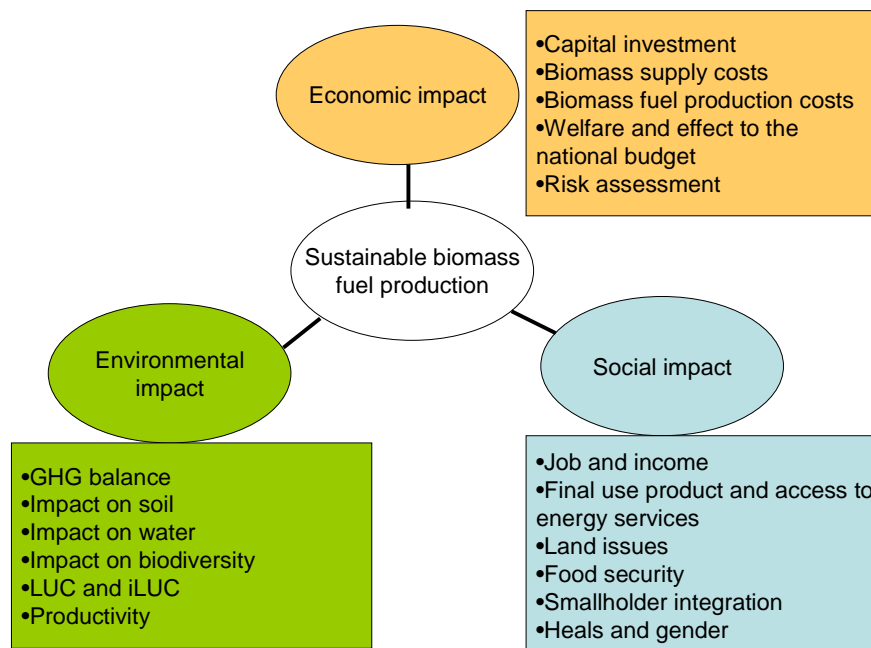


Evaluation report of different criteria for sustainability and certification of biomass and solid, liquid and gaseous biofuels - D 4.4.1

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Source: IEA, 2010, Diagrammatic visualization of sustainability of biofuel feedstocks production with a wide range of potential environmental, economic and social impacts.

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Preface

This publication is part of the EUBIONET III Project (Solutions for biomass fuel market barriers and raw material availability - IEE/07/777/SI2.499477, www.eubionet.net) funded by the European Union's Intelligent Energy Programme. EUBIONETII is coordinated by VTT and other partners are Danish Technological Institute, DTI (Denmark), Energy Centre Bratislava, ECB (Slovakia), Ekodoma (Latvia), Fachagentur Nachwachsende Rohstoffe e.V., FNR (Germany), Swedish University of Agricultural Sciences, SLU (Sweden), Brno University of Technology, UPEI VUT (Czech), Norwegian University of Life Sciences, UMB (Norway), Centre wallon de Recherches agronomiques, CRA-W (Belgium), BLT-HBLuFA Francisco Josephinum, FJ-BLT (Austria), European Biomass Association, AEBIOM (Belgium), Centre for Renewable Energy Sources, CRES (Greece), Utrecht University, UU (Netherlands), University of Florence, UNIFI (Italy), Lithuanian Energy Institute, LEI (Lithuania), Imperial College of Science, Imperial (UK), Centro da Biomassa para a Energia, CBE (Portugal), Energy Restructuring Agency, ApE (Slovenia), Andalusian Energy Agency, AAE (Spain). EUBIONET III project will run 2008 – 2011.

The main objective of the project is to increase the use of biomass based fuels in the EU by finding ways to overcome the market barriers. The purpose is to promote international trade of biomass fuels to help demand and supply meet each other, while at the same time the availability of industrial raw material is to be secured at reasonable price. The EUBIONET III project will in the long run boost sustainable, transparent international biomass fuel trade, secure the most cost efficient and value-adding use of biomass for energy and industry, boost the investments on best practice technologies and new services on biomass heat sector and enhance sustainable and fair international trade of biomass fuels.

30 November 2010

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1 Introduction

The objective of this evaluation report is to give a comprehensive overview of the current state of the art of different sustainability criteria and certification systems used in Europe and to evaluate the different criteria used for the sustainability and certification of bioenergy (D4.4. in EUBIONET III). The results from a stakeholder questionnaire provide additional recommendations on how to move forward in the development and harmonization of certification systems for bioenergy in Europe.

All EUBIONET III partners wrote country reports (D4.3) and described the certification systems used in their countries. These country reports are all available on the EUBIONET III website (www.eubionet.net). This report covers the main results from the country reports and evaluates the different criteria used for the sustainability and certification of bioenergy, resulting in recommendation on how to proceed in the development of sustainability certification for bioenergy in Europe. Note that the country reports were mostly written during the autumn 2009, so some details can have been changed after completing the country reports.

Chapter 2 provides a general overview about sustainable production and use of bioenergy in the European countries and what are the sustainability requirements of the European Union on the production of biofuels and bioliquids.

Chapter 3 gives definitions for the terms used in the context of certification systems and presents initiatives and systems, which are developed to guarantee the sustainability of biomass for different purposes. Some international initiatives are described closer and compared with the sustainability criteria of the European Union for biofuels and -liquids (greenhouse gas savings, biodiversity and land with high carbon stock). We will compare only the principles and criteria, not the verification systems and methods. The best principles do not guarantee sustainable biomass if the verification system is not credible and trustful.

Chapter 4 presents the results of the EUBIONET III-stakeholder survey on sustainability of bioenergy and certification issues.

The results of the work are summarised and discussed in the chapter 5 and recommendations are given how to develop the certification systems for bioenergy and biomass may be further developed in the future.

2 Biomass for bioenergy

2.1 General overview

The global climate change and finite resources on fossil fuels are reasons to use bioenergy. The bioenergy is generated from organic matter such as energy crops, agricultural and forest residues, wood, manure or other biogenic material. Because during conversion and combustion of the organic matter the same amount of carbon is emitted as was absorbed during the feedstock growth, bioenergy has a closed cycle of carbon. It can be used in the form of liquid, gaseous or solid biofuels for transport, electricity and heat production. Currently, the various uses of bioenergy account for about 10% of the world's total primary energy supply. While over 85% of global bioenergy consumption is due to traditional bioenergy use for heating and cooking in developing countries, the remaining 15% can be accounted for modern use of bioenergy¹.

Beside the positive effects, the production, trade and use of liquid and solid biofuels can have negative environmental, social and economic impacts. For Soimakallio et al. the most controversial impact arises from biofuel production acting as a new driver for land-use change resulting in deforestation. They write that „deforestation can affect both biodiversity and the global carbon-balance arising from the loss of habitats for fauna and flora, but also the release to the atmosphere of soil and vegetative carbon stocks“.² Biomass production can also shift other activities from the production area to other areas which lead to negative effects on the environment.³

Other concerns⁴, which are discussed with biofuels, are e.g. the competition on land resources between production of biofuels, food and other resources, scarcity of water and the input of fertilizers and pesticides. The production of cash crops for the bioenergy production in the agricultural sector can replace the production of food crops. This could increase the food price and affect especially poor people. Bio-energy production could disturb the water supply situation in areas with an already stressed water situation, if the need of water increases when cultivating energy crops or if the evapotranspiration is increased on the land where energy crops are cultivated.

2.2 Bioenergy use and potential in European countries

In the EUBIONET III project the partners were asked to report about the bioenergy resources and use in their countries. Based on these country reports a summary report was written. The information in this chapter is based on the end report of the work package 2 "Solutions to overcome biomass trade barriers"⁵.

The partners were asked to report on solid biofuels only. EUBIONET III reported figures of biomass use for EU24 (excluding Norway) were 3 046 PJ (72,752 ktoe) in 2006. This is equal to EUROSTAT figures. According to the EUROSTAT, the total primary energy in EU27 was 3,730 PJ (89,090 ktoe) in 2006, which includes solid biofuels 3,052 PJ (72,896 ktoe), biogas 200 PJ (4,778 ktoe), biodegradable waste 243 PJ (5,804 ktoe) and liquid biofuels 221 PJ (5,278 ktoe).

According the EUBIONET III-report, firewood is the most used biomass in Europe. The figure of firewood is not so accurate, because most of the firewood is not traded officially. Industrial by-products and residues represent the next biggest biomass types contributing to the total figure: use of solid by-products covers 19% of the total consumption, whilst the share of spent liquors (mainly black liquor) is 14%. Forest residues come next with 15% share of the total figure, and is followed by herbaceous

¹ Schubert, Blasch 2010

² Soimakallio et al. 2009

³ Lewandowski, Faaij 2006

⁴ According Lewandowski, Faaij 2006 and Soimakallio et al. 2009

⁵ Junginger et al. 2010, EUBIONET III report

and fruit biomass resources 7%, used wood 6% and refined wood fuels 4%. Use of pellets has increased in many countries. Pellets are produced from wood industrial by-products and residues and there might be some overlapping with solid industrial wood residue figures, so pellets are included in resources under industrial by-products and residue.

The partners were also asked to give information about the availability of biomass resources in the EUBIONET III partner and subcontractor countries.

The EUBIONET III partners have estimated that total potential for biomass is 6,500 PJ (155,250 ktoe), of which 67% is woody biomass. The greatest potential (47%) to increase the use of biomass in energy production seems to lie in forest residues and herbaceous & fruit biomass. The utilisation of forest residues is often connected with round wood harvesting especially in Nordic countries, so the use of round wood by the forest industry impacts also the exploitation of the forest residue potential. Industrial by-products and residues (bark, sawdust, cutter chips, grinding dust, etc.) are quite well exploited in energy production and pellet or briquette production. The availability and cost of forest biomass varies considerably between countries and within countries. The most common biomass fuel is forest wood (wood chips, firewood and hog fuel European Environmental Agency has estimated in 2006 that environmentally-compatible annual primary biomass potential is 7 950 PJ (189,883 ktoe) in 2010, 9880 PJ (235,980 ktoe) in 2020 and 12 351 PJ (294,999 ktoe) in 2030.

If we compare the use of bioenergy reported by EUBIONET III partners and subcontractors (3 098 PJ (105,704 ktoe) in 2006) with the potential, we can see that currently 48% of the estimated biomass potential is exploited.

