Verification Protocol for Sustainable Solid Biomass

Commissioned by the ministry of Economic Affairs
This document is a translation of the official Dutch version. In case of any doubt or difference between this translation and the original document, the Dutch version takes precedence and shall always be considered the correct version.
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1. Introduction

1.1 Purpose of the verification protocol

Sustainability criteria for solid biomass
Within the framework of the Dutch Energy Agreement, sustainability criteria have been formulated for the co-firing and co-gasification of biomass in coal-fired power plants (≥ 100 MW) and large-scale heat projects where steam is generated from the burning of wood pellets (≥ 5 MW). The criteria are included in the SDE+ Renewable Energy Production Incentive Scheme (Regeling van de minister van Economische Zaken van 24 februari 2016, nr. WIZ/16001395, tot wijziging van de algemene uitvoeringsregeling stimulering duurzame energieproductie). The SDE+ Scheme comprises the conditions that energy producers have to meet to obtain the SDE+ subsidy for producing renewable electricity and heat, including sustainability criteria for solid biomass. The sustainability requirements (principles and criteria) of the SDE+ Scheme have been incorporated into this protocol.

Demonstrating compliance with the sustainability criteria
Dutch energy producers applying for the SDE+ subsidy will need to demonstrate compliance with the sustainability criteria of the solid biomass that they use for energy production. Certificates originating from voluntary (and yet to be approved) certification schemes can be used for this purpose. When biomass is not certified for all criteria, verification of compliance with the sustainability criteria can be used for the remaining requirements. The energy producer can also choose not to use certified biomass and use verification for all requirements. This protocol describes how and under what conditions verification and certification can be used to prove sustainability of the biomass needed to qualify for subsidy. At the end of each year the energy producer submits to RVO.nl a conformity year statement based on certificates and verification statements for all underlying individual consignments.

Users of this Verification Protocol
- Energy Production Plants (EPPs) receiving SDE+ subsidy can use this protocol to make arrangements in their biomass supply chain to meet the sustainability requirements. Furthermore, by means of independent verification based on this protocol, EPPs can demonstrate compliance with the sustainability criteria of the solid biomass they use for energy production in their plants.
- This protocol is also aimed at verification bodies and auditors conducting verification under the SDE+ Scheme.
- Economic operators in the solid biomass supply chain of the EPPs that are obliged to demonstrate the sustainability of solid biomass are encouraged to use this protocol to implement the sustainability requirements and prepare for independent verification.

Future legislation for demonstrating sustainability
Within the coming years, new legislation will come into force in the Netherlands where this protocol will officially be appointed as a document for proving compliance with SDE+ sustainability criteria by the Dutch Minister of Economic Affairs. The Minister will also approve certification schemes that can be used to demonstrate compliance with (part of) the Dutch requirements under the new legislation. For now, several sustainable forest management certificates can be used to prove compliance with part of the requirements of this protocol. The procedure is explained in Chapter 2.
1.2 Scope

Economic operators in the Verification Protocol
This protocol applies to EPPs receiving SDE+ subsidy where:
• solid biomass is converted into steam by burning wood pellets, in a boiler with a capacity of ≥ 5 MW;
• solid biomass is used for co-firing and co-gasification with coal for conversion into renewable electricity in a coal-fired power plant with a capacity of ≥ 100 MW.

The EPPs must demonstrate the sustainability of all solid biomass used for energy production in their facility for which they receive SDE+ subsidy. Note that in order for the EPPs to prove compliance, all economic operators in the upstream biomass supply chain must demonstrate compliance (see Chapter 2). This Verification Protocol can be used for this purpose. This concerns economic operators not only in the Netherlands but all over the world. Verification bodies and auditors can use this Verification Protocol when conducting their verification and issuing their statements.

Types of biomass covered by the protocol
The Verification Protocol covers the following categories of solid biomass that may qualify for subsidy:

Category 1: Woody biomass from large Forest Management Units (FMUs ≥ 500 ha)
Branches, tops, trees and primary felling residues sourced directly from forests of 500 ha or larger. Unused wood that has the same composition as wood growing in the forest and that has not been mixed with or contaminated by foreign materials or substances.

Category 2: Woody biomass from small Forest Management Units (FMUs < 500 ha)
Branches, tops, trees and primary felling residues sourced directly from forests of less than 500 ha. Unused wood that has the same composition as wood growing in the forest and that has not been mixed with or contaminated by foreign materials or substances.

Category 3: Residues from nature and landscape management
Biomass residues (branches, tops, trees) produced in the course of managing urban and rural green spaces and nature areas, other than forests designated for the preservation, restoration or enhancement of specific natural, recreational or aesthetic functions. These also include biomass residues produced during routine maintenance of public green spaces and parks.

Category 4: Agricultural residues
Residues obtained directly from agricultural business. Short rotation crops are excluded, with the exception of the residues thereof.

Category 5: Biogenic residues and waste flows
Waste flows and residues from the agro-food and timber industry (secondary residual flows) and tertiary residual flows such as post-consumer wood waste.
1.3 Normative references/relevant documents

The following documents are relevant for the application of this protocol. Where there is reference to dated documents, only the cited version is applicable. Where there is reference to undated documents, the most recent version of the referred document (including Regulations) is applicable.

- ISO 19011, Guidelines for auditing of management systems;
- ISO/IEC 17025, General requirements for the competence of testing and calibration laboratories;
- ISAE3000 Assurance Standard;
- NTA8003:2008, Classification of biomass;
- Regulation of the Minister of Economic Affairs of 24 February 2016, No. WJZ/16001395, amending the General Regulations Implementing the Sustainable Energy Production (Incentive) Scheme, to adjust the sustainability requirements for solid biomass;
- BioGrace-II, the GHG calculation tool.
2. Verification basics

2.1 Participants in the verification process

The verification process follows the supply chain of the biomass. All economic operators and relevant subcontractors in the solid biomass supply chain must undergo third-party verification in order to demonstrate that the supplied biomass meets the requirements of this protocol. The independent third party is an conformity assessment body (CAB). Based on a risk analysis, the auditor of this CAB decides whether a subcontractor must also be audited. The economic operators are shown in the biomass supply chain in Figures 1 and 2.

The economic operator is defined as a legal entity that owns the biomass. Where economic operators hire subcontractors, responsibility for their compliance with the requirements rests with the economic operator. More details about the various economic operators involved in handling biomass are included in Table 1. Each economic operator can supply biomass to the next step in the supply chain using its own verification statement, which shows the buyer of the biomass that its seller supplies biomass compliant with the sustainability criteria. However, verification statements do not have to physically accompany the biomass consignments in each step in the supply chain. It is also possible to have a Conformity Assessment Body issue a verification statement at each economic operator at the end of the year, covering all biomass consignments supplied in that year.

The EPP must demonstrate sustainability for all biomass used for energy production in a given year. For this purpose, a Conformity Assessment Body must issue a conformity year statement to the EPP. For the conformity year statement the EPP needs verification statements and/or certificates for all biomass used for energy production.

Figure 1 Verification of category 1 and 2 solid biomass supply chain

Forest Management Units (FMU), Biomass Producers, subcontractors and energy production plants are possible actors in the categories 1 and 2 solid biomass supply chain and are subject to verification (see Figure 1). Only economic operators (who have legal ownership of the biomass) issue verification statements. This means that subcontractors’ activities performed on behalf of economic operators in the supply chain are part of the verification at the contracting economic operator concerned. Subcontractors do not receive verification statements themselves.
Economic operators supplying category 3, 4 or 5 biomass (referred to as Points of Origin, PO) are not subject to verification, but may be selectively audited during verification of the first collection point (FCP) depending on identified risks (see Figure 2).

**Figure 2. Verification of category 3, 4 and 5 solid biomass supply chain**

![Verification diagram]

**Table 1. Economic operators in the solid biomass supply chain**

<table>
<thead>
<tr>
<th>Economic operator</th>
<th>Subject to verification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Forest Management Unit (FMU)</strong></td>
<td>Yes*</td>
</tr>
<tr>
<td>One or more forest stands containing natural forest, planted forest or other types of forest that are managed as a single unit.</td>
<td></td>
</tr>
<tr>
<td><strong>First Collection Point (FCP)</strong></td>
<td>Yes</td>
</tr>
<tr>
<td>FCPs are economic operators that collect or receive category 3, 4 or 5 biomass directly from the point of origin. FCPs trade, distribute or further process the collected biomass. FCPs are responsible for the correct documentation of the categories and quantities of biomass collected.</td>
<td></td>
</tr>
<tr>
<td><strong>Biomass Producer (BP)</strong></td>
<td>Yes</td>
</tr>
<tr>
<td>This is mostly the pellet mill. BPs are economic operators that collect or receive category 1 and 2 biomass directly from FMUs. BPs trade, distribute or further process the collected biomass.</td>
<td></td>
</tr>
<tr>
<td><strong>Point of Origin (PO)</strong></td>
<td>No</td>
</tr>
<tr>
<td>POs are economic operators where category 3, 4 or 5 biomass occurs or is generated. POs are not subject to verification, but may be audited during the FCP verification based on identified risks.</td>
<td></td>
</tr>
<tr>
<td><strong>Subcontractor</strong></td>
<td>No</td>
</tr>
<tr>
<td>Company or organisation that has a contract with an economic operator for services or activities (for example harvesting, transport, storage). The subcontractor has no ownership of the biomass and therefore is not considered an economic operator in this protocol. A subcontractor can be audited during the verification of the hiring economic operator based on identified risks.</td>
<td></td>
</tr>
<tr>
<td><strong>Energy Production Plant (EPP)</strong></td>
<td>Yes</td>
</tr>
<tr>
<td>The subsidy recipient that runs a facility where sustainable solid biomass is processed into renewable electricity and/or renewable heat.</td>
<td></td>
</tr>
</tbody>
</table>

* For category 2 biomass in the case of a risk-based approach, the FMU is not subject to verification.
2.2 Biomass sustainability requirements

The SDE+ Scheme and this protocol cover five categories of requirements (principles, criteria and indicators):

1. Requirements for greenhouse gas (GHG) emission savings and calculation.
2. Requirements for soil management when using residues from nature and landscape management and agriculture.
3. Carbon and Land Use Change requirements.
4. Sustainable Forest Management (SFM) requirements.
5. Traceability and Chain of Custody requirements.

The requirements are divided into 15 Principles as reflected in Table 2 below.

Table 2 Requirements (Principles) applying to economic operators and biomass categories

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Applies to</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Requirements for greenhouse gas (GHG) emission savings and calculation</strong></td>
<td></td>
</tr>
<tr>
<td>Principle 1: The use of biomass shall lead to a substantial reduction in GHG emissions calculated across the entire chain in comparison with the use of fossil fuels.</td>
<td>EPP All categories</td>
</tr>
<tr>
<td><strong>Requirements for soil management when using residues from nature and landscape management and agriculture</strong></td>
<td></td>
</tr>
<tr>
<td>Principle 2: Soil quality shall be maintained and where possible improved.</td>
<td>FCP 3 &amp; 4</td>
</tr>
<tr>
<td><strong>Requirements for Carbon and Land Use Change</strong></td>
<td></td>
</tr>
<tr>
<td>Principle 3: Production of raw biomass may not result in the destruction of carbon sinks.</td>
<td>All FMUs 1 &amp; 2</td>
</tr>
<tr>
<td>Principle 4: The use of biomass may not result in a long-term carbon debt.</td>
<td>All FMUs 1 &amp; 2</td>
</tr>
<tr>
<td>Principle 5: Biomass production may not result in Indirect Land Use Change (ILUC).</td>
<td>FMU ≥ 500 ha 1</td>
</tr>
<tr>
<td><strong>Requirements for Sustainable Forest Management (SFM)</strong></td>
<td></td>
</tr>
<tr>
<td>Principle 6: Relevant international, national and regional/local laws and regulations shall be observed.</td>
<td>All FMUs 1 &amp; 2</td>
</tr>
<tr>
<td>Principle 7: Biodiversity shall be maintained and where possible enhanced.</td>
<td>All FMUs 1 &amp; 2</td>
</tr>
<tr>
<td>Principle 8: The regulating effect and the quality, health and vitality of the forest shall be maintained and where possible enhanced.</td>
<td>All FMUs 1 &amp; 2</td>
</tr>
<tr>
<td>Principle 9: The production capacity for wood products and the relevant non-timber forest products shall be maintained in order to safeguard the future of the forests.</td>
<td>All FMUs 1 &amp; 2</td>
</tr>
<tr>
<td>Principle 10: The management of the forest shall contribute to the local economy and create employment opportunities.</td>
<td>All FMUs 1 &amp; 2</td>
</tr>
<tr>
<td>Principle 11: SFM shall be achieved through a management system.</td>
<td>All FMUs 1 &amp; 2</td>
</tr>
<tr>
<td>Principle 12*: Forest managed by a group or regional association shall be sufficiently safeguarded for SFM.</td>
<td>All FMUs 1 &amp; 2</td>
</tr>
<tr>
<td><strong>Traceability and Chain of Custody requirements</strong></td>
<td></td>
</tr>
<tr>
<td>Principle 13: A Chain of Custody (CoC) shall be in place that covers the entire chain from the first link to the bioenergy producer. The CoC shall link the source to the material used in the product or product group, and quantify the GHG emissions of each individual link (operator).</td>
<td>All economic operators All categories</td>
</tr>
<tr>
<td>Principle 14: In case of a group management system of the CoC, the group as a whole shall meet the same requirements for the CoC as individual businesses.</td>
<td>All economic operators All categories</td>
</tr>
<tr>
<td>Principle 15: The logos and labels of a certification system that are printed on products and documents shall be unambiguous and shall be used in accordance with the rules of that certification system.</td>
<td>All economic operators All categories</td>
</tr>
</tbody>
</table>

The above requirements are outlined in detail in Chapters 3, 4, 5, 6 and 7.

* Because the requirements under P12 and P15 are mainly relevant in the context of certification rather than verification, they are not discussed in further detail in this protocol.
2.3 Temporary use of certificates for demonstrating compliance

Economic operators can use certificates originating from voluntary certification schemes to demonstrate compliance with the sustainability criteria. In the new legislative system, which is expected to become effective in 2018, certification schemes will be approved by the Dutch Minister of Economic Affairs. The purpose of the assessment of a certification scheme is to indicate what sustainability criteria are adequately covered by the scheme. For these criteria, the certification scheme can obtain approval by the Dutch Minister of Economic Affairs. This approval means that only for the criteria for which the certification scheme obtained approval, certificates from this scheme can be used as a means to demonstrate compliance with these sustainability criteria.

Until the new legislative system is in place, the use of certificates for demonstrating compliance is allowed temporarily based on Table 3. This table shows which groups of criteria are covered by the various certification schemes and, consequently, for which criteria these schemes may be used to demonstrate compliance. The list below contains schemes that were already assessed before:

- by the Timber Procurement Assessment Committee (TPAC) to demonstrate compliance with the Dutch requirements for sustainable procurement of timber, or
- by the European Commission to demonstrate sustainability in the framework of the Renewable Energy Directive for biofuels and bioliquids.

For each scheme, it is stipulated for which principles it may be used during the transition period. A certification scheme may only be applied as a means to demonstrate compliance if the type of solid biomass used comes within the scope of that scheme.

When certification schemes are used, they can be mentioned in the verification statement, without the statement giving any guarantee of the underlying principles. Assessment of the assurance of these schemes as such is not included in the verification activities performed under this protocol.

Table 3: Overview of certification schemes and the principles for which they may be used to demonstrate compliance during the transitional period

<table>
<thead>
<tr>
<th></th>
<th>P1 GHG emission data in the chain *</th>
<th>P1 Energy producer (GHG emission reduction)*</th>
<th>P2 Soil quality</th>
<th>P3-P11 Carbon and Sustainable Forest Management</th>
<th>P13-P14 Chain management</th>
<th>Controlled biomass</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSC (100% compliant)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>FSC (controlled wood)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEFC (100% compliant)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>PEFC controlled sources</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SBP/GGL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>EU-recognised systems (e.g. ISCC-EU, NTA 8080)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BioGrace-II</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* EC recognition does not include the calculation of the total GHG emission reduction achieved in the power plant and the supply chain. The reason for this is that certification schemes do not cover the final conversion from biomass to electricity and/or heat in the power plant. This final step can only be assessed by means of BioGrace-II.

