The Baltic Bioenergy Promotion Project
#018 Bioenergy Promotion

WP3 Policy
Task 3.2

Sustainable bioenergy production:

Identification and description of sustainability initiatives and certification systems in the BSR

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2 Introduction

The project Bioenergy Promotion is a part of Baltic Sea Region Program 2007-2013 and is co-financed by the European Union and the Government of Norway. Bioenergy Promotion aims to strengthen the development towards a sustainable, competitive and territorially integrated Baltic Sea Region in the field of production and use of bioenergy. The project will serve as a platform for cross-sectoral and transnational networking to facilitate information and knowledge exchange, coordinated policy development and design and application of bioenergy promoting instruments as well as regional development.

The project is coordinated by the Swedish Energy Agency and it consists of 33 partners from ten countries (Belarus, Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Norway, Poland and Sweden).

Task 3.2 assesses how sustainability criteria can be practically translated into policy frameworks via certification systems. Certification may be a useful means to ensure certain standards of sustainable production and use of biomass. In this first part of the work, existing certification systems for sustainable biomass supply and use in the BSR are identified and described. Since no single certification system covering the production and usage of forest based and agricultural biomass for energy is at hand in the BSR region, the objective of the task is to contribute to an identification of the different existing systems. In further work they are compared with the requirements for a sustainable bioenergy production worked out in the task 3.1 and an analysis will uncover weaknesses of the individual systems.

This report gives an overview of 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.

3 Sustainability standards – overview and key definitions

Fossil energy sources are limited, and they harm the environment by emitting greenhouse gases (GHGs). Bioenergy is one of the solutions that can contribute to a secure and sustainable energy supply, but there are also certain risks attached to the increased use of biomass. Possible negative impacts of bioenergy include deforestation, soil degradation, biodiversity loss, stress on water resources, rising food prices and displacement of communities.

Certification systems guarantee that the certified product complies with a set of certain criteria defined in a standard. A standard can be defined as “a set of rules for ensuring quality”[1]. ISO defines a

[1] European Telecommunications Standards Institute (ETSI): *What are standards?* http://www.etsi.org/WebSite/Standards/WhatIsAStandard.aspx (accessed October 13, 2010).

standard as a “document established by consensus and approved by a recognized body that provides for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context”.[2]

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”[3]. 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”.[4]

The basis of a certification system is a set of 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.[5]

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 claim.[6]

[2]ISO /IEC Guide 2:1996, *Standardization and related activities- General vocabulary*; definition 3.2.
[3] Simonetta Zarrilli, *Making Certification Work for Sustainable Development: The Case of Biofuels* (2008), http://www.unctad.org/en/docs/ditcted20081_en.pdf , p.vi.
[4] I. Lewandowski and A. P. I. Faaij, "Steps towards the development of a certification system for sustainable bio-energy trade," *Biomass and Bioenergy* 30 (2006): 83–104., p.86.
[5] Zarrilli, *Making Certification Work for Sustainable Development: The Case of Biofuels*., p.2.
[6] Norbert Schmitz, "Certification to ensure sustainable production of biofuels," *Biotechnology Journal*, no. 2 (2007): 1474–80., p.1478.

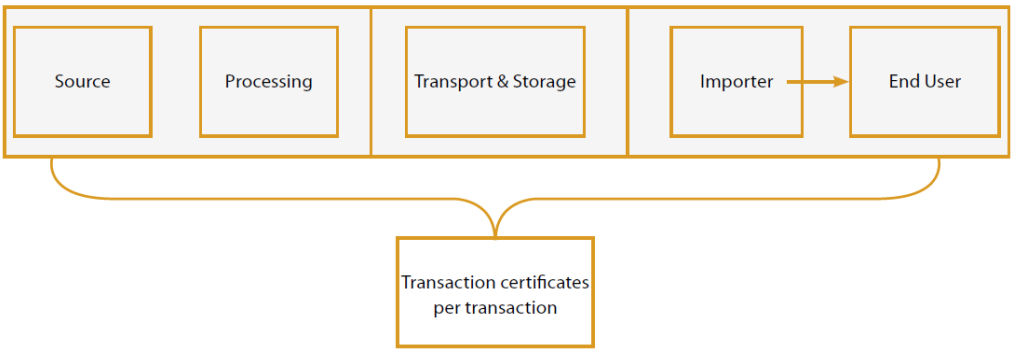

Figure 1: Segregation system[7]

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.

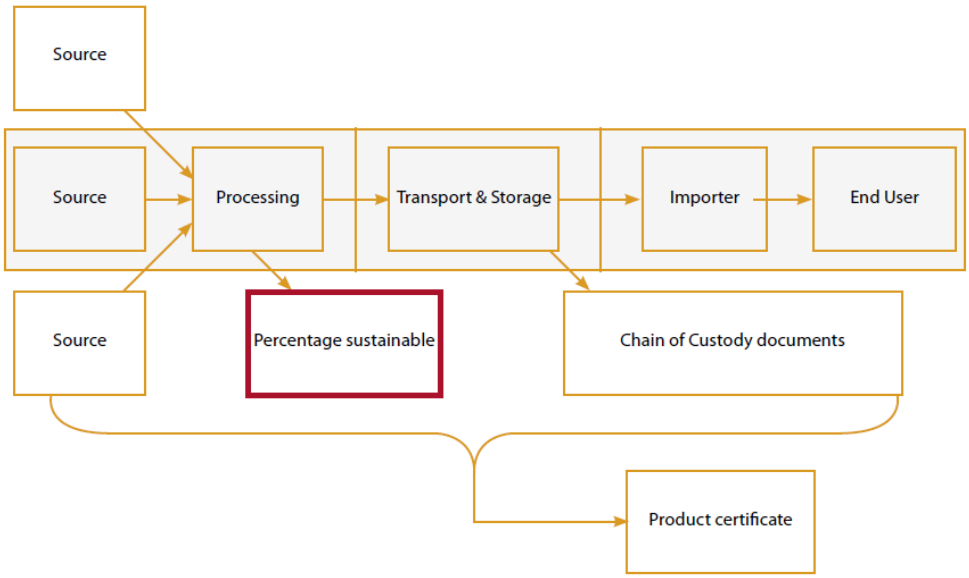

Figure 2: Mass balance system[8]

"Mass balance" allows the 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.

