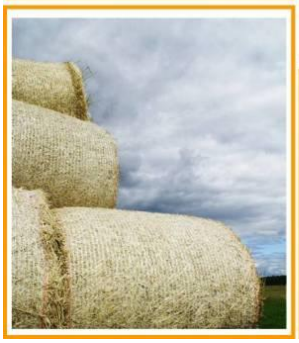
SolidStandards

Enhancing the implementation of quality and sustainability standards and certification schemes for solid biofuels (EIE/11/218)



D5.1c

Comparative analysis of sustainability certification initiatives for solid biomass and solid biofuels

INTELLIGENT ENERGY EUROPE

The SolidStandards project

The SolidStandards project addresses ongoing and recent developments related to solid biofuel quality and sustainability issues, in particular the development of related standards and certification systems. In the SolidStandards project, solid biofuel industry players will be informed and trained in the field of standards and certification and their feedback will be collected and provided to the related standardization committees and policy makers.

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About this document

This document is Deliverable D5.1c for Work Package 5.1 of the SolidStandards project. Refer to “Reading Guide for Work Package 5.1” for more information about Work Package 5.1.This document was prepared in October 2012 by:

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Contents

Important notes:

1. All data and information were collected as of June and July 2012. There is a range of parallel processes taking place at present concerning the development of certification schemes, for e.g. IWPB.
2. A large part of the information is presented in cartography. The original blank map is a royalty free image taken from Bruce John Design Inc. (2009).

1. Overview of sustainability certification initiatives for solid biofuels

To ensure that solid biomass for energy is deployed in a sustainable way, numerous voluntary certification schemes have been developed (such as industrial pellet schemes) or adapted (such as forest management schemes) to promote good practices throughout the supply chain. Different from liquid biofuels, the European Commission (EC) has not yet made any decision on sustainability requirement for solid biomass due to different opinions between stakeholders and also between the member states. However, a few individual member countries have defined their own sustainability assurance systems, for e.g. the UK (ROCs) and Belgium (Green Certificates). The Netherlands is also considering to install sustainability criteria for solid biomass, and therefore developed the Dutch Biomass Protocol.

The forest management schemes cover the production of woody biomass from natural forest and forest plantation, while the industrial schemes extend the scopes to transportation and use of biomass for energy. These schemes require market actors along the supply chain to comply with sustainability requirements. Some of these systems exist on national level and others are internationally acknowledged.

Although most of the schemes have the objective to promote sustainable use of biomass, the scope, structure and approach may be varied. Furthermore, the definition of sustainability criteria and their coverage significantly differ. The following sections provide an overview of the differences between the selected schemes and discusses the main characteristics and differences.

Two forest management schemes and five industrial schemes were selected. All of them have been developed for international use. These schemes are

i. Forest Stewardship Council (FSC)
ii. Programme for the Endorsement of Forest Certification Schemes (PEFC)
iii. Green Gold Label (GGL)
iv. Laborelec Label
v. The Dutch technical agreement - NTA 8080
vi. ISCC PLUS
vii. Initiative of Wood Pellets Buyers (IWPB)

Inventories that describe the characteristics in standardized format are attached in document WP D5.1-1. Table 1 shows an overview of voluntary sustainability certification schemes applied to solid biomass.

Sustainable forest management schemes

The two largest forestry certification systems in Europe (and in the world) are the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification Schemes (PEFC). Both concentrate on sustainable forest management by using independent third party assessment of forestry practices against a set of forestry standards. The FSC Principles and Criteria (P&C) set out best practices for forest management. In many countries, FSC Regional or National Standards are developed by FSC working groups. Regional and national standards transfer the P&C to the specific conditions and context found in each country or region.

PEFC is an umbrella standard that recognizes existing national forestry standards, such as SFI, CSA, ATFS, etc., when certain conditions are met (See Document WP D5.1-1 for all forest standards endorsed by PEFC). In some cases, such as the UK, the UKWAS scheme was endorsed by PEFC and approved by FSC for use in their UK certifications. These forestry standards has significant potential to be used to assess sustainable utilization of forestry biomass for energy production. In principal, national PEFC schemes should not

deviate substantially with regard to the sustainability requirements listed in PEFC. Therefore, PEFC international can be regarded as a basic scheme that represents PEFC to certain extent, to be benchmarked against.

Industrial schemes for sustainable use of biomass for energy

The following five systems are covered:

Green Gold Label: Green Gold Label was founded in 2002 by Essent (a power company from the Netherlands) and Skal International (now Control Union Certifications). The Green Gold Label programme is a certification system for sustainable biomass. It covers production, processing, transport and final energy transformation.

Laborelec Label: On behalf of GDF-SUEZ/Electrabel (a power company from Belgium), Laborelec and SGS have put in place a verification procedure applied to each biomass production unit. In this work, this system is named as Laborelec Label.

NTA 8080: Based on Dutch and European sustainability criteria, a certification system for biomass for energy purposes has been developed by a diverse group of stakeholders coordinated by NEN. The criteria have been turned into verifiable requirements. The certification system offers a way for suppliers and buyers of biomass to distinguish sustainable products.

ISCC PLUS: A new certification system for food, feed, technical/chemical (e.g. bioplastics) and other bioenergy (e.g. solid biomass) applications developed as an extension of ISCC. An overview on the system was given at the Second ISCC Global Sustainability Conference and General Assembly in Brussels on February 8, 2012. The consultation period ended May 31st, 2012. ISCC PLUS offers an opportunity for already certified conversion units (ISCC DE or ISCC EU) to efficiently extend sustainability certification to food and feed products (e.g. oil seed meal, DDGS, oil for food and other uses).

IWPB: Initiative Wood Pellets Buyers (IWPB) is a working panel grouping the major European utilities firing wood pellets in large power plants such as GDF SUEZ, RWE, E.On, Vattenfall, Drax Plc, and Dong, as well as certifying companies such as SGS, Inspectorate, and Control Union. They propose to use the GGL foundation as the new governance structure for the sustainability standard based on the IWPB principles.

Table 1 Overview of voluntary sustainability certification schemes applied to solid biomass: FSC, PEFC, NTA 8080, GGL and Laborelec label. (For details of each single scheme please refer to WP D5.1-1 Factsheets of sustainability certification initiatives for solid biomass and solid biofuels)

		FSC	PEFC	GGL[1]	Laborelec Label	NTA 8080
	Website	www.fsc.org	www.pefc.org	www.greengoldcertified.org	www.laborelec.be/ENG/biomass-verification-procedure/	www.sustainable-biomass.org/
A.	**General aspects**					
1	**Description of organization (owner) and scheme**	FSC is an independent, non-governmental, not-for-profit organization. The FSC Principles and Criteria (P&C) set out best practices for forest management.	PEFC is an international not-for-profit membership organization endorses national forest certification schemes PEFC International describes the requirements for standardising bodies in the development and revision of forest management and scheme-specific chain of custody standards.	Owned by Green Gold Label Foundation which was established by RWE and Control Union. GGL is certification system for sustainable biomass covering production, processing, transport and final energy transformation.	Owned by GDF-SUEZ / Electrabel EPA, developed by Laborelec. Laborelec label is a biomass verification procedure used by Electrabel (mainly for co-firing in power plants).	The Netherlands Standardization Institute (NEN) is a private, non-profit organization. NEN is the independent owner of NTA 8080. NTA 8080 is a certification system describes the requirements for sustainably produced biomass for energy applications (power, heat & cold and transportation fuels).
2	**Applied since**	1993	2000	2002	N/A	2011
3	**Biomass focus**	Biomass feedstock from forests and forest plantations It covers all product raw materials produced in forests, including timber and non-timber forest products (NTFPs)	Biomass feedstock from forests and forest plantations It covers all product raw materials produced in forests, including timber and non-timber forest products	Biomass / biofuel / bio-liquids for energy production and biofuel conversion. It covers agricultural / forestry products and also residual products.	Mainly for wood pellets	All biomass for all types of biomass end-uses (electricity, heat & cold and transportation fuels)

[1] The GGL foundation is used as the new governance structure for the new sustainability standard based on the Initiative Wood Pellets Buyers (IWPB) principles. IWPB is a working panel grouping the major European utilities firing wood pellets in large power plants GDF SUEZ, RWE, E.On, Vattenfall, Drax Plc, and Dong, as well as certifying companies SGS, Inspectorate, and Control Union. Laborelec participates in this work panel as a technical expert. The IWPB is developing a common sustainability approach for solid biomass in large scale power plants. See Document WP D5.1-1 for details.