Re FSC and PEFC: The use of FSC® controlled wood and PEFC controlled sources is allowed for controlled biomass as defined in the list of definitions in this protocol.

Re PEFC: Only the systems approved by TPAC (www.tpac.smk.nl) may be used.
Re SBP, GGL, FSC en PEFC: The difference between category 1 and 2 material is the size of the forest of the FMU from which the biomass was sourced. This aspect is not recognised in the FSC of PEFC schemes. It is however relevant for this protocol in the determination of the applicable sustainability requirements and whether the risk-based approach can be used (see 2.4 and Chapter 8). If the information of the size of the FMU is not available, biomass should be considered category 1.

Re SBP/GGL: It is possible for FSC/PEFC certified biomass to flow through the Chain of Custody to the EPP under GGL or SBP certification. An economic operator that works with SBP/GGL needs to ensure that SBP/GGL is applied to FSC/EFC certified biomass and the CO₂ emission data are correctly applied, following the rules of this protocol.


2.4 Compliance with forest criteria using Risk Based Approach

In the SDE+ Scheme, eventually, the verification of biomass sustainability must take place at FMU level. However, for small forest units (< 500 ha) the SDE+ Scheme contains a growth path for verification or certification (see Table 4 for more detailed information). This means that smaller FMUs do not need to be subjected to FMU level verification. The biomass producer may demonstrate compliance with the SFM criteria using a Risk Based Approach (RBA, see Figure 3).

*Figure 3* Verification of compliance with SFM criteria based on a Risk Based Approach at the biomass producer
The biomass producer will need to produce sufficient evidence to demonstrate that the (initial or residual) risk level is ‘low’ for each SFM criterion. For each criterion with a higher risk level in the region concerned, mitigation measures must be implemented. These measures must be effective and be monitored by the biomass producer in such a way that the risk of non-compliance is reduced to a ‘low’ level.

The requirements for demonstrating compliance using a risk based approach are set out in Chapter 8.

The period in which compliance with the SFM criteria can be demonstrated using an RBA depends on the first year in which the EPP receives SDE+ subsidy, as indicated in Table 4. The starting year is considered the first year subsidised biomass is used to generate energy.

### Table 4  Period during which RBA can be applied at the BP to demonstrate compliance with SFM criteria in smaller forests

|----------------------------------|------|------|------|------|------|------|

In this regard, it is of great importance for the EPP receiving subsidy to inform its supply chain about the period for which the RBA can be used to demonstrate compliance with the SFM criteria. For category 2 biomass (from FMUs < 500 ha), the verification statement will specify whether the risk based approach has been applied.

The RBA may also be used to demonstrate compliance with the criteria for controlled biomass. Controlled biomass is defined as category 1 or 2 biomass that meets principles 3, 4 and 5 and criteria 7.3 and 7.1 of the SDE+ Scheme. Chapter 7 provides the mixing rules under which controlled wood can be used for verification under this protocol.

### 2.5  Overview of verification

#### 2.5.1  Responsibility of economic operators

Each economic operator in the sustainable biomass supply chain is responsible for implementing the requirements of this protocol, and for the completeness and correctness of the information relevant to the verification. The economic operator must review and confirm its processes and documentation to be in compliance with the requirements before supplying biomass to the next economic operator.

As the party with legal obligation under the SDE+ Scheme, the EPP is expected to have processes in place (e.g. contractual agreements, supplier evaluations) to promote compliance with the requirements of this protocol within the entire sustainable biomass supply chain.

#### 2.5.2  The verification process

Economic operators up to the EPP can demonstrate compliance with the requirements of this protocol through a verification process. Normally this verification would take place (in one step) after production of the biomass, but it is also possible to do part of the verification up front. The options are described below.

**One-stage verification process**

This is a post-delivery verification, verifying whether the quantities of biomass that have already been supplied (or received and processed by an EPP) meet the requirements of this protocol. One-stage verification is always based on:
consignments of sustainable biomass that the economic operator has supplied to the next economic operator (buyer/receiver) during a certain period of time, and the available information on the sustainability of the supplied biomass. Supplied sustainable biomass must comply with the principles, criteria and indicators in this protocol. A successful verification results in a verification statement for each customer to which the economic operator supplies biomass; or on the consignments of sustainable biomass received during a year by an EPP receiving SDE+ subsidy and processed into renewable electricity and possibly renewable heat, and the available information on the sustainability of the received biomass. Received sustainable biomass must comply with the principles, criteria and indicators in this protocol, including the requirements for GHG emission savings and mass balance and Chain of Custody. A successful verification results in a conformity year statement.

**Two-stage verification process**
This verification process for economic operators up to the EPP consists of an annual pre-verification compliance audit and a subsequent (post-delivery) verification. During the pre-verification compliance audit, the Conformity Assessment Body reviews compliance with the principles, criteria and indicators in this protocol. A successful pre-verification compliance audit results in a pre-verification statement. In that case, in the subsequent verification information form the pre-verification can be used for the assessment of compliance of the supplied biomass. A successful post-delivery verification results in a verification statement.

**Splitting of statements**
Splitting of a statement may be requested if the biomass covered by the verification is delivered to two or more different buyers after declaration. Splitting is allowed under the following conditions:
- Statements can only be split by the Conformity Assessment Body that issued the original statement.
- The original statement to be split must be submitted to the Conformity Assessment Body and cannot be used again.
- The Conformity Assessment Body will subsequently issue one or more statements for an amount of biomass not exceeding the total amount on the original statement.
- The sustainability characteristics stated on the original statement will be allocated to the new statements, in order to comply with mass balance requirements and the emission reduction calculation rules.
- New statements issued after splitting will state that they originate from a split, together with the unique identification code of the original statement.
- The split must be traceable in the mass balance and in the GHG balance.
2.6 Pre-Verification, Verification & Conformity year statements

CABs issue a pre-verification, verification or conformity year statement based on a successful audit of an economic operator. The Conformity Assessment Body keeps a register of all issued pre-verification, verification and conformity year statements, containing:

- the unique number of the issued statement;
- statement date;
- name and address of the economic operator for which the statement was issued;
- name and address of the recipient of the sustainable biomass (only for the verification statement).

Sections 2.6.1 to 2.6.3 describe the requirements and contents of the pre-verification, verification and conformity year statements.

2.6.1 Pre-verification statement

Purpose of the pre-verification statement
Statement based on a yearly audit at an economic operator before the actual delivery of a biomass consignment has taken place. When a consignment is accompanied by a pre-verification statement, the recipient can be more certain that the economic operator will be able to deliver biomass that complies with the requirements of this protocol. In the subsequent verification, information from the pre-verification can be used for the assessment of compliance of the supplied biomass.

General requirements
A pre-verification statement can only be issued for one geographical site of an economic operator (i.e. FMU, Warehouse or Processing Unit) or a group of FMUs.

Content of the pre-verification statement
Each pre-verification statement must contain the following information:

- Name and address of the economic operator that has undergone the pre-verification compliance audit;
- Legal framework and requirements (this protocol) the pre-verification was based on;
- For the requirements in the previous bullet, per (group of) requirements:
  - A statement that the processes and procedures of the economic operator comply with the relevant requirements of this protocol; or in the case of the use of certification, a statement that the economic operator is certified for a relevant certification scheme according to Table 3 of this protocol;
- A unique code in AAA-PXXXXX-20zz format, where:
  - AAA is a letter code, provided by the RVO.nl, referring to the issuing CAB;
  - P indicates the type of statement: pre-verification statement;
  - XXXXX is a unique sequence number for each pre-verification statement;
  - 20zz is the year in which the compliance statement is issued;
- Date of issue of the pre-verification statement;
- Date of completion of the pre-verification compliance audit;
- Name/signature of the Conformity Assessment Body.

2.6.2 Verification statement

Purpose of the verification statement
The verification statement confirms compliance to (part of the) sustainability requirements. Only at the EPP it is possible to show full compliance, because only then can all GHG emissions be calculated. Also, at the EPP it is possible to confirm that all information needed to calculate the GHG emissions has gone through the Chain of Custody correctly. A verification statement is issued for each consignment from one economic operator to the next in the Chain of Custody in a certain period of time.
General requirements
A verification statement can only be issued for one geographical site of an economic operator up to the EPP (i.e. FMU, Warehouse or Processing Unit) or a group of FMUs. The verification statement reflects the quantities and sustainability characteristics of the supplied sustainable biomass. A separate statement is issued for each economic operator in the chain receiving sustainable biomass. If sustainability is proven in combination with certificates for a number of criteria, the criteria covered by the verification statement are specifically mentioned in the statement. The relation between certificates and verification is further explained in section 2.3.

Each economic operator supplying sustainable biomass submits a copy of the verification statement to the economic operator receiving the sustainable biomass as proof that the supplied quantities of sustainable biomass comply with the requirements of this protocol.

The verification statement
Each verification statement must contain as a minimum the following information:

- Name and address of the economic operator that has asked for the verification statement;
- Legal framework and requirements (this protocol) the verification is based on;
- Description of the verification activities;
- Product description;
- Quantities (in tonne) of supplied sustainable and controlled biomass; in the case of supply to the EPP, including information relevant to the EPP for defining the correct NTA 8003:2008 code.

Sustainability characteristics for each sustainable biomass consignment:
- Type of solid biomass;
- Biomass category (1, 2, 3, 4 or 5);
- Does the consignment qualify as controlled biomass (yes/no);
- Country of origin of the biomass (country of the FMU or PO the biomass originated from);
- GHG emission (in g CO₂-eq/MJ energy carrier) (and/or information enabling the use of default values further down the chain. This information must be sufficient to enable correct selection of category in Appendices 2 and 3 for deliveries to the EPP (MJ on lower heating value);
- If the economic operator used certificates, which certificates were used and which principles they covered according to table 3.

Overall:
- A statement of the CAB the supplied quantities of sustainable and controlled biomass reflected in the verification statement meet the requirements of this protocol, and that they are covered by verification or certification;
- Name and address of the economic operator that received the sustainable biomass;
- A unique code in AAA-VXXXXX-20zz format, where:
  - AAA is a letter code, provided by RVO.nl, referring to the issuing Conformity Assessment Body;
  - V indicates the type of statement: verification statement;
  - XXXXX is a unique sequence number for each verification statement;
  - 20zz is the year in which the verification statement is issued;
- Date of issue of the verification statement;
- Name/signature of the Conformity Assessment Body.

2.6.3 Conformity year statement

Purpose of the conformity year statement
The conformity year statement enables the EPP to prove the sustainability of the solid biomass used for SDE+ subsidy in a specified calendar year; that certificates are used as indicated in the protocol and that the format for annual reporting to RVO.nl was completed correctly.
**General requirements**

A conformity year statement can only be issued for an EPP receiving SDE+ subsidy. The EPP submits the conformity year statement to RVO.nl to demonstrate compliance with the SDE+ Scheme for the quantities of sustainable and controlled biomass used for energy production.

Because the annual biomass used for energy is not necessarily the same as the biomass delivered to the EPP in that period, the proof of conformity with the requirements of the Regulation cannot solely be based on the verification statements.

**The conformity year statement**

Each conformity year statement must contain as a minimum the following information:

- Name and address of the EPP and address of the installation verified;
- Legal framework and requirements (this protocol) the verification was based on;
- Year covered by the statement;
- Description of the verification activities;
- List of all consignments of biomass used in a year, including a description and the amount (quantities in Mtonnes) of sustainable and controlled biomass processed into renewable electricity and/or renewable heat, and the following sustainability characteristics:
  - Type of solid biomass;
  - Biomass category;
  - Controlled biomass (yes/no);
  - Country of origin of the biomass (country of the FMU or PO the biomass originated from);
  - GHG emission of supplied biomass (default or calculated values). Calculated values are reflected in g CO$_2$/MJ (electricity) or MJ( heat);
  - Lower heating value (in MJ/kg);
  - Whether or certificates (as indicated in Table 3) that were used, if so which ones were used and what criteria they cover;
  - Whether verification statements were used, including criteria they covered;
  - A statement of the CAB that each consignment received and processed biomass reflected in the conformity year statement meets the requirements of this protocol.

For the year:

- Average emission reduction in % compared to the given reference$^1$;
- Used controlled biomass in categories 1 and 2 as a % of the total category 1 and 2 material;
- A conclusion of the CAB that the EPP complies with the requirements of this protocol;
- A unique code in AAA-CXXXXX-20zz format, where:
  - AAA is a letter code, provided by RVO.nl, referring to the issuing Conformity Assessment Body;
  - C indicates the type of statement: conformity year statement;
  - XXXX is a unique sequence number for each conformity year statement;
  - 20zz is the year in which the conformity year statement is issued;
- Date of issue of the conformity year statement;
- Named/signature of the Conformity Assessment Body.

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$^1$ This applies only to solid biomass. Liquid biomass needs to meet the requirements of the RED.
2.7 Verification Bodies

Auditors conduct verification audits on behalf of a Conformity Assessment Body. A Conformity Assessment Body is only allowed to conduct verifications and issue pre-verification, verification or conformity year statements under this protocol, when it is able to prove it has relevant expertise. For an overview of requirements for verification bodies and auditors, see Chapter 9.
3. Requirements for total GHG savings

The requirements in this chapter apply to Energy Production Plants (EPP) that process sustainable biomass in renewable electricity and/or heat. An economic operator complies with the principle and related criterion if compliance with all applicable underlying indicators is demonstrated.

3.1 Criteria and indicators principle 1

**Principle 1:** The use of biomass shall lead to a substantial reduction in GHG emissions calculated across the entire chain in comparison with the use of fossil fuels.

**C 1.1** The reduction in CO₂eq emissions is calculated to be a minimum of 70% per year on average based on the EU reference value. The average emissions have a maximum of 56 g CO₂-eq/MJ for electricity and 24 g CO₂-eq/MJ for heat. No consignment of biomass shall result in emissions above 74 g CO₂-eq/MJ for electricity and 32 g CO₂-eq/MJ for heat.

**Indicators**

<table>
<thead>
<tr>
<th>1.1.1</th>
<th>The EPP shall calculate, using BioGrace-II, the total GHG emissions in gram CO₂ of sustainable biomass processed into renewable electricity and/or heat, based on:</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>• default values in Appendix 2; or</td>
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<td></td>
<td>• calculated values using the latest version of the BioGrace-II calculation tool (or, with valid justification,</td>
</tr>
<tr>
<td></td>
<td>• an equivalent tool that follows the calculation methodology in Appendix 1); or</td>
</tr>
<tr>
<td></td>
<td>• a combination of calculated values and disaggregated default values where appropriate.</td>
</tr>
<tr>
<td></td>
<td>The requirements on mixing in the section on mass balancing apply. The EPP shall register all relevant data.</td>
</tr>
</tbody>
</table>

| 1.1.2 | The calculated reduction of CO₂-eq emissions over an average of one year shall be a maximum of  |
|-------| 56 g CO₂-eq/MJ for electricity and 24 g CO₂-eq MJ for heat. Emission reductions shall be calculated using BioGrace-II. |

| 1.1.3 | All individual supplies of biomass shall result in emissions below or equal to a value of 74 g CO₂-eq/MJ for electricity and 32 g CO₂-eq/MJ for heat. |
4. Sustainability requirements for residues from nature/landscape management and agriculture

The sustainability requirements in this chapter apply to First Collecting Points (FCPs) that collect residues from nature and landscape management (category 3 biomass) and agriculture (category 4 biomass).

An economic operator complies with the principle and related criterion if compliance with all applicable underlying Indicators is demonstrated.

As described in section 9.2.2 of this protocol, each verification procedure starts with a strategic risk analysis, the main objective of which is to identify the aspects that need more or less attention in the audit. The scale and intensity of the activities producing category 3 and 4 material will influence the risks of non-compliance with criteria and indicators in this protocol as well as the measures to be taken by the economic operators. Examples include the risk of erosion or the importance of the nutrient balance for the different types soil concerned.

4.1 Criteria and indicators principle 2

Principle 2: Soil quality shall be maintained and where possible improved

C 2.1 Best practices shall be applied for the maintenance or improvement of the soil and soil quality in relation to production, or the management objectives as these have been included in a management plan.