[7] Figure source: Cramer, Jacqueline, Erik Wisserna, Mariska de Brujine, Ella Lammers, Daan Dijk, Hans Jager, Sander van Bennekom and others. *Testing framework for sustainable biomass: Final report from the project group "Sustainable production of biomass"* (2007), http://www.senternovem.nl/mmfiles/Testing%20framework%20for%20sustainable%20biomass%2001-02-2007_tcm24-295616.pdf, p.25.

[8] Figure source: Cramer,et al:*Testing framework for sustainable biomass: Final report from the project group "Sustainable production of biomass"* (2007), p.26.

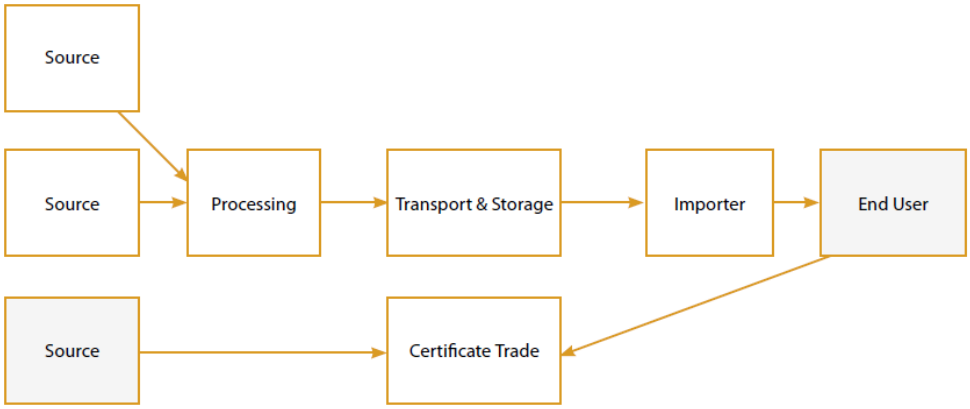

Figure 3: Book and claim system[9]

"Book and claim" is an administrative system that provides tradable credits for the production of certified sustainable products. Also under "book and claim" the product quantity sold as certified is equal to the material quantity entering the certification process. The traded biofuel and the certification information are full separated and there is no traceability possible. Schmitz 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".[10]

An audit is a process to determine and to evaluate the compliance with the standard. The methods can be e.g. 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 sustainability confirmation of biomass, but instead various systems which demonstrate basic suitability (specialist knowledge, organization structure etc.) will be accredited for this purpose.[11] Meta-standards are aimed at reducing costs for the market actors by avoiding multiple audits.

4 Sustainability initiatives and certification systems for bioenergy

Eleven certification systems or initiatives were identified to be relevant in the Baltic Sea Region. The initiatives can be distinguished in i.a. legal requirements, such as the RES Directive, certification systems with requirements for auditing, verification and certification, such as ISCC and initiatives, which are being developed and not yet implemented. Some systems, particularly forest management

[9] Figure source: Cramer,et al:*Testing framework for sustainable biomass: Final report from the project group "Sustainable production of biomass"* (2007), p.26.
[10] Ibid., p. 1478.
[11] Horst Fehrenbach et al., *Criteria for a Sustainable Use of Bioenergy on a Global Scale* (2008), p. 3.

systems, have been used for years in our region, when some initiatives are still being developed. Through global trade also energy crops which are not cultivated in the Baltic Sea Region will become more important for our bioenergy supply, and sustainability standards applying for such crops cannot be left out in this report.

Nevertheless this identification list does not claim to be complete nor should the selection or non-selection of the presented systems be understood as a judgment or abasement. As example of further initiatives, which are not included in this report because the criteria they are developing 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.

In following sections the analysed certification systems are introduced and described.

4.1 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[12]) 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 biofuels 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 2010.

The role of biomass fuels in achieving the targets of the directive is significant. In order for liquid or gaseous biofuels for transport 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.

- GHG savings:

  The GHG emission savings from the use of biofuels should be at least 35%. This target will increase in 2017 when the minimum for GHG reductions will be 50% or 60% for refineries 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

[12] The European Parliament and the Council, "Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC," OJ Nr. 140 p. 16-62 of 5.6.2009.

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:

  The raw materials should not be obtained from land, which was classed as high carbon stock (like wetlands, continuously forested areas or undrained peatland) in January 2008 and that no longer has this status

- Cross Compliance:

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

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% GHG 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[13] was adopted at 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 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 recommend using the criteria as laid down in the RES Directive[14].The Commission will follow the situation and review in 2011 if further measures are needed to ensure sustainability.

[13] European Commission, "Report from the Commission to the Council and the European Parliament on sustainability requirements for the use of solid and gaseous biomass sources in electricity, heating and cooling" (February 25, 2010).