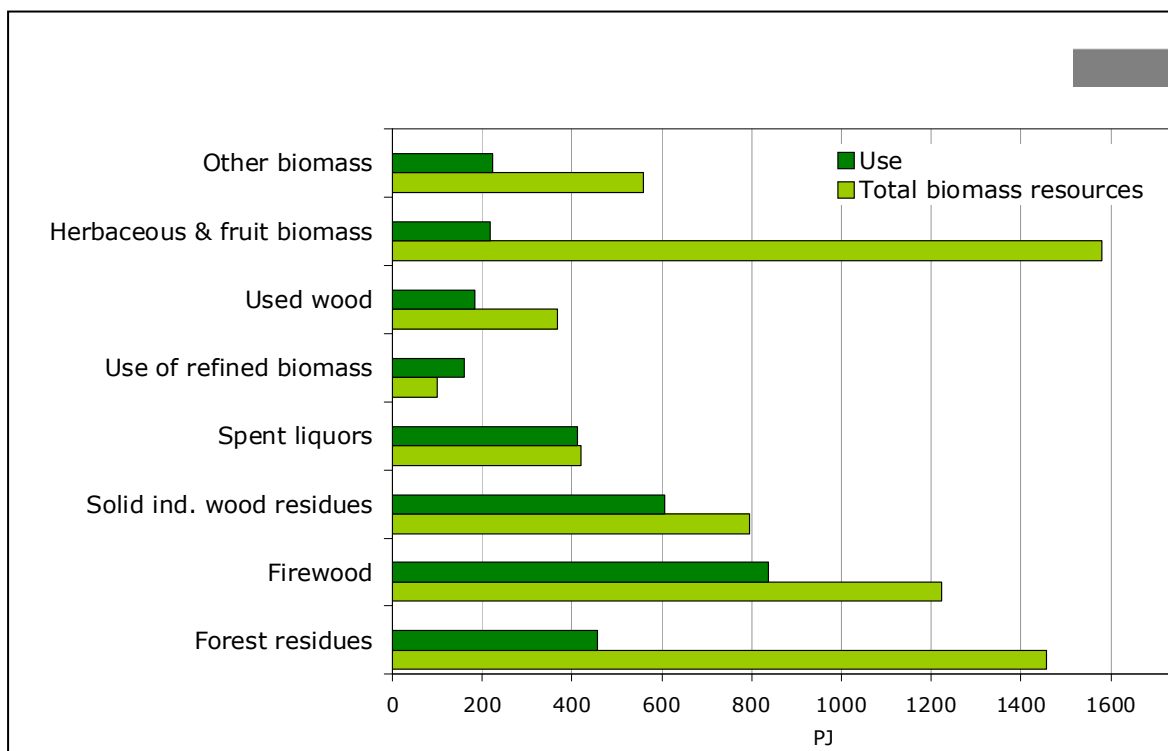


Figure 1. Biomass use and potential in Europe (EUBIONET III)

The use of liquid biofuels was not reported in the report on solid biofuels. Following information is found on the home pages of the European Biodiesel Board and European Bioethanol Fuel Association.

7,755,000 tons biodiesel were produced in Europe in 2008. The most important producer countries are Germany (2,819,000 tons), France (1,815,000 tons) and Italy (595,000 tons)⁶.

The European Bioethanol Fuel Association counts the total EU bioethanol production as 2.8 billion in 2008. France, Germany, Spain and Poland are the biggest producers of ethanol in the EU, followed by Sweden and the UK. The largest amounts consume France, Germany, Sweden, the UK, Poland and the Netherlands. Total imports of bioethanol (fuel and non-fuel) are estimated to be 1.9 billion litres in 2008. Thereof, between 1.4 and 1.5 billion litres came from Brazil only. Approximately 50% of total imports have been used for the fuel sector (approximately 1.1 billion litres). This equals 39% of total EU production.⁷

2.3 RED Sustainability criteria for biofuels and -liquids

The Renewable Energy Directive from 2009 (Directive 2009/28/EC on the promotion of the use of energy from renewable sources) implemented new features for the European energy and climate policy. It sets an overall binding target of a 20% share of renewable energy sources in final energy consumption. Each Member State has an individual binding national target for the share of renewables and has to reach a share of 10% of renewables in transport. The Directive requires reduction of administrative and regulatory barriers, improving of information and training and access to the electricity grid for the renewables.

Member States have to prepare and publish National Renewable Energy Action Plans, in which they show with which measures they are going to reach the targets set in the directive. These plans were to be submitted by 30 June 2010⁸.

The role of biomass fuels in achieving the targets of the directive is significant. In order for biofuels to be accounted for the national targets for renewable energy obligations and to be eligible for financial support for the consumption of biofuels, they must meet sustainability criteria which are set in the directive.

- Greenhouse gas savings:

The greenhouse gas emission savings from the use of biofuels should be at least 35%. This target will increase in 2017 when the minimum for greenhouse gas reductions will be 50% or 60% for plants beginning operation in 2018 and beyond. Default values for calculation of GHG savings are provided and a calculation method for them, who would like to calculate actual values for their own production chain, is included. The impact of actual land use change in the production change must be taken into account.

- Biodiversity:

The raw materials should not be obtained from land with high biodiversity value like primary forest, nature protection areas or highly biodiverse grassland

- Land with high carbon stock:

There should be no conversion of land, which was classed as high carbon stock (like wetlands, continuously forested areas or undrained peatland) in January 2008

- Cross Compliance (CAP regulation):

Agricultural raw materials cultivated in the EU must also meet EU agricultural "cross compliance" rules applied under the EU Common Agricultural Policy

⁶ European Biodiesel Board

⁷ European Bioethanol Fuel Association

⁸ So far (17th November) 23 plans have been submitted (Source: Transparency platform (http://ec.europa.eu/energy/renewables/transparency_platform/action_plan_en.htm))

Economic operators have to show that the sustainability criteria have been fulfilled and the Member states have primarily the responsibility for the verification of the fulfilment of the criteria. The verification can follow in different ways:

- Companies will have to report to EU member states about the sustainability of their biofuels.
- Bilateral and multilateral agreements between EU and other countries on the sustainability criteria.
- Voluntary national and international certification schemes, which the European Commission accredits as sufficient proof to verify compliance with the sustainability criteria and with the requirement of 35% greenhouse gas savings.

The Directive required also a report from the Commission on requirements for a sustainability scheme for use of solid biomass, other than biofuels and bioliquids. This report was adopted in the end of February 2010 and was accompanied by an impact assessment, which states that binding criteria would impose substantial costs on European economic actors, bearing in mind that at least 90 % of biomass consumed in the EU comes from European forest residues and by-products of other industries. The report concludes that at this stage, more detailed legislation including mandatory criteria is not necessary, but the Member States can develop national schemes if they take into account the internal market and the targets for renewable energy. The Commission will follow the situation and review in 2011 if further measures are needed to ensure sustainability.

In June 2010 the Commission published two Communications, one on voluntary schemes and default values⁹ and another on the practical implementation of the EU biofuels and bioliquids sustainability scheme and on counting rules for biofuels.¹⁰ In the first one, the commission informs on the procedure the Commission will follow to recognise the voluntary schemes and multilateral agreements. These schemes can be used by operators to prove that their biofuels or liquids comply with the sustainability criteria set in the Directive. The second issue of the communication is the clarification of the procedure to amend or add new "default values" to calculate the greenhouse gas emissions savings that are laid down in the Directive.

The second Communication is designed to assist the Member States and to facilitate a consistent implementation of the sustainability criteria. The Communication reiterates that Member States have to meet binding, national targets for renewable energy and that only those biofuels with high greenhouse gas savings count for the national targets, explaining also how this is calculated.

In June the Commission published also Guidelines for the calculation of land carbon stocks¹¹. Through these guidelines the Commission provides a detailed and binding methodology to calculate land carbon stocks. Land carbon stock is the quantity of carbon contained in areas of land and, depending on land use changes, the situation can be changed. The decision provides a methodology to calculate the carbon stock to have reference values and to be able to calculate the greenhouse gas impact of a land use change.

⁹ Communication from the Commission on voluntary schemes and default values bin the EU biofuels and bioliquids sustainability scheme (OJ C160, page 1)

¹⁰ Communication from the Commission on the practical implementation of the EU biofuels and bioliquids sustainability scheme and on counting rules for biofuels (OJ C160, page 8)

¹¹ Commission decision of 10 June 2010 on guidelines for the calculation of land carbon stocks for the purpose of Annex V to Directive 2009/28/EC (OJ L 151, page 19)

3 Certification systems guaranteeing the sustainability of biomass

3.1 Sustainability standards - an overview

For a single consumer it is difficult to get information about the production chain of a product he would like to buy. Instruments for the consumer are the different certification systems, which guarantee that the certified product complies with a certain standard. Zarrilli defines certification as "a form of communication along the supply chain that permits the buyer to be ensured that the supplier complies with certain requirements"¹². Lewandowski describes certification as "the process whereby an independent third party (called a certifier or certification body) assesses the quality of management in relation to a set of predetermined requirements (the standard). The certifier gives a written assurance that a product or process conforms to the requirements specified in the standard. The 'requirements' are mostly formulated as criteria that have to be fulfilled for the certification of a product or a production process".¹³

The basis of a certification system is the principles, general starting points that describe the objective of the certification. A principle is usually formulated in an abstract and non-quantifiable way. These objectives are then translated into measurable requirements by criteria, which are much more specific than general principles. For each criterion there are indicators or verifiers, which are quantitative or qualitative minimum parameters by which a criterion becomes testable.¹⁴

Not only the cultivation of the biomass has to be certified, also the way of the biomass from the producer to its consumer has to be verified. This is called chain of custody and it means the link between the physical product and certification information which certifies all steps in the production chain and serves with a system of tracking of certified products. There are three basic principles of the chain of custody: segregation, mass balance and book and claim¹⁵. In the "Segregation" model there are separate systems for certified and non-certified material and no mixture is possible. The sold product is made of 100% certified material. "Mass balance" allows the physical mixing of certified and non-certified product flows. The proportion (or percentage) of the product sold as sustainable certified is equal to the proportion of sustainable certified material entering the process. "Book and claim" is an administrative system that provides tradable credits for the production of certified sustainable products. The traded biofuel and the certification information are full separated and there is no traceability possible. Schmitz¹⁶ comments that "due to its high effectiveness and efficiency, the book and claim system has high acceptance among industrial and trading enterprises, and it can be implemented relatively quickly. It is considered that the costs for the registration equipment and commercial platform will be low". To comply with the RED, the biofuels should use the mass balance systems to verify compliance.