<table>
<thead>
<tr>
<th>Indicators</th>
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</table>
| 2.1.1 The First Collection Point (FCP) shall demonstrate that the supplying Point of Origin (PO) has a policy or a plan for maintaining (and where possible improving) soil quality, based on local best practices. When relevant, this plan shall include:  
1. Key objectives of soil management;  
2. Measures to prevent erosion;  
3. Maintenance of the soil nutrient balance (nitrogen, phosphorus, potassium);  
4. Maintenance of soil organic matter, soil fertility, structure and salinity; |
| 2.1.2 The FCP shall hold relevant information (e.g. reports from the PO, audit reports, monitoring data) to demonstrate that the plan or policy has been implemented. |
5. Carbon and land use change requirements

The criteria and indicators for carbon and land use change in this chapter apply to biomass from categories 1 and 2 (C5.1 only category 1). An economic operator meets the principles and related criteria when conformity with all applicable underlying indicators is demonstrated.

5.1 Criteria and indicators principle 3-5

Principle 3: Production of raw biomass may not result in the destruction of carbon sinks

C3.1 Biomass shall not be sourced from permanently drained land that was classified as peatland on 1 January 2008, unless it can be demonstrated that the production and harvesting of the biomass does not result in water depletion of a previously undrained soil.

<table>
<thead>
<tr>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1.1 The economic operator shall demonstrate that the biomass is not sourced from permanently drained land that was classified as peatland on 1 January 2008 unless Indicator 3.1.2 applies.</td>
</tr>
<tr>
<td>3.1.2 If indicator 3.1.1 cannot be fulfilled, the economic operator shall demonstrate that the production and harvesting of the biomass does not result in water depletion of a previously undrained soil.</td>
</tr>
</tbody>
</table>

Guidance
Comparing two or more types of relevant information (e.g. area photographs, satellite images, land register documents/certificates, online maps/databases, site surveys, NGO reports, Forest Management Plans (FMPs)) for the situation before and after 1 January 2008 is considered an appropriate method for providing clear and sufficient evidence. When only one type of relevant information is available to compare the situation before and after 1 January 2008, additional evidence is required that may consist of:

- Environmental Impact Assessments of expansions since 1 January 2008 (showing that no conversion of peatland has taken place) conducted with appropriate assessment tools. Appropriate assessment tools include databases like the Harmonized World Soil Database;
- Reports of consultation with relevant stakeholders (State Environmental Agency, local community, NGOs) confirming that no conversion of peatland occurred after 1 January 2008.

C3.2 Biomass shall not be sourced from land that was converted from wetland to an alternative, dryer ecosystem after 1 January 2008.

<table>
<thead>
<tr>
<th>Indicator</th>
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<tbody>
<tr>
<td>3.2.1 The economic operator shall demonstrate that the biomass is not sourced from land that was converted from wetland to an alternative (drier) ecosystem after 1 January 2008.</td>
</tr>
</tbody>
</table>

Guidance
Comparing two or more types of relevant information (e.g. area photographs, satellite images, land register documents/certificates, online maps/databases, site surveys, NGO reports, FMPs) for the situation before and after 1 January 2008 is considered an appropriate method for providing clear and sufficient evidence. When only one type of relevant information is available to compare the situation before and after 1 January 2008, additional evidence is required that may consist of:

- Environmental Impact Assessments of expansions since 1 January 2008 (showing that no conversion of peatland has taken place) conducted with appropriate assessment tools. Appropriate assessment tools include databases like RAMSAR Convention, the Modis Land Cover Database and the World Intact Forest Landscape Database;
- Reports of consultation with relevant stakeholders (State Environmental Agency, local community, NGOs) confirming that no conversion of wetland into any dryer land occurred after 1 January 2008.
C3.3 Biomass shall not be sourced from production forests (including wood plantations) that were created by means of conversion of natural or semi-natural forest after 31 December 1997.

Indicator

3.3.1 If biomass originates from wood plantations where conversion has taken place of natural or semi-natural forests, the economic operator shall demonstrate whether this conversion occurred before or after December 1997.

Guidance

A wood plantation is an FMU consisting of forest stands which are established through planting and/or seeding in the context of afforestation or reforestation. They consist either of introduced species (all planted stands) or of intensively managed stands of native species complying with the following criteria:

- One or more species per plantation;
- Uniform age class distribution;
- Regular planting distance.

Note however that enrichment planting after clear-cutting within an FMU could be part of sustainable management of natural or semi-natural forests depending on the scale and intensity of the forest management.

Principle 4: The use of biomass may not result in a long-term carbon debt

C4.1 The FMU where the wood is sourced shall be managed with the aim of retaining or increasing carbon stocks in the medium or long term.

Indicator

4.1.1 The economic operator shall provide clear and sufficient evidence that harvesting rates and methods ensure that carbon stocks, in terms of tree stands or other carbon proxies, are maintained or increased in the medium or long term.

C4.2 Biomass shall not be sourced from stumps unless these stumps had to be removed from the site for other reasons than wood or biomass production.

Indicators

4.2.1 The biomass producer shall demonstrate that the risk of accepting or accidentally accepting unregistered wood or biomass from trunks received from its suppliers can be considered low.

4.2.2 The biomass producer shall register all wood or biomass received from stumps.

4.2.3 In the event stumps are removed and used for biomass, the biomass producer shall demonstrate that these stumps had to be removed from the site for other reasons than wood or biomass production (e.g. road construction).

C4.3 On average less than half the volume of the annual round wood harvest from forests shall be processed as biomass for energy generation.

Indicators

4.3.1 The economic operator shall have relevant information available showing that less than 50% of annual harvested round wood (excluding thinning) in its sourcing region is used for production of biomass products for energy generation. Round wood from production forests with a rotation period of less than 40 years is exempt from this criterion. Relevant information in this regard is any government report, NGO report, local economy statistics or similar information reflecting the allocation for biomass originating from the region.

4.3.2 In the absence of regional biomass allocation information (as indicated in 4.1.1), the economic operator shall provide clear and sufficient evidence (e.g. total harvested and supplied wood and volumes supplied to pellet mills) that less than 50% of annual harvested round wood (except thinning wood) is sold to pellet mills. Round wood from production forests with a rotation period of less than 40 years is exempt from this criterion.
**Principle 5: Biomass production may not result in Indirect Land Use Change (ILUC)**

**C5.1** Biomass sourced from new bioenergy plantation systems that were planted after 1 January 2008 shall have a demonstrably low ILUC risk.

**Guidance**

The GLOBIOM study² (2015) commissioned by the European Commission demonstrated that in case of new biomass energy production systems (with a short rotation time):

- land conversion due to new energy plantations does not lead to displacement of food production (in particular because it takes place on abandoned land and other natural land);
- overall no CO₂ emissions take place, but CO₂ sequestration (i.e. negative ILUC emissions due to large carbon storage in biomass) does.

Even if new biomass energy production systems are partly established on land used as cropland until the date of conversion, overall no CO₂ emissions take place (comparable with the scenario of perennial crops in the GLOBIOM study). The ILUC impact because of the use of partly agricultural land leads to displacement of food/feed production. However, this emission effect is more than offset by the sequestration of carbon in biomass and soil through energy wood production.

The GLOBIOM study is taken as a basis for assessing the ILUC risk of biomass as elaborated in the decision tree below. More detailed information on this approach can be found in Appendix 4.

---

Decision tree for the ILUC criterion

1. The biomass is sourced from a large FMU (> 500 ha) (category 1)
   - No: The ILUC criterion does not apply
   - Yes

2. The biomass is sourced from a new plantation system that was planted after 1 January 2008
   - No: The ILUC criterion does not apply
   - Yes

3. The biomass is sourced from a plantation system with a short rotation period (2-10 years for biomass grown from stumps of the previous harvest or ≤ 20 years for biomass from harvested trees)
   - No: The ILUC criterion does not apply
   - Yes

4. The plantation system is specifically developed for the production of biomass for energy generation
   - No: The ILUC criterion does not apply
   - Yes

5. The bioenergy cultivation plantation system is established on land mainly (> 50%) in use as cropland until the date of conversion
   - No: The ILUC risk is low (net CO2 sequestration)
   - Yes

   Low ILUC risk must be made plausible (using the GLOBIOM model or equivalent)

---

3 There is a risk that a possible increase in CO2-emissions cannot be fully compensated by carbon sequestration in plantations (net ILUC emission), however this risk is expected to be low.

4 The GLOBIOM-model builds on the LIBB-method mentioned in the guidance with the criterion.
6. Sustainable forest management requirements

The Sustainable Forest Management (SFM) criteria and indicators in this chapter apply to category 1 and 2 biomass. In case of category 2 biomass FMUs and Biomass Producers may (temporarily) use an RBA to demonstrate compliance with the SFM requirements. If indicators cannot be used for the risk assessment, other means of verification may be used. This shall be made transparent to the CAB during the verification process (see section 8.3.1 of this protocol).

An Economic Operator complies with a principle and related criteria if it is able to demonstrate compliance with all applicable underlying indicators. As indicted in section 9.2.2 of this protocol, each verification includes a strategic risk assessment, the main objective of which is to identify which compliance aspects need to be given extra attention during the verification process. The scale and intensity of the forest management will influence the risk of non-compliance with the criteria and indicators of this protocol as well as the measure to be taken by the economic operator. Aspects of scale and intensity of the forest management are relevant for such activities as the identification, monitoring and protection of areas of high conservation value (C7.1), protection of endangered species (C7.2), requirements for the contribution to the local economy (C10.1) and the management plans and systems in place for forest management (C11.1, C11.2, C11.3, C11.5).

6.1 Criteria and indicators principle 6-12

Principle 6: Relevant international, national and regional/local laws and regulations shall be observed

C6.1 The forest manager holds the legal right to use the forest.

<table>
<thead>
<tr>
<th>Indicator</th>
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</table>
| C6.1.1 Documentation (e.g. cadastral registrations, licenses, permits), including associated maps (when applicable), demonstrating legal rights to manage the land as forests and manage and utilise its forest resources shall be provided.

**Guidance**

Legal rights comprise at a minimum:

- Land tenure and management rights;
- Concession licenses;
- Harvesting permits;
- Legally required licenses for the exploitation, payment, and claims related to ecosystem services.

C6.2 The forest manager complies with all obligations to pay taxes and royalties.

<table>
<thead>
<tr>
<th>Indicator</th>
</tr>
</thead>
</table>
| C6.2.1 Clear and sufficient evidence (statement from tax authorities, auditor’s statement, payment receipts) that all taxes and royalties related to forest management are paid correctly (timely and in full) is provided.

**Guidance**

This includes all legally required taxes/royalties, such as (but not limited to):

- Forest harvesting fees such as royalties, stumpage fees and other volume-based fees, including payments based on correct classification of quantities, qualities and species;
- Sales taxes which apply to wood being sold, including sale of wood as growing forest (standing stock sale);
- Taxes on income and profit related to profits derived from the sale of forest products and harvesting activities.
C6.3 All applicable anti-corruption legislation is observed. If no anti-corruption legislation exists, the forest manager must take alternative anti-corruption measures proportionate to the scale and intensity of the management activities and the risk of corruption.

**Indicators**

| 6.3.1 | The economic operator is aware of any applicable anti-corruption laws and regulations and has a system in place to monitor its performance against these. |
| 6.3.2 | In countries with a Corruption Perception Index (CPI) lower than 50 and where anti-corruption laws and regulations do not exist or are ineffective, the economic operator ensures that staff whose roles carry a higher level of risk in the area of ethical business practice (e.g. sales, harvesting, logistics, dealing with local officials) are trained on what action to take in the event of an issue arising in their area. |
| 6.3.3 | In countries with a Corruption Perception Index (CPI) lower than 50 and where anti-corruption laws and regulations do not exist or are ineffective, the economic operator has a transparent and effective system in place for confidentially reporting and dealing with unethical business practices without fear of reprisals towards the reporter. |

**Principle 7: Biodiversity must be maintained and where possible enhanced**

C7.1 Sites with high conservation values and representative areas of the forest types that are found in the FMU have been identified and are protected and where possible enhanced.

**Indicators**

| 7.1.1 | Areas of high conservation value and representative areas of forest types within the FMU are identified, using available regional high conservation value surveys, relevant databases and maps. In the absence of reliable high conservation value surveys, maps or databases, the following (additional) sources are used to identify areas of high conservation value:  
• Consultation with local communities;  
• Consultation with local and regional experts;  
• Other credible documentary evidence. |
| 7.1.2 | Appropriate strategies and actions have been established and implemented to maintain and/or enhance the identified areas of high conservation value and representative areas within the FMU. Strategies and actions take into account existing national and local legislation for protection of high conservation values, and include monitoring and evaluation of effectiveness. |
| 7.1.3 | Local communities must be involved in the establishment and evaluation of strategies and actions to maintain and/or enhance the areas of high conservation value if they were consulted for the identification of these areas. |

C7.2 Measures have been taken to protect endangered plant and animal species and, if applicable, to increase the populations and enhance the habitats of these species.

**Indicators**

| 7.2.1 | Threatened and endangered species and their habitats (e.g. nesting and feeding areas) that are present or are likely to be present within the FMU are identified based on 'best available information' known to and observed by the economic operator, and on what could be learnt from neighbours and other local stakeholders. |
| 7.2.2 | In the presence of threatened and endangered species within the FMU, appropriate forest management practices to protect or maintain the presence of threatened or endangered species and their habitats within the FMU have been defined and implemented. Appropriate forest management practices include, but are not limited to:  
• Conservation zones (or protected areas). Size and location of the conservation zones conform to national and local legislation and are sufficient to guarantee the continuing presence of the identified species. Conservation zones have been identified and marked on maps and, where necessary, on the ground in a way that is visible when entering the zone; and  
• Reduced harvesting methods to protect nesting and breeding sites. |

**Guidance**

Conservation zones are not necessarily woodland. They may include wetlands and open space, and may have dual purposes.
C7.3 The conversion of forests within the FMU to other forms of land use, including wood plantations, is not permitted unless:
- the area concerned is small (the total converted area over the years is no greater than 5% of the area of the FMU on benchmark date 1 January 2008); and
- it clearly leads to long-term advantages for nature conservation; and
- there is no damage or threat of damage to areas with a high conservation value.

### Indicators

<table>
<thead>
<tr>
<th>7.3.1</th>
<th>Any parts of the FMU that are scheduled for conversion from natural or semi-natural forest to plantation or any other kind of non-forest land use have clearly been identified and documented.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.3.2</td>
<td>The areas scheduled for conversion shall total less than 5% of the total area of the FMU as of 1 January 2008.</td>
</tr>
<tr>
<td>7.3.3</td>
<td>The areas scheduled for conversion do not damage or threaten any area of high conservation value.</td>
</tr>
</tbody>
</table>

### Guidance

Clear long-term advantages for nature conservation means that the conversion fits in a long term forest management plan and the related forest management measures. If, for example, the conversion is part of the construction of a road and this road is acceptable for nature conservation and the construction complies with all requirements than the conversion is compliant with C7.3. The requirements of C7.3 are referring to conversion within an FMU to other types of land use, including wood plantations. Beside this biomass from wood plantations that were created by conversion of natural or semi natural forests after 31 December 1997 is not accepted according to C7.3.

C7.4 In the case of wood plantations, there is a preference for native species, and a relevant percentage of the plantation must be able to revert to natural forest at a later stage.

### Indicators

<table>
<thead>
<tr>
<th>7.4.1</th>
<th>In the case of wood plantations, it is demonstrated through documented trials that the selection of species for planting is based on their overall suitability for the site and their appropriateness to the management objectives.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.4.2</td>
<td>Any choice to use exotic species and genotypes must be clearly justified.</td>
</tr>
<tr>
<td>7.4.3</td>
<td>Representative samples of existing natural ecosystems, which shall cover at least 5% of the area of the FMU, are managed so as to retain them or restore them to their natural state, based on the identification of key biological areas, consultation of stakeholders, local government and scientific authorities.</td>
</tr>
</tbody>
</table>

C7.5 Exploitation of non-timber forest products, including products from hunting and fishing, is regulated, monitored and controlled, among others to safeguard the maintenance of the biodiversity in the forests.