[14] Recommended differences for the sustainability criteria: waste and certain residues should only be required to fulfil the GHG performance criteria, methodology of calculation of LULUCF GHG emissions and promotion of high energy conversion efficiency.

4.2 Forest Stewardship Council

Organisation:	Forest Stewardship Council
Status of implementation:	In operation
Scope:	Forestry
Geographical coverage:	Global
Supply chain coverage:	Forest management
Type:	Certification system
Link:	www.fsc.org

FSC is an independent, non-governmental, not-for-profit organization established to promote the responsible management of the world's forests.[15]

The Forest Stewardship Council was established in 1993 as a response to concerns over global deforestation. Members of the FSC are forest owners, industry and forest products trade, environmental NGOs and social interest groups such as trade unions and indigenous peoples' organisations. FSC is widely regarded as one of the most important initiatives of the last decade to promote responsible forest management worldwide.

The objective of the initiative is to promote environmentally appropriate, socially beneficial, and economically viable forest management. FSC has set up a forest certification scheme consisting of three main elements: forest stewardship standards, accreditation of independent third-party certification and chain-of-custody verification and product labelling

Figure 4: Forest Stewardship Council-label[16]

FSC defines 10 principles and associated criteria that describe how forests have to be managed in a way to meet legal, social, environmental and economic needs. These constitute a global framework for the development of locally adapted and auditable standards. The process of adaptation is carried out by national multi-stakeholder groups and it involves consultations with interested parties, field testing and harmonisation processes with FSC initiatives in neighbouring countries. FSC officially endorses those national standards that fulfil FSC's requirements regarding conformity with its Principles and Criteria as well as certain procedural rules followed during their development.

An independent, third-party certification of individual forest enterprises or groups of enterprises according to the FSC standards is obligatory. FSC does not carry out the certification itself, but has

[15] Information in this section is from the homepage of the Forest Stewardship Council, http://www.fsc.org.
[16] Figure source: http://de.wikipedia.org/w/index.php?title=Datei:Forest_Stewardship_Council_Logo.svg&filetimestamp=20080322145237.

established an accreditation programme which accredits independent certification companies on the basis of ISO regulations. Important parts of the FSC-accredited certification are stakeholder consultations and the provision that a summary report of each successful certification is made available for the public interest.

From the start the FSC system was designed as a market mechanism that would allow consumers to make a responsible choice informed by a product label. This necessitated the setting up of a tracing system which guarantees that products from FSC-certified sources can be identified as such at each stage of further processing and trade and have not been mixed with other sources. This so-called verification of the chain-of-custody is likewise carried out by independent certification bodies which certify each link in the supply chain. Although the system has been subsequently adapted to better accommodate the complexities of certain production processes, there still remains a chain-of-custody system in place guaranteeing the correctness of the FSC-label.

FSC is funded through the support of charitable foundations and government donors (1/3), and membership subscriptions and accreditation fees (2/3 of the whole funding).)

The FSC principles cover only forest management, the processing, manufacturing and trading of the FSC-labelled products are not covered by environmental or social criteria. That means that an FSC-labelled product could have been produced using child labour and be impregnated with hazardous chemicals.

Overview of the FSC Principles[17]

Principle 1: Compliance with all applicable laws and international treaties

Principle 2: Demonstrated and uncontested, clearly defined, long–term land tenure and use rights

Principle *3*: Recognition and respect of indigenous peoples' rights

Principle 4: Maintenance or enhancement of long-term social and economic well-being of forest workers and local communities and respect of worker's rights in compliance with International Labour Organisation (ILO) conventions

Principle 5: Equitable use and sharing of benefits derived from the forest

Principle 6: Reduction of environmental impact of logging activities and maintenance of the ecological functions and integrity of the forest

Principle 7: Appropriate and continuously updated management plan

Principle 8: Appropriate monitoring and assessment activities to assess the condition of the forest, management activities and their social and environmental impacts

Principle 9: Maintenance of High Conservation Value Forests (HCVFs) defined as environmental and social values that are considered to be of outstanding significance or critical importance

Principle 10: In addition to compliance with all of the above, plantations must contribute to reduce the pressures on and promote the restoration and conservation of natural forests

[17] Forest Stewardship Council, *FSC International Standard: FSC Principles and Criteria for Forest Stewardship*, FSC-STD-01-001 (Version 4-0) (Approved 1993, amended 2002).

More than 125 million ha forest worldwide are certified to FSC standards, distributed in over 80 countries (March 2010). Almost everything made from wood and other forest products is available with the FSC label. The range of FSC products covers paper and lumber, furniture, jewellery, guitars, footballs, cosmetics and more. FSC certified forests represent the equivalent of 5% of the world's productive forests (July 2009).

4.3 The Programme for the Endorsement of Forest Certification

Organisation:	The Programme for the Endorsement of Forest Certification
Status of implementation:	In operation
Scope:	Forestry
Geographical coverage:	Global
Supply chain coverage:	Forest management
Type:	Meta-standard
Link:	www.pefc.org

Figure 5: The Programme fort he Endorsement of Forest Certification[18]

PEFC is an international non-profit, non-governmental organization dedicated to promoting sustainable forest management.[19] It is an umbrella organization and works by endorsing national forest certification systems developed through multi-stakeholder processes. At the end of 2009, there were 28 by the PEFC endorsed standards. Each standard has to meet the minimum sustainability requirements, which are based on regional principle schemes. In Europe, including the Baltic Sea Region, the basic framework is the MCPFE[20] Pan European Criteria and Indicators for Sustainable Forest Management[21]. The European countries and the European Community have agreed on six common criteria, twenty-seven quantitative indicators and 101 descriptive indicators for sustainable forest management, covering boreal, temperate and Mediterranean-type forests.