			(NTFPs)			
4	**Objective**	To promote the responsible management of the world's forests	To promote the sustainable forest management especially among small forest managers	To ensure importation of sustainable biomass for energy, power production and chemical purposes	To offer a scheme that adds up the wishes of all regional authorities in Belgium for green certificates	To offer a way for suppliers and buyers of biomass to distinguish sustainable products, based on verifiable requirements translated from Dutch and European sustainability criteria
5	**Recognition by**	No bilateral recognition. See Document WP D5.1-1	Mutual recognition between PEFC endorsed schemes.	The UK: Approved by Ofgem in March 2012.	N/A	The EC has recognized the 'NTA 8080' scheme for demonstrating compliance with the sustainability criteria under Directives 98/70/EC and 2009/28/EC of the European Parliament and of the Council in July 2012. The Decision is valid for a period of five years after it enters into force
B.	**Functions and coverage**					
1	**Management**	(Elected) The board of directors and the Director General	(Elected) The board of directors and the Secretary General	The Executive Board, the Advisory Board and the Technical Committee.	GDF-SUEZ/Electrabel TPM/Fuel Procurement is in charge of the daily application of the verification procedure	NEN Scheme Ownership - an integrated division of the NEN Office
2	**Membership and Decision-making**	FSC membership is open to a wide range of organizations and individuals (NGOs, unions, market actors and etc.). The decision-making body is made up of the three membership chambers (environmental, social and economic), which are further split into North and South	There are two categories of membership with voting rights: (1) National members (or "National Governing Bodies") are independent, national organizations established to develop and implement a PEFC system within their country, (2) International Stakeholder	The Executive Board (elected by existing members) is responsible for strategic decision making and is ultimately responsible for the initiative, with the advices from the Advisory Board (evenly represented by all stakeholders).	The system was designed by SGS Belgium and Laborelec.	A Committee of Experts has been set up to draft, establish and maintain the certification scheme, through consultation process in the form of working groups, consultation rounds, etc. The committee is responsible for involving the stakeholders in the maintenance of the

		sub-chambers. The purpose is to maintain the balance of voting power between different interests without having to limit the number of members.	members are international entities including NGOs, companies, and associations committed to supporting PEFC's principles.			scheme.
3	**Target groups and coverage**	(i) Forest management units (ii) Actors along the supply chain taking ownership of FSC certified biomass (processing, transformation, manufacturing and distribution) It could be for individual, or in the form of projects - one-off and complex products FSC certified without each involved participant having to become individually FSC certified	PEFC's target group is national forest certification schemes. The target groups of these national schemes are generally similar to those of FSC (see left column). Individual national schemes may additionally include other target groups.	Suppliers (producers, processors, traders) and buyers of biomass.	Suppliers (producers, processors, traders) and buyers of biomass Mainly for wood pellets.	Suppliers (producers, processors, traders) and buyers of biomass. It covers solid, liquid and gaseous biomass. Note that NTA 8080 and CAN/CSA-Z809 are the only two standards with sustainability criteria for solid biomass (noting that CSA is not developed for bioenergy)
4	**Geographical coverage (2012)**	Producers: No. of countries: 80 Total area: 155 million ha (43 % in Europe; 40% in USA) No. of certificates: 1124 CoC: Total countries: 106 Total certificates: 23462 (49% in Europe) (As of 15 June 2012)	Producers: No. of countries: 29 Total area: 243 million ha (60% in USA; 33 % in Europe) CoC: Total countries: 61 Total certificates: 9069 (84% in Europe) (As of 15 June 2012)	Producers: Canada, USA, Portugal, Baltic States Consumers: The Netherlands and the UK	Consumers: Belgium	International

5	**Actual utilization**	(Certified areas) By types of forest certified: Natural forest: 63.7% Semi-Natural and Mixed Plantation & Natural forest: 28% Plantation: 8.3% By biomes: Boreal: 52.3% Tropical/Subtropical: 11.7% Temperate: 36.1% By ownership: Public: 53.7% Private: 28.51% Government: 13.5% Community: 3.6% Others: 0.6% By tenure management: Private: 63.6% Public: 24.3% Others: 12.1%	No detailed information available	In 2012, 25 companies have been certified. More than 5 million tonnes of biomass were certified with the Green Gold Label in 9 years-time. In 2012, approximately 3 milliontonnes were certified	In 2010, 30 pellet suppliers have participated for verification	19 certificates have been issued as of August, 2012
C.	**Schemes characteristics**					
1	**Schemes structure**	"Top-down" - It has drawn up 10 principles and the accompanying criteria which are to be used worldwide. The principles were translated to country-specific criteria and indicators.	"Bottom-up" – It is based on inter-governmental principles that are developed for different forest regions of the world. It recognizes (as umbrella standard) existing national forestry standards, such as SFI, CSA, ATFS, etc., when certain conditions are met.	Offers two programmes: 1. Green Gold Label (GGL) (for sustainable biomass (covering production, processing, transport and final energy transformation) 2. Clean Raw Material (CRM) is a specific clean wood certificate for pre-treated	Biomass verification procedures (9 documents): General: DOC 01 For supply chain inspection: DOC 02 to DOC 07 For producers: DOC 08 and	The NTA 8080 certification system includes two levels of certification: 'NTA 8080 approved' for organisations that comply with the NTA 8080 requirements and 'NTA RED' for organisations that do not yet meet the NTA 8080 requirements but comply with all the RED

		10 principles and accompanying criteria ↓ Translated to country-specific criteria and indicator (C & I) ↓ National FSC Standards	Benchmarking ↑ Assessments ↑ National standards for sustainability forest management	biomass, based on the Dutch standard NTA 8003 "Classification of biomass for energy production" codes 101-169.	09	criteria. In order to become recognized by the EC, NTA 8080 have included in the interpretation document the 'RED language' (for biofuels and bioliquids).
2	**Regional differences**	Based on the Principles and Criteria, provide locally appropriate indicators for each criterion to show compliance can be demonstrated in that national situation.	Large differences between the single national systems. See Document WP D5.1-1 for details.	Not relevant	N/A	Not relevant
D.	**Certification systems set-up**					
1	**Standard setting**	All FSC standards and policies are developed by the Policy and Standards Unit based at the FSC International Center in Bonn.	Standard Setting (PEFC ST 1001:2010) describes the requirements for standardising bodies in the development and revision of forest management and scheme-specific chain of custody standards.	Various Working Groups where specific topics are addressed, for example the development of the Green Gold Label standards, accreditation procedures, communication, engagement with governments etc. The Working Groups are multi-stakeholder governing bodies.	The system was designed by Laborelec and SGS Belgium	See B-2.
2	**Standards documents**	www.fsc.org/standards.340.htm	www.pefc.org/standards/technical-documentation/pefc-international-standards-2010	www.greengoldcertified.org/site/pagina.php?id=11	www.laborelec.be/ENG/biomass-verification-procedure/	http://www.sustainable-biomass.org/publicaties/3941
3	**Forest management: Principles and**	10 principles as in (a) a. FSC STD 01 001 V4-0 EN	Sustainability principles and criteria vary significantly between PEFC endorsed	GGLS5: Forestry standards - derived from existing and internationally recognised	DOC 08: Inspection Procedure for Forestry Based Company -	NTA 8080 describes the sustainability criteria that are based on the so-called