An audit is a process to determine and to evaluate the compliance with the standard. The methods can be e.g. a review of documentation, field studies or stakeholder interviews. The certification systems require different methods and audit frequencies and different competence from the auditors.

Some certification systems are so-called meta-standards: They define the basic principles and other certifications can be recognised to meet the criteria in the sense of the standard. That means that not a single certification system alone will have the function of

¹² Zarrilli 2008, p. vi

¹³ Lewandowski, Faaij 2006, p.84

¹⁴ Zarrilli 2008, p.2

¹⁵ Schmitz 2007, p.1478

¹⁶ Schmitz 2007, p. 1478

sustainability confirmation of biomass, but instead various systems which demonstrate basic suitability (specialist knowledge, organization structure etc.) will be accredited for this purpose.¹⁷

3.2 Initiatives or systems to guarantee the sustainability of biomass feedstock from forest

The two relevant forestry certification systems in Europe are the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification Schemes (PEFC). There are also some smaller national forestry certification systems, like the UK Woodland Assurance Standard (UKWAS) (UK, see Appendix Nr. 1), Austrian Forest Programme (see Appendix Nr. 2) and CSQA (Italy¹⁸).

In the forestry sector sustainability certifications were introduced in 1993 as a tool to avoid unsustainable forest management. The development of certification systems in forestry was a market-based response to address public concerns related to deforestation in the tropics, resulting in loss of biodiversity and the perceived low quality of forest management in areas where traded wood products are sourced from. The first implemented forest certification was the Forest Stewardship Council (FSC).¹⁹ Since then, a range of other schemes have become operational by the end of the last decade.²⁰ From these, PEFC is one of the larger recognized international forestry standards in the world. PEFC is based on inter-governmental principles that are developed for different forest regions of the world. FSC is one set of general principles, translated to country-specific criteria and indicators. PEFC recognizes (as umbrella standard) existing national forestry standards, when certain conditions are met. Both concentrate on sustainable forest management by using independent third party assessment of forestry practices against a set of forestry standards. The standards certify wood and fibre products only and are therefore not directly applicable for first generation biofuels. The standards could be used for biomass used for electricity production and for second generation biofuels.²¹

Total share of the certified forest area in Europe is ca. 45%. As showed in the following figure, the PEFC-certified area is larger, but differences between the countries are significant.

Table 1: Certified forest area in Europe in 2009²²

PEFC ha	FSC ha	Forest and other wooded area ha	% certified of the forest area
58,352,825	26,269,446	188,333,000	44.9%

For Example Finland and Austria have only PEFC-certified forest, while the Baltic Countries are using mostly the FSC-system.

¹⁷ Fehrenbach et al. 2008, p. 3

¹⁸ SQA developed a self defined biomass certification scheme, features: traceability and origin of biomass; no presence of debated (controversial) biomass sources, energy balance of the chain; GHG balance of the chain. The Scheme applies both to forest and agricultural biomass, Nibbi 2009

¹⁹ More information on principles in Forest Stewardship Council Approved 1993, amended 2002

²⁰ Lewandowski, Faaij 2006, p.84

²¹ Soimakallio et al. 2009

²² FSC, PEFC, Eurostat, links see 20

Table 2: Forest certifications after countries²³

Country	PEFC %	FSC %	Forest area ha	% cert. of forest area
Austria	100	0.0	3,960,000	100.0
Belgium	48	2.1*	694,000	48
Bulgaria	0*	4.3*	4,114,000	4.3*
Czech republic	70*	1.9*	2,701,567	71.6*
Denmark	41	20.5	535,000	61.8*
Finland	95	0	23,302,000*	95.0
Germany	66	3.9	11,100,000	70.0
Greece		0.6*	6,532,000*	0.6*
Hungary	0*	10.0	1,976,000*	10.0
Ireland	0*	62.8*	710,000	62.8*
Italy	6.7	0.4	10,467,533	7.1*
Latvia	0*	50.3*	3,221,000	50,3
Lithuania	0	49.5	2,150,000	49.5
Norway	95% of the harvest	0.0	12,000,000	95 % of the harvest
Poland	0*	76.2*	9,192,000*	76.2*
Romania	0*	13.9*	6,628,000*	1<3.9*
Sweden	30	45.7*	22,900,000	75.7*
Slovakia	64	9.0*	1,932,049	74.4
Spain	4.1*	<1%	28,214,000	4.4*
Netherlands	0*	41.5*	365,000	41.5*
Portugal	5.2*	5.4*	3,867,000*	10.5*
Slovenia	0*	16.2*	1,308,000*	16.2*
UK	0*	55.0*	2,865,000*	55.0*
France	30.2*	0.1*	17,262,000*	30.3*

²³ Source: EUBIONET III WP 4 Country reports, if there were now figures available, the used figures are from PEFC (<http://register.pefc.cz/statistics.asp>), FSC (http://www.fsc.org/fileadmin/web-data/public/document_center/powerpoints_graphs/facts_figures/09-12-15_Global_FSC_certificates_-_types_and_distribution_-_FINAL.pdf) and Eurostat (http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-76-06-322/EN/KS-76-06-322-EN.PDF) and marked with a *
Some forestry areas, which are certified after both systems (FSC and PEFC), can be counted twice in the figure for total certified area.

In the following info box, the Austrian PEFC certification system is presented as an example of a national forest management system.

Example 1: Austrian PEFC certification¹

"With 3,960,000 ha, nearly 47.2 % of the Austrian territory is covered by forests and therefore Austria is one of the most forested countries in Europe. The surveys of the Forest Inventory performed 2000-2002 (ÖWI 2000/2002) showed that the forested area in Austria has been increasing steadily. With an annual increasing of 9.3 solid cubic meters per ha and annual forestry operations of 5.6 m³ of solid timber per ha, 60 % more timber is growing than is being harvested. "

"Since February 2002, the whole Austrian forest area is certificated with PEFC. The major problems with certification are the small structured forest areas. More than 50 % of Austrians forest is divided into small areas under 200 ha and 80 % owned by private persons. To reduce the costs of certification for forest farmers and family companies with small forests, PEFC has developed a regional certification system. Therefore 9 regions were defined. Every company or famer of these regions has to sign a declaration of participation to sell certificated wood. With in this declaration, the forest owner has committed to fulfill the PEFC guideline and the implementation of the regional specific arrangements. With PEFC relates to a sustainable forest management but not to the product wood. The Chain of Custody Certification enable the reproduction of the whole production chain from the PEFC certificated forest over wood processing and producing until the finished product."

In the following table the principles of the Directive for Renewable Energies by the European Union are summarised and for each certification system is shown, if the issues are covered (both certification systems are described in detail in appendixes). An "Included" indicates that the issue is covered by the initiative and a (Not included) indicates that the issue is mentioned by the initiative, but only on a general level and doesn't fulfil the requirements of the RED. Not included indicates that the criteria do not cover the requirements. Greenhouse gas issues, biodiversity, and land use change are important criteria and they are the requirement to be accepted as a certification system for the EC-Directive. We wanted to see, if and where there are differences between the criteria of the existing systems and the requirements of the RED.

Social aspects are not required by the European Union, but there is a requirement of reporting on further sustainability issues, like social aspects.

The RED does not apply for solid biofuels. The Commission published in February 2010 a report on sustainability requirements for solid and gaseous biomass sources in electricity, heating and cooling²⁴ and recommends that the Member States, if they introduce national sustainability schemes, would use the same criteria as in the RED.

In this analysis it is assumed that the same criteria would apply for all kind of bioenergy, not only for biofuels and -liquids. As PEFC-standard the Finnish standard is used. The PEFC criteria are national and there can be large differences between the single systems.

²⁴ Report from the Commission on sustainability requirements for the use of solid and gaseous biomass sources in electricity, heating and cooling [COM (2010) 11]

Table 3: Sustainability issues of certification systems for forestry benchmarked to the European Directive on Renewable Energy

RED	FSC ²⁵	PEFC ²⁶
Article 17.2 The greenhouse gas emission saving from the use of biofuels and bioliquids shall be at least 35 %	Principle is not included	(Principle is not included) ²⁷
Article 17.2 Biofuels and shall not be made from raw material obtained from land with high biodiversity value, namely land that had one of the following statuses in or after January 2008, whether or not the land continues to have the status:	Reference date for plantations November 1994 ²⁸	Principle is not included
- primary forest and other wooded land (no clearly visible indication of human activity and the ecological processes are not significantly disturbed)	Included ²⁹	Included ³⁰
- areas designated by law or by the relevant competent authority for nature protection purposes	Included ³¹	Included ³²
- for the protection of rare, threatened or endangered ecosystems or species recognised by international agreements	Included ³³	Included ³⁴
-highly biodiverse grassland	FSC principles refer to forests and not to grassland ³⁵	PEFC principles refer to forests and not to grassland ³⁶

²⁵ See Appendix Nr. 10

²⁶ As standard is the Finnish PEFC standard (see Appendix Nr. 7) used.

²⁷ Requires a positive carbon balance in a period of five years: Principle 2: Forest stand shall be preserved as a healthy carbon sink

The level of sustainable allowable cut (Sustainable allowable cut is the valid estimate of the proportioned average of a five-year cycle as estimated by the Finnish Forest Research Institute for the regional forestry target programme (regional forest programme), during this period the amount of carbon accumulated in tree stand (stem) is higher than the amount of carbon removed in timber harvests) shall not be exceeded in the (certified) area during the five-year cycle preceding the audit. The timber volume cut during the five-year cycle can, as a consequence of natural damage, exceed the sustainable allowable cut. This criterion shall not be used in certification of one or a group of forest management associations.

²⁸ 10.9 Plantation established in areas converted from natural forests after November 1994 normally shall not qualify for certification.

²⁹ 6.10 Forest conversion to plantations or non-forest land uses shall not occur

³⁰ 10 Typical features of valuable habitats shall [be] preserved

i.a. a) The forest-covered natural habitat types defined in Section 29 of the Nature Conservation Act (1096/1996) being in their natural state or equivalent to natural state (...) shall not be altered in such a way that endangers the preservation of their characteristic features

b) The management measures on sites in natural state or equivalent to natural state and habitats of special importance which can be recognized easily from their surroundings and defined in Section 10 of the Forest Act (1093/1996) shall be carried out in such a way that preserves the typical features of these sites. The measures on sites, for which forest authority has given a permit based on Section 11 of the Forest Act, are allowed.

c) In addition, the most important features of the biological diversity in the habitats with high conservation value, listed below, shall be preserved in forest management operations in the majority of the habitat area. [List in the standard, i.a. old-growth forests]

³¹ 1 Forest management shall respect all applicable laws of the country in which they occur

³² 9 Conservation value of protected areas or areas belonging to Natura 2000 network shall not be deteriorated by forestry measures.