Criterion 1: Maintenance and appropriate enhancement of forests and their contribution to global carbon cycle

Criterion 2: Maintenance of forest ecosystem health and vitality

Criterion 3: Maintenance and encouragement of productive functions of forests (wood and non-wood)

Criterion 4: Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems

[18] Figure source: http://en.wikipedia.org/wiki/Programme_for_the_Endorsement_of_Forest_Certification_schemes.
[19] Information in this section is from the homepage of the Programme for the Endorsement of Forest Certification, www.pefc.org.
[20] The Ministerial Conference on the Protection of Forests in Europe (MCFPE, now Forest Europe)) is a political initiative towards the protection and sustainable management of forests throughout the region. The political commitments of the MCFPE involve 46 European countries, the European Union. There is cooperation with other world countries and international organizations.
[21] Third Ministerial Conference on the Protection of Forests in Europe, *Annex 1 of the Resolution L2 Pan-European Criteria and Indicators for Sustainable Forest Management* (2-4 June 1998, Lisbon/Portugal).

Criterion 5: Maintenance and appropriate enhancement of protective functions in forest management (notably soil and water)

Criterion 6: Maintenance of other socio-economic functions and condition

For the African national standards the reference basis is the ATO/ITTO Principles[22] and for further tropical forests the standards should be compatible with ITTO guidelines on sustainable forest management[23]. In addition the standards have to respect the fundamental ILO conventions and other international conventions relevant to forest management, e.g. Convention on Biological Diversity and Kyoto Protocol and Carbon Sinks.

The PEFC is the largest forest certification system in the world. The area of the PEFC-certified forest was 223,5 million hectares by end of 2009. In the Baltic Sea Region PEFC is the largest forestry certification system in Norway and in Finland; in both countries 95% of forest[24] is certified after PEFC, while the Baltic countries are using mostly the FSC-system.[25]

A revision of a single PEFC-standard will take place every 5 years. In Finland the new standard was just endorsed by the PEFC. The revised standard includes new criteria concerning the sustainable harvesting of energy wood and forest as carbon sink.

4.4 Nordic Ecolabel (Swan)

Organisation:	Nordic Ecolabelling (Swan- label)
Status of implementation:	In operation (standard for biofuels will be revised at the end of the year)
Scope:	Pellets, biofuels (fuels with at least 1/3 of the volume from renewable sources)
Geographical coverage:	Scandinavian countries (distribution), global (production)
Supply chain coverage:	Production, processing, transport
Type	Metastandard (100% of palm oil, soybean and sugar cane; 70% of wood raw materials must be certified in accordance with system approved by the Nordic Ecolabelling)
Link:	www.nordic-ecolabel.org

In 1989 the Nordic Council of Ministers introduced a common, official environmental label for the Nordic countries.[26] The purpose was to create an environmental labelling system, which would contribute to a sustainable manufacturing and consumption. The Swan was chosen as a symbol as a variation of the logo of the Nordic Council of Ministers and commonly the label is known in the Nordic

[22] African Timber Organization and International Tropical Timber Organization, *ATO/ITTO principles, criteria and indicators for the sustainable management of African natural forests*, ITTO Policy Development Series No 14 (23.01.2003).
[23] International Tropical Timber Organisation, *ITTO guidelines on the sustainable management of natural tropical forests* (1992).
[24] Norway> 95% of the harvest.
[25] Source: EUBIONET III WP 4 Country reports, available on www.eubionet.net.
[26] The information in this section is from the homepage of the Nordic Ecolabel, http://www.nordic-ecolabel.org.

countries as “the Swan”. The label is well-known. According to a consumer survey 91 percent of asked consumers in the Nordic countries respond that they recognise the label.[27]

Figure 6: The Nordic Ecolabel[28]

The Nordic countries work together using the Swan ecolabel. Norway and Sweden were members of the ecolabelling scheme from the beginning, Finland joined in 1990, Iceland in 1991 and Denmark in 1997. Each Nordic country has local offices with the responsibility for criteria development, control visits, licensing and marketing. The work with the Swan ecolabel is co-ordinated by the Nordic Ecolabelling Board, which has produced a set of regulations. Groups of experts from government, environmental organisations, trade and industry from the Nordic countries develop proposals for criteria, which are sent out for public review. The Board finalises and approves the proposals.

Once a criteria document has been finalised, businesses can apply for the right to use the label on a product which falls into this category. The national offices manage licence applications and grant licences.

Labelling criteria are defined for over 60 product groups. Two of these groups are fuels and pellets. The criteria for fuels[29] require at least 1/3 of the fuel volume to be from renewable raw materials for the fuel to get the license. The requirements cover all alternative types of fuels to fossil fuels, for example ethanol, biodiesel, biogas and different fuel mixtures. Use of grains, maize, millet or rice is not allowed in the production of Swan-labelled fuels. As a reason the Nordic Ecolabelling states that the uncertainty regarding food and oil production is too great at the current time.

For both product groups there are limits set for energy use and greenhouse gas contribution during the production, for fuels these limits are valid for the life cycle as a whole. For fuels, a maximum of 50 grams CO_2 per megajoule fuel is the level allowed. This means for example that Nordic Ecolabelled ethanol must have at least 65 percent less CO_2 levels than fossil petrol.