	Standards	FSC Principles and Criteria for Forest Stewardship b. FSC-STD-01-002 V1-0 EN Glossary of Terms c. FSC STD 01 003 V1 0 EN SLIMF Eligibility Criteria d. FSC STD 01 003a EN SLIMF Eligibility Criteria Addendum 2010-09-07 e. FSC-STD-01 005 V1-0 EN Dispute resolution system f. FSC STD 30 005 V1-0 EN Standard for Group Entities in Forest Management Groups	schemes in number, structure and contents, but SFM standards must fulfill a set of minimum requirements laid out in the International PEFC standard: PEFC ST 1003:2010	forest management standard; Following may also comply: 1. FSC – (incl. FSC Controlled) 2. PEFC 3. CSA-SFM (incl. SFI Fiber Sourcing, but only with individual chain of custody data) 4. SFI 5. FFCS 6. Approved pre-scope certificate of one of the endorsed forest management certification systems, with the intention of full certification	10 principles First principle on GHG and energy balance is mainly assessed following the experienced procedure of Laborelec-SGS. For the other principles, the assessment will be based on the QUALIFOR and NTA inputs. If any FSC certificate covering the surfaces where the wood to be processed was harvested is provided, no further verification of the Principles 2 to 10 is needed.	Cramer criteria: • greenhouse gases (emissions & carbon stock); • competition with other applications; • biodiversity; • environment (soil, water and air); • prosperity; • social well-being. NTA 8081 describes the certification requirements including those applicable to group certification and the use of residues and waste. An interpretation document further elaborates on the requirements in NTA 8080
4	**Agricultural standards**	Not applicable	Not applicable	GGLS2: Agricultural criteria - based on the United Nations sustainable development program Agenda 21. This standard is to be used for approval of the agricultural source when no other certification system is available. Following may also comply: 1. GlobalGAP 2. All programmes that certify organics as per EU, Japanese and/or US regulations	N/A	See D-3

5	**Chain of Custody (CoC)**	*Policy:* FSC guidelines for certification bodies fsc-pol-40-002 (2004) EN: Group chain of custody (CoC) certification *Standard:* a. FSC STD 40 003 V1-0 EN Multi site Chain of Custody b. FSC STD 40 004 V2-1 EN Chain of Custody Certification c. FSC STD 40 004a V2-0 EN FSC Product Classification d. FSC STD 40 004b V1-0 EN FSC Species Terminology e. FSC STD 40 006 V1-0 EN Project Certification f. FSC STD 40 007 V2-0 EN Sourcing Reclaimed Materials	PEFC ST 2002:2010: Chain of Custody	GGLS1: Chain of Custody and Processing – Trader GGLS4: Transaction and Product Certificate CRM1: Chain of custody and processing standards - CRM is the counterpart of GGL1 for CRM material. Where GGL focuses on sustainability, CRM is used to prove that clean wood is used for the production of e.g. torrefied material. CRM 2: Transaction Certificate - the counterpart of GGL4 for CRM material, covering a specifically described amount of clean wood, leading to a CRM Transaction Certificate.	DOC02: Pellet Supplier Declaration Form DOC 03: Pellet Supplier Audit Procedure DOC 04: Pellet Transport Declaration Form DOC 05: Energy and Carbon Balance Form DOC 06: Pellet Supplier Declaration Form	See Document WP D5.1-1
6	**Other standards**	Standards that apply to multiple types of certificate holders: a. FSC STD 50 001 V1-2 EN Certificate Holder Trademark Requirements b. FSC TMK 50 201 V1-0 EN Requirements for promotional use of FSC trademarks (also applies to non-certified commercial organizations)	Standards for multiple types of certificate holders: a. Group Forest Management Certification (PEFC ST 1002:2010) b. PEFC Logo Usage Rules (PEFC ST 2001:2008 v2) c. Annex 7 - Endorsement and Mutual Recognition of National Schemes and their Revision	GGLS6: Use at power plant - specifically for power plants; follows the conversion process of the biomass into electricity and lays down requirements for policy, administration, safety, mass balance calculation, etc. GGLS7: Stewardship criteria – For raw materials from other sources (from high conservation value areas as	DOC 09 Inspection Procedure for Sawmill Industry requires at least: - the evaluation of the overall energy balance for the supply of each biomass feedstock - the full traceability of the resources that were used for manufacturing the biomass and the evidence that those resources are managed	See D-3

		Standards that apply to FSC accredited certification bodies: a. FSC STD 20 001 V3-0 EN General Requirements for FSC Certification Bodies - application of ISO/IEC Guide 65:1996 (E) FSC Controlled Wood controls the non-certified material in FSC products avoid timber from the most destructive and harmful practices, such as illegal logging or human rights abuses: a. FSC STD 30 010 V2-0 EN Controlled Wood standard for FM enterprises b. FSC STD 40 005 V2-1 EN Company Evaluation of Controlled Wood	Standards that apply to certification bodies: Certification Body Requirements – Chain of Custody (PEFC ST 2003:2012) PEFC Due Diligence System (DDS) for avoidance of raw material from controversial sources (Included in CoC)	well as material coming from parks, public gardens and green spaces) GGLS8: Greenhouse gases and energy balance calculation - an inventory is made of all components that influence GHG emissions within the chain, such as energy use for processing and storage, fuels used in transport.	in a sustained way	
E.	**Others**					
1	**Certification bodies**	Only FSC accredited certification bodies are authorized to issue FSC certificates. See Document WP D5.1-1 Certification bodies are accredited by ASI according to FSC STD 20 001 V3-0 EN General Requirements for FSC Certification Bodies -	Varies among nationally endorsed schemes, but there is a total of 374 certification bodies accredited for PEFC certification	Control Union	SGS Belgium (Inspection and independent reporting)	Certification is done by certifying bodies that have entered into an agreement with NEN. See Document WP D5.1-1 for the list.

		application of ISO/IEC Guide 65:1996 (E). See Document WP D5.1-1 for the list.				
2	**Cost**	See Document WP D5.1-1	See Document WP D5.1-1	Approximately €0,10 per metric tonne of biomass	No exact data – the costs is less than 0,1% of the biomass fuel cost	Certificate cost for operators: Annual fee per certificate [€50- €200] annual membership fee [€50-€5,000, depending on turnover] OR fee per metric ton [€0.03]. The annual fee is collected by the CB and subsequently transferred to the scheme manager. See Document WP D5.1-1 for cost for auditing.
3	**Policy relation**	Forest management shall respect all national and local laws and administrative requirements. In signatory countries, the provisions of all binding international agreements such as CITES, ILO Conventions, ITTA, and Convention on Biological Diversity, shall be respected.	Forest management shall comply with legislation applicable to forest management issues including forest management practices; nature and environmental protection; protected and endangered species; property, tenure and land-use rights for indigenous people; health, labour and safety issues; and the payment of royalties and taxes. For a country which has signed a FLEGT Voluntary Partnership Agreement	European level: A decision from the European Commission is pending for the approval of the newly developed GGL – RED standard under the Renewable Energy Directive (RED). The UK: Currently, the GGL - RED standard is the only voluntary system that has been approved by Ofgem.	Applied to all Belgium Green certificates (5 different Green Certificates mechanisms are running in Belgium: 2 different in Flanders (1 Green, 1 Cogen), 1 in Wallonia, 1 in Brussels and 1 at the Federal level)	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 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. The EC has recognized the 'NTA 8080' scheme for demonstrating compliance

			(VPA) between the European Union and the producing country, the “legislation applicable to forest management” is defined by the VPA agreement.			with the sustainability criteria under Directives 98/70/EC and 2009/28/EC of the European Parliament and of the Council in July 2012. The Decision is valid for a period of five years after it enters into force.

2. Review of sustainability certification schemes benchmark

2.1. General introduction

This is a review of two sustainability certification schemes benchmarking studies carried out by SMK for NL Agency and ECOFYS for Ofgem, given that the Netherlands and the United Kingdom are the forerunners in setting sustainability requirement for solid biofuels. This is not a new analysis, even though we intend to examine each criterion. While we summarize the findings of the aforementioned studies, we focus on discussing the non-conformity between schemes for each criterion. The content is organized by single sustainability criterion instead of by schemes, to enable the identification of key elements that cause the non-conformities. The two benchmark studies are described in the following:

The Dutch Benchmark (DB)

This study benchmarked voluntary schemes against the "Dutch assessment protocol for voluntary sustainability schemes for solid biomass", or referred to as Biomass Protocol (BP). The BP is closely related to the criteria that the EC has recommended for solid biomass and the criteria of the EU RED for biofuels and bioliquids, with an additional criterion on soil quality derived from NTA 8080. This study will be referred to as the Dutch benchmark in the following text. Schemes assessed: FSC, PEFC International, TPAS (SMK, 2012).

The British Benchmark (BB)

This study benchmarked voluntary schemes against the Renewable Obligation Order (ROO) land criteria requirements[2] (as contained in A2 of the ROO 2011) and Ofgem's requirements for audit, certification and accreditation processes. The land criteria requirements are directly translated from the EU RED; specifically Articles on the protection of biodiversity (17.3), land with high carbon stocks (17.4) and peatland (17.5). The purpose of the benchmark was to assess whether the voluntary schemes could potentially be used by biomass electricity generators in the UK to report compliance with the ROO land criteria. This study will be referred to as the British benchmark in the following text. Schemes assessed: FSC, CSA/CAN, SFI, ATFS, PEFC International, GGL, Natural England, UKWAS (Ofgem, 2012a).