### Indicator

| 7.5.1 | The FME identifies and complies with all legal requirements applicable to the management and/or collection of the non-timber forest products in question, including CITES. |
Principle 8: The regulating effect and the quality, health and vitality of the forest must be maintained and where possible enhanced

C8.1 The soil quality of the FMU is maintained and if necessary improved, with special attention to coasts, river banks, erosion-sensitive areas and sloping landscapes.

**Indicators**

8.1.1 Specific measures have been taken to maintain and if necessary improve the soil within the FMU in terms of structure, fertility and biological activity. As a minimum, site preparation and harvesting methods within the FMU have been designed to minimise soil compaction and maximise the retention of nutrients on-site.

8.1.2 All forestry operations within the FMU with a potential negative environmental impact, with an emphasis on watershed protection (e.g. coasts, riverbanks), areas susceptible to erosion and slopes, are accompanied by appropriate control systems and procedures. Control systems are based on national or regional best practices with regard to erosion and sediment control, minimisation of forest damage during harvesting, road construction and other mechanic disturbances under specific weather conditions (all-weather harvesting vs. dry weather harvesting).

C8.2 The water balance and quality of both groundwater and surface water in the Forest Management Unit and downstream (outside the FMU) must be at least maintained and where necessary improved.

**Indicators**

8.2.1 Forest operations or any other activity within the FMU should not negatively impact the local hydrology of natural water courses, water bodies, riparian zones and their connections.

8.2.2 All forestry operations within the FMU with a potential negative environmental impact are accompanied by appropriate control systems and procedures with regard to protection of water resources both within and downstream from the FMU, based on national and regional best practices.

C8.3 Important ecological cycles present in the FMU are preserved, including carbon and nutrient cycles.

**Indicators**

8.3.1 Site preparation and harvesting methods have been designed to minimise soil compaction and maximise the retention of nutrients on-site.

8.3.2 There is evidence that specific measures have been taken to ensure that sensitive areas are sufficiently protected from erosion or fire.

C8.4 Unnecessary damage to ecosystems is prevented by applying the most suitable logging (Reduced Impact Logging (RIL)) and road construction methods and techniques for local conditions.

**Indicators**

8.4.1 There is evidence that the most suitable logging (Reduced Impact Logging (RIL)) and road construction methods and techniques are used in the FMU to prevent unnecessary damage to ecosystems. This may include the use of RIL techniques, adapted to the site-specific characteristics within the FMU.

8.4.2 Harvest planning and harvest operations are carried out in accordance with national or sub-national (e.g. State) best practice guidelines.
C8.5  If fires are used to achieve forest management objectives (such as regeneration of specific tree species), then adequate control measures have been taken.

**Indicator**

8.5.1  Where fires are used to achieve forest management objectives (such as regeneration of specific tree species), then adequate control systems and procedures are in place, including fire control and safety precautions.

C8.6  The forest management measures are designed to prevent and control diseases and pests where these form a threat to natural capital.

**Indicators**

8.6.1  The FME has identified pests and diseases that are present and that potentially threaten the natural stock within the FMU.

8.6.2  When applicable, the FME has procedures in place to prevent and control potential and existing pests and diseases that have been identified (e.g. by applying Integrated Pest Management (IPM)).

C8.7  The use of chemicals is only permitted if ecological processes and the optimal deployment of sustainable alternatives prove insufficient. Pesticides classified as Type 1A and 1B by the World Health Organisation (WHO) and chlorinated hydrocarbons are not permitted.

**Indicators**

8.7.1  The FME shall not use nor store any of the WHO Type 1A and 1B pesticides and chlorinated hydrocarbons.

8.7.2  Where chemicals are used, an up-to-date list of all pesticides used in the FMU is kept.

8.7.3  Where chemicals are used, all staff and contractors involved in their use have received training in handling, application and storage procedures.

8.7.4  Where chemicals are used, safe transport, storage, handling, application and emergency procedures have been implemented.

C8.8  The accumulation of inorganic waste and litter is prevented and such waste and litter is collected, stored in approved areas and disposed of responsibly.

**Indicators**

8.8.1  There is a documented system in place for collecting and keeping inorganic waste and litter safely, and for safe transportation for disposal.

8.8.2  There shall be no evidence that the FME’s waste products are disposed of other than at the listed sites, and in accordance with environmentally appropriate and safe methods and applicable legal requirements.

8.8.3  All staff and contractors involved in the use of chemicals, fuel and oil have received training and materials for controlling and cleaning up chemicals, fuel and oil in the case of accidental spillage.

Principle 9: The production capacity for wood products and the relevant non-timber forest products (NTFPs) must be maintained in order to safeguard the future of the forests

C9.1  The production capacity of all forest types represented in the FMU is maintained.

**Indicators**

9.1.1  There is a clear methodology to determine the Annual Allowable Cut (AAC) or harvest per forest type.

9.1.2  The allowable harvest level is based on conservative, well-documented and the most current estimates of growth and yield in order to not jeopardise the forest’s productive potential in the medium to long term.

9.1.3  There are clear, accurate and up-to-date records of harvest volumes of all commercial timber species, and of the commercial harvest of any NTFPs.
C9.2  The FMU is sufficiently protected against all forms of illegal exploitation (timber and non-timber forest products including hunting and fishing), illegal establishment of settlements, illegal land use, illegally initiated fires and any other illegal activities.

**Indicators**

| 9.2.1 | The boundaries of the FMU have been clearly marked and mapped. |
| 9.2.2 | Concrete measures are taken to prevent illegal harvesting, including products of hunting and fishing, settlement, illegal land-use, illegal fires and any other unauthorised activities within the FMU. |

**Guidance**

Depending on the size of the forest area and on the risk of illegal activity occurring, this may include (but is not limited to) measures to ensure that:

- forest roads have gates and/or controlled access to high-risk areas;
- forest roads are physically closed off after harvesting;
- forest roads are patrolled to detect and prevent illegal access to the forest;
- personnel and resources have been assigned to detect and control illegal activities promptly.

| 9.2.3 | Appropriate measures are taken when illegal activities are detected. |

**Guidance**

Depending on the nature of the activity, such measures may include (but are not limited to):

- reporting the activity to an appropriate authority;
- disciplinary action or fines if staff were involved;
- collaborating with the appropriate authorities, and always within the law, to control the unauthorised activity;
- taking legal action (e.g. prosecution) if necessary.

**Principle 10:** The management of the forest must contribute to the local economy and create employment opportunities

C10.1  The management of the forest and local processing of wood and NTFPs creates a reasonable amount of employment opportunities for the local population, including indigenous peoples.

**Indicators**

| 10.1.1 | The FME promotes the hiring of people from local communities, including indigenous people, for functions/tasks in the FMU. |

**Principle 11:** Sustainable forest management must be achieved through a management system

C11.1  The forest management system is designed to achieve the objectives of a Forest Management Plan (FMP) and covers the inventory, analysis, planning, implementation, monitoring, evaluation and adjustment cycle.

**Indicators**

| 11.1.1 | Policies and operational management objectives shall exist for the FMU under evaluation and shall at least meet national and regional legal requirements. |
| 11.1.2 | Depending on the scale and intensity of the forest management, a management plan and/or supporting documents shall exist for the FMU under evaluation. This management plan includes the long-term management objectives and a description of the inventory, planning, monitoring and evaluation cycle. An Environmental Impact Assessment forms part of the plan. |
C11.2 An FMP is drawn up that at least includes:
• a description of the current condition of the FMU;
• the long-term goals, including economic, social and ecological functions;
• the AAC per forest type and, if applicable, the annual allowable harvest of NTFPs based on reliable and current data;
• the budget for the implementation of the FMP.

Indicator

11.2.1 An FMP includes the long-term management objectives for the FMU, with due regard for economic, social and ecological (species, ecosystems, functions) aspects. The FMP includes at least the following information:
• a description of the inventory, analysis, planning, implementation, monitoring, evaluation and revision cycle;
• a description of the current condition of the FMU;
• the long-term goals, including economic, social and ecological functions;
• the average AAC per forest type and, if applicable, the annual allowable harvest of NFTPs based on reliable and current data.

C11.3 Essential elements for the management of the forest are indicated on maps.

Indicators

11.3.1 There are appropriate maps of the forest resource base, including protected areas, planned management and land ownership.

11.3.2 Before the commencement of harvesting and road construction, clear and accessible maps are made available describing the forest resource base and the boundaries of the FMU including areas with special ecological, archaeological or cultural values, areas reserved for wildlife and areas where harvesting takes place.

C11.4 The implementation of the FMP and the ecological and economic effects thereof are periodically monitored on the basis of reliable data.

Indicators

11.4.1 Procedures for collecting the monitoring data have been clearly documented and are consistent and replicable over time to allow comparison and assessment of change.

11.4.2 The frequency, intensity and expense of the monitoring are defined and are appropriate to the scale, intensity and risks of the forest operations as well as the relative complexity and fragility of the resources under management. Monitoring at least includes the following information in order to facilitate evaluation:
• data collected during pre- and post-harvest inventory and general inventory to identify and describe significant changes in the forest flora over time;
• data on the presence of key species of fauna within the FMU, sufficient to identify and describe environmental impacts of harvesting and significant changes in populations over time;
• data to demonstrate the maintenance of any areas of high conservation value and representative areas of forest types within the FMU;
• data to demonstrate employment opportunities offered to local communities;
• data to demonstrate that a proportion of the production of the FMU is made available to local enterprises, such as small-scale industries and processing operations.

C11.5 The FMP is implemented by professional office and field staff, whose expertise and knowledge is maintained by means of an effective and regular training programme.

Indicators

11.5.1 Competency/training requirements for all employees are identified and necessary (periodic) training is provided to ensure employees are sufficiently qualified and trained to perform their tasks.

11.5.2 Appropriate employee qualification is available.

11.5.3 Safeguards and verification procedures are in place to ensure that contractors are qualified for the activities they conduct within the FMU.
7 Traceability and Chain of Custody requirements

7.1 Introduction

The traceability and Chain of Custody requirements in this chapter ensure that the physical flow of sustainable biomass can be traced back throughout the supply chain. This also ensures that sustainability characteristics can be assigned to individual consignments of biomass, and that the quantity of sustainable biomass withdrawn at any stage of the supply chain does not exceed the quantity of sustainable biomass supplied. This guarantees the integrity of verification and conformity year statements. The term ‘consignment’ refers to a specific quantity of biomass with the same sustainability characteristics. The origin of all consignments must be traceable.

Economic operators that are subject to verification are required to have processes in place to ensure that evidence of the sustainability characteristics of received and supplied sustainable biomass is documented, managed and forwarded through the supply chain. The EPP that receives subsidy is then able to demonstrate that the consignments of sustainable biomass that has been processed into renewable electricity and possibly heat meet the requirements of the SDE+ Scheme. The requirements in the SDE+ Scheme related to the Chain of Custody are transformed into an integral approach in this chapter. The criteria themselves (P13-14) can be found in 7.2, but they are not translated in indicators. Experience in the field has shown that it makes more sense to look at these criteria collectively and transform them into general requirements for traceability and Chain of Custody. This has been done in the rest of this chapter.

7.2. Criteria for Chain of Custody as defined in the regulation

The criteria for Chain of Custody for all parties in the chain are defined in the regulation in P13, 14 and 15. However, the criteria defined in P15 are only relevant in the certification context and therefore no indicators were defined for P15 as part of this protocol.

5 Regeling van de Minister van Economische Zaken van 24 februari 2016, nr. WIJZ/16001395, tot wijziging van de Algemene uitvoeringsregeling stimulering duurzame energieproductie in verband met de aanpassing van de duurzaamheidsseisen vaste biomassa
**Principle 13:** A Chain of Custody (CoC) shall be in place that covers the entire chain from the first link to the bioenergy producer. This CoC shall link the source to the material used in the product or product group, and quantify the greenhouse gas emissions of each individual link (operator).

**Guidance**

*There are five biomass categories (see Table 1). Each category comes from a different source (see table below).*

<table>
<thead>
<tr>
<th>Category</th>
<th>Source</th>
<th>First link (potential first CoC certificate holder)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Woody biomass from large Forest Management Units</td>
<td>Forest Management Unit &gt; 500 ha</td>
<td>Forest Management Unit</td>
</tr>
<tr>
<td>2. Woody biomass from small Forest Management Units</td>
<td>Forest Management Unit, or predefined collection area of which the Forest Management Unit of &lt; 500 ha forms a part.⁶</td>
<td>Forest Management Unit or first collection point⁷ Biomass producer (BP) (Pellet mill)</td>
</tr>
<tr>
<td>3. Residues from nature and landscape management</td>
<td>Predefined collection area</td>
<td>First collection point</td>
</tr>
<tr>
<td>4. Agricultural residues</td>
<td>Predefined collection area</td>
<td>First collection point</td>
</tr>
<tr>
<td>5. Biogenic residues and waste flows</td>
<td>Company that generates the residual product</td>
<td>First collection point</td>
</tr>
</tbody>
</table>

**C13.1** Each individual organisation in the Chain of Custody uses a CoC system that meets the relevant requirements of this standard.

**C13.2** Each individual organisation in the Chain of Custody has the relevant greenhouse gas emissions information for its own organisation, which has been obtained using a methodology that is based on the most recent European Commission publication on sustainability criteria for solid biomass and the reference values provided for fossil fuels.

**C13.3** The management system of each organisation in the CoC provides safeguards that ensure that these CoC requirements are met.

**C13.4** Each individual organisation in the Chain of Custody registers the quantities and the names and certificate numbers of the organisations they purchase biomass from and sell biomass to.

**C13.5** Businesses keep all documentary evidence available for a minimum of five years.

**C13.6** Mixing of materials from categories 1 and 2 with different sustainability characteristics is only permitted if at least 70% of the mixture used by the end-user complies with all the relevant principles and the corresponding criteria in Table 1, and the remaining 30%:
- complies with P3, P4 and P5; and
- is not sourced from converted forests as described in C7.3; and
- is not sourced from forests where high conservation values are threatened as described in C7.1.

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⁶ A temporary exception applies for the first link for small Forest Management Units. See Chapter 3 for an explanation and an overview of the requirements for the biomass categories.

⁷ The first collection point is the first legal owner of the material after the business from which the biomass was sourced.
If materials with different sustainability or other characteristics are mixed anywhere in the chain, one or both of the following methods shall be applied:

**Volume credit method:**
The registered characteristics and quantities of the biomass output are the same as the characteristics and quantities of the corresponding biomass input after application of the conversion factor.

**Percentage based method:**
The percentage of material in a product or product group that meets the relevant principles and the corresponding criteria in Table 1 is reported.

For both methods:
- the method may be applied up to the level of a location; and
- the organisation defines a claim period during which the biomass input is measured and reports the results; and
- the sustainability characteristics (including categories and quantities) of mixed biomass output shall be able to be traced back to the characteristics of the individual biomass inputs, taking account of the applicable conversion factors.

The sustainability properties do not only concern sustainable management of the source, but also the relevant greenhouse gas emission data, which have been obtained using a methodology that is based on the most recent European Commission publication on sustainability criteria for solid biomass and the reference values provided for fossil fuels.

The percentage-based method may only be applied for forest-based biomass.

**Principle 14:** In case of a group management system of the CoC, the group as a whole shall meet the same requirements for the CoC as individual businesses. The management system shall meet a number of requirements to this end.

- **C14.1** A group is led by a legal entity who is responsible for the group as a whole. This entity uses a management system that enables it to effectively supervise the participating locations within the scope of the certificate.

The entity has an effective management system in place as well as the appropriate technical and human resources.

- **C14.2** The group applies a CoC system and the corresponding criteria as described in P13. Furthermore, each group member individually meets these requirements insofar applicable to its own activities.

- **C14.3** The group leader uses a registration system to record:
  - the names and addresses of the members;
  - a statement submitted by each member in which it declares that it meets the CoC certification requirements;
  - the incoming and outgoing biomass flows of each individual group member.
7.3 Sustainable biomass supply information

This paragraph describes requirement for economic operators in the chain that are subject to verification. These requirements shall be used to ensure compliance with the criteria and will safeguard, in each step of the Chain of Custody, the availability of the information required for the verification statements.