According to a telephone conversation with Karin Bergbom from the SFS Ecolabelling there has been a high interest in ecolabelling of fuels, but until now there has been only one Swedish company, which has certified its product, biogas for cars. The criteria for the label will be reviewed in this year and the target is to publish the revised criteria by the end of the year. The Nordic Ecolabel is discussing, how they could integrate the requirements of the RED into the criteria of the Swan-label.

[27] Nordic Ecolabel, *The Nordic Ecolabel 20 years* (2010), p.5.
[28] Figure source: http://www.svanen.nu/Default.aspx?tabName=swanlogo&menuItemID=7081.
[29] Nordic Ecolabelling, *Nordic Ecolabelling of fuels: Version 1.1 -- 25 June - 31 December 2011* (8.6.2009).

4.5 Verifiable Sustainable Ethanol Initiative

Organisation:	Verified Sustainable Ethanol Initiative
Status of implementation:	In operation, at the same time further developed
Scope:	Bioethanol from sugarcane
Geographical coverage:	Production in Brazil, distribution in Brazil
Supply chain coverage:	Production, processing, distribution ("from a well to-wheel perspective")
Type:	Company's own voluntary certification scheme
Link:	www.sustainableethanolinitiative.com

Figure 7: Verified Sustainable Ethanol- label[30]

The Verified Sustainable Ethanol Initiative was established by SEKAB Biofuels and Chemicals, a company that imports Brazilian ethanol into Sweden, in conjunction with the Brazilian Sugarcane Industry Association (UNICA).[31] The aim of the initiative is to guarantee the environmental and social sustainability of Brazilian ethanol. The SEKAB initiative sets requirements for sustainable ethanol, together with a verification process, including full traceability of all physical flows. The requirements address GHG emissions, working conditions, child labour, zero tolerance of felling of rainforests and ecological considerations. An independent international company will be performing on-site checks to make sure the producers are meeting the system's requirements. SEKAB claim that Brazilian companies delivering ethanol to the Swedish fuel E85 are compliant with the requirements. First verified bioethanol was sold in Sweden in August 2008.

The principles of the system are:

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

- Field-to-wheel perspective
- Cultivation, production, transportation
- Total CO_2 emissions from Brazil to Sweden
- Calculations according to RTFO principles
- Fossil input: fertilizers, pesticides, fossil energy
- Renewable output: ethanol, energy (steam, electricity)

[30] Figure source: http://www.sustainableethanolinitiative.com/Sve/Standardsidor/Filer/Per%20Carstedt.pdf.
[31] Information in the section from: SEKAB, *Verified Sustainable Ethanol Initiative: Homepage* (2010), http://www.sustainableethanolinitiative.com/.

At least 30 % mechanisation of the harvest now, plus a planned increase in the degree of mechanisation to 100 %

- Benefits of mechanized harvesting:
  - Lower local particle emissions
  - Better work environment
  - Improved reduction of CO_2
- Disadvantages:
  - Risk of unemployment
- 30 % mechanized harvest first year
- Implementation plan for 100% mechanization

Zero tolerance for felling of rain forest

- No deforestation of rainforest is permitted
- Deforestation of other forests according to national laws
- Permits required
- Brazilian law: cut down 1 tree, replant 25 new
- To preserve biodiversity
- Land use change

Zero tolerance for child labour

- Child labour below 16 years of age
- Defined according to Brazilian law
- Apprentice from 14 years of age
- In compliance with article 1 and 2 in ILO convention 138

Rights and safety measures for all employees in accordance with UN guidelines

- Zero tolerance to forced labor (”slave labor”)
- Workers right to organize in unions etc.
- All employees must be registered
- Employees must be paid at least minimum wages
- Health & safety policies shall be in place and followed

Ecological consideration in accordance with UNICAs environmental initiative

- Protection of forests close to water areas
- Protection of water resources
- Program for reuse of water in industrial processes and for conservation of water quality
- Implementation plan for soil conservation
- Plan for reduction of environmental impacts from production

Continuous monitoring that the criteria are being met

- Monitoring and verification of the criteria’s shall be done through audits by an independent third party
- Full traceability of all physical flows

In case of non-compliance, a minor non-compliance must be corrected in within 3 months; if a major non-compliance is found, a plan for mitigation shall be submitted within 14 days. A major non-compliance is always followed by an extra audit[32].

[32] SEKAB, *Verified sustainable ethanol - Requirements for sustainable ethanol*.

4.6 ISCC

Organisation:	International Sustainability Carbon certification
Status of implementation:	In operation
Scope:	All kind of biomass
Geographical coverage:	Global
Supply chain coverage:	Biomass production, processing, distribution
Type:	In principle yes but not possible according to RED
Link:	www.iscc-system.org

Figure 8: ISCC Seal for certificates[33]

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.[34] A Number of stakeholders from Europe, Latin America and South East Asia have been involved in 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 to a minimum (e.g. by avoiding double and triple certifications of a single producer). In addition, the project should contribute to reducing the risk of non-sustainable production of biomass and bioenergy 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. The result, International Sustainable Carbon Certification (ISCC) has now completed its pilot phase (Feb 2008-Feb 2010) and obtained the official recognition as sustainability certification system for biomass and bioenergy in July 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 principles of the ISCC are:[35]

Principle 1: Biomass shall not be produced on land with high biodiversity value or high carbon stock and not from peat land. HCV areas shall be protected.

Principle 2: Biomass shall be produced in an environmentally responsible way. This includes the protection of soil, water and air and the application of Good Agricultural practices.