2.2. Overall comparison of two benchmark studies

Against national protocols: Both benchmark studies have been carried out against national regulations or protocol, which are closely related to the criteria recommended by the EC for solid biomass. The Dutch BP includes several criteria for retaining soil quality, and these were included in the Dutch benchmark too. The British benchmark does not include a few criteria in the assessment: preservation of grasslands (both as in the RED) and soil quality (NTA 8080). The latter was not included in the ROO and therefore not included in the

[2] It outlines the new requirement to provide information to Ofgem on sustainability criteria with regard to greenhouse gas reductions and prior land use for the biomass used. This requirement was introduced in the 2011 amendments to these Orders. The sustainability criteria for solid and gaseous biomass, are: 1. land criteria: relate to the type of land on which the biomass was produced (during or after January 2008); and 2. GHG emissions criteria: relate to the GHG emissions from the use of the biomass to generate one mega joule of electricity.

benchmark. The Dutch BP only applied to large energy producers of 1 MW thermal or 1 MW electrical or above, intended to avoid placing undue administrative burden on small-scale producers. The threshold is lower in the British ROO, where the sustainability requirements are applied to generators greater than 50 kW.

Distinction between natural and plantation forests: In the Dutch benchmark, a clear distinction has been made between natural forests and forest plantations. The reason is that the extent to which an SFM systems meets a Dutch BP requirement (also the RED criteria) may be different for certified natural forests and certified forest plantations. For example, land conversion to natural forest is principally not possible and therefore only the forest plantation part was assessed for this aspect. There is no such distinction in the British benchmark.

Number of schemes assessed: The British benchmark covers 7 SFM schemes and 1 industrial scheme, while the Dutch benchmark includes only 2 SFM schemes and 1 timber procurement assessment system. The details of schemes assessed are listed in Table 2.

Criteria assessed: The British benchmark does not take preservation of grassland into account. On the other hand, the Dutch benchmark has left out preservation of protected areas and permanently wooded areas in this assessment, claiming that they have been assessed (internally) previously by Brinkmann in 2011. However, the Dutch benchmark assessment on preservation of lightly wooded areas are relatively stricter by examining whether or not “lightly wooded areas” is covered explicitly by forest definition in each schemes. The British benchmark has mentioned that the version of the GGL scheme benchmarked is still under construction, and has not yet implemented. A key part of the implementation will be GGL re-benchmarking the third party schemes that are accepted as a declaration under the GGL scheme. They would expect that the schemes currently accepted by GGL would not cover all the revised (land use) criteria of the GGL. There also some differences in the auditing criteria assessed by the two benchmarks which also further described in the following subsections.

Level of scoring: Both benchmark studies use a similar scoring system for all schemes, i.e. fully addressed (O), partially addressed (≈) and inadequately addressed (X). In case the reference date is later than the one required in the RED criteria, the Dutch benchmark considers the scheme does not adequately meet the requirement, whereas the British benchmark considers the scheme to partially meet the requirement. Table 3 provides an overview of scores given by both benchmark studies for different schemes and systems.

Table 2 Schemes assessed by SMK (for NL Agency) and ECOFYS (for Ofgem) benchmark studies

Acronyms used	Full name	Details	Assessed by (O = yes)		Available at
			NL Agency	Ofgem	
FSC	Forest Stewardships Council	Version 4, Amended 2002		O	http://www.fsc.org/download.fsc-principles-and-criteria-for-forest-stewardship-fsc-std-01-001-version-4-0-en.181.htm
		FSC-STD-01-001 (V5-0)	O		http://igi.fsc.org/md.static/FSC-STD-01-001_V5-0_D5-0_EN_FSC_Principles+Criteria.pdf
		FSC-STD-40-004 (V2-1)	O		http://www.fsccanada.org/docs/fsc-std-40-004_v2-1_en_chain_of_custody_certification.pdf?LanguageID=EN-US
		FSC-STD-20-007b (V1-0) EN		O	http://www.fsc.org/download.forest-management-evaluations-addendum-forest-certification-public-summary-reports-fsc-std-20-007b-v1-0-en.191.htm
		FSC-STD-20-001 (V3-0) EN		O	http://www.fsc.org/download.general-requirements-for-fsc-accredited-certification-bodies-application-of-isoiec-guide-651996-e-fsc-std-20-001-version-3-0-en.186.htm
		FSC-STD-20-006 (V3-0) EN		O	http://www.fsc.org/download.stakeholder-consultation-for-forest-evaluations-fsc-std-20-006-v3-0-en.188.htm
PEFC inter-nationals	Programme for Endorsement of Forest Certification Schemes	PEFC ST 1003:2010 (Nov 2010)	O	O	http://www.pefc.org/standards/technical-documentation/pefc-international-standards-2010/item/download/292
ATFS (PEFC)	American Tree Farm System	2010-2015 Standard		O	http://www.treefarmsystem.org/stuff/contentmgr/files/1/b6def982f32878ce457388c59ba57a4b/misc/final.aff_2011standards_brochure_high_9_21.11.pdf
CSA (PEFC)	Canada's National Standard for Sustainable Forest Management	CAN/CSA Z809-08		O	http://www.pefc.org/images/stories/documents/NGB_Documentation/Canada/CAN_CSA-Z809-08.pdf
SFI (PEFC)	Sustainable Forestry Initiative	2010-2014 Standard and Interpretation Nov 2011		O	http://www.sfiprogram.org/files/pdf/Interpretations_2010-2014_Requirements.pdf
NE	Natural England	Energy crop scheme		O	
UKWAS	UK Woodland Assurance Standard	Second Edition, Nov 2008		O	http://www.naturalengland.org.uk/ourwork/farming/funding/ecs/
GGL	Green Gold Label	GGLS2 RED v2010.1 (Agri), (Forestry) & Certification requirements v6d		O	http://www.greengoldcertified.org/data/docs/Certification%20Requirements%20v6d.doc http://www.greengoldcertified.org/site/pagina.php?id=11
TPAS	The Dutch Timber Procurement Assessment System		O		http://www.tpac.smk.nl/nl/s517/TPAC-home/c413-Documents

Table 3 Overview of scores of voluntary certification schemes on sustainability requirements recommended by the RED and other additional national level requirement

Keys: fully addressed (O); partially addressed (≈); inadequately addressed (X); not assessed (blank).		Score																
		The Dutch benchmark						The British benchmark									Other sources	
		TPAC		FSC		PEFC[3]		FSC	PEFC				NE	UK WAS	GGL		NTA 8080[4]	ISCC PLUS[5]
#	Criteria	N[6]	P[6]	N[6]	P[6]	N[6]	P[6]		ATFS	CSA	SFI	PEFC			A[7]	F[7]		
Sustainability criteria (RED Article 17)[8]																		
1	The reduction in greenhouse gas emissions resulting from the use of biomass shall be at least 60%.	X	X	X	X	X	X								O[9]			
	Preservation of biodiversity (RED Article 17.3)																	
2	Preservation of primary forest and other wooded land: Biomass shall not be made from raw material obtained from land that was wooded in or after January 2008, whether or not the land continues to have that status.	≈	O	≈	O	≈	X	O	≈	≈	≈	≈	≈	O	O	O		
3	Preservation of protected areas: Biomass shall not be made from raw material obtained from land that was classed as a protected area in or after January 2008, whether or not the land continues to have that status.	≈	≈	O[10]	O[10]	O[10]	O[10]	≈	≈	≈	≈	≈	≈	≈	O	O		
4	Preservation of grassland with high biodiversity value: Biomass shall not be made from raw material obtained from land that was classed as grassland with a high biodiversity value in or after January 2008, whether or not the land continues to have that status.		X		X		X	This criterion is not included in the UK Renewable Obligation. Refer to Section 4.5.										
	Preservation of carbon stock (RED Article 17.4)																	
5	Preservation of wetlands: Biomass shall not be made from raw material obtained from land that was a wetland in January	O	X	≈	X	O	O	X	≈	≈	≈	≈	≈	≈	O	O		