³³ 1.3 In signatory countries, the provisions of all binding international agreements such as CITES, ILO conventions, ITTA, and Convention on Biological Diversity, shall be respected

³⁴ 12 Known habitats of endangered species shall be safeguarded

RED	FSC	PEFC
<p>Art 17.4</p> <p>Biofuels and bioliquids shall not be made from raw material obtained from land with high carbon stock, namely land that had one of the following statuses in January 2008 and no longer has that status:</p>		
-wetlands, namely land that is covered with or saturated by water permanently or for a significant part of the year	Principle is not included	Principle is not included
- continuously forested areas (more than one hectare with trees higher than five metres and a canopy cover more than 30%)	No forest conversion to plantations, reference date November 1994 ³⁷	Not included
-Land spanning more than one hectare with trees higher than five metres and a canopy cover of between 10% and 30%		
<p>Article 17.5</p> <p>Biofuels and bioliquids shall not be made from raw material obtained from land that was peatland in January 2008, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil</p>	Not included	(Not included) ³⁸

³⁵ Nevertheless, criteria 1.3 (see above) and 6.2 (Safeguards shall exist which protect rare, threatened and endangered species and their habitats) cover also grasslands

³⁶ Similar to FSC: Protected areas and typical features of valuable habitats shall be preserved (principles 9 and 10)

³⁷ Criterion 10.9 Plantations established in areas converted from natural forests after November 1994 normally shall not qualify for certification., 6.10 Forest conversion to plantations or non-forest land uses shall not occur

³⁸ Included, but without reference date: 11 Peatland nature shall preserved

The forestry certification systems are missing binding limits for greenhouse gas emissions to be eligible with the EC criteria. The Finnish PEFC requires a positive carbon balance for the forest in a period of five years, but doesn't define a further target for the saving, which would be required by the RED (at least 35% CO₂ savings) or include the entire production chain in the calculation. The focus of FSC and PEFC lies on other use of wood than energetic, but as forestry is the largest bioenergy supplier in the European countries, the inclusion of the GHG-emissions in the forestry certifications should be discussed in the future.

Further issues, which are not covered by the RED-criteria, are the quality of air, soil and water and social issues.

None of the forest certification systems mentions the quality of air as criterion for the certification. In both systems, FSC and PEFC, the sustainable use of water and soil and maintenance of water and soil quality are mentioned. The conservation of biodiversity is an issue in both systems, the FSC says that "Forest management shall conserve biological diversity and its associated values, water resources, soils, and unique and fragile ecosystems and landscapes, and, by so doing, maintain the ecological functions and the integrity of the forest" and PEFC formulates several criteria for preservation of protected areas, valuable habitats, peat land nature and habitats of endangered species. Workers rights and land right issues are issues in both systems. The criterion of Finnish PEFC of safeguarding of the everyman's rights can be regarded as a Scandinavian detail.³⁹

3.3 Initiatives or systems to guarantee the sustainability of biomass feedstock from agriculture

For the agricultural sector, many approaches, both national and international, have been developed to verify the sustainability of the biomass feedstock. See also deliverable D4.3 from the EUBIONET III project.



Figure 2: The old European organic agriculture label⁴⁰

The first environmental label for organic agriculture at the European level was introduced in 1991 based on the European Union regulation (EEC) 2092/91. The initiative was taken from retailers, food processors, auctioneers and farmers. The aim was to reduce the negative impact of intensive agriculture on environment and biodiversity and to improve the marketability of the product and the transparency to the consumer⁴¹. In the EU-25 in 2005, the organic area made up 3.9% of the total utilised agricultural area. The highest proportions of organic area were recorded in Austria (11.0%), Italy (8.4%), the Czech Republic and Greece (both 7.2%) and the lowest in Malta (0.1%), Poland (0.6%) and Ireland (0.8%).⁴²

In the country reports, a wide variety of different systems was introduced, whereby most of the systems are designed for the certification of organic agricultural products to guarantee the quality of food. In the following table there is an overview of the in country reports presented certification systems.

³⁹ That means that opportunities for free access to and stay in forests and for picking of forest products according to everyman's rights shall be safeguarded. Everyman's rights include among others e.g. walking, skiing or bicycling, temporary camping on other person's land, gathering of berries, mushrooms and some other nature products, gathering of dried twigs, brushwood, fallen cones and nuts. The following activities are not included in everyman's rights: setting fire, damaging trees or bushes, driving in motor vehicles on terrain, gathering of protected plants, lichens and mosses, making feeding places for game, damaging seedling stands and cultivated land and littering the environment

⁴⁰ Source: <http://www.agriculture.gov.ie/contentarchive/farmingsectors/organicfarming/>

⁴¹ Lewandowski, Faaij 2006, p.84

⁴² European Commission 2010

Example 2: Examples of initiatives to support the sustainability of biomass from agriculture⁴³

Slovenia:

BIODAR (76 Eko-farms of 276 Ekofarms)
Demeter (18 Eko-farms)

Sweden:

Svanen

Bra miljöval⁴⁴ (599 products on market with Bra Miljöval at present)

KRAV (5235 products certified according the criteria of KRAV, with makes 90% of the organic products on the Swedish market)

Lithuania:

Ekoagros (the company implements certification of ecological agriculture farms and their products (food products and fodder))

Italy:

Biomassa- CSQA (CSQA developed a self defined biomass certification scheme, features: traceability and origin of biomass; no presence of debated (controversial) biomass sources, energy balance of the chain; GHG balance of the chain. The Scheme applies both to forest and agricultural biomass)

GLOBALGAP

Austria:

Öpul⁴⁵ (Approximately 2,26 million hectares, or 89% of Austria`s agriculturally used area (not including mountain pastures), are covered by the programme)

AMA Biozeichen

The BIO Austria label (more than 13 000 farmers)

Norway:

Debio (2702 farms, 52248 ha)

Latvia:

"Latvian eco-product" (Latvijas ekoprodukts) (4218 participants)

National food quality scheme

Spain:

Agricultura Ecologica

Netherland:

Eko-keur⁴⁶ (1400 farms + 1250 companies in processing industry)

Demeter (4069 ha, 120 farms + 28 processors + 10 distributors)

Max Havelaar

Roundtable initiatives (RSPO⁴⁷, RTRS⁴⁸, BSI⁴⁹)

UTZ certified⁵⁰ (374 certificates (76 944 producers) providing 308,500 MT coffee Market share: 28% is certified coffee from which 25% comes from Utz)

Germany:

Bio-Siegel (implementing the EU Regulation 2092/91 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs) (3307 companies)

Demeter (1400 farmers)

Bioland (4967 farmers)

Naturland (50 000 farmers)

Ecoland

DLG Certificate "Sustainable Agriculture – Fit for the Future" (Nachhaltige Landwirtschaft - zukunftsfähig)

Gää

Ecovin

⁴³ Source: country reports. Date of reference: between September 2009 and March 2010,.

⁴⁴ See Appendix Nr. 34

⁴⁵ See Appendix. Nr. 15

⁴⁶ See Appendix Nr. 18

⁴⁷ See Appendix Nr. 27

⁴⁸ See Appendix Nr. 22

⁴⁹ See Appendix Nr. 26

⁵⁰ See Appendix Nr. 19

UK:

Assured Combinable Crops Scheme (ACCS)

Basel criteria for soy

Linking Environment and Farming Marque (LEAF)

Genesis Quality Assurance (GQA)⁵¹ (≈ 4 000 (including husbandry activities))

Assured Food Standard AFS (Red Tractor Farm Assurance) ≈ 78,000 farms (including husbandry activities)

GAECs of the CAP and Higher Level of Stewardship

Belgium:

GIQF standard (673 agricultural companies, 231 traders and transformers)

Biogarantie®⁵² (852 farms in 2007 (73% in WR, 27% in FR)) Demeter (Few: 198 ha, 2 farms)

European label organic farm

Fairtrade⁵³

Czech Republic:

Fairtrade Labelling Organizations International

GlobalGAP⁵⁴

Denmark:

Ø-mærket (2835 farmers)

Svanen

Blomsten (ECO-Label)

ISO

Hungary:

Biokontroll Hungária Nonprofit Kft.

IFOAM⁵⁵

There are several different labels and certifications for organic agriculture, but many of the national labels require the fulfilment of the EC-criteria for organic agriculture (see e.g. Eko-Keurmerk from the Netherlands or the Bio-Siegel from Germany). The regulation (EEC) No. 2092/91 on organic farming and the corresponding labeling of agricultural products and foods was adopted by the European Council of Agricultural Ministers adopted in 1991 and renewed in 2009. After 1 of July 2010 every product from organic agriculture sold on the area of the European Union has to wear the new European organic agriculture label.



Figure 3: The new European organic agriculture label⁵⁶

The Chain of Custody of the **European organic agriculture label** is based on track and trace system: "the operator shall keep the land, animals, and products used for, or produced by, the organic units separate from those used for, or produced by, the non-organic units and keep adequate records to show the separation". Control bodies and control authorities in Europe can verify compliance to the EU legislation.

⁵¹ See Appendix Nr. 14

⁵² See Appendix Nr. 16

⁵³ See Appendix Nr. 24

⁵⁴ See Appendix Nr. 20

⁵⁵ See Appendix Nr. 25

⁵⁶ Source: http://ec.europa.eu/agriculture/organic/logo/index_de.htm

Typical principles of organic farming are

- Wide crop rotation as a prerequisite for an efficient use of on-site resources
- Very strict limits on chemical synthetic pesticide and synthetic fertiliser use, livestock antibiotics, food additives and processing aids and other inputs
- Absolute prohibition of the use of genetically modified organisms
- Taking advantage of on-site resources, such as livestock manure for fertiliser or feed produced on the farm
- Choosing plant and animal species that are resistant to disease and adapted to local conditions
- Raising livestock in free-range, open-air systems and providing them with organic feed
- Using animal husbandry practices appropriate to different livestock species⁵⁷

External audits take place on an annual basis, focused on the risk areas. Every 3 years, all criteria are controlled and verified. Unannounced inspections take place throughout the year. Verification includes field visits, control of documentation and records and test sampling (samples collected by auditor).