Principle 3: Safe working conditions through training and education, use of protective clothing and proper and timely assistance in the event of accidents.

[33] Figure source: http://www.iscc-system.org/index_eng.html.
[34] The information in this section is from the homepage of the International Sustainability and Carbon Certification, http://www.iscc-system.org.
[35] International Sustainability and Carbon Certification, *ISCC 202 Sustainability Requirements for the Production of Biomass*, ISCC Draft 10-01-19 V 1.13 (2010).

Principle 4: Biomass production shall not violate human rights, labour rights or land rights. It shall promote responsible labour conditions and workers' health, safety and welfare and shall be based on responsible community relations.

Principle 5: Biomass production shall take place in compliance with all applicable regional and national laws and shall follow relevant international treaties.

Principle 6: Good management practices shall be implemented

The document "System basics"[36] requires, that "to qualify for this certification system, the produced liquid biomass respectively biofuels must grant GHG emission savings of 35 percent."[37]

A set of "major musts" and minor musts" criteria was developed around these principles. For a successful audit, all major musts have to be fulfilled. At the same time, 80% of the minor musts have to be fulfilled.

First audits have started in the European Union and abroad. In July 2010 there were already over 30 certified companies.

4.7 Cramer criteria

Organisation:	Project group "sustainable production of biomass" set up by the Dutch government, under chairmanship of Jacqueline Cramer
Status of implementation:	The criteria have been used as a basis for a Dutch Technical Agreement for biomass for energy purposes (NTA 8080). This standard is available, a standard for certification (NTA 8081) is under development
Scope:	All kind of biomass
Geographical coverage:	Developed in the Netherlands as an advice report, but applicable for all countries
Supply chain coverage:	Whole chain, from production to application
Grade of integration:	Meta-standard
Link:	www.rsb.org

The project group "Sustainable production of biomass", was set up by the Dutch government with the target to formulate criteria for the production and the processing of biomass in energy, fuels and chemistry. In February 2007, the project group, chaired by Jacqueline Cramer, presented the final report "Testing framework for sustainable biomass".[38] The project group identified six themes (GHG emissions; competition with food or other local applications; biodiversity; environment; prosperity; social well-being) for which it formulated sustainability criteria, also called the Cramer criteria.

The Principles of the testing framework are:

Principle 1: The GHG balance of the production chain and application of the biomass must be positive

Principle 2: Biomass production must not be at the expense of important carbon sinks in the vegetation and in the soil

[36] International Sustainability and Carbon Certification, *System Basics: for the Certification of sustainable biomass and bioenergy* (2010b).
[37] Ibid.p. 14.
[38] Jacqueline Cramer et al., *Testing framework for sustainable biomass: Final report from the project group "Sustainable production of biomass"* (March 2007).

Principle 3: The production of biomass for energy must not endanger the food supply and local biomass applications (energy supply, medicines, building materials)

Principle 4: Biomass production must not affect protected or vulnerable biodiversity and will, where possible, have to strengthen biodiversity

Principle 5: In the production and processing of biomass, the soil, and soil quality are retained or improved

Principle 6: In the production and processing of biomass ground and surface water must not be depleted and the water quality must be maintained or improved

Principle 7: In the production and processing of biomass the air quality must be maintained or improved

Principle 8: The production of biomass must contribute towards local prosperity

Principle 9: The production of biomass shall contribute towards the social well-being of the employees and the local population

These Cramer criteria are broadly supported in the Netherlands and are considered a minimum requirement for the use of biomass for energy applications. For the Netherlands, the progress at European level was too slow and Dutch private companies, the government and non-governmental organization set up a voluntary agreement to develop an own sustainability standard for biomass for energy purposes, the Netherlands Technical Agreement 8080 based on the Cramer Criteria.

The standard NTA 8080, which was published in March 2009, is applicable for all kind of biomass from all over the world. It can be used to assess equivalence of existing certification systems for sustainable biomass and to set up new certification systems. A standard for a certification system for biomass, NTA 8081, is currently developed.

4.8 Better Sugarcane Initiative

Organisation:	Better Sugarcane Initiative
Status of implementation:	Version 3 of the standard was published in July 2010
Scope:	Sugar cane
Geographical coverage:	Global
Supply chain coverage:	Partial value chain: Production and primary processing
Type:	Certification system
Link:	www.bettersugarcane.com

Figure 9: Logo of the Better Sugarcane Initiative[39]

BSI is a global multi-stakeholder non-profit initiative with the aim of reducing the environmental and social impacts of sugar cane production.[40] Sugar retailers, investors, traders, producers and NGOs who are committed to sustainable sugar production collaborate by establishing principles and criteria that can be applied in the sugarcane growing regions of the world. The BSI is funded by members, among whom there are consumer companies

[39] Figure source: http://www.tradestandards.org/en/Standard.71.aspx.
[40] Information in this section is from the homepage of the Better Sugarcane Initiative, www.bettersugarcane.org.

(e.g. Coca Cola, Cadbury Schweppes), commodity traders (e.g. ED & F Man, Cargill), NGOs (e.g. WWF, Solidaridad), national and local producers (e.g. UNICA, EID Parry) and oil companies (e.g. Shell, BP).

The BSI aims to reduce the impact of cane sugar production on the environment in measurable ways and contribute to social and economic benefits for sugar farmers and all others concerned with the sugar supply chain. The goal of the BSI is to reduce farm and other sugar processing impacts, while increasing sugar's competitiveness in markets that are becoming increasingly competitive.