[3] PEFC international
[4] EC has recognized 'NTA 8080' scheme for demonstrating compliance with the sustainability criteria under Directives 98/70/EC and 2009/28/EC of the European Parliament and of the Council
[5] The authors assumed that ISCC PLUS was developed based upon existing criteria of ISCC, in other words complies with the RED criteria
[6] N: Natural forest; P: Planted forest
[7] A: GGL Agriculture; F: GGL Forestry
[8] Biomass which is waste or residues, other than agricultural, aquaculture, fisheries and forestry residues do not have to comply with criteria 2 to 8.
[9] Cross-checked with official GGL website; not included in the British benchmark.
[10] According to the Dutch benchmark, Brinkmann assessment has assessed this requirement as fully addressed

	2008 and no longer has that status.																	
6	Preservation of permanently wooded areas: Biomass shall not be made from raw material obtained from land that was a permanently wooded area in January 2008 and no longer has that status.	O	O	O [10]	O [10]	O [10]	O [10]	O	≈	≈	≈	≈	X	≈	O	O		
7	Preservation of lightly wooded areas: Biomass shall not be made from raw material obtained from land that was a lightly wooded area in January 2008 and no longer has that status.	O	X	O	X	O	≈	O	≈	≈	≈	≈	X	≈	O	O		
	Preservation of peatland (RED Article 17.5)																	
8	Preservation of peatland: Biomass shall not be made from raw material obtained from land that was peatland in January 2008.	≈	X	X	X	X	X	X	X	X	X	X	X	X	O	O		
	Additional requirements: Retaining soil quality (NTA 8080: 2009en)																	
9	(i) No violation of national laws and regulations that are applicable to soil management. (ii) In the production and processing of biomass best practices must be applied to retain or improve the soil and soil quality. (iii) The use of residual products must not be at variance with other local functions for the conservation of the soil.	O O O	O [10] O [10] O															
Audit quality and chain of custody (RED Article 18)																		
	Adequate standard of independent auditing (RED Article 18.3)																	
10	(i) Document management (ii) Audit frequency (iii) Auditor competency (iv) Management of the audit (v) Accreditation of certification bodies (vi) Stakeholder consultation (vii) Public summaries of the certification audit (viii) Accreditation process for Accreditation Bodies (ix) Audits shall be conducted before economic operators are permitted to participate in the sustainability scheme (x) Group audits (if relevant)	O O O O O O O	O O [10] O [10] O [10] O [10]		≈ O O O O O O O	≈ O O O O O O O	≈ O O O O O O O	≈ O O O O O O O	≈ O O O O O O O	O ≈ O O X ≈ O X	≈ O O O O O O O	X O O O O X X O		
	The use of a mass balance system (RED Article 18.1)																	
11	(i) Economic operators shall use a mass balance system (ii) The mass balance system shall be applied at the level of a geographic location as a minimum	≈ X																

2.3. Criterion 1: Reduction in greenhouse gas emissions when compared to fossil fuels

Criteria	The use and production of biomass must give rise to a reduction in greenhouse gas emissions when compared to fossil fuels	
RED Article	17.2 – Reduction in greenhouse gas emissions when compared to fossil fuels	
Requirement	The Dutch BP: The reduction in greenhouse gas emissions resulting from the use of biomass shall be at least 60% Note: (i) For biofuels this is 35%, gradually increasing to 60% for new installations after 1 January 2018. (ii) Greenhouse gas emissions (reductions) shall be calculated in accordance with the methodology outlined in the February 2010 Commission report, and not be based on the methodology specified in RED).	
Detailed description of requirement	The reduction in greenhouse gas emissions resulting from the use of biomass shall be calculated in accordance with Annex I of the European Commission Report on Sustainability Requirements for the use of solid and gaseous biomass sources in electricity, heating and cooling (25 February 2010)	
Assessment	Score	Rationale and comments
GGL (Source: official website)	O	GGL uses the calculation method stipulated by the Renewable Energy Directive 2009/28/EG. However, DECC considers the EC report in 2010 on the requirement for sustainability criteria for solid biomass and biogas. DECC is currently considering the need to align the Orders with this policy intent and intends to publish its findings by autumn 2012.
FSC and PEFC (The Dutch Benchmark)	X	The forestry certification systems are missing quantified binding limits for greenhouse gas emissions as required by the EC criteria. None of these schemes meet the quantified GHG emission reduction of 60%. Recommendation: Additional requirement on top of SFM, use of GHG calculation tools

2.4. Criterion 2: Preservation of primary forest and other wooded land

Criteria	Preservation of primary forest and other wooded land	
RED Article	17.3 – Preservation of biodiversity	
Requirement	Biomass shall not be made from raw material obtained from land that was wooded in or after January 2008, whether or not the land continues to have that status	
Detailed description of requirement	• Primary forest and other wooded land, namely forest and other wooded land of native species, where there is no clearly visible indication of human activity and the ecological processes are not significantly disturbed. • This includes areas that: (i) are designated by law or by the relevant competent authority for nature protection purposes; or (ii) are designated for the protection of rare, threatened or endangered ecosystems or species recognised by international agreements or includes in lists drawn up by intergovernmental organization or the International Union for the Conservation of Nature, subject to their recognition in accordance with the procedure in Article 18, section 4, second paragraph of the RED. • Unless evidence is provided that the production of that raw material does not interfere with those nature protection purposes.	
Assessment	Score	Rationale and comments
FSC (DB)	N: ≈ P: O	N: The principle “High Conservation Value” forests is used which offers some assurance. “Primary forest” is not explicitly defined as no-go areas. P: Prohibits conversion of natural forest to plantation forest after 1994.
FSC (BB)	O	No rationale/comments in the benchmark report
PEFC (DB)	N: ≈ P: X	N: Forest management activities are not excluded in these areas P: Prohibits conversion of natural forest but the cut-off date (Dec 2010) does not meet the requirement.
PEFC (BB)	≈	Reference date is later than January 2008. Conversion of primary forests to forest plantations possible under ‘justified circumstances’.
ATFS	≈	No reference date
CSA	≈	No reference date. It is assumed that primary forests would fall under the broad definition of ‘forest land’. The term ‘where ecologically appropriate’ leaves this criterion open for interpretation. Moreover, biomass production from these lands is not excluded.
SFI	≈	No reference date
TPAS	N: ≈ P: O	N: It is specified to exclude (all) primary forest and management activities in these areas P: Prohibits conversion of natural forests to plantation forest after 1997.
NE	≈	No reference date. Criterion does not explicitly prohibit the production of raw material from land that was primary forest (although protected areas considered to give good coverage)
UKWAS	O	Appropriate reference date of 1985 for conversion of ancient semi-natural woodlands (considered to be equivalent to ‘primary forests’ in UK)
GGL	O	No rationale/comments in the benchmark report

2.5. Criterion 3: Preservation of protected areas

Criteria	Preservation of protected areas	
RED Article	17.3 - Preservation of biodiversity	
Requirement	Biomass shall not be made from raw material obtained from land that was classed as a protected area in or after January 2008, whether or not the land continues to have that status.	
Detailed description of requirement	• This includes areas that: (i) are designated by law or by the relevant competent authority for nature protection purposes; or (ii) are designated for the protection of rare, threatened or endangered ecosystems or species recognised by international agreements or includes in lists drawn up by intergovernmental organisation or the International Union for the Conservation of Nature, subject to their recognition in accordance with the procedure in Article 18, section 4, second paragraph of the RED. • Unless evidence is provided that the production of that raw material does not interfere with those nature protection purposes.	
Assessment	Score	Rationale and comments
FSC (DB)	O	The Dutch benchmark regards this requirement as fully addressed according to an internal assessment by Brinkmann. ***Note***: However it does not preclude logging in areas that have lost their protected status after January 2008.
FSC (BB)	≈	No reference date for non-woodland protected areas.
PEFC (DB)	O	The Dutch benchmark regards this requirement as fully addressed according to an internal assessment by Brinkmann. ***Note***: However it does not preclude logging in areas that have lost their protected status after January 2008.
PEFC (BB)	≈	No reference date
ATFS	≈	No reference date
CSA	≈	No reference date
SFI	≈	No reference date
TPAS	N: ≈ P: ≈	Does not preclude forest management activities in areas that no longer have a protected status.
NE	≈	No reference date.
UKWAS	≈	No reference date for non-woodland protected areas
GGL	O	No rationale/comments in the benchmark report