Beside national initiatives and the European regulation there are international voluntary standards, which have been developed by NGOs and interested stakeholders. Some focus on one singular agricultural product (sugar cane, palm oil) and some have a brighter scope.

One of these initiatives is by the WWF initiated collaboration of sugar retailers, investors, traders, producers and NGOs who are committed to sustainable sugar production the **Better Sugar Cane Initiative**⁵⁸ to establish principles and criteria that can be applied in the sugarcane growing regions of the world. BSI's mission is to promote measurable improvements in the key environmental and social impacts of sugarcane production and primary processing.

BSI uses in its standard measurable (result oriented) indicators and hopes to gain more credibility through metrics (numbers that can be put to each of the indicators). They fear that using process indicators (as is utilized in various standards, sometimes in combination with result oriented indicators), certification programs can become subjective rather than science-based. The second version of the principles is currently under public consultation⁵⁹.



Figure 4: Logos of a) Better Sugarcane Initiative⁶⁰, b) Green Palm label⁶¹, c) UTZ Certified label⁶² and d) Rainforest Alliance Certified Eco-label⁶³

⁵⁷ List adapted from the internet page on organic farming by the European Commission. Source: http://ec.europa.eu/agriculture/organic/organic-farming/what-organic_en

⁵⁸ More information on principles in Better Sugarcane Initiative 2009

⁵⁹ Appendix Nr. 26

⁶⁰ Source: <http://www.tradestandards.org/en/Standard.71.aspx>

⁶¹ Source: <http://www.greenpalm.org/en/downloads>.

⁶² Source: <http://www.utzcertified.org/index.php?pageID=101>.

⁶³ Source: <http://www.rainforest-alliance.org/main.cfm?id=programs>

The **Roundtable on Sustainable Palm Oil (RSPO)**⁶⁴ is a multi-stakeholder initiative dedicated to promoting sustainable production of palm oil worldwide. It was initiated by the WWF in 2001 and formally established in 2004. The more than 400 members of RSPO represent the different sectors of the palm oil industry - oil palm growers, palm oil processors and traders, consumer goods manufacturers, retailers, banks and investors, social and environmental NGOs.

The RSPO has developed a set of principles and criteria for sustainable production of palm oil and accepts the systems "segregation", "mass balance" and "book and claim" as supply chain systems for the certification. Segregation and mass balance supply chain systems are organised by UTZ CERTIFIED⁶⁵ with offers a web-based traceability system. The book and claim system is operated by Green Palm⁶⁶ programme. The Green palm certificates are offered and sold on a web based trading system.

The Sustainable Agriculture Certification Network awards the Rainforest Alliance Certified Eco-label to farms, who produce soy, sugarcane, sunflower, palm oil, bananas, citrus, cocoa, coffee, flowers and ferns and meet the criteria. The Rainforest Alliance (RA) is an international environmental organization based in New York City. Rainforest Alliance provides two secretariats for the Sustainable Agriculture Network: The Standards & Policy Secretariat coordinates the development of standards and related policies for SAN and the Certification. Secretariat administers the certification systems for the Sustainable Agriculture Certification Network (SANcert). The Sustainable Agriculture Network/Rainforest Alliance is a coalition of non-profit, independent conservationist organizations that promotes the social and environmental sustainability of agricultural activities by developing a standard, and certifying farms that comply with that standard RA has stated that it is interested in developing standards for energy crops if demand for such certified produce arises. In that case, certified produce could be on the market in 2-4 years time⁶⁷. SAN has included additional criteria for e.g. sugar cane and some other large commodities, this also in line with the ongoing discussions on biofuels (SAN Addendum).



*Figure 5 Logo of the Round Table on Responsible Soy Association*⁶⁸

The Round Table on Responsible Soy Association⁶⁹ is an international multi-stakeholder initiative that brings together those concerned with the impacts of the soy economy. It's working to define what responsibly-grown and processed soy is and to promote the best available practices to mitigate negative impacts throughout the value chain. RTRS was initiated by WWF Switzerland and Coop Switzerland. A first paper has been developed by ProForest in 2004 known as the so-called "Basel Criteria for Responsible Soy"⁷⁰. The standard has been tested during the last year and in this summer the full version of the principles should be released and the first certified soy should come on the market at the end of the year. The RTRS has established a working group with the main target to successfully pass the comitology procedures for recognition as a voluntary scheme after the RED and to be ready to implement by 1 January 2011.

⁶⁴ More information on principles in Roundtable on Sustainable Palm Oil October 2007

⁶⁵ For more information see <http://www.utzcertified.org>.

⁶⁶ For more information see <http://www.greenpalm.org>.

⁶⁷ Appendix Nr. 21

⁶⁸ Source: <http://www.responsiblesoy.org>

⁶⁹ More information on principles in Round Table on Responsible Soy Association (RTRS) 28 May 2009

⁷⁰ Appendix Nr. 22

Table 4: Sustainability issues of certification systems for agriculture benchmarked to the European Directive on Renewable Energy

RED	EC Organic agriculture ⁷¹	BSI ⁷²	RSPO ⁷³	SAN ⁷⁴	RTRS ⁷⁵
Article 17.2 The greenhouse gas emission saving from the use of biofuels and bioliquids shall be at least 35 %	Principle is not included	Included ⁷⁶	(Principle is not included) ⁷⁷	(Principle is not included) ⁷⁸	(Not included) ⁷⁹
Article 17.2 Biofuels and shall not be made from raw material obtained from land with high biodiversity value, namely land that had one of the following statuses in or after January 2008, whether or not the land continues to have the status:	Principle is not included	Included ⁸⁰	Included ⁸¹	Included ⁸²	Included
- primary forest and other wooded land (no clearly visible indication of human activity and the ecological processes are not significantly disturbed)	Principle is not included	Included	Included	Included	Included
- areas designated by law or by the relevant competent authority for nature protection purposes	Principle is not included	Included	Included ⁸³	Included ⁸⁴	Included
- for the protection of rare, threatened or endangered ecosystems or species recognised by international agreements	Principle is not included	Included	Not included	Included	Not included
-highly biodiverse grassland	Principle is not included	Included	Not included	Not included	Not included

⁷¹ See Appendix Nr. 18

⁷² See Appendix Nr. 26

⁷³ See Appendix Nr. 27

⁷⁴ See Appendix Nr. 21

⁷⁵ See Appendix Nr. 22

⁷⁶ 3.2 To monitor global warming emissions with a view to minimising climate change impacts: Global warming burden per unit mass product (Field to gate emissions):

Total < 0,4 t CO₂eq/t sugar or Total <24 g CO₂eq/MJ (only used if ethanol is produced)

⁷⁷ Criterion 5.6 Plans to reduce pollution and emissions, including greenhouse gases, are developed, implemented and monitored.

⁷⁸ Criterion 10.6 The farm must implement practices to diminish its emissions of GHG gases and increase CO₂ sequestration. Such practices include soil cover management, use of clean technologies, improvement of energy efficiency, reduction in tillage etc aimed at GHG reduction and CO₂ sequestration

⁷⁹ 4.3 Efforts to reduce emissions of Greenhouse Gas emissions are made.

⁸⁰ Additional criterion for the European market : 6.2 To protect land with high biodiversity value, land with high carbon stock and peatlands, reference date January 2008

⁸¹ 7.3 New plantings since November 2005, have not replaced primary forest or any area containing one or more High conservation values

⁸² From November 1, 2005 onwards no high value ecosystems must have been destroyed by or due to purposeful farm management activities.

⁸³ Compliance with applicable laws and regulations

⁸⁴ 1.3 The farm's upper management must demonstrate a commitment to certification and to complying to the requirements stipulated in the standard and by law.

RED	EC Organic agriculture	BSI	RSPO	SAN	RTRS
Art 17.4 Biofuels and bioliquids shall not be made from raw material obtained from land with high carbon stock, namely land that had one of the following statuses in January 2008 and no longer has that status:	Principle is not included	Included	Not included	Not included	Not included
-wetlands, namely land that is covered with or saturated by water permanently or for a significant part of the year	Principle is not included	Included	Not included	Included	Not included
- continuously forested areas (more than one hectare with trees higher than five metres and a canopy cover more than 30%)	Principle is not included	Included	Not included	Included ⁸⁵	Not included
-Land spanning more than one hectare with trees higher than five metres and a canopy cover of between 10% and 30%					
Article 17.5 Biofuels and bioliquids shall not be made from raw material obtained from land that was peatland in January 2008, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil	Not included	Included	Not included	Not included	Not included

⁸⁵ 9.5 (...) The cutting of natural forest cover or burning to prepare new production areas is not permitted.

All initiatives except the EC organic agriculture mention the reduction of greenhouse gases as an issue for the certification, but only BSI defines a minimum reduction as a limit with their standards for the EU market access. The RSPO has discussed about the topic, but couldn't find solution to come to a mutual agreement and accepted methodology. BSI seeks the EC recognition at the end of the year and has published a standard for biomass intended to be put as biofuels and -liquids onto the European Union Market.

Regarding the air quality, only RSPO mentions air quality as one of the areas where there can be possible environmental impacts. Soil conservation and social aspects are issues in all of these certification systems, except the EC organic agriculture, which does not define any social criteria.

The biodiversity conservation is an issue in all of the systems. The BSI sets the requirement of assessing direct impacts of sugarcane enterprises on biodiversity and ecosystems services. The issues to assess are aquatic oxygen demand per unit mass product, High Conservation Value areas at risk, soil nutrient status, eutrophication per unit mass product and ecotoxicity to aquatic life per unit mass product. The cut-off date for land use change of the BSI-standard is the same as in the Directive of European Union, January 2008.

The RSPO requires that the conservation of rare, threatened or endangered species and high conservation value habitats is taken into account in management plans and operations and that new plantings since November 2005 have not replaced primary forest or any area required to maintain or enhance one or more High Conservation Values.

A conservation programme for all existing natural ecosystems has to be established for the certification after SAN, and from the date of application for certification onwards, the farm must not destroy any natural ecosystem. Additionally, from November 1, 2005 onwards no high value ecosystems must have been destroyed by or due to purposeful farm management activities.

The RTRS has proposed a criterion, which is still optional that expansion for soy cultivation should take place only on land cleared of native vegetation before 2008.

All above listed certification systems, except the EC organic agriculture, include criteria on workers rights and land right issues and community relationships.

Only BSI complies with their additional criteria for the European Market fully with the EU criteria. The other standards lack on binding thresholds for greenhouse gas emissions and prohibition of using peatlands and other lands with high carbon stock.

