring high additional costs (Faaij *et al.* 2006). Within the frame of extra costs for the sustainable production of biomass and certification, two different cost aspects are identified (see also annex 17):

- Extra costs to meet sustainability criteria for the production and transport of biomass (e.g. measures against soil erosion or an additional wastewater treatment facility).
- Costs for monitoring the compliance with the sustainability criteria and the physical traceability of the product; Components of these costs are e.g. the costs of field study by a certifier or sampling the palm oil during loading and unloading.

A brief attempt to quantify possible cost ranges for these cost items, based on existing sustainability schemes and certification systems, is included in annex 17. Based on this, it can be concluded that costs for complying with (strict) sustainability criteria can be substantial: a range of 8-65% additional costs was found in literature, though incidentally also a slight cost reduction was reported. Costs for the certification process itself and chain-of-custody are (in case of large-scale operations) much lower, a range of 0.1 - 1.2% was found. However, for small-scale farmers, again this number may be much higher. Costs are strongly related to the scale of operation, the strictness of sustainability criteria, the number of sustainability criteria and the expertise required to check them adequately. In addition, many biomass types (especially not pre-treated, bulky biomass) have already a relative low economic value. For example, in Finland one lorry of forest chips (40 tonnes) residues costs about € 800 at the power plant gate

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(Alakangas, 2007). For such streams and small-scale production, extra costs for sustainability certification could potentially become prohibitive.

Zarrilli (2006) mentions that developing countries have traditionally encountered difficulties getting certificates (see 4.2.4) issued by their domestic certification bodies and recognized by the importing countries. They often need to rely on (expensive) services provided by international certification companies. Issues of cost and who pays are therefore critical to the success of a certification program, particularly when seeking participation of smaller-scale producers with fewer resources (WWI 2006). It is recommended to make as much as possible a link with existing certification systems to limit administrative burdens and costs (Cramer *et al.* 2006), see also 4.2.4.

4.1.8 Issues related to inequalities in development and trade

There is concern that biomass certification can become an obstacle for international trade and develop trade restrictions due to proposed sustainability criteria. Measures to ensure conformity may act as powerful non-tariff barriers (especially for developing countries) if they impose costly, time-consuming tests (Zarrilli 2006). Also, some sustainability indicators under development go beyond indicators developed in many other sectors and it should be avoided that this backfires on biotrade if too many restrictions are put in place (Cramer *et al.* 2006). The WTO (2006b) also mentions a number of arguments why not to distinguish between products on the basis of how they are made, i.e. on the basis of sustainability criteria:

- If one country sets rules (such as requiring eco-labels), which deals with the way products are made in another country, then it is intervening in the producing country's rules;
- When products are identified only by what they are, not how they are made; countries can set their own standards as appropriate for their level of development and can then make their own trade-offs between their own needs (and values) for development and environmental protection;
- If countries do not impose their standards on each other, standards can be tailored to conditions, priorities and problems in different parts of the world.

Sustainability criteria should be developed through a transparent and fair process, taking into account local conditions, where all countries involved are effectively presented. Support is needed to improve developing country's capacity to play an active role in the development of biomass certification (Zarrilli 2006). It must be considered that there is a large diversity in the technical efficiency level in biomass production in the world ranging from large-scale, high-tech production to smaller-scale, low-tech biofuel production focused primarily on poverty alleviation. The appropriate technologies and policy orientations required to promote these two objectives are different. Policymakers need to clearly define their outcomes and design policies accordingly. The larger and more developed biofuel industries become, the greater the policy effort required to fulfil social and environmental aims (WWI 2006).

5. Summary and conclusions

The need to secure the sustainability of biomass production and trade in a fast growing market is widely acknowledged by various stakeholder groups and setting standards and establishing certification schemes are recognized as possible strategies that help ensure sustainable biomass production and trade.

Recently, various stakeholder groups have undertaken a wide range of initiatives as steps towards the development of sustainability standards and biomass certification systems. Sustainability standards and criteria are developed by various organizations. Between them, there seems to be a general agreement that it is important to include economic, social and environmental criteria in the development of a biomass certification system. However, mutual differences are also visible in the strictness, extent and level of detail of these criteria, due to various interests and priorities.

Concrete initiatives to translate these standards into operational criteria and indicators and to monitor and verify them through an established biomass certification system are more limited. At this moment, there are two certification systems for biomass in operation, initiated by energy companies, and some pilot studies are in implementation or under development.

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The development of a (biomass) certification system is impeded by a number of issues. Many uncertainties on the feasibility, implementation, costs and compliance with international trade law of international biomass certification systems remain. Also, the possible risk of proliferation of individual standards and systems causes loss of efficiency and credibility. Therefore, it is worthwhile to consider in this preliminary phase which ways can be followed if the strategy to be taken is the development of a reliable, efficient biomass certification system.

Some urgent actions can be identified, needed for further development:

1. **Better international coordination between initiatives is required to improve coherence and efficiency in the development of biomass certification systems.** Various international organizations can take the lead in this as EC (for European region), UNEP/FAO/UNCTAD or others. This does not only prevent proliferation of biomass certification systems, but also provides a clearer direction in the approach to be taken (e.g. national or international oriented, mandatory or voluntary) for national and local initiatives.
2. Certification is not a goal on itself, but means to an end. It can be one of the policy tools that can be used to secure the sustainability of biomass. Setting up good practice codes and integrating sustainability safeguards in global business models may be also effective ways to ensure this. Thus, **an open vision for (a combination with) alternative policy tools should be maintained to look for the best suitable options to secure sustainable biomass production and trade.**
3. At this moment, experience is limited to make some criteria operational and more experience and time is required. Issues such as the design of specific criteria and indicators according to the requirements of a region, how to include avoidance of leakage effects and the influence of land use dynamics require the development of new methodologies and integrated approaches. On the other hand, there is a need to secure the sustainability of biomass in a fast growing market on the short term. **A gradual development of certification systems with learning (through pilot studies and research) and expansion over time, linked to the development of advanced methodologies can provide valuable experience, and further improve the feasibility and reliability of biomass certification systems.** This stepwise approach gives the possibility for coherence of activities, monitoring and adjustment if needed.

Met opmaak: opsommingstekens en nummering

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