2.6. Criterion 4: Preservation of grassland with high biodiversity value

Criteria	Preservation of grassland with high biodiversity value	
RED Article	17.3 - Preservation of biodiversity	
Requirement	Biomass shall not be made from raw material obtained from land that was classed as grassland with a high biodiversity value in or after January 2008, whether or not the land continues to have that status.	
Detailed description of requirement	Grassland with high biodiversity value is defined as: (i) natural grassland, namely grassland which, in the absence of human intervention, would remain grassland and which maintains the natural species composition and ecological characteristics and processes; or (ii) non-natural grassland, namely grassland which, in the absence of human intervention, would cease to be grassland and which is species-rich and not degraded, unless evidence is provided that the harvesting of the raw material is necessary to preserve its grassland status.*	
Assessment	Score	Rationale and comments
FSC (DB)	N: n.r. P: X	N: Conversion of grassland to natural forest is not possible. P: Not addressed
FSC (BB)		This criteria is not included in the UK RO *
PEFC (DB)	N: n.r. P: X	N: Conversion of grassland to natural forest is not possible. P: Not addressed
PEFC (BB)		This criteria is not included in the UK RO *
ATFS		This criteria is not included in the UK RO *
CSA		This criteria is not included in the UK RO *
SFI		This criteria is not included in the UK RO *
TPAS	N: n.r. P: X	N: Conversion of grassland to natural forest is not possible. P: Not addressed
NE		This criteria is not included in the UK RO *
UKWAS		This criteria is not included in the UK RO *
GGL		This criteria is not included in the UK RO *

* The European Commission sets the criteria and geographical boundaries in order to determine which grasslands fall under this requirement (Directive for Renewable Energy 2009/28/EC Art. 17(3c)). Additional information from the Commission shall be required for testing this aspect.

2.7. Criterion 5: Preservation of wetlands

Criteria	Preservation of wetlands	
RED Article	17.4 - Preservation of carbon stock	
Requirement	Biomass shall not be made from raw material obtained from land that was a wetland in January 2008 and no longer has that status.	
Detailed description of requirement	Wetlands are defined as land that is covered with or saturated by water permanently, or for a significant part of the year. This stipulation shall not apply to land that at the time that the raw material was obtained had the same status as in January 2008.	
Assessment	Score	Rationale and comments
FSC (DB)	N: ≈ P: X	N: The principle "High Conservation Value" forests is used which offers some assurance. Wetlands (and forested wetlands) are not specifically mentioned. P: Does not preclude that a plantation is established on land that was previously classified as (non-forested) wetlands
FSC (BB)	X	No specific criterion addressing wetlands.
PEFC (DB)	N: O P: O	N: Fully addressed P: Wetlands are considered categorized under "areas which are dedicated to environmental, ecological, cultural and social functions" in 5.4.2. *Authors' remark:* The BB noted that reference date is missing, which indicate that this might be given an "X".
PEFC (BB)	≈	No reference date
ATFS	≈	No reference date; No specific reference to wetland conversion
CSA	≈	No reference date; Criteria (CSA) focus on water quality and quantity rather than explicit prevention of the conversion of wetlands
SFI	≈	No reference date
TPAS	N: O P: O	N: Fully addressed P: Does not preclude that a plantation is established on land that was previously classified as (non-forested) wetlands
NE	≈	No reference date. Criterion does not explicitly prohibit the production of raw material from wetland areas (although protected areas considered to give good coverage)
UKWAS	≈	No reference date
GGL	O	No rationale/comments in the benchmark report

2.8. Criterion 6: Preservation of permanently wooded areas

Criteria	Preservation of permanently wooded areas	
RED Article	17.4 – Preservation of carbon stock	
Requirement	Biomass shall not be made from raw material obtained from land that was a permanently wooded area in January 2008 and no longer has that status.	
Detailed description of requirement	• Permanently wooded areas are defined as areas spanning more than one hectare with trees higher than five metres and a canopy cover in excess of 30%, or trees able to reach those thresholds in situ. Land with a primarily agricultural or urban land use is not included in this definition. • Land used for agricultural purposes shall include the following in this context: tree stands in agricultural production systems, such as fruit orchards, palm oil plantings and woodland cultivation systems, in which crops are cultivated beneath trees. This definition shall not apply to land that at the time that the raw material was obtained had the same status as in January 2008.	
Assessment	Score	Rationale and comments
FSC (DB)	O	The Dutch benchmark regards this requirement as fully addressed according to an internal assessment by Brinkmann.
FSC (BB)	O	FSC criteria 6.10: Forest conversion to plantations or non-forest land uses shall not occur, except in circumstances where conversion: a) entails a very limited portion of the forest management unit; b) does not occur on high conservation value forest areas; and c) conservation benefits across the forest management unit.
PEFC (DB)	O	The Dutch benchmark regards this requirement as fully addressed according to an internal assessment by Brinkmann.
PEFC (BB)	≈	No reference date
ATFS	≈	No reference date
CSA	≈	No reference date
SFI	≈	No reference date
TPAS	N: O P: O	Prohibits conversion of certified forests into any other type of land-use; Prohibits certification of forest plantations that are established on forestland after 1997.
NE	X	No specific criterion addressing the conservation of continuously forested land. (Protected areas / EIA not considered to provide sufficient coverage, focus is on biodiversity rather than conservation of carbon stocks as such)
UKWAS	≈	No reference date
GGL	O	No rationale/comments in the benchmark report

2.9. Criterion 7: Preservation of lightly wooded land

Criteria	Preservation of lightly wooded areas	
RED Article	17.4 - Preservation of carbon stock	
Requirement	Biomass shall not be made from raw material obtained from land that was a lightly wooded area in January 2008 and no longer has that status.	
Detailed description of requirement	Lightly wooded areas are defined as areas spanning more than one hectare with trees higher than 5 m and a canopy cover between 10% and 30%, or trees able to reach those thresholds in situ, unless evidence is provided that the carbon stock of the area before and after conversion is such that, when the methodology laid down in Annex V, part C of the RED is applied, the conditions laid down in criterion 1 would be fulfilled (minimum reduction in greenhouse gas emissions). This definition shall not apply to land that at the time that the raw material was obtained had the same status as in January 2008.	
Assessment	Score	Rationale and comments
FSC (DB)	N: O P: X	N: Fully addressed P: It is unclear whether lightly wooded areas are considered forests under the FSC definition
FSC (BB)	O	***Comments from the authors:*** As indicated by the Dutch benchmark, it is unclear whether lightly wooded areas are considered under the FSC definition
PEFC (DB)	N: O P: ≈	N: Fully addressed. Explicitly define that lightly wooded areas are considered forests P: The cut-off date (Dec 2010) does not meet the requirement *Authors' remark:* Since the reference date was not met, this should be given an "X" instead of "≈" as in the original document.
PEFC (BB)	≈	No reference date
ATFS	≈	No reference date
CSA	≈	No reference date
SFI	≈	No reference date
TPAS	N: O P: X	N: Fully addressed P: It is unclear whether lightly wooded areas are considered forests Note: TPAC will as soon as possible include the FAO definition of forests
NE	X	No specific criterion addressing the conservation of lightly wooded areas. (Protected areas / EIA not considered to provide sufficient coverage, focus is on biodiversity rather than conservation of carbon stocks as such)
UKWAS	≈	No reference date
GGL	O	No rationale/comments in the benchmark report