3.4 Initiatives or systems to guarantee the sustainability of bioenergy for heat and power

The project partners were asked to present initiatives and systems in their countries, which guarantee the sustainability of bioenergy for heat and power. In the following table the in the country reports presented systems are summarized.

Some of the listed initiatives are green electricity labels, which have only one or no requirements on sustainability, when other like NTA 8080 and ISCC are initiatives on sustainable production on bioenergy.

Further initiatives, which are not included in this report because the criteria are not completed are the ISO and GBEP. ISO will develop an international standard to address sustainability issues linked to bioenergy. The standard will be produced by a new ISO project committee, ISO/PC 248, Sustainability criteria for bioenergy. GBEP is a voluntary based global initiative with public, private and civil society representatives and it is

working to develop a set of relevant and voluntary criteria and indicators as well as examples of best practice regarding the sustainability of bioenergy.

Example 3: Examples of initiatives to support the sustainability of bioenergy for heat and power⁸⁶

Slovenia:

Feed-in tariff for electricity (electricity production from CHP on woody biomass with high efficient cogeneration)
Operational Program on use of Wood Biomass as a Source of Energy

Sweden:

Investment grants for the production of electricity from biomass
Electricity certificates for renewable electricity production (wind, solar, geothermal energy, certain biofuels, wave energy and certain hydro power)

Finland:

Renewable Energy Certificate System, advocates a standard certificate as evidence of the production of a standard renewable energy quantity and provides a methodology which enables renewable energy trade.

Guarantee of Origin (GoO), implemented in the line with the article 5 of the RES-e directive. The GoO is given to the producer of electricity, if the producer has joined the scheme, after the production has taken place. Parallel to this system also RECS system is operational.

Italy:

Biomassa- CSQA (CSQA developed a self defined biomass certification scheme, features: traceability and origin of biomass; no presence of debated (controversial) biomass sources, energy balance of the chain; GHG balance of the chain. The Scheme applies both to forest and agricultural biomass)

Netherland:

The Dutch government wishes to incorporate sustainability criteria for biomass into the relevant policy instruments. In the short term this regards the Dutch subsidy arrangement for electricity production. The sustainability criteria are translated into a national standard: *NTA 8080*. The sustainability criteria in standard *NTA 8080* will be linked to the subsidies for electricity companies in 2010

The label *Milieukeur Groene Electriciteit* (Green Electricity) sets environmental requirements for green electricity in general including wind, solar and biomass. No green electricity from biomass is certified with MilieuKeur at this moment. The MilieuKeur criteria are currently revised and will become available in the beginning of 2010. The *NTA 8080* criteria will most probably be used for biomass

The *Green Gold Label* (GGL) is an initiative of the Dutch energy company Essent in consultation with several stakeholders. The GGL aims at a traceable system for biomass from (by-) products from the power plant (and its green power it produces) back to the sustainable source. The system is laid down in 8 different GGL standards. At present 11 biomass suppliers, that provide biomass to Essent, have a certificate.

Germany:

Biomassenachhaltigkeitsverordnung für Strom BioNachVO (Biomass Sustainability Ordinance for the Electricity Sector)

The Ordinance is designed to grant feed-in-tariffs for electricity production from liquid biomass on the basis of the EU RES Directive requirements.

Extra requirements have been introduced to receive the bonus for utilization of renewable biomass resources (+6 Cent/kWh):

- Prove of sustainable production of biomass has to be provided from 1. January 2010 (Certificate)
- GHG reduction of 35% immediately after entering into force.
- Reference point for land use change will be 2005 (instead of 1 Jan 2008).

The ordinance entered into force on 24 August 2009. The Bundesanstalt für Landwirtschaft und Ernährung (BLE, Federal Agency for Agriculture and Food) will be responsible for the accreditation of certification agencies.

⁸⁶ Source: Country reports, date of reference from September 2009 until March 2010

The "International Sustainable Carbon Certification" project (ISCC)

The project's aim is to demonstrate the feasibility of certifying biomass produced for bioenergy. It develops a metasystem on already existing certification systems. Thus it could not only be used for the bioheat and biopower sector but also for biofuels for transport and all other applications that involve biomass.

The project is funded by the German Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) via its funding agency Fachagentur Nachwachsende Rohstoffe e.V. (FNR, Agency for Renewable Resources).

UK:

The Renewables Obligation, the Renewables Obligation (Scotland) and the Northern Ireland Renewables Obligation are designed to incentivise renewable generation into the electricity generation market. Suppliers meet their obligations by presenting sufficient Renewables Obligation Certificates ("ROCs") to cover their obligations.

Where suppliers do not have sufficient ROCs to meet their obligation, they must pay an equivalent amount into a fund, the proceeds of which are paid back on a prorated basis to those suppliers that have presented ROCs (Ofgem, 2009).

Ofgem has produced a guideline with the procedures for the implementation of the RO for fuelled generating stations including aspects such as the characteristics of the feedstocks, the energy system to be used, sustainability reporting using a system called FMS Fuel Measurement and Sampling.

CHP generating stations wishing to claim CHP ROCs will need to be accredited under the CHPQA programme before they can be issued CHP ROCs (Ofgem, 2009).

In the following the NTA 8080 and the ISCC are presented shortly and later compared with the EC criteria.

The Dutch government would like to incorporate sustainability criteria for biomass into the relevant policy instruments. In the short term this regards the Dutch subsidy arrangement for electricity production and the obligation for biofuels for road transport. In the longer term the Dutch government wishes to promote a wider application of these sustainability criteria, which are translated into a national standard: **NTA 8080**⁸⁷. NEN will be the scheme holder of the standard. In 2009, certifiers (in close cooperation with NEN and working groups) tested the standard for verification and were developing an auditing scheme. Some indicators in the NTA standard were still open and could be interpreted in various ways. It is important that this is avoided to minimize free interpretation space of certifying companies. The results and recommendations are brought back into the working groups and finalized. The sustainability criteria in standard NTA 8080 will be linked to the subsidies for electricity companies in 2010. It is expected that the sustainability criteria for biofuels will go in implementation from 2011 onwards. Here, the Netherlands is looking for close cooperation with the EC and other countries. The NTA 8080 is brought into the discussion groups of CEN TC 383.⁸⁸

⁸⁷ See appendix Nr. 31

⁸⁸ van Dam 2010



Figure 6: ISCC seal for certificates⁸⁹

production of biomass and bioenergy and 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.⁹⁰ The result, **International Sustainable Carbon Certification (ISCC)**⁹¹ has now absolved its pilot phase (Feb 2008-Feb 2010) has obtained the first official (preliminary) recognition as Sustainability Certification System for Biomass and Bioenergy in January 2010 in Germany. Its focus lies on liquid biofuels for transport and electricity but extension to all other applications involving biomass is envisaged and the criteria are already usable for all biomass.

The German Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) and its funding agency the Agency for Renewable Resources (FNR) have been funding an international pilot project to develop a certification system for bioenergy. Number of stakeholders from Europe, Latin America and South East Asia has been involved to the project, which is managed by a consultancy company from Cologne. The target was to develop a pragmatic, internationally oriented certification system which should keep the administrative burden of certification in 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

⁸⁹ Source: http://www.iscc-system.org/index_eng.html

⁹⁰ Schmitz 2008

⁹¹ See appendix Nr. 35

Table 5: Sustainability issues of certification systems for biomass for heat and power

RED	NTA 8080	ISCC ⁹²
Article 17.2 The greenhouse gas emission saving from the use of biofuels and bioliquids shall be at least 35 %	Included ⁹³	Included
Article 17.2 Biofuels and shall not be made from raw material obtained from land with high biodiversity value, namely land that had one of the following statuses in or after January 2008, whether or not the land continues to have the status:	Included ⁹⁴	Included
- primary forest and other wooded land (no clearly visible indication of human activity and the ecological processes are not significantly disturbed)	Included	Included
- areas designated by law or by the relevant competent authority for nature protection purposes	Included	Included
- for the protection of rare, threatened or endangered ecosystems or species recognised by international agreements	Included	Included
-highly biodiverse grassland	Included	Included
Art 17.4 Biofuels and bioliquids shall not be made form raw material obtained from land with high carbon stock, namely land that had one of the following statuses in January 2008 and no longer has that status:	Included ⁹⁵	Included
-wetlands, namely land that is covered with or saturated by water permanently or for a significant part of the year	Included	Included
- continuously forested areas (more than one hectare with trees higher than five metres and a canopy cover more than 30%)	Included ⁹⁶	Included
-Land spanning more than one hectare with trees higher than five metres and a canopy cover of between 10% and 30%		

⁹² More information on Principles in International Sustainability and Carbon Certification 2010

⁹³ A net GHG emission reduction shall take place among the whole chain:

- For electricity and heat at least 70%

- For transportation fuels at least 50%; transition period till 2012 with a minimum of 35%

⁹⁴ Reference date 1st of January 2007

⁹⁵ Biomass production shall not be at the expense of important carbon sinks in the vegetation and in the soil

⁹⁶ Areas in which the loss of above-ground carbon storage cannot be recovered within a period of 10 years of the intended biomass production are excluded for the installation of new production units for biomass

RED	NTA 8080	ISCC
<p>Article 17.5</p> <p>Biofuels and bioliquids shall not be made from raw material obtained from land that was peatland in January 2008, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil</p>	Included	Included

Both NTA 8080 and ISCC set a minimum for greenhouse gas reduction during the bioenergy chain and forbid the conversion of land with high carbon stock. NTA 8080 has even higher reduction targets, for electricity and heat at least a reduction of 70% in case of reference of Dutch mixture of electricity or coal shall take place, or at least 50% in case of reference of natural gas. If in the chain of biomass innovative preparation technology or technologies are demonstrably used to enlarge the availability and / or applicability of sustainable biomass, a minimum of 50% applies. For transportation fuels the reduction should be at least 50% with a transition period till 2012.

Other sustainability issues are also covered by both certification systems. There are only very limited number certification systems for bioenergy in general. Beside ISCC and NTA8080 there are some further initiatives under development. The International Organisation for Standardisation (ISO) will develop an international standard (ISO 13065) to address sustainability issues linked to bioenergy and Global Bioenergy Partnership (GBEP) is working to develop a set of voluntary criteria and indicators as well as examples of best practice regarding the sustainability of bioenergy.