BSI's mission is to promote measurable improvements in the key environmental and social impacts of sugarcane production and primary processing. The Principles and Criteria for BSI have been drawn up, modified a few times and accepted by the BSI members. The Public Consultation of the Version 2 ran until January 2010 and the last version of the standard was published in July 2010.

The Principles of the standard are:[41]

- Obey the Law
- Respect human rights and labour standards
- Manage input, production and processing efficiencies to enhance sustainability
- Actively manage biodiversity and ecosystem services
- Commit to continuous improvement in key areas of the business

BSI has chosen to use in its standards measurable indicators. Great importance is attached to devising metrics, numbers that can be put to each of the indicators. It is assumed that credibility comes with metrics; without metrics, certification programs can become subjective rather than science-based. However choosing the appropriate metrics is not simple. The metrics employed may vary radically in the degree to which they capture the full character of an individual effect. Some effects are intrinsically more readily quantifiable than others (e.g. particulate emissions vs. aesthetic landscape effects). This is most difficult in the area of social issues.

For the production of ethanol intended to be put on the European market, BSI has developed additional requirements on GHG emissions and land with high biodiversity value to meet the sustainability criteria of the European Union for biofuels and -liquids. BSI has submitted an application to the EU to be recognised as a voluntary scheme after the RED.

[41] Better Sugarcane Initiative, *Better Sugarcane initiative Production Standard: July 2010* (July 2010).

4.9 Roundtable on Sustainable Palm Oil

Organisation:	Roundtable on Sustainable Palm Oil
Status of implementation:	In operation
Scope:	Palm oil
Geographical coverage:	International
Supply chain coverage:	Entire value chain
Type:	Certification system
Link:	www.rspo.org

The Roundtable on Sustainable Palm Oil (RSPO)[42] 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. It is a global, multi-stakeholder initiative on sustainable palm oil. 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.

Figure 11: Green Palm label[44]

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 CERTIFIED[45] with offers a web-based traceability system. The book and claim system is operated by Green Palm[46] programme. The Green palm certificates are offered and sold on a web based trading system.

Figure 10: UTZ Certified label[43]

The eight RSPO principles are:

Principle1: Commitment to transparency

Principle 2: Compliance with applicable laws and regulations

Principle 3: Commitment to long-term economic and financial viability

Principle 4: Use of appropriate best practice by growers and millers

Principle 5: environmental responsibility and conservation of natural resources and biodiversity

Principle 6: responsible considerations of employees and of individuals and communities affected by growers and millers

Principle 7: responsible development of new plantations

[42] The information in this section is from the homepage of the Roundtable on Sustainable Palm Oil, www.rspo.org.
[43] Figure source: http://www.utzcertified.org/index.php?pageID=101.
[44] Figure source: http://www.greenpalm.org/en/downloads.
[45] For more information see http://www.utzcertified.org.
[46] For more information see http://www.greenpalm.org.

Principle 8: commitment to continuous improvement in key areas of activities.

Figure 12: Round Table on Sustainable Palm Oil[47]

The RSPO scheme does not include limiting criteria on GHG emissions and does not forbid oil palm plantations on drained peat land. An RSPO greenhouse Gas Working Group is established to consider these issues.

Most of the palm oil is used in food and materials. Only 5 % of the worldwide production is used for biofuels.[48] At the moment the production capacity of certified palm oil is 2 350 000 tons per year.

4.10 Roundtable on Sustainable Biofuels

Organisation:	Roundtable on Sustainable Biofuels
Status of implementation:	Pilot testing of the Version One of the standard; first certified biofuels shall be available at the end of 2010/ early 2011
Scope:	Liquid biofuels for transportations from all feedstocks
Geographical coverage:	Global
Supply chain coverage:	Entire supply chain
Grade of integration:	Meta-standard
Link:	www.rsb.org

The Roundtable on Sustainable Biofuels (RSB) was established in 2006 and it is coordinated by the Energy Center at EPFL in Lausanne. [49] This international initiative brings together farmers, companies, non-governmental organizations, experts, governments, and inter-governmental agencies concerned with ensuring the sustainability of biofuels production and processing.

The first draft, “Version Zero” of the principles and criteria of the RSB was published in August 2008. Prior versions of the principles and comments and feedback of stakeholders can be read on the webpage of the initiative.

The “Version One” of the standard was published in November 2009. The standard includes the Principles & Criteria and an associated guidance document, detailed compliance indicators, and the glossary of terms.

[47] Figure source: http://www.rspo.org/.
[48] Renewable Energies Agency, *Germany's Renewable Energy Agency - Information Platform: Questions and answers about bioenergy*, Webpage (2010).
[49] Information in section is from the homepage of the Roundtable on Sustainable Biofuels, www.rsb.org.