2.10. Criterion 8: Preservation of peatland

Criteria	Preservation of peatland	
RED Article	17.5 - Preservation of peatland	
Requirement	Biomass shall not be made from raw material obtained from land that was peatland in January 2008.	
Detailed description of requirement	• An exception shall be made if evidence can be provided that: — the soil was completely drained in January 2008; or — the soil has not been drained since January 2008. In the case of peatland that was partially drained in January 2008, subsequent, deeper drainage of parts of the soil not yet fully drained constitutes a violation of the criterion. • Peat itself is not considered to be a biomass.	
Assessment	Score	Rationale and comments
FSC (DB)	N: X P: X	The criterion is inadequately addressed
FSC (BB)	X	No specific criterion addressing peatlands.
PEFC International (DB)	N: X P: X	In international agreements (e.g. the Ramsar convention) the definition of wetlands includes peatlands, but it is questionable whether PEFC also holds this broad definition. Moreover, as the PEFC requirements also do not mention water balance or drainage. The primary reason for assuming that PEFC does not mean peatlands when it refers to wetlands is that it would imply that peatlands are under restricted use. It should be noted that there is a considerable area of PEFC certified peatland forest, especially in Finland, Sweden and Canada (see main report).
PEFC (BB)	X	No specific criterion addressing peatlands. Maintenance and enhancement of forest resource contribution to carbon cycle could affect peatlands, but based on the current criterion wording this is unclear.
ATFS	X	No specific performance measure or indicators assessing peatlands
CSA	X	No specific criterion addressing peatlands. (Protected areas not considered to provide sufficient coverage of peatlands In addition, focus is on biodiversity rather than conservation of carbon stocks as such.)
SFI	≈	No specific performance measure or indicators assessing peatlands
TPAS	N: ≈ P: X	N: Requires that the soil quality and the groundwater balance are maintained, make it less likely that peatlands are disturbed or drained for forestry. P: Precludes the drainage of peatland for the establishment of forest plantation
NE	X	No specific criterion addressing peatlands. (Protected areas / EIA not considered to provide sufficient coverage, focus is on biodiversity rather than conservation of carbon stocks as such)
UKWAS	X	No specific criterion addressing peatlands. (Protected areas / EIA not considered to provide sufficient coverage, focus is on biodiversity rather than conservation of carbon stocks as such)
GGL	O	No rationale/comments in the benchmark report

2.11. Additional requirement in BP: Retaining soil quality

Criteria	Retaining soil quality	
RED Article	Adapted from NTA 8080	
Requirement	• No violation of national laws and regulations that are applicable to soil management • In the production and processing of biomass best practices must be applied to retain or improve the soil and soil quality • The use of residual products must not be at variance with other local functions for the conservation of the soil.	
Assessment	Score	Rationale and comments
FSC (DB)	N: = P: =	FSC refers residuals to non-timber forest products (NTFPs).
TPAS	N: = P: =	Although the TPAS criteria do not explicitly mention residues, TPAS (criterion 5.1 & 5.3) will provide sufficient guarantee that soil conservation is not jeopardized, with consultation with stakeholders (2.2) and monitoring of the effects of forest management (8.4).

2.12. Adequate standard of independent auditing

2.12.1. Document management

Criteria	Adequate standard of independent auditing	
RED Article	18.3	
Requirement	Document management	
Detailed description of requirement	As a condition for participation in the sustainability scheme, economic operators shall be required to: i) Have an auditable scheme that enables the claims they make or rely upon to be verified; ii) Retain any evidence for a minimum of 5 years; and iii) Accept responsibility for preparing any information related to the auditing of such evidence.	
Assessment	Score	Rationale and comments
FSC (DB)	O	No rationale/comments in the benchmark report
FSC (BB)	≈	There is no set time period for parties using the scheme.
PEFC (BB)	≈	There is no set time period for parties using the scheme.
ATFS	≈	There is no set time period for parties using the scheme.
CSA	≈	There is no set time period for parties using the scheme.
SFI	≈	There is no set time period for parties using the scheme.
TPAS	O	Although there is no time period, but TPAC holds the opinion that the primary objective of the requirement - verification of claims - is safeguarded. So TPAC concludes that this requirement is fully addressed.
NE	O	No rationale/comments in the benchmark report
UKWAS	≈	No specific criterion for UKWAS Criterion for FSC: only covers the certification body Criterion for PEFC: no set time period for parties using the scheme
GGL	X	No provision for a documentation management system detailed in Certification Requirements v3.

2.12.2. Audit frequency

Criteria	Adequate standard of independent auditing	
RED Article	18.3	
Requirement	Audit frequency	
Detailed description of requirement	Ofgem: Parties shall be audited once every 5 years for a full certification audit and once a year for a surveillance audit.	
Assessment	Score	Rationale and comments
FSC (BB)	O	No rationale/comments in the benchmark report
PEFC (BB)	O	No rationale/comments in the benchmark report
ATFS	O	No rationale/comments in the benchmark report
CSA	O	No rationale/comments in the benchmark report
SFI	O	No rationale/comments in the benchmark report
TPAS	O	Indirectly addressed through it reference to ISO 17021 and ISO Guide 65
NE	≈	Rural Payment Agency follow-on assessment based on a sample level of less than 100% and is not on an annual basis.
UKWAS	O	No rationale/comments in the benchmark report
GGL	O	No rationale/comments in the benchmark report

2.12.3. Audit competency

Criteria	Adequate standard of independent auditing	
RED Article	18.3	
Requirement	Audit competency	
Detailed description of requirement	Ofgem: • Certification bodies shall ensure that auditors are competent for the tasks which they are selected to perform in accordance to the guidance in ISO 19011:2011, or justified equivalent. • Specific requirements relevant to the product that the Certification Body is certifying should be added as training requirements where appropriate (e.g. forestry etc.)	
Assessment	Score	Rationale and comments
FSC (BB)	O	No rationale/comments in the benchmark report
PEFC (BB)	O	No rationale/comments in the benchmark report
ATFS	O	No rationale/comments in the benchmark report
CSA	O	No rationale/comments in the benchmark report
SFI	O	No rationale/comments in the benchmark report
TPAS	O	Addressed by referencing to ISO 17021 and ISO Guide 65.
NE	O	No rationale/comments in the benchmark report
UKWAS	O	No rationale/comments in the benchmark report
GGL	O	No rationale/comments in the benchmark report

2.12.4. 2.12.4 Management of the audit

Criteria	Adequate standard of independent auditing	
RED Article	18.3	
Requirement	Management of the audit	
Detailed description of requirement	Ofgem: Audit shall be carried out in accordance with ISO 19011:2011, or justified equivalent (i.e. to follow a Plan, Do, Check, Act approach)	
Assessment	Score	Rationale and comments

FSC (BB)	O	No rationale/comments in the benchmark report
PEFC (BB)	O	No rationale/comments in the benchmark report
ATFS	O	No rationale/comments in the benchmark report
CSA	O	No rationale/comments in the benchmark report
SFI	O	No rationale/comments in the benchmark report
TPAS	O	Addressed by referencing to ISO 17021 and ISO Guide 65.
NE	O	Approach to audit is considered to be a justified equivalent to ISO 19011
UKWAS	O	No rationale/comments in the benchmark report
GGL	O	No rationale/comments in the benchmark report

2.12.5. Stakeholder consultation

Criteria	Adequate standard of independent auditing	
RED Article	18.3	
Requirement	Stakeholder consultation	
Detailed description of requirement	Ofgem: A range of relevant stakeholders should be included in stakeholder consultation during site audits. (Recommendation / Not mandatory)	
Assessment	Score	Rationale and comments
FSC (BB)	O	No rationale/comments in the benchmark report
PEFC (BB)	O	No rationale/comments in the benchmark report
ATFS	O	No rationale/comments in the benchmark report
CSA	O	No rationale/comments in the benchmark report
SFI	O	No rationale/comments in the benchmark report
NE	≈	Miscanthus applications are not automatically subject to public consultation.
UKWAS	O	No rationale/comments in the benchmark report
GGL	X	No provision for a stakeholder consultation detailed in Certification Requirements v3.

2.12.6. Public summaries of the certification audit

Criteria	Adequate standard of independent auditing	
RED Article	18.3	
Requirement	Public summaries of the certification audit	
Detailed description of requirement	Ofgem: The certification body should publish public summaries of the certification audit. The summary should include overall findings of the certification audit, any details of non-compliance and any issues identified during the stakeholder consultation. Information should be available in both English and the relevant local language(s), if applicable. (Recommendation / Not mandatory)	
Assessment	Score	Rationale and comments
FSC (BB)	O	No rationale/comments in the benchmark report
PEFC (BB)	O	No rationale/comments in the benchmark report
ATFS	O	No rationale/comments in the benchmark report
CSA	O	No rationale/comments in the benchmark report
SFI	O	No rationale/comments in the benchmark report
NE	O	No rationale/comments in the benchmark report
UKWAS	O	No rationale/comments in the benchmark report
GGL	X	No provision for public summaries of the certification audit detailed in Certification Requirements v3.