3.5 Initiatives or systems to guarantee the sustainability of biofuels for transportation

Example 4: Examples of initiatives to guarantee the sustainability of biofuels for transportation

Sweden:

Verified Sustainable Ethanol Initiative is an effort to physically guarantee Swedish consumers that they are filling up with good ethanol and to increase the offering of verified sustainable ethanol in close collaboration with the Brazilian sugar industry.

Netherlands:

The Dutch government wishes to incorporate sustainability criteria for biomass into the relevant policy instruments. In the short term this regards the obligation for biofuels for road transport. It is expected that the sustainability criteria for biofuels will go in implementation from 2011 onwards. Here, the Netherlands will follow the RED of the European Commission and is looking for close cooperation with the EC and other countries. The NTA 8080 is brought into the discussion groups of CEN TC 383

Germany:

Biomassenachhaltigkeitsverordnung für Biokraftstoffe BioNachVO (Biomass Sustainability Ordinance for Biofuels)

The ordinance is designed along the same lines as the Sustainability Ordinance for the Electricity Sector described above. It will implement Article 17 of the RES Directive requirements one-to-one covering raw materials cultivated inside or outside the territory of the Community which are used for energy from biofuels and other bioliquids. The Bundesanstalt für Landwirtschaft und Ernährung (BLE, Federal Agency for Agriculture and Food) will be responsible for the accreditation of certification agencies.

UK:

Reporting under the Renewable Transport Fuel Obligation (RTFO) is based on a meta-standard approach to sustainability.

Above there are the by the project partners listed national initiatives to guarantee the sustainability of biofuels for transportation.

The UK's Renewable Transport Fuel Obligation (RTFO) aims to reduce CO₂ emissions from road transport by promoting the supply of renewable fuels. The RTFO, which operates since April 2008, imposes a legal obligation on fossil fuel suppliers to produce Renewable Transport Fuel Certificates demonstrating that a specified percentage of their total fuel sales is renewable.

It is also possible for a company to arrange its own independent auditing against the Meta-Standard. In order to obtain a Renewable Transport Fuel Certificate (RTFC), suppliers shall submit a carbon and sustainability report to the Renewable Fuels Agency (RFA). The sustainability reporting scheme, which focuses on biofuel feedstock production, makes use of a set of existing voluntary agri-environment and social accountability schemes, which were benchmarked against the RTFO Biofuel Sustainability Meta-Standard. This 'benchmarking' process considers both the criteria covered and robustness of the checks that are in place. If a scheme is considered robust and meets enough of the criteria, it is a 'Qualifying Standard'. If a scheme meets all the criteria, it achieves the RTFO Meta-Standard.

In September 2007, Sweden and Brazil signed a bilateral agreement aimed to boost bioethanol trade and to foster increased collaboration between researchers and companies from both countries, with the aim of developing better and more efficient technologies for sustainable bioethanol production.



Figure 7: Verified Sustainable Ethanol label

This agreement laid the ground for the SEKAB Verified Sustainable Ethanol Initiative⁹⁷, which was developed by the Swedish bioenergy company SEKAB together with Brazilian bioethanol producers. Through this initiative, SEKAB aims to supply verified sustainable bioethanol from the Sao Paulo region of Brazil to the Swedish market. The verified ethanol is available in Swedish pumps since August 2008.

The Roundtable on Sustainable Biofuels is an international, multistakeholder initiative that was established in 2006 to achieve global consensus around a set of principles and criteria for sustainable liquid biofuel feedstock production, processing and biofuel transportation and distribution. After many consultations with stakeholders and a number of draft revisions, in November 2009 the first full version of the standard was approved for pilot testing. During 2010 the RSB will pilot test the standard through different supply chains in different regions of the world, and changes will be proposed as to how to improve the RSB Standard based on lessons learnt from this pilot test. In 2010 the RSB will become a fully operational biofuel certification standard and seek the recognition as a voluntary certification scheme according to the Renewable Energy directive of the European Union.

⁹⁷ More information available on SEKAB

Table 6: Issues to guarantee the sustainability of biofuels

RED	RTFO	RSB for EU Market Access ⁹⁸	SEKAB ⁹⁹
Article 17.2 The greenhouse gas emission saving from the use of biofuels and bioliquids shall be at least 35 %	Included	Included ¹⁰⁰	Included ¹⁰¹
Article 17.2 Biofuels and shall not be made from raw material obtained from land with high biodiversity value, namely land that had one of the following statuses in or after January 2008, whether or not the land continues to have the status:	Included	Included	Not included
- primary forest and other wooded land (no clearly visible indication of human activity and the ecological processes are not significantly disturbed)	Included	Included	Included ¹⁰²
- areas designated by law or by the relevant competent authority for nature protection purposes	Included	Included	Not included
- for the protection of rare, threatened or endangered ecosystems or species recognised by international agreements	Included	Included	Not included
-highly biodiverse grassland	Included	Included	Not included
Art 17.4 Biofuels and bioliquids shall not be made form raw material obtained from land with high carbon stock, namely land that had one of the following statuses in January 2008 and no longer has that status:	Included	Included	Not included
-wetlands, namely land that is covered with or saturated by water permanently or for a significant part of the year	Included	Included	Not included

⁹⁸ Roundtable on Sustainable Biofuels 12.11.2009

⁹⁹ More information on principles on SEKAB

¹⁰⁰ In the basis principles, the greenhouse gas emission threshold is not defined; during the pilot test period testing will be done against minimum GHG emission reduction thresholds set at 10%, 40% and 70%. In the standard for EU market access, the threshold is the same than in the Directive.

¹⁰¹ At least 85 % reduction in fossil carbon dioxide compared with petrol, from a well to-wheel perspective

¹⁰² Zero tolerance for felling of rain forest

RED	RTFO	RSB for EU Market Access	SEKAB
- continuously forested areas (more than one hectare with trees higher than five metres and a canopy cover more than 30%)	Included	Included	Not included
-Land spanning more than one hectare with trees higher than five metres and a canopy cover of between 10% and 30%			
Article 17.5 Biofuels and bioliquids shall not be made from raw material obtained from land that was peatland in January 2008, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil	Included	Included	Not included

RSB and RTFO comply with all of the sustainability issues. RSB will publish a GHG calculation methodology for reporting on the lifecycle GHG emissions. It has published an extra standard¹⁰³ to comply with the requirements of the European Renewable Energies Directive. The GHG emission thresholds of the RSB can change during this year. They are tested in pilot projects and may be revised after the pilot phase. The SEKAB has set very ambitious GHG emission reduction targets, on their homepage¹⁰⁴ there is no actual information available, if it has been possible to reach these reduction targets.

Land use change is included in the GHG calculation method of the RSB, but in principle the conversion of land with high carbon stock is not explicitly forbidden, only in the EU-standard. In SEKAB only the felling of rain forest is forbidden, other types of land with high carbon stock are not explicitly mentioned.

Regarding other environmental issues SEKAB contains only a soft criterion that ecological practices according to UNICA's environmental initiative should be followed.

4 Views of stakeholders on sustainability criteria

The EUBIONET III project has developed and implemented a questionnaire study as support to analyze the ongoing development of sustainability criteria for bioenergy in the European Union and further actions needed to come to a harmonization of certification systems, based on EU stakeholder views. The questionnaire was online from February to August 2009. 473 responses were received from which 285 could be used for further processing. The responses were collected from 25 EU member countries. Additional responses were received from 9 non-European countries. A full report with the results of the questionnaire is available from Dam et al (2009). This section of the report presents the key results, conclusions and recommendations.

The open access of the questionnaire enabled enthusiastic stakeholders to respond on larger scale than expected. For other countries or stakeholder groups, reactions were very limited though. This process created an opportunity for all interested stakeholders to respond and give their opinions. A disadvantage of this process was, however, that stakeholders were – in numbers – not equally represented in the various country and stakeholder groups.

Due to the unbalanced representativeness of respondents in the country and stakeholder groups, the conclusions should be handled with care. However, the dominant *and* marginal viewpoints do provide an interesting basis to map out and articulate various perspectives and viewpoints on the development and implementation of sustainability criteria for bioenergy in the European Union.

There is amongst the stakeholders agreement that a criterion on the 'minimization of GHG emissions' should be included in a certification system for biomass and bioenergy. Criteria on the optimization of energy and on the protection of water are also considered highly relevant to include in a certification system. The inclusion of criteria on indirect impacts in a certification system is considered a low priority, most probably because of the limitations of a certification system to regulate impacts that take place on a meso- or macro level. Other criteria, as child labour, are given by some stakeholder groups a low priority because this is considered the responsibility of the country in question.

¹⁰³ Roundtable on Sustainable Biofuels 19.03.2010

¹⁰⁴ SEKAB

There is no clear preference between the other listed sustainability criteria amongst the stakeholders. Priorities differ per country group and, more clearly, per stakeholder group. This also means that some of the socio-economic criteria are given similar priority as environmental criteria by several of the stakeholder or country groups.

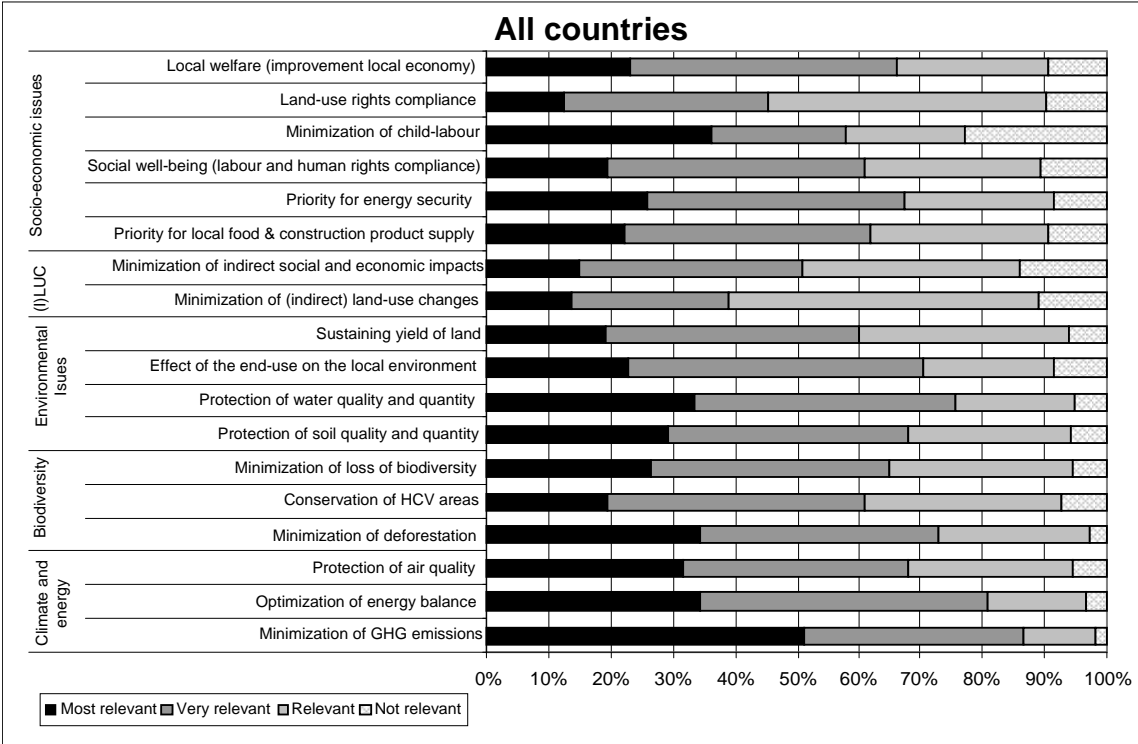


Figure 8: Total response in all countries to indicate the importance of sustainability criteria to include in a biomass and bioenergy certification system