7.3.1 Supply chain and biomass information

(Applies to all economic operators subject to verification)

Economic operators that are subject to verification shall establish and maintain records necessary to provide evidence of compliance with the traceability and CoC requirements of this protocol. Economic operators subject to verification shall therefore have the following up-to-date information available for all incoming and outgoing sustainable biomass respectively, and processed sustainable biomass:

- List with names and addresses of suppliers and recipients of sustainable biomass (does not apply to FMUs);
- Regional risk assessment records demonstrating that supplying FMUs meet the requirements in Chapters 4 and 5 (applies only to BPs);
- Information demonstrating that POs supplying category 3 and 4 biomass meet the criteria and indicators of Principle 2 (applies only to FCPs);
- Information demonstrating that POs supplying category 5 biomass are the first point in the chain (applies only to FCPs);
- Copy of relevant biomass sustainability and/or CoC certificates and (pre-)verification of suppliers of sustainable biomass (does not apply to FMUs);
- Copy of certificates and last audit report of own relevant biomass sustainability and/or CoC certification;
- Contracts with relevant subcontractors/service providers and all suppliers and recipients of sustainable biomass;
- Weighbridge tickets, bills of lading or other documentation for all incoming and outgoing sustainable biomass;
- Mass balance calculation (does not apply to FMUs);
- GHG emissions information of sustainable biomass as needed by the EPP to determine the GHG emissions of the biomass at the end of the supply chain. In the case of individual GHG calculations, the GHG calculation itself as well as the input data used for the calculation must be available (see 7.5.1);
- Description of internal processes (e.g. harvesting/logging, drying, blending, palletisation or other) and key data (including production dates);
- Monthly biomass inventory (not for FMUs);
- Relevant yields/conversion factors (if applicable);
- Records of internal audits conducted.

Economic operators shall keep all the above documentary evidence and all records to demonstrate compliance available for at least five years.

7.3.2 Use of verification statements and delivery documents

(Applies to economic operators subject to verification up to and including the EPP)

Economic operators up to the EPP that are subject to verification shall provide their recipients of sustainable biomass with all the necessary sustainability information of the supplied biomass through a verification statement. The verification statement must contain the information as indicated in 2.6.2. Since verification statements are provided after delivery (in the case of a one-stage verification process there is no pre-verification statement that can be provided at delivery), when the biomass changes ownership a statement does not have to be provided. If no statement is provided, the biomass should come with delivery documents that contain the same information as needed for a verification statement. Economic operators may choose for the verification statement to be a separate document or to include the required information in delivery documents already applied (e.g. CMR, certification delivery notes, BOL, weighbridge tickets). Economic operators may also aggregate a number of deliveries of consignments with the same sustainability characteristics under one contract in one verification statement. In this case, the whole delivery period shall be stated on the verification statement.
7.3.3 Timely issuing of verification statements  
(Appplies to economic operators subject to verification up to and including the EPP)

The timely issuing and receipt of sustainability characteristics is crucial for documentation, for calculating the mass balance and for verification by the Conformity Assessment Body. For this reason, verification statements should preferably accompany the physical biomass delivery. Economic operators shall provide the recipient of sustainable biomass with a copy of the verification statement no later than 15 days following the date of issue by the Conformity Assessment Body.

7.3.4 Check verification statement  
(Appplies to economic operators subject to verification up to the and including EPP, except FMUs)

The recipient of the sustainable biomass shall check whether all the information required by this protocol is both available and consistent in the verification statement as issued by the supplying economic operator. Verification statements that are obviously lacking information or contain inconsistent information should not be accepted by the recipient.

7.4 Mass balance

The mass balance method (criterion C13.7) allows consignments of sustainable biomass (which may have different sustainability characteristics) and controlled biomass to be physically mixed within internal company processes. Within the mass balance period, consignments of sustainable biomass with the same sustainability characteristics (raw material, biomass category, country of origin, GHG emissions, etc.) can be arbitrarily merged or split within the bookkeeping as long as the total amount does not exceed the quantity credit. This section describes the requirements for economic operators under verification that apply mass balance for mixing of consignments with different sustainability characteristics.

7.4.1 Mass balance calculation method  
(Appplies to economic operators subject to verification up to the EPP, except FMU)

When consignments of biomass with different (or limited or no) sustainability characteristics are mixed, the separate sizes and sustainability characteristics of each consignment remain assigned to the mixture. If a mixture is split up, any consignment taken out of the mixture may be assigned any of the sets of sustainability characteristics (accompanied with sizes) as long as the combination of all consignments taken out of the mixture has the same sizes for each of the sets of sustainability characteristics that were in the mixture. Appropriate arrangements shall be in place to ensure that the mass balance is respected. The amount of compliant biomass going out of a mixture shall be equal to the amount of compliant material going into the mixture (provided that corresponding conversion values have been applied).

The mass balance is calculated using information in the delivery documentation and shall (if necessary) be corrected after monthly biomass inventory and receipt of verification statements from suppliers. Mass balance calculation is required for each geographical site (location).

7.4.2 Mass balance calculation period and credits  
(Appplies to economic operators subject to verification up to the EPP, except FMU)

The balance may be achieved over a maximum period of three months and is regularly verified. At that moment in time a negative mass balance is not allowed. If more sustainable biomass (including existing inventory) with the same sustainability characteristics was received within one mass balance period than was dispatched, the surplus of sustainable biomass (positive credits) should be transferred from one mass balance period to the next. A transfer of credits should reflect the products and the respective sustainability characteristics.
The credit transfer can only be effected if at least the equivalent amount of physical biomass (sustainable and non-sustainable) is in stock, as positive credits are stated in the bookkeeping. This means that it is not possible to transfer more positive credits into the next mass balance period than the quantity that is physically in stock at the end of the mass balance period.

A negative mass balance (negative credits) is not allowed. A negative mass balance would occur if at the end of a mass balance period less sustainable biomass (including existing stock) was received than dispatched.

### 7.4.3 Biomass mixing requirements for EPP
*(Applies to EPP)*

Within a period of one calendar year, EPPs are allowed to mix sustainable and controlled biomass of categories 1 and 2 to produce renewable electricity or heat. If the following criteria are met, all category 1 and 2 biomass is eligible for inclusion in the conformity year statement for the SDE+ subsidy:

- At least 70% of the yearly mixture complies with all the requirements of the SDE+ Scheme and this protocol (sustainable biomass), and;
- The remaining 30% or less complies with the requirements for controlled biomass.

On the mass balance these are two different consignments. There are no limitations for physically mixing sustainable biomass of categories 1 and 2 with sustainable biomass of other categories. However, these remain different consignments on the mass balance.

### 7.5 GHG information & calculation

All economic operators up to the EPP must have sufficient and valid GHG information available of the sustainable biomass up till then in the supply chain and must provide this information to the next sustainable biomass recipient. There are four options for GHG information to be provided to the sustainable biomass recipient:

1. Use of (disaggregated) default values (as reflected in Appendices 2 and 3);
2. Use of actual values (individual calculated values) including information that enables the recipient to determine the correct values and/or category (Appendices 2 and 3);
3. Use of a combination of (disaggregated) default values and actual values (within the BioGrace-II calculation rules), including information that enables the recipient to determine the correct values and/or category (Appendices 2 and 3);
4. Information that enables the recipient to determine the correct values and/or category (Appendices 2 and 3). (For example, a trader can provide information on transport distance with which the EPP can calculate the actual GHG value.)

#### 7.5.1 Use of total or disaggregated default values

In all cases the most recent version of the default values should be used. If the total default value is applied, the supplying economic operator shall state 'Use of total default value' on its verification statement, combined with the following information:

- Biomass energy carrier (Appendix 2);
- Biomass type (feedstock in Appendix 2);
- Transport distance (km) up to the site of the economic operator from which the sustainable biomass was dispatched; and
- The configuration of the pellet mill to enable the selection of the correct default value (if applicable).

When a disaggregated default value is applied for a certain element in the supply chain (extraction/cultivation, processing and transport and distribution), the supplying economic operator shall state 'Use of disaggregated default value' for that particular element on its verification statement, combined with the following information:

- Biomass energy carrier (Appendix 3);
- Biomass type (feedstock in Appendix 3);
• Transport distance (km) up to the site of the economic operator from which the sustainable was dispatched (if a disaggregated default for transport and distribution is used); and
• The configuration of the pellet mill to enable the selection of the correct default value (if applicable).

If the actual data do not enable a choice of the right default value (Appendices 2 and 3), the most conservative value shall be taken, e.g., the value for the largest transport distance and/or a configuration using a natural gas boiler.

7.5.2 Use of actual (individually calculated) values
Individually calculated GHG values or ‘actual values’ are calculated based on the calculation methodology laid down in Appendix 1. The BioGrace-II tool or another comparable calculation tool should be used to calculate actual values, provided the calculation method in Appendix 1 is applied. The calculation rules laid down in BioGrace-II are compulsory. Emission factors and lower heating value (when not available from BioGrace-II) shall be gathered from official sources. The lower heating value can also be measured through laboratory analyses by an ISO 17025-accredited laboratory.

Economic operators performing an actual GHG calculation must state the calculated GHG values for their product in kg CO\textsubscript{2}-eq/tonne or in CO\textsubscript{2}-eq/MJ of sustainable product in the verification statement. Information on actual GHG emission values must be provided for all relevant elements of the GHG emission calculation formula. This means that it may be necessary to report separately on emissions from extraction/cultivation, processing, and transport and distribution. Alternatively, the economic operator can provide the actual information as inputs to enable the biomass recipient to calculate the actual GHG values or determine the defaults.

BioGrace-II stipulates that if actual values are used for one parameter in a step, then actual values shall be used for all other parameters in that step, including the parameters of the other steps within the same part of the bioenergy production chain (extraction/cultivation, processing or transport and distribution). When using actual values, the BioGrace-II rules shall be followed.

The calculation is performed for a full twelve-month period and must be as up to date as possible. As an alternative, it may cover the previous calendar year or financial year. The respective period for data gathering and thus for the calculation of GHG emissions must be transparently indicated in the calculation.

7.6 Management system requirements
Economic operators until the EPP shall have a management system to prove they can comply with the Chain of Custody requirements.

7.6.1 Procedures and instructions
The economic operator shall have documented and implemented procedures, containing at least the following elements:
• Description of internal material flows;
• Organisational structure, responsibilities and authorities with respect to traceability and Chain of Custody;
• Procedures for complying with the traceability and Chain of Custody requirements of this protocol.

7.6.2 Qualified employees
The management of the economic operator shall identify and nominate competent employees who have key tasks with respect to implementation and maintenance of the traceability and Chain of Custody requirements of this protocol. Those key tasks include:
• Sourcing, first gathering/collecting or registration of incoming sustainable products and evaluation of the quantity of sustainable products and related sustainability characteristics;
• Processing of sustainable biomass and/or evaluation of the portion of sustainability characteristics;
• Delivery, storage, sales and distribution of sustainable products and evaluation of the quantity of sustainable products and related sustainability characteristics;
• Calculation of GHG emissions and saving;
• Issuing of (pre-)verification statements;
• Planning and/or execution of internal audits.

The economic operator shall ensure that all employees with the above tasks have received appropriate training and/or instruction and shall keep records of provided training courses and instructions.

7.6.3 Technical equipment
The economic operator shall identify, provide and maintain technical facilities that are required to ensure that the traceability and Chain of Custody requirements of this protocol are met. Quantities of delivered sustainable biomass shall be determined using measuring devices and methods that comply with relevant (local) regulatory requirements.

7.6.4 Internal audits
The economic operator shall conduct internal audits at least once a year covering all the relevant requirements of this protocol and establish corrective and preventive measures if required.
8. The risk based approach

The requirements in this chapter apply to biomass producers that wish to demonstrate compliance with applicable requirements in Chapter 6 through the Risk Based Approach (RBA). By following the procedures in this chapter, small-scale FMUs (< 500 ha) in a specific region do not need to undergo individual verification to demonstrate compliance with the SFM criteria. The biomass producer (usually a pellet mill) shall have evidence available to demonstrate that for each of the SFM criteria the (mitigated residual) risk level is ‘low’. The RBA can also be used for demonstrating compliance with the controlled biomass criteria.

During verification the biomass producer shows the Conformity Assessment Body (CAB) that the RBA was conducted in accordance with the requirements in this chapter, that all required information is available, that the sizes of the regions are correct and that mitigation measures are adequate and effective. As part of the verification the CAB needs to consult relevant stakeholders. Which stakeholders are to be consulted depends on the information in the risk assessment and is up to the professional judgement of the verification team. When applying an RBA for small FMUs, the biomass producer must keep an administration in which the FMUs are registered from which biomass is sourced and showing that they each cover less than 500 ha.

The RBA can be performed by the biomass producer, or by another organisation on behalf of the biomass producer, and may cover the supply bases of several biomass producers together. In any case the biomass producer must demonstrate that its supply base is fully covered by the RBA and that the RBA was performed in a manner as indicated in this chapter. Additionally, the biomass producer must supply the Conformity Assessment Body with the requested information on how the RBA was performed. The RBA involves the following process steps:
1. Determination of the region;
2. Gathering of information in relation to the SFM requirements\(^8\) in Chapter 6;
3. Risk assessment;
4. Establishment and regular monitoring of measures to prevent the sourcing of biomass with specified risk (mitigation measures);
5. Regular monitoring of the risk assessment and mitigation measures.

8.1 Determination of region(s)

The biomass producer shall identify one or more homogeneous areas (regions) to source biomass from. Areas can be determined both on a geographical scale (e.g. states, counties, province) and on a functional scale (forest type, ownership, scope of management, type/quality of forest). In any case, the SFM requirements in Chapter 6 play a key role in determining the homogeneity of a region.

The boundaries of a region shall be clearly identified on maps and in other relevant documentation. Boundaries may be described as a reference to the existing administrative or environmental divisions whilst functional scale can refer to characteristics that determine the functional scale, e.g. plantations vs. natural forests.

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\(^8\) When applying an RBA for controlled biomass, the criteria for controlled biomass apply.
Figure 5  Steps for biomass producers to demonstrate compliance with SFM using RBA

8.2  Gathering information

The biomass producer shall gather information on identified areas that is relevant for a risk analysis with respect to the SFM requirements.

8.2.1  Documents

The gathering of relevant documentation such as laws and regulations, government statistics, NGO reports, expert studies and maps is part of the information gathering exercise. The biomass producer assesses the relevance and reliability of the information using objective criteria such as date of publication, reliability and independence of the source (academic institutions, international agencies, NGOs and government bodies), methodology etc.

Data sources shall be referenced so that they can be verified by the Conformity Assessment Body and other external parties.

8.2.2  Consultation of stakeholders and experts

The outcomes of consultations with stakeholders and experts are an important source of information for the risk analysis. A stakeholder is any individual or group that has an interest in any decision or activity (e.g. logging, forest management) of an organisation (the biomass producer, FMU involved). Examples of stakeholders are NGOs, local residents or communities, workers or unions, local or regional government, companies and company associations, and contractors.

As part of the information gathering exercise, the biomass producer shall document and implement effective procedures for consultation on the SFM requirements with stakeholders in specific regions. The procedures shall at least include:

• Responsibilities for stakeholder consultation;
• Description of the various stages in the consultation process;
• Identification of the stakeholders to be involved;
• A proactive approach of stakeholders, who must be given sufficient time to respond (at least one month);
• Consultation of qualified and independent experts where specialised knowledge is required.
The biomass producer shall keep the reports and the contributions and comments from stakeholders and experts, including reactions and measures taken in response. The biomass producer shall make the results of the risk-based method (risk assessment and mitigating measures taken) publicly available as part of the stakeholder consultation.

8.3 Risk assessment

8.3.1 Risk assessment methods
The biomass producer shall conduct a risk analysis for each identified region (step 1), based on information gathered (step 2). The risk of non-compliance shall be assessed for each SFM criterion in Chapter 6, using adequate risk analysis methods. If possible, underlying indicators in this protocol should be used. When indicators are not suitable for a risk assessment at the regional level (e.g. indicators can only be used at an FMU level), other means of verification are allowed, provided that this is properly substantiated by the biomass producer for the assessment by the Conformity Assessment Body.