2.12.7. Accreditation process for accreditation bodies

Criteria	Adequate standard of independent auditing	
RED Article	18.3	
Requirement	Ofgem: Accreditation process for accreditation bodies	
Detailed description of requirement	Ofgem: Accreditation Bodies shall "Commit to comply" with ISO 17011: 2004, or justified equivalent. Commitment to compliance can be demonstrated through independent peer-review by an auditor that is recognised by either ISEAL or the IAF.	
Assessment	Score	Rationale and comments
FSC (BB)	O	No rationale/comments in the benchmark report
PEFC (BB)	O	No rationale/comments in the benchmark report
ATFS	O	No rationale/comments in the benchmark report
CSA	O	No rationale/comments in the benchmark report
SFI	O	No rationale/comments in the benchmark report
NE	X	EC guidance on biofuel sustainability (Communication 2010/C 160/01) is based on a third party verification approach. (See Table 24)
UKWAS	O	No rationale/comments in the benchmark report
GGL	O	No rationale/comments in the benchmark report

2.12.8. Audits shall be conducted before participation

Criteria	Adequate standard of independent auditing	
RED Article	18.3	
Requirement	The Dutch BP: Audits shall be conducted before economic operators are permitted to participate in the sustainability scheme	
Detailed description of requirement	As a general rule, a voluntary scheme should ensure that economic operators are audited before allowing them to participate in the scheme. This type of audit may take the form of a “group audit”.	
Assessment	Score	Rationale and comments
TPAS	O	Addressed by referencing to ISO 17021 and ISO Guide 65 – both require that audits are conducted before an economic operator is certified.

2.12.9. Group audit

Criteria	Adequate standard of independent auditing	
RED Article	18.3	
Requirement	The Dutch BP: Group audit (if relevant)	
Detailed description of requirement	• Group audits are primarily intended for smallholder farmers, producer organisations and cooperatives. In such cases, verification of all units concerned can be performed based on a sample of units, where appropriate, taking into account a relevant standard developed for this purpose. • Group auditing for compliance with the scheme’s land-related criteria is only acceptable when areas concerned are near one another and have similar characteristics. • Group auditing for the purpose of calculating greenhouse gas savings is only acceptable when the units have similar production systems and products.	
Assessment	Score	Rationale and comments
TPAS	O	No rationale/comments in the benchmark report

2.12.10. Adequate standard of independent auditing (Additional requirement)

Criteria	Adequate standard of independent auditing	
RED Article	The EC does not require this requirement	
Requirement	The Dutch BP: Verification bodies must hold accreditation Ofgem: Accreditation of certification bodies	
Detailed description of requirement	The Dutch BP: The sustainability scheme demands that verifiers are accredited by: i) A national accreditation institution that is associated with the International Accreditation Forum (IAF); or ii) A full or aspiring member of the International Social and Environmental Accreditation and Labelling Alliance (ISEAL) Ofgem: Certification Bodies must be accredited to ISO Guide 65: 1996, ISO 17021: 2011, or justified equivalents	
Assessment	Score	Rationale and comments
FSC (DB)	O	The Dutch benchmark regards this requirement as fully addressed according to an internal assessment by Brinkmann.
FSC (BB)	O	No rationale/comments in the benchmark report
PEFC International (DB)		No rationale/comments in the benchmark report
PEFC (BB)	O	No rationale/comments in the benchmark report
ATFS	O	No rationale/comments in the benchmark report
CSA	O	No rationale/comments in the benchmark report
SFI	O	No rationale/comments in the benchmark report
TPAS	O	No rationale/comments in the benchmark report
NE	X	EC guidance on biofuel sustainability (Communication 2010/C 160/01) is based on a third party verification approach. ('external: the audit is not performed by the economic operator or scheme itself')
UKWAS	O	No rationale/comments in the benchmark report
GGL	O	No rationale/comments in the benchmark report

3. Discussion and conclusion

The question on how existing certification schemes fit with sustainability criteria for bioenergy is more relevant than ever. Against the background of the implementation of sustainability requirements for liquid biofuels, the discussion on adapting these criteria on solid biofuels has been on-going. The EC has recommended the adaption, but has not yet made a final decision. Thus far, most of the members are keeping the status quo, but a few have already started working on setting their own requirements for solid biofuels. Especially the United Kingdom is among the forerunners that almost directly adapting the RED criteria for liquid biofuels on solid biofuels, but also Dutch policy makers have been developing sustainability frameworks for bioenergy. As presented in Chapter 2, benchmarking of existing schemes for solid biomass have been carried out against their national requirements. Since the Dutch and British criteria are closely related to the RED criteria, we can collectively discuss the outcome of both benchmark studies.

We try to address the question by examining the results of both studies. Though there are some discrepancies between both cases, the findings of the analysis indicate a cautious optimism in terms of the conformity of the SFMs with the RED criteria. The findings are summarized under 3 areas:

1. Greenhouse gas emission assessment tools as complementary to SFM schemes

Due to the fact that mitigation of climate change is not the main objectives for the SFM schemes at the time that they were developed, none of the SFM schemes address the greenhouse gas reduction criterion. It is not surprising that none of the schemes have actually included the calculation of GHG reductions, except GGL-RED which was developed based on the RED criteria. Nevertheless, this shall not prevent the use of SFM schemes for solid biofuels. In fact, schemes such as GGL accept SFM certification along the supply chain. In other words, mutual recognitions already exist. Mutual recognition or establishing complementary schemes will save a great amount of efforts and costs.

2. Reference date for land conversion

Often the non-conformities come from the reference date for land use changes. The RED criteria set January 2008 as the reference date for all land use changes. However, the SFM schemes usually do not have a cut-off date, or the cut-off date is later than January 2008. Most of the SFMs are graded “partially addressed” the land use change criteria by the British Benchmark due to the missing reference date. On the other hand, PEFC uses December 2010 as the cut-off date for the conversion of natural forest, which is much later than January 2008. To ensure the compliance with the RED criteria, the date of land conversion should be explicitly assessed by the SFM schemes.

3. Dispute over the definitions of land types

Besides reference date, definitions for different land types are the most important issue:

(i) The RED criteria preclude the use of biomass that comes from “primary forests”, however the definition of primary forests might be open for interpretation if we refer to different SFM definitions. In fact, the SFM schemes focus more on the prohibition of biomass use from “protected areas”. It is unclear whether the strict definition of primary forests is appropriate in the context of SFM schemes.

(ii) The conversion of grassland with high biodiversity to plantation forest is prohibited, but the British Benchmark claims that it is unable to determine which grasslands fall under this category yet without additional information from the EC. At the moment, the Dutch Benchmark concluded that none of the SFM schemes include this criterion.

(iii) Third, the term “lightly wooded land” is not defined in most of the SFM schemes, except PEFC. Again, PEFC uses December 2010 as cut-off date, which is later than the date given by the RED.
(iv) None of the SFMs explicitly address the preservation of peatlands. Although the definition of wetlands may include peatlands, it is questionable whether the SFMs hold this definition.

In Europe, the ministers responsible for forests in Europe have developed common principles, criteria and guidelines for sustainable forest management. An open-ended, ad-hoc working group on sustainability criteria for forest biomass production, including bio-energy, was initiated in response to new developments and other processes addressing the sustainability of biomass production, notably the emerging focus on the role of forests and sustainable forest management related to climate change and energy. Sweden had a leading role in the work. The Renewable Energy Directive was an important reason for establishing the working group (WG) and the possibilities to influence the developments on the Directive was a reiterating topic in the WG 6th meetings. In order to avoid different rules for and definitions of “sustainability” of forest biomass, used for energy versus other uses, the possibility of verification at national level for The Ministerial Conference on the Protection of Forests in Europe (MCPFE) signatories was suggested.

In conclusion, while the first issue could be solved by developing complementary assessment, and the second one is mainly a socio-economic consideration, the authors see these findings indicate that the third issue is the major one. To solve the confusion over the definition of land types, substantial discussion based on scientific knowledge is needed. The experience from liquid biofuels points to preventing conversion of high values lands to agriculture land. However, instead of land conversion, currently the main impact of the RED criteria on solid biofuels would be on the production of biomass from existing stands. The nature of liquid biofuels production and solid biofuels production should be clearly distinguished. While liquid biofuels are mainly produced from agriculture feedstock, solid biofuels mainly come from forestry and wood industry. To avoid overlooking sustainable sources of solid biomass, the types of forests might need to be redefined according to scientific findings and local conditions. The potential dispute over definitions of primary forests, lightly wooded forests and the others should be taken into considerations. Years of experience and opinions of experts from existing voluntary SFM frameworks should be taken as important components in setting up sustainability requirements for solid biofuels in the near future.

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