The need for a European certification system for biomass and bioenergy is recognized, although there are limitations. There is agreement that the introduction of a certification system for biomass and bioenergy in Europe will result in more sustainable biomass production in Europe and in an increased credibility of biomass as a renewable energy source. Respondents stress, however, the need for a level playing field in the market, meaning that the European sustainability requirements for biomass and bioenergy should be extended to other geographical world regions and to other feedstock and renewable energy sources.

The majority of the respondents expect that a certification system for biomass and bioenergy in Europe will result into a larger availability of biomass in the long term in- and outside Europe. More than half of the respondents expect that the introduction of a certification system will lead to improved international competition of European certified biomass with other world markets and to increased trade of bioenergy products inside Europe.

Also, the introduction of a European certification system for biomass and bioenergy is expected to lead to higher biomass production costs and end-prices for the consumer. At the same time, increased investments in the bioenergy sector are expected as well. The risk for administrative burdens is considered high by most respondents.

The large variety of geographical areas, crops, residues, production processes and end-uses is seen as key area of attention that limits the development towards a harmonized certification system for sustainable biomass and bioenergy in Europe. Another concern is the lack of sufficient knowledge about criteria and indicators, which is needed to certify bioenergy products. At the same time, some respondents clarify that this may not be a limitation for further development of a certification system: A system will need to

incorporate and review processes so that adjustments can be made as our knowledge improves. Additional points of concern, explicitly mentioned by respondents are the presence of political barriers, conflicts of interest, differences in views and norms and implementation and verification issues.

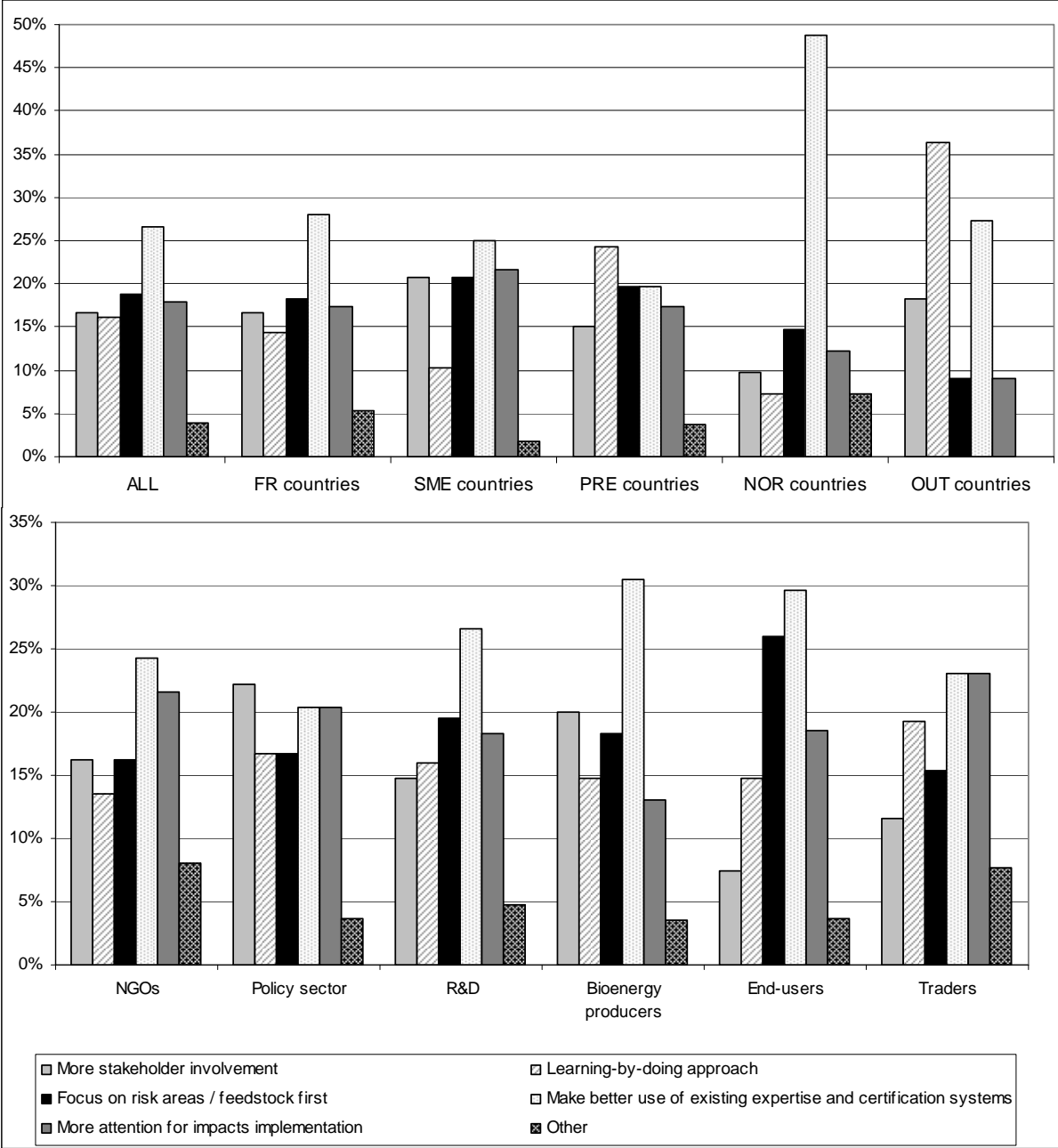


Figure 9: Recommendations from all and for individual country¹⁰⁵ and stakeholder groups (in %) for improvement of harmonization of biomass and bioenergy sustainability certification on European level¹⁰⁶.

¹⁰⁵ FR = Front-running countries (incl. Belgium, Germany, Netherlands, UK), SME = South and Mid-European Countries, PRE = Pre-accession countries, NOR = Nordic countries, OUT = Countries outside Europe

¹⁰⁶ The respondents could choose between five different answers. If not mentioned in the list, respondents could indicate additional areas of attention under the answer "other". It was possible to give more than one answer.

5 Conclusions and recommendations for harmonization

Measuring and quantifying sustainability of bioenergy is a very complicated issue. The meaning of sustainability can be defined in different ways, depending of the context and of own values and interests. It is almost a philosophical question how to measure something, whose three dimensions (environmental, social, and economic) sometimes are even in conflict with each other.

Based on the country reports, this evaluation report contains 44 criterias¹⁰⁷, which describe various national and international systems and initiatives to guarantee the sustainability of biomass. Some of the initiatives are developed for organic agriculture, some for sustainable forestry management and only a few are developed to certify biomass for bioenergy purposes. The scope of the initiatives differs and the geographical coverage varies for each of the initiatives. The scope of many (national) initiatives lies on organic agriculture and does not include greenhouse gas emissions or social issues. Also forestry, with long experience on certification issues, has not included the GHG emissions along the product life chain in the criteria for sustainable wood.

Only the newly for bioenergy developed certification systems, RTFO, NTA8080 ISCC, RTRS¹⁰⁸ and RSB covered all sustainability requirements defined by the European Union. From these four systems, only ISCC is operating at the moment, the other three standards are still in the pilot phase and being tested. ISCC has been recognized as a voluntary scheme according the Directive in Germany. It is too early to estimate, if the audits and verification systems can guarantee a sustainable production of biomass for energy purposes or if the difficult problems of indirect land use change or GHG emission calculation methodic still affect the credibility and interest of the stakeholder on the initiatives.

For the market, the variety of the certification systems is confusing and for biomass producers it is difficult to find the right certification system, which satisfies the needs of the clients but does not require too much costs and work. It would be easier, if the amount of different systems would be reduced. Also, a comprehensive bioenergy sustainability certification system should not be based on a single crop (examples RSPO, RTRS), the type of the bioenergy (solid or liquid, as example the EC sustainability criteria) or the application (transport, heating, food, e.g. RTFO for transport).

The respondents of the questionnaire stress the need for a level playing field in the market, meaning that the European sustainability requirements for biomass and bioenergy should be extended to other geographical world regions and to other feedstocks and renewable energy sources. On the other hand, the large variety of geographical areas, crops, residues, production processes and end-uses is seen as key area of attention that limits the development towards a harmonized certification system for sustainable biomass and bioenergy. Many respondents consider the risk for administrative burdens high.

The most important criterion for the stakeholder in our questionnaire was the criterion on the 'minimization of GHG emissions' which should be included in a certification system for biomass and bioenergy.

For example the forestry certification systems FSC and PEFC do not include a limit for greenhouse gas emissions in their criteria. The focus of FSC and PEFC lies on other use of wood than energetic, but as forestry is the largest bioenergy supplier in the European countries, the inclusion of the GHG-emissions in the forestry certifications should be discussed in the future.

In the long run, the aim could be to develop some basic principles which apply for all agriculture to guarantee a sustainable land use and agriculture in aim to produce

¹⁰⁷ Martikainen, A. et al. Different criteria for sustainability and certification of biomass and solid, liquid and gaseous biofuels- D 4.4.2 – EUBIONET III

¹⁰⁸ RTRS covers not only bioenergy, also soy as a resource for fodder etc.

bioenergy. For different energy crops there could be several sub-standards to meet the special needs of each application. It could be even considered to expand sustainability certification not only to all bioenergy, but also to all biomass usage. Food, fodder, and industrial use could be included and sub-standards under the general principles formulated.

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