Using a list of the qualifications of the persons involved, the biomass producer shall demonstrate that the persons performing the risk analyses are qualified (through training and experience) to perform risk analyses tailored to the complexity of the processes and information being assessed, and the country or region under assessment. A peer review by experts can provide additional assurance as to the quality of the risk assessment.

8.3.2 Assessment of the risks
The risk of non-compliance for each SFM criterion is expressed as ‘specified risk’ or ‘low risk’, based on the analysed information and application of the indicators set out in this protocol. For each SFM criterion, the rationale for risk designation shall be provided in relation to the information used. A ‘low risk’ is identified when there are clear indications that the chance of non-compliance with the relevant sustainability criterion in combination with the consequences is small and the risk assessment has yielded no information that leads to a ‘specified risk’ designation. A ‘specified risk’ is identified when there is not enough information for the risk assessment to establish whether the risk is low or when the mitigating measures are not sufficiently effective in reducing the chance that identified risks materialise or in reducing the consequences of such risks. In case of doubts a precautionary approach shall be applied.

8.4 Risk mitigation and measures
For a region with SFM criteria designated as ‘specified risk’, mitigating measures must be defined in order to reduce the risk level to ‘low risk’. Mitigation measures can comprise additional information gathering (e.g. through on-site verification by the biomass producer), reduction of the region size by excluding risk areas, or other appropriate measures.

In the event that the risk of non-compliance for one or more SFM criteria remains a ‘specified risk’, then biomass from that region cannot be classified as sustainable.

8.5 Regular monitoring of the risk assessment
The biomass producer shall conduct a review of the risk assessment and the mitigating measures at least once per year and in the event of relevant developments in the region sustainable biomass is sourced from and/or relevant changes in the information gathered for a particular region or criterion.
9. Verification procedures

9.1 Introduction

In addition to competent auditors, clear requirements on how to conduct verification audits are key factors for ensuring the integrity, reliability, credibility, and high quality of verification. Furthermore, they facilitate a consistent verification of the requirements laid down in the SDE+ Scheme. The verification requirements specified in this chapter describe the aspects to be considered and procedures to be followed when conducting verification audits.

An economic operator (other than an FMU) seeking verification leading to a verification statement or a conformity year statement must already have received sustainable biomass and be in possession of one or more verification statements from its suppliers. The verification process consists of four key steps, as described below in Figure 6.

**Figure 6: The verification process**

1. Planning & Risk Assessment
   - Determine scope
   - Understand the business & biomass supply chain
   - Assess & Understand key risks

2. Verification Strategy Development
   - Map risks to information integrity and controls in place
   - Develop verification strategy & verification plan

3. Execution
   - Conduct verification audit according verification plan
   - Review and update risk and verification plan
   - Document evidence, gaps and inconsistencies

4. Conclusion & Reporting
   - Prepare report and statement
   - Issue verification or conformity year statement
   - Keep records and on demand submit copy of statement to RVO.nl
9.2 Planning and Strategic Risk Assessment

The first stage in the verification process is to determine the verification scope, understand the engagement risk and identify the verification activities that are likely to be required in order to provide verification conclusions.

9.2.1 Understanding the scope and biomass supply chain

The Conformity Assessment Body shall engage with the economic operator in order to gain an understanding of the latter’s activities, certifications and supply chains, for example by reviewing the company’s Chain of Custody mapping. This engagement logically takes place before entering into a contract for the verification.

9.2.2 Strategic Risk Assessment (SRA)

Each verification must follow a risk-based approach. Verification bodies therefore shall adopt and apply methodologies for Strategic Risk Assessment (SRA). An SRA is a systematic and continual process for assessing significant risks of non-compliance with the requirements of this protocol. The main objective of the SRA is to identify which compliance aspects need to be given more attention during verification and what verification activities are likely to be required.

The SRA shall take the following verified information into consideration:

a. Country of verification;
b. Product types and categories of biomass being handled;
c. National and local legislation and status of enforcement;
d. The economic operator’s supply chain (type and number of suppliers/recipient of sustainable biomass) and operations (including detailed information about the forest areas/geo-coordinates);
e. Certifications;
f. Expected quantities (number of sustainable biomass consignments) to be verified;
g. Issued statements for the economic operator under verification and received verification statements from suppliers.

In case of verification of FMUs and BPs:

h. Scale: large (≥ 500 ha), small (< 500 ha) and region information;
i. Intensity of the expected forest management activities;
j. Information from reliable sources for the evaluation of risks of non-compliance with the SFM criteria.

The scale and intensity of forest management may also influence the risk of non-compliance or the required actions from an FME or economic operator. Aspects of scale, intensity and risks of non-compliance are relevant for the identification, monitoring and protection of HCVs and endangered species and the extent of forest management plans and systems in place. Possible reliable sources include country risk assessments, the Corruption Perception Index, impact studies and forest management practices in the area.

k. RBA (for BP’s identified biomass sourcing regions).
l. Use of actual (calculated) GHG values or default values.

The SRA may be conducted based on a desk audit and shall be conducted by auditors/experts proficient in such risk assessments. The Conformity Assessment Body shall document the results of the SRA and the information (including sources) on which it is based.
9.3 Verification Strategy Development

The second stage in the verification process is the design of the verification strategy. This will involve auditors (1) mapping out the risks of errors in the compliance evidence and claims from the economic operator (control risks), and (2) developing a verification plan based on identified control risks.

9.3.1 Maturity of control framework/mapping control risks

Following the results of the SRA, auditors will need to obtain an understanding of the nature and extent of the economic operator’s control framework for compliance evidence. Where controls are in place, auditors shall develop procedures to test the effectiveness of these controls. Where information is being provided but no controls are in place, auditors shall develop procedures for substantive testing to understand the reliability and accuracy of this information.

There are three main categories for the controls over the economic operator’s information that may be in place:

1. Internal control mechanisms

Economic operators are required to have an internal audit process in place for reviewing and challenging the consistency of compliance-related processes and controls with the requirements of this protocol. This process may focus on just the economic operator’s internal systems and processes, or it may extend to supply chain audits. Auditors shall develop testing procedures to assess the reliance that can be placed on the outputs of internal controls (e.g. audit reports). Where such internal control mechanisms are mature and effective, auditors may be able to place a significant degree of reliance on their outputs. However, where such systems are relatively immature or ineffective, auditors will be unable to rely on the outputs and will have to undertake substantive testing (sampling) in order to obtain sufficient appropriate evidence.

2. Documentation to support compliance evidence

Documentation to support claims of the economic operator, such as declarations from suppliers or requirements written into suppliers’ contracts, is a form of control over compliance evidence used by many economic operators. Auditors need to understand the availability of this documentation, and develop procedures to assess its reliability and determine whether it provides sufficient appropriate evidence to support the evidence being provided, or whether further substantive testing is required.

3. External control mechanisms

The third category of controls that economic operators may have over compliance evidence is external assurance. External assurance may be provided in the form of certificates on sustainability or Chain of Custody standards or in the form of other third-party audits of aspects of the requirements of this protocol. Auditors should not seek to duplicate other forms of external assurance that an economic operator has in place, although they do need to develop procedures that enable them to test whether the third-party assurance can be relied upon and for which of the requirements it can be relied upon (e.g. review of external audit reports to ensure there are no outstanding issues, review of available benchmarks with this protocol).

Insight into the economic operator’s control framework and system for mapping control risks may be obtained through a desk review, but is preferably acquired on-site or by a combination of on-site and desk review.

9.3.2 Verification plan and assurance level

The reliance that auditors place on existing controls over compliance information needs to be considered in light of the materiality of that information and the results of the SRA. It is an auditor’s professional judgement whether or not a control can be relied upon. This judgement shall be made following consideration of the evidence that a control is effective. Based on the results of the SRA and the mapped control risks, the auditors shall set up a verification plan. It is expected that the provided compliance evidence and quantities and characteristics of sustainable biomass, as well as controls testing, will have to be subjected to substantive procedures. However, the SRA and the mapped control risks guide the verification strategy. The execution stage shall be conducted on-site at the economic operator’s location or locations. Particular aspects of a verification (e.g. verification of a GHG calculation methodology) can be based on a desk review.
Compliance with the SFM criteria may be verified based on a desk review by using appropriate tools providing at least the same level of assurance as an on-site audit. For example, the analysis of land use change after 2008 in a specific area may be conducted on-site, or by using tools which may provide an even higher level of assurance than an on-site audit, or by a combination of on-site audit and a desk review.

9.3.2.1 Assurance level

The Conformity Assessment Body must establish at least a ‘limited assurance level’ when conducting pre-verification audits leading to a pre-verification statement. A ‘limited assurance level’ implies a reduction in risk to an acceptable level as the basis for an opinion of the Conformity Assessment Body worded in negative terms, such as ‘based on our assessment, nothing has come to our attention to cause us to believe that the supplied consignments of sustainable biomass do not comply with the requirements of this protocol’.

The Conformity Assessment Body must establish at least a ‘reasonable assurance level’ when conducting verification audits leading to a verification statement for the delivered quantities of sustainable biomass. A ‘reasonable assurance level’ requires extensive evidence gathering activities that enable a Conformity Assessment Body to issue a positive statement, such as ‘based on the aforementioned verification plan, we confirm that the received and supplied consignments of biomass comply with the requirements of the protocol, on the basis of a reasonable assurance level’. The materiality level is defined at 5% of the total quantities of sustainable biomass supplied in the supply period.

For verifications leading to a conformity year statement, a ‘reasonable assurance level’ must be established. Reasonable assurance verification involves significantly more extensive evidence gathering activities that reduce the risk to a level whereby the auditor is able to issue an opinion in positive terms, for example: ‘based on the aforementioned verification plan, we confirm that the received and processed consignments of biomass comply with the requirements of the protocol, on the basis of a reasonable assurance level’. The materiality level shall be 5% of the total quantities of sustainable biomass received and processed in the reporting period.

9.3.2.2 Verification plan

The verification plan shall be forwarded to the economic operator prior to the execution stage, and shall contain as a minimum:
- Verification objectives and scope;
- Name, role and responsibilities of the verification team members;
- Language of the audit and any translator requirement if needed;
- Sites to visit;
- A verification programme describing the nature and scope of the verification activities as well as the time and manner in which these activities are to be carried out (e.g. documents to review, staff to interview, stakeholders to consult and methods of consultation).

9.4 Execution

The third phase is the execution of the verification activities. This includes:
- Testing controls for compliance information and performing substantive testing of the reliability of information provided where controls have not been developed or are not effective;
- Reviewing/testing the available compliance evidence.

The auditor shall document evidence found during the verification process and identify any material gaps/nonconformities.
9.4.1 Quality and nature of evidence
Auditors are required to obtain sufficient appropriate compliance evidence upon which to base their conclusions. Sufficiency refers to the quantity of evidence needed to reach a conclusion. Appropriateness denotes the relevance and reliability of this evidence. Auditors must use their professional judgement and exercise professional scepticism in evaluating the quantity and quality of evidence, and thus its sufficiency and appropriateness, to support the verification conclusions.
Evidence will be assessed based on its nature and source. Some sources are more reliable than others:
- Audit evidence from independent external sources (e.g. third-party auditor or research body) is more reliable than that generated internally by the economic operator or its suppliers;
- Evidence in the form of physical (visual) verification is more reliable than documentary or oral representations;
- Evidence in the form of documents and written representations is more reliable than oral representations;
- Evidence is more persuasive when items from different sources or of a different nature are consistent.

9.5 Conclusion and reporting
In the final stage of the verification process the auditor shall discuss with the economic operator any corrections/adjustments (including the time frame) that may be necessary in order to issue a statement. The auditor may also conclude that biomass consignments cannot be verified as conforming to the requirements of this protocol. In the event compliance with all requirements is demonstrated, the auditor shall issue a statement and a more detailed verification report to the management of the economic operator.
The statement and verification report shall be issued to the economic operator within two (2) weeks (ten working days) after completion of the verification audit.
The Conformity Assessment Body shall send a copy of the issued statement to RVO.nl if the latter so demands. In the case of a conformity year statement, this shall be annexed to the report demanded by RVO.nl for the SDE+ subsidy.

As a minimum, the following information shall be included in the verification report:
- Name and address of the economic operator;
- Verification scope;
- Audit date and report date;
- Name of auditors;
- Result of the verification audit;
- Volume of sustainable biomass verified and supply period;
- Strengths and weaknesses in the economic operator’s processes for collecting and collating compliance evidence, and recommendations for improving these processes.
10. Requirements for verification bodies

10.1 Requirements for conformity assessment bodies

Conformity Assessment Bodies which apply this protocol for verification purposes should provide proof of their expertise. Since the protocol does not yet provide for accreditation, such expertise can be proven if the CAB is already active in the relevant field. Whether a field is relevant depends on the principles covered by the verification. A CAB can demonstrate that it is active in a field if it has been recognised or accredited for a certification system in Table 3. This means:

- For carbon and forest criteria (P3-P11): FSC and PEFC;
- For soil criteria (P2): FSC, PEFC, and EU recognised schemes for biofuels, e.g. ISCC-EU or NTA8080;
- For emission calculations (P1): EU recognised schemes for biofuels, e.g. ISCC-EU or NTA8080;
- For Chain of Custody (P13-P14): FSC, PEFC, SBP, Green Gold Label and EU recognised schemes for biofuels, e.g. ISCC-EU or NTA8080.

For emission reduction calculation at the EPP, Table 3 only includes BioGrace II. However, since this calculation tool is not yet a part of any verification scheme, no additional requirements are imposed on the CAB specifically for this calculation.

10.2 Competency requirements for auditors

Auditors conducting verifications using this protocol must have the appropriate experience, skills and qualifications to evaluate all aspects of the criteria and indicators, with due regard for the scale and complexity of the area to be assessed and the country/region where the verification is conducted. Key considerations for the selection of auditors include experience and qualifications in relation to relevant subjects, such as risk assessment, Chain of Custody (mass balance and data handling), GHG verification, forestry and environmental issues.

The Conformity Assessment Body shall guarantee that the scope is represented in the skills and qualifications of the auditors. If the required qualifications cannot be met, the audit team shall be expanded until it meets all the required qualifications during the verification. If carbon and forest criteria are combined with one of the other scopes, it is obvious that the audit team must consist of two or more auditors.

The following competency requirements apply to auditors conducting verifications using this protocol.
10.2.1 General competency requirements
A verification team shall consist of a lead auditor and, where necessary, a suitable number of assessors or technical experts for a specific scope of the verification. Irrespective of their particular work area, all auditors shall meet the following general audit requirements:

1. At least five years of general work experience and at least two years of work experience in a relevant work area;
2. At least 40 hours of audit training (e.g. according to ISO 19011);
3. At least 20 days of audit work completed in a relevant area over the past two years, as an audit team leader or auditor as part of an audit team (not as a trainee);
4. Demonstrable knowledge of this protocol and the underlying legal framework through training, briefings and/or active participation in the development of this protocol.

Relevant work includes the areas reflected in sections 7.3.2 to 7.3.5.

10.2.2 Conducting risk analysis
The audit team must include auditors who are proficient (through training and experience) in conducting risk analyses tailored to the complexity of the processes and information being assessed, and the country/area where the verification is conducted, and as such are able to define the focal points and intensity of the verification process.

10.2.3 Auditing sustainable forest management

10.2.3.1 Forestry
For forest verification, the audit team must include auditors with a background in forestry through education and experience in forest management with respect to the size and complexity of the site where the verification is being conducted. For example, if a large (>500 ha) FMU is being assessed, the audit team shall include auditors who have first-hand experience in audits of large FMUs or who themselves have managed operations of a similar type and size or who have professional experience, for example, as paid consultants or advisors to similar kinds of operations.

10.2.3.2 Environmental issues
For forest verification, the audit team must include auditors with the requisite experience and knowledge to evaluate the FMU’s process for identifying HCVs and interviewing stakeholders on the presence of ecological HCVs in the area to be evaluated, as well as other environmental issues that are likely to be of importance during the evaluation. Qualification or professional experience in the area of forest ecology (whether natural or planted) is of key importance. In addition, general knowledge is required of the management of rare or endangered species that are likely to be present in the forest area, and knowledge of key environmental impacts such as those on hydrology or soils.