The RSB standard is built around the following principles:[50]

1. **Legality**: Biofuel operations shall follow all applicable laws and regulations
2. **Planning, Monitoring and Continuous Improvement**: Sustainable biofuel operations shall be planned, implemented, and continuously improved through an open, transparent, and consultative Environmental and Social Impact Assessment (ESIA) and an economic viability analysis.
3. **Greenhouse Gas Emissions:** Biofuels shall contribute to climate change mitigation by significantly reducing lifecycle GHG emissions as compared to fossil fuels.
4. **Human and Labor Rights**: Biofuel operations shall not violate human rights or labor rights, and shall promote decent work and the well-being of workers
5. **Rural and Social Development:** In regions of poverty, biofuel operations shall contribute to the social and economic development of local, rural and indigenous people and communities.
6. **Local and Food Security:** Biofuel operations shall ensure the human right to adequate food and improve food security in food insecure regions.
7. **Conservation**: Biofuel operations shall avoid negative impacts on biodiversity, ecosystems, and other conservation values
8. **Soil:** Biofuel operations shall implement practices that seek to reverse soil degradation and/or maintain soil heath.
9. **Water**: Biofuel operations shall maintain or enhance the quality and quantity of surface and ground water resources, and respect prior formal or customary water rights.
10. **Air**: Air pollution from biofuel operations shall be minimized along the supply chain.
11. **Use of technology, Inputs, and Management of Waste:** The use of technologies in biofuel operations shall seek to maximize production efficiency and social and environmental performance, and minimize the risk of damages to the environment and people.
12. **Land rights:** Biofuel operations shall respect land rights and land use rights.

In 2010 the RSB Standard will be pilot tested in biofuel supply chains throughout the world to identify areas in need of further refinement. No certificates are issued during this phase. The certification system will involve independent third party certification bodies and several chain of custody options (100% segregation, mass balance, etc.) will be able to be certified. Certified biofuels should be available at the end of 2010 or at the beginning of 2011. The Roundtable on Sustainable Biofuels is seeking to be recognised by the European Commission as a voluntary scheme according to the Directive for renewable energies and published in June 2010 a standard for EU market access[51]. The standard is intended to ensure that production, processing and trade of biomass and biofuels for use in the European Union complies with the sustainability criteria defined in the RES Directive. In addition to the RSB short claim like “RSB compliant Biomass” or “RSB compliant Biofuel” the claims “EU RED compliant Biomass” or “EU RED compliant Biofuel” should be used.

[50] Roundtable on Sustainable Biofuels, *RSB Principles and Criteria for Sustainable Biofuel Production: Version 1.0*, RSB Reference Code: RSB-STD-01-001 (23.02.2010).
[51] Roundtable on Sustainable Biofuels, *RSB Standard for EU market Access: Version 1.0*, RSB Reference Code: RSB-STD-11-001 (15.06.2010).

4.11 Round Table on Responsible Soy

Organisation:	Round Table on Responsible Soy
Status of implementation:	Field testing
Scope:	Soy for different purposes, can be used to produce biodiesel
Geographical coverage:	Global
Supply chain coverage:	Production, processing, trade and use
Type:	Certification system
Link:	www.responsiblesoy.org

Figure 13: The label of the Round Table on Responsible Soy Association[52]

The Round Table on Responsible Soy was established in November 2006. It is a global platform composed of the main soy value chain stakeholders with the common objective of promoting the responsible soy production through collaboration and dialogue among the involved sectors in order to foster an economical, social and environmental sustainability. [53]

The "Principles and Criteria – Field Test Version" [54] of RTRS was approved in May 2009. It is the result of two rounds of consultations on earlier drafts of the criteria. There are the following five principles:

1. Legal Compliance and Good Business Practice.
2. Responsible Labour Conditions.
3. Responsible Community Relations.
4. Environmental Responsibility.
5. Good Agricultural Practice.

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 according to the RED and to be ready to implement by 1 January 2011.

[52] Figure source: http://www.responsiblesoy.org.
[53] Information in the section from the homepage of the Round Table on Responsible Soy Association (RTRS), http://www.responsiblesoy.org.
[54] Round Table on Responsible Soy Association (RTRS), *RTS Principles and Criteria for Responsible Soy: Field Testing Version* (28 May 2009).

5 Summary

There is a variety of certification systems on the market. Some systems concentrate on the crop (examples RSPO, RTRS, FSC), some on the type of the bioenergy (solid or liquid, as example the EC sustainability criteria) and some on the application (transport, heating, food). There are mandatory and voluntary initiatives as well as initiatives which cover only one company[55]. For this report the most relevant certification systems for sustainable biomass supply and use in the BSR were identified and described.

In the next part of the report the principles of the certification systems are compared with the requirements for a sustainable bioenergy production worked out in the task 3.1 of the Bioenergy Promotion Project.

[55] An example is the SEKAB initiative which in presented in this report. Further initiatives exist, e.g. Vattenfall has voluntarily committed itself to identifying measures that guarantee the sustainability of its solid biomass sources.

6 List of acronyms and abbreviations:

BioSt-NachV	Biomassestrom-Nachhaltigkeitsverordnung, German Biomass-electricity-sustainability ordinance
BSI	Better Sugarcane Initiative
Cramer	Criteria from the publication *Testing framework for sustainable biomass: Final report from the project group "Sustainable production of biomass"*
EPFL	École polytechnique fédérale de Lausanne
EU	European Union
FSC	Forest Stewardship Council
GBEP	Global Bioenergy Partnership
GHG	Greenhouse gases
HCV	High Conservation Value
ISCC	International Sustainability Carbon Certification
ISO	International Organization for Standardization
ITTO	International Tropical Timber Organisation
NEN	Nederlands Normalisatie-instituut (the Dutch Standardization Institute)
NTA	Netherlands Technical Agreement
PEFC	Programme for the Endorsement of Forest Certification
RES Directive	Directive 2009/28/EC on the promotion of the use of energy from renewable sources
RSB	Roundtable on Sustainable Biofuels
RSPO	Roundtable on Sustainable Palmoil
RTFO	Renewable Transport Fuel Obligation (UK)
RTRS	Round Table on Responsible Soy
SEKAB	Svenska Etanolkemi AB
WTO	World Trade Organisation

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