10.2.4 Auditing Chain of Custody and GHG information
For Chain of Custody and/or GHG verification, the audit team must include members with:
- knowledge and experience of mass balance methodology and traceability;
- knowledge, through relevant GHG verification training (e.g. ISO 14064, PAS 2050, GHG Protocol, Voluntary schemes under the RED), and experience of GHG accounting and verification;
- technical knowledge of the processes at the sites of the economic operator under verification.
10.2.5 Auditing EPPs (conformity year statement)
Auditors conducting a verification at EPPs (conformity year statement) must:
• have attended assurance training based on ISAE3000 or another standard/protocol based on ISAE3000;
• have gained work experience in the past two years based on ISAE3000 or other standard/protocol based on ISAE3000, as an audit team leader or as an auditor as part of an audit team (not as a trainee).
## 11. List of definitions

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<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td><strong>Annual Allowable Cut (AAC)</strong></td>
<td>The volume of wood that is allowed to be harvested within a predefined area within one year, normally expressed in cubic metres of wood per year. The calculation of the AAC shall take account of landscape values, forest types, protected areas and infrastructure and may not exceed the net annual increment in the long term.</td>
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<tr>
<td><strong>Area</strong></td>
<td>Clearly demarcated part of a Forest Management Unit (FMU) that the woody biomass originates from.</td>
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</table>
| **Areas with High Conservation Value** | Areas that contain one or more of the following values:  
1. Diversity of species. Concentrations of biological diversity including indigenous species and endangered species that are of importance on a global, regional or national level.  
2. Ecosystems and habitats. Rare or endangered ecosystems or habitats.  
3. Ecosystem services. Basic ecosystem services in critical situations such as protection of important water sources and control of erosion of vulnerable soils and slopes.  
4. Ecosystems on landscape level. Whole forest landscapes or other large whole ecosystems on landscape level that are of importance on a global, regional or national level because they contain viable populations of the majority of the natural species in natural patterns of distribution and numbers.  
5. Cultural values. Areas or means of living that are of global or national cultural, archaeological of historical importance to/ or fundamental to traditional cultures/ beliefs of local indigenous people. |
<p>| <strong>Audit</strong> | Systematic, documented process for obtaining records, statements of facts or other relevant information and assessing them objectively to determine the extent to which specified requirements are fulfilled. <em>(adapted from ISO 17000)</em> |
| <strong>Auditor</strong> <em>(inspector, verifier, assessor)</em> | Person appointed by a Conformity Assessment Body to conduct an audit. |
| <strong>Biodiversity</strong> | The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. |
| <strong>Bioenergy plantation system</strong> | A plantation system that is developed specifically for the production of biomass for energy generation, whereby fast-growing tree species (e.g. willow, poplar, eucalyptus or acacia) are planted in dense plantations and harvested in short rotation periods. These systems include: (i) short rotation coppicing systems, whereby the new crop grows from the stumps of the previously harvested stems and/or sprouts with rotations between two and ten years, and (ii) short rotation forest plantations using tree species that are harvested within 20 years or less. |
| <strong>Biogenic raw materials</strong> | Materials of biological or organic origin, as defined in the biomass categories. |
| <strong>BioGrace-II tool</strong> | The ‘BioGrace-II GHG calculation tool’ can be found on <a href="http://www.BioGrace.net">www.BioGrace.net</a>. It includes an Excel calculator tool, calculation rules, a methodological background document, a list of additional standard conversion values and a user manual. When using the Excel tool the user is required to apply the calculation rules. |</p>
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<tr>
<th>Term</th>
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<tbody>
<tr>
<td><strong>Biomass</strong></td>
<td>The biodegradable fraction of products, waste and residues from agriculture - including vegetable and animal substances -, forestry, fishery and aquaculture and related processing industries, as well as biodegradable fractions of industrial and domestic waste.</td>
</tr>
<tr>
<td><strong>Biomass producer</strong></td>
<td>Legal entity that collects and processes biogenic raw material into solid biomass usable for EPPs.</td>
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<tr>
<td><strong>Branch</strong></td>
<td>A sprout of a stem or trunk or a secondary trunk or stem that branches off the main trunk or stem.</td>
</tr>
<tr>
<td><strong>Certification</strong></td>
<td>Conformity assessment, conducted by a Conformity Assessment Body according to the applicable certification standard, and the related conformity assessment statement.</td>
</tr>
<tr>
<td><strong>Certification scheme</strong></td>
<td>Document describing how the conformity assessment process is to be performed.</td>
</tr>
<tr>
<td><strong>Chain of Custody (CoC)</strong></td>
<td>A set of rules, procedures and documents (at company level) that are used to provide a link between the source of a material and the point in the chain where a claim is made regarding the characteristics of that material (ISO 13065:2015).</td>
</tr>
<tr>
<td><strong>Chemicals</strong></td>
<td>Artificially produced, usually synthetic, compounds that are potentially hazardous to health and/or the environment and/or that might cause material damage. For example: fertiliser and pesticides.</td>
</tr>
<tr>
<td><strong>Co-firing</strong></td>
<td>Method in which a part of the (ground to grid) coals for the production of electricity and/or heat is substituted by biomass. The biomass is inserted into the incinerator of the coal plant together with the coal. The proportionate share of the calorific value of the biomass can be counted as renewable energy.</td>
</tr>
<tr>
<td><strong>Co-gasification</strong></td>
<td>Method where biomass in a separate gasifier is converted into a flammable gas mixture of carbon monoxide and hydrogen. This gas mixture is then blown into the plant and burned. Co-gasification is possible in coal plants as well as gas plants.</td>
</tr>
<tr>
<td><strong>Conformity Assessment Body</strong></td>
<td>A body that issues a verification and/or conformity year statement based on this verification protocol.</td>
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<tr>
<td><strong>Conformity year statement</strong></td>
<td>Conformity assessment statement issued by the conformity assessment body based on the findings of the assessment performed at the Energy Production Plant with a positive result on the information reported. The statement shall serve to substantiate the report of the SDE+ subsidy recipient towards RVO.nl over a defined year.</td>
</tr>
<tr>
<td><strong>Conservation zone or protected area</strong></td>
<td>A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. (based on IUCN Definition 2008)</td>
</tr>
<tr>
<td><strong>Consignment</strong></td>
<td>A quantity of biomass used for energy production that has uniform physical and sustainability characteristics. A consignment may consist of several truckloads or shiploads, as long as the characteristics of the biomass are uniform.</td>
</tr>
<tr>
<td><strong>Controlled biomass</strong></td>
<td>Biomass of categories 1 or 2 (woody forest based) that complies with the criteria under principles 3, 4 and 5 and criteria 7.3 and 7.1. For controlled biomass, compliance can be proven by the economic operator purchasing the biomass from the FMU based on a regional risk-based approach.</td>
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<tr>
<td>Term</td>
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<tr>
<td>Ecological functions</td>
<td>The functions that the forest fulfils and that are linked to ecology, including climate regulation, erosion control, soil formation, water retention, carbon storage, water purification, pollination and the development, support and maintenance of biological diversity.</td>
</tr>
<tr>
<td>Ecological cycles</td>
<td>Natural processes in which elements that occur in various forms are constantly interchanged between distinct compartments of the ecosystem, including nutrient, carbon and aquatic cycles.</td>
</tr>
<tr>
<td>Economic operator</td>
<td>Any company or organisation (legal entity) that handles (e.g. harvests, transports, trades, stores or processes) and holds legal ownership of the sustainable biomass.</td>
</tr>
<tr>
<td>Endangered species</td>
<td>Plant and animal species that are at least classified as 'endangered' in the international Red List of the IUCN and in the IUCN's guidelines for the regional application of the Red List.</td>
</tr>
<tr>
<td>Energy Production Plant (EPP)</td>
<td>Economic operator receiving subsidy for running a facility where sustainable solid biomass is processed into renewable electricity and/or renewable heat.</td>
</tr>
<tr>
<td>Environmental Impact Assessment (EIA)</td>
<td>Systematic process used to identify potential environmental and social impacts of proposed projects, to evaluate alternative approaches, and to design and incorporate appropriate prevention, mitigation, management and monitoring measures.</td>
</tr>
<tr>
<td>First Collection Point (FCP)</td>
<td>Economic operator that collects or receives category 3, 4 or 5 biomass directly from the Points of Origin (POs). FCPs trade, distribute and/or further process the collected biomass. The FCP is responsible for the correct documentation of the categories and quantities of biomass collected.</td>
</tr>
<tr>
<td>Forest</td>
<td>Land spanning more than 0.5 ha with trees higher than 5 metres and a canopy cover of at least 10%, or with trees able to reach these thresholds in situ. This does not include land that is predominately under urban or agricultural use.</td>
</tr>
<tr>
<td>Forest management</td>
<td>Planning and operational activities aimed at the management and use of forests and other forested areas in order to achieve predefined economic and/or social and/or cultural and/or environmental goals.</td>
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<tr>
<td>Forest Management Enterprise (FME)⁹</td>
<td>The entity, owner, concessionaire or person who is legally responsible for the management and exploitation of an FMU.</td>
</tr>
<tr>
<td>Forest Management Unit (FMU)</td>
<td>One or more forest stands containing natural forest, planted forest or other types of forest that are managed as a single unit. FMUs produce category 1 or 2 biomass.</td>
</tr>
<tr>
<td>Group (or regional association)</td>
<td>Legal entity involving several Forest Management Enterprises which cooperate in a certain area, or companies that work together in a certain segment of the Chain of Custody.</td>
</tr>
<tr>
<td>Habitat</td>
<td>An area or type of area where an organism or population occurs naturally.</td>
</tr>
</tbody>
</table>

⁹ In SDE this is called a Forest Manager.
Indigenous peoples: People and groups of people that can be identified or characterised as follows:
- The key characteristic or criterion is self-identification as an indigenous person at the individual level and acceptance by the community as their member;
- Historical continuity with pre-colonial and/or pre-settler societies;
- Strong link to territories and surrounding natural resources;
- Distinct social, economic or political systems;
- Distinct language, culture and beliefs;
- Form non-dominant groups in society;
- Resolve to maintain and reproduce their ancestral environments and systems as distinctive peoples and communities.


Industrial boiler steam from wood pellets: The production of renewable steam generated by a production facility through the use of burning wood pellets, in a boiler with a capacity ≥ 5 MW.

Legal user rights: The right granted by a government authority or legally authorised entity or person to carry out forestry activities in a certain area.

Local communities: Communities of any size that are in or adjacent to the FMU, and also those that are close enough to have a significant impact on the economy or the environmental values of the FMU or to have their economies, rights or environments significantly affected by the management activities or the biophysical aspects of the FMU (based on FSC®-STD-01-002).

Location (or site): A geographical unit of an economic operator or a combination of units situated in a place that is geographically separated from other units of the same economic operator.

Mass balance: The mass balance is the Chain of Custody system under which the sustainability characteristics remain assigned to consignments of biomass on a bookkeeping basis while the physical mixing of biomass with different sustainability characteristics and the mixing of sustainable and non-sustainable biomass is allowed.

Materiality: The concept of materiality recognises that some matters, either individually or in the aggregate, are important for the fair presentation of financial statements in conformity with generally accepted accounting principles, while other matters are not important. In performing the audit, the auditor is concerned with matters that, either individually or in the aggregate, could be material to the financial statements. The auditor’s responsibility is to plan and perform the audit to obtain reasonable assurance that material misstatements, whether caused by errors or fraud, are detected.

Mitigation measure: Actions taken in order to decrease the probability of occurrence or the negative impacts, or both, of a risk to an acceptable level as described in this Verification Protocol.

Natural forest: Forest that has a natural origin and is developed naturally without any kind of human interference related to these natural processes.
| **Non-Timber Forest Products (NTFP)** | All forest products other than wood, including materials harvested from trees such as resin and leaves, and other plant, animal or plant-animal products. |
| **Peatland** | Areas with soils containing at least a 40 cm deep layer of peaty material in the first 80 cm of the soil. |
| **Point of Origin (PO)** | Economic operators where category 3, 4 or 5 biomass occurs or is generated (first economic operator in the supply chain of category 3, 4 and 5 biomass). POs are not subject to verification, but may be audited during the FCP verification based on identified risks. |
| **Post-delivery compliance verification** | An audit conducted by a Conformity Assessment Body to evaluate the conformity of biomass supplied by an economic operator to a biomass recipient. A successful audit results in a verification statement. |
| **Pre-verification compliance audit** | An audit conducted by a verification body to evaluate whether an economic operator complies with the requirements of this protocol. A successful audit results in a pre-verification statement. |
| **Processing Unit (PU)** | Economic operator that converts received biomass by changing its physical and/or chemical properties (e.g. pellet mills). |
| **Production forest** | A forested area primarily intended for the production of wood, fibre, bio-energy and/or non-timber forest products. |
| **Reduced Impact Logging (RIL)** | Harvesting techniques and methods developed to minimise undue damage to the forest, environment and the harvested wood itself, as well as creating safe working conditions. |
| **Region** | The largest possible area for which reliable and independent information is available and the conditions are sufficiently homogeneous to evaluate the risk of non-compliance with the requirements of this protocol. |
| **Renewable energy** | Energy from renewable non-fossil sources such as wind, sun, aero-thermal, geometric, hydrothermal energy and energy from oceans, hydropower biomass, landfill gas, gas from sewage treatment and biogas. |
| **Representative areas of forest types** | Forest types that are representative for a certain area, based on a combination of three primary criteria:  
  • geological and soil conditions of the stand;  
  • species composition on the base of potential natural flora and fauna;  
  • history: land use before forestation combined with the age of the forest. |
| **Residues** | Biomass generated in the production of other (main) products or biomass released in a process other than a production process. A distinction is made between primary, secondary and tertiary residual flows. The primary residual flow concerns parts of plants that are left behind on the field or in the forest after harvest. The secondary residual flow concerns all forms of biomass that remain behind in a production process, such as wood waste and sawdust in a sawmill. Tertiary residual flows concern biomass products that are usually interpreted as waste materials, such as organic waste from fruits, vegetables and gardens, waste wood and other post-consumer material.  
Biogenic residual and waste materials consist for instance of residues from the agro-food and timber industries and tertiary biomass such as waste wood. |
| **Residues from nature and landscape management** | Residue products from management of urban green, landscape or nature other than forest aiming at the preservation, recovery or strengthening of specific natural, recreational or landscape functions. This also includes biomass residual products from the regular maintenance of public green areas and parks. |
| **Risk** | The likelihood that something will occur that has an effect on objectives. This is measured as a combination of the probability that the event will occur and the seriousness of its consequences \( \text{risk} = \text{probability} \times \text{effect} \). |
| **Risk Based Approach (RBA)** | Approach that includes measures and procedures to minimise the risk of sourcing non-compliant material from unsustainable sources. The RBA contains an assessment of the risk of non-compliance for a determined region followed by the establishment of mitigation measures to qualify identified specified risks as low. |
| **Rotation period of a production forest** | Period between the planting and harvesting and/or subsequent logging of a wood stand, taking the optimal current growth into account. |
| **Round wood** | Unprocessed wood from a tree trunk (log) excluding branches, stump and roots. |
| **Selective logging** | Logging method used in unevenly aged and usually mixed stands of forest from which trees are harvested periodically, whereby the forest as a whole remains intact indefinitely (i.e. no clear-cutting takes place). |
| **Semi-natural forest** | A forest where natural processes have a major influence on its development. Human interference is limited to the silvicultural treatments as prescribed in the approved Forest Management Plan. |
| **Silviculture** | The practice of controlling the establishment, growth, composition, health and quality of forests to meet diverse needs and values. |
| **Stakeholder** | Any individual, group or entity that has an interest in any decision or activity (e.g. logging, forest management) of an economic operator and/or may be affected by its decisions or activities. |
| **Strategic Risk Assessment (SRA)** | A systematic and continuous process of assessing significant risks of non-compliance with the requirements of this protocol, which is part of each verification. The main objective of the SRA is to identify which compliance aspects need to be given more attention during the verification and what verification activities are likely to be required (inform verification strategy). |
| **Stump** | The part of the tree that remains attached to the roots after felling. |
| **Sustainability statement** | Statement of conformity (compliance) issued by an accredited and recognised Conformity Assessment Body for an EPP stating that the biomass received and processed into renewable electricity and/or heat meets all the requirements of this protocol. |
| **Sustainability verification** | An audit conducted by a Conformity Assessment Body to evaluate the conformity of biomass received and processed by an EPP. A successful audit results in a sustainability statement. |
| **Sustainable biomass** | Biomass that complies with all applicable criteria according to the protocol. |
### Sustainable Forest Management (SFM)

The management and use of forests and other forested areas in a manner and with an intensity that ensures that they retain and will continue to retain their productivity, biological diversity, regenerative capacity and vitality, as well as the capacity to fulfil the relevant economic, ecological and social functions at the local, national and global levels. Forest carbon stock shall be preserved or enhanced in the long term and shall not cause any harm to other ecosystems.

### Thinning

The selective or systematic harvesting of trees from a more or less uniformly aged forest with the aim of increasing the stem diameter and health of the remaining forest stand.

### Thinning wood

Wood obtained from trees harvested in thinning operations.

### Timber harvest

The volume (including bark) of all trees, living or dead, with a diameter of more than 10 cm at breast height (DBH > 10 cm), that is harvested in a forest or forested area. This includes all harvested trees.

### Trader/Warehouse

Economic operator that trades and/or stores one of the biomass categories, without any processing.

### Verification

Compliance (conformity) assessment, conducted by a Conformity Assessment (Verification) Body according to the applicable Verification Protocol and underlying regulatory requirements.

### Verification statement

Statement of conformity (compliance) of supplied biomass, issued by an accredited and recognised Conformity Assessment Body for an economic operator up to the EPP.

### Wetland

Land that is covered or saturated with water permanently or for a large part of the year.

### Wood plantation

Forest stand which is established through planting and/or seeding in the context of afforestation or reforestation. A wood plantation consists either of introduced species (all planted stands) or of an intensively managed stand of native species complying with the following criteria: one or more species per plantation, uniform age class distribution, regular planting distance.
Appendix 1
Methodology for the calculation of GHG emissions of solid biomass for the generation of electricity and heat (normative)

This appendix includes the methodology for the calculation of GHG emissions from the Report of the European Commission COM (2010)11 plus additions in European Commission Staff Working Document SWD (2014)259. This methodology is used for calculating the default values as listed in SWD (2014)259 and in JRC report EUR 27215 EN. This methodology is also included in the ‘Methodological background document’ of the BioGrace-II tool, from which parts that are not relevant for this protocol have been omitted. The methodology included in this appendix shall be applied when calculating GHG emissions to be used to comply with the sustainability criteria in this protocol. Parts from the original methodological description that are not relevant have been omitted. The article numbers concerned have been left open in order to keep this appendix as consistent as possible with the original document. The parts that have been omitted concern GHG calculations of the relative emission reduction of the production of biogas/biomethane, of land use change, of improved agricultural management and of CO₂ capturing and storage.

1. GHG emissions from the production of biomass energy carriers, before conversion into electricity and heat, shall be calculated as:

\[ E = e_{ec} + e_p + e_{td} + e_u \]

where:
- \( E \) = total emissions from the production of biomass energy carriers before final energy conversion
- \( e_{ec} \) = emissions from the extraction or cultivation of raw materials
- \( e_p \) = emissions from processing
- \( e_{td} \) = emissions from transport and distribution
- \( e_u \) = emissions from the fuel in use, i.e. greenhouse gases emitted during combustion

Emissions from the manufacture of machinery and equipment shall not be taken into account.
2. GHG emissions from the use of biomass energy carriers in the generation of energy or heat, including energy conversion to electricity and/or heat, shall be calculated as follows:

For installations exclusively generating useful heat:

\[ EC_h = \frac{E}{\eta_h} \]

For installations exclusively generating electricity:

\[ EC_{el} = \frac{E}{\eta_{el}} \]

where:

\[ EC_{h,el} = \text{total GHG emissions from the final energy commodity} \]
\[ E = \text{total GHG emissions from the biomass before the final end-conversion} \]
\[ \eta_{el} = \text{electrical efficiency, defined as the annual electricity produced divided by the annual fuel input} \]
\[ \eta_h = \text{thermal efficiency, defined as the annual useful heat produced divided by the annual fuel input} \]

For electricity generated by energy installations that deliver both useful heat and electricity:

\[ EC_{el} = \frac{E}{\eta_{el}} \left( \frac{C_{el} \cdot \eta_{el}}{C_{el} \cdot \eta_{el} + C_h \cdot \eta_h} \right) \]

For useful heat generated by energy installations that deliver both useful heat and electricity:

\[ EC_h = \frac{E}{\eta_h} \left( \frac{C_h \cdot \eta_h}{C_{el} \cdot \eta_{el} + C_h \cdot \eta_h} \right) \]

where:

\[ C_{el} = \text{the exergy fraction in electricity, set to 100\% (C_{el} = 1)} \]
\[ C_h = \text{the Carnot efficiency (the exergy fraction in useful heat)} \]

The Carnot efficiency, \( C_h \), for useful heat at different temperatures is:

\[ C_h = \frac{T_h - T_0}{T_h} \]
where:

\[ T_h = \text{temperature, measured in absolute temperature (Kelvin), of useful heat at the point of delivery} \]

\[ T_0 = \text{ambient temperature, set at 273.15 Kelvin (= 0°C)} \]

For \( T_h < 150°C \) (423.15 Kelvin), \( C_h \) can also be defined as:

\[ C_h = \text{Carnot efficiency in heat at 150°C (= 423.15 Kelvin), which is: 0.35453} \]

For the purpose of this calculation, the following definitions shall apply:

(a) ‘cogeneration’ shall mean the simultaneous generation in one process of more than one useful energy commodity (electricity, heat, cooling, biomethane and other energy carriers);

(b) ‘useful energy commodity’ shall mean an energy carrier produced in a cogeneration process to satisfy an economically justifiable demand;

(c) ‘economically justifiable demand’ shall mean the demand that would otherwise be satisfied at market conditions.

3. GHG emissions resulting from the use of biomass energy carriers for the generation of electricity and heat (EC) shall be expressed in terms of grams of CO\(_2\) equivalent per MJ of final energy commodity (as defined above): g CO\(_2\)-eq/MJ.

4. Not applicable

5. For the application of point 1, the greenhouse gases CO\(_2\), N\(_2\)O and CH\(_4\) shall be taken into account. For the calculation of CO\(_2\)-equivalence, those gases shall be valued as follows:

\[ \text{CO}_2: 1 \]
\[ \text{N}_2\text{O}: 298 \]
\[ \text{CH}_4: 25 \]

6. Emissions from extraction, harvesting or cultivation of raw materials, \( e_{ec} \) shall include emissions from the extraction, harvesting or cultivation process itself; from the collection, drying, storage and transport of raw materials; from waste and leakages; and from the production of chemicals or products used in extraction or cultivation. Capture of CO\(_2\) in the cultivation of raw materials shall be excluded. Estimates of emissions from cultivation or harvesting may be derived from the use of averages calculated for smaller geographical areas than those used in the calculation of the default values, as an alternative to using actual values.

7. Not applicable

8. Not applicable

9. Not applicable
10. Emissions from processing, eu, shall include emissions from the processing itself; from waste and leakages; and from the production of chemicals or products used in processing. In accounting for the consumption of electricity or heat not produced within the EPP, the GHG emission intensity of the generation and distribution of that electricity or heat shall be assumed to be equal to the fossil fuel comparators set out in point 18. By derogation from this rule, producers may use an average value for an individual electricity or heat production plant for electricity or heat produced by that plant if that plant is not connected to the (electricity) grid.

11. Emissions from transport and distribution, etd, shall include emissions from the transport and storage of raw and semi-finished materials and from the storage and distribution of finished materials. Emissions from transport and distribution to be taken into account under point 6 shall not be covered by this point.

12. Emissions from the fuel in use, eu, shall include emissions of CH₄ and N₂O from the combustion of biomass. CO₂ emissions from the fuel in use shall be taken to be zero for biomass.

13. Not applicable

14. Not applicable

15. Where a cogeneration unit – providing heat and/or electricity to a fuel production process for which emissions are being calculated – produces excess electricity or excess useful heat, the GHG shall be divided between the electricity and the useful heat according to the temperature of the heat (which reflects the usefulness (utility) of the heat). The allocation factor, called Carnot efficiency Cₙ, is calculated as follows for useful heat at different temperatures:

\[ C_h = \frac{T_h - T_0}{T_h} \]

where:
- \( T_h \) = temperature, measured in absolute temperature (kelvin), of the useful heat at the point of delivery
- \( T_0 \) = ambient temperature, set at 273.15 Kelvin (= 0°C);

For \( T_h < 150°C \) (423.15 Kelvin), \( C_h \) can alternatively be defined as:

\[ C_h = \text{Carnot efficiency in heat at } 150°C \text{ (= 423.15 Kelvin), which is 0.35453} \]

For the purposes of this calculation, actual efficiencies shall be used, defined as the annual electricity and heat produced respectively divided by the annual energy input.

For the purposes this calculation the following definitions shall apply:
(a) ‘cogeneration’ shall mean the simultaneous generation in one process of thermal energy and electricity;
(b) ‘useful’ heat shall mean heat generated to satisfy an economically justifiable demand for heat;
(c) ‘economically justifiable demand’ shall mean demand that does not exceed the need for heating and which would otherwise be satisfied at market conditions by energy generation processes other than cogeneration.

16. Where a fuel production process produces, in combination, the fuel for which emissions are being calculated and one or more other products (co-products), GHG emissions shall be divided between the fuel or its intermediate product and the co-products in proportion to their energy content (determined by lower heating value in the case of products or co-products other than electricity).
17. For the purposes of the calculation referred to in points 15 and 16, the emissions to be divided shall be \(e_{\text{ec}} + \) the fractions of \(e_p\) and \(e_{\text{td}}\) that take place up to and including the process step at which a co-product is produced. If any allocation to co-products has taken place at an earlier process step in the life-cycle, the fraction of those emissions assigned in the last such process step to the intermediate fuel product shall be used for this purpose instead of the total of those emissions. Wastes, secondary biomass and primary forest and agricultural crop residues, including treetops and branches, straw, bagasse, husks, cobs and nut shells, and residues from processing, including crude glycerine (glycerine that is not refined), shall be considered to have zero life-cycle GHG emissions up to the process of collection of those materials. In the case of fuels produced in refineries other than the combination of processing plants with boilers or cogeneration units providing heat and/or electricity to the processing plant, the unit of analysis for the purposes of the calculation referred to in point 16 shall be the refinery.

18. For the purposes of the calculation referred to in point 10, the fossil fuel comparator \(EC_{(a)}\) shall be 186 g CO\(_2\)-eq/MJ electricity. For the purposes of the calculations in point 10, the fossil fuel comparator \(EC_{(b)}\) shall be 80 g CO\(_2\)-eq/MJ heat.

19. Not applicable
Appendix 2
Total default values for GHG intensities (normative)

To accommodate the calculation of the GHG intensity of fuels, every participant (economic operator) in the chain shall collect sufficient and valid information. For this purpose, values may be calculated, or default values may be adopted from BioGrace-II. In the first case the calculations shall align with the methodology in Appendix 1. In the second case the tables in this appendix and in the next one can be used for relevant default values. Where an economic operator does not calculate its own values, passing the values from the tables below to the next participant shall suffice, both for the own values and for the values of previous economic operators. Where it concerns an EPP, the correct default value can be applied for the calculation of GHG intensity, based on the tables in this appendix and in the next one and the information provided. That information shall be sufficient in order to choose the correct category. This concerns information related to:
- biomass energy
- feedstock
- configuration of pellet mill (where relevant)
- transport distance.

If the actual transport distances and/or configuration of the pellet mill do not enable a choice of the right default value, the most conservative value shall be taken, meaning the value for the largest transport distance and/or a configuration using a natural gas boiler.

**Missing information from a part of the chain**
Where there is information available to perform own emission calculations for a part of the chain and information is missing for another part, the participant may use disaggregated default values for the missing part of the chain to perform the calculation. Values for these disaggregated values are given in Appendix 3. This may happen when a company has information available for the calculation of its own emissions during transport, but not for emissions during production. In such a case the relevant default data for cultivation/production can be taken from BioGrace-II, whilst actual calculations can be made using the information on transport.

**Calculating the GHG intensity of electricity and/or heat**
In order to enable calculation of the final GHG intensity of the generated electricity and/or heat, the EPP shall perform a calculation based on the input data of fuels used and the output data of electricity and/or heat produced by the plant. This converts the units in the tables below to the necessary value in the unit ‘amount of GHG per MJ of electricity’ or the unit ‘amount of GHG per MJ of heat’. The conversion efficiency of the plant shall be taken into account.

The values in this appendix are adopted from the JRC report EUR 27215 EN, an update of the JRC report EUR 26696 EN of 2014 that was published as an appendix to the SWD(2014)259 final report regarding sustainability criteria of solid and gaseous biomass. The full reference of the JRC report is:

Emission values are expressed per MJ biomass energy carrier delivered to the EPP, not including the final conversion efficiency. Emission values resulting from land use, CO₂ emissions from combustion of biomass and emissions from indirect impacts are not taken into account. CH₄ and N₂O from the final combustion are taken into account. This is in accordance with the methodology used in the JRC report.
<table>
<thead>
<tr>
<th>Biomass energy carrier</th>
<th>Feedstock</th>
<th>(where relevant) Configuration of pellet mill</th>
<th>Transport distance</th>
<th>Default value (g CO₂-eq per MJ\text{biomass})</th>
<th>Possible biomass category</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood chips</td>
<td>Forestry residues</td>
<td>n/a</td>
<td>1 - 500 km 500 - 2,500 km 2,500 - 10,000 km In excess of 10,000 km</td>
<td>6 8 14 25</td>
<td>1 &amp; 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Short rotation coppice (Eucalyptus)</td>
<td>n/a</td>
<td>2,500 - 10,000 km</td>
<td>26</td>
<td>1 &amp; 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Short rotation coppice (Poplar – fertilised)</td>
<td>n/a</td>
<td>1 - 500 km 500 - 2,500 km 2,500 - 10,000 km In excess of 10,000 km</td>
<td>9 11 17 28</td>
<td>1 &amp; 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Short rotation coppice (Poplar – non-fertilised)</td>
<td>n/a</td>
<td>1 - 500 km 500 - 2,500 km 2,500 - 10,000 km In excess of 10,000 km</td>
<td>7 9 15 26</td>
<td>1 &amp; 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stemwood</td>
<td>n/a</td>
<td>1 - 500 km 500 - 2,500 km 2,500 - 10,000 km In excess of 10,000 km</td>
<td>6 8 14 25</td>
<td>1 &amp; 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wood industry residues</td>
<td>n/a</td>
<td>1 - 500 km 500 - 2,500 km 2,500 - 10,000 km In excess of 10,000 km</td>
<td>4 7 13 24</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Wood pellets/briquettes</td>
<td>Forestry residues</td>
<td>Configuration 1: Natural gas boiler 1 - 500 km 500 - 2,500 km 2,500 - 10,000 km In excess of 10,000 km</td>
<td>36 36 38 42</td>
<td>1 &amp; 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Configuration 2: Wood chip boiler 1 - 500 km 500 - 2,500 km 2,500 - 10,000 km In excess of 10,000 km</td>
<td>19 19 21 25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Configuration 3: Wood chip - CHP 1 - 500 km 500 - 2,500 km 2,500 - 10,000 km In excess of 10,000 km</td>
<td>7 7 8 13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Short rotation coppice (Eucalyptus)</td>
<td>2,500 - 10,000 km</td>
<td>48</td>
<td>1 &amp; 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Configuration 2: Wood chip boiler</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Configuration 3: Wood chip - CHP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Short rotation coppice (Poplar – fertilised)</td>
<td>2,500 - 10,000 km</td>
<td>22</td>
<td>1 &amp; 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Configuration 1: Natural gas boiler 1 - 500 km 500 - 10,000 km In excess of 10,000 km</td>
<td>38 40 44</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Configuration 2: Wood chip boiler 1 - 500 km 500 - 10,000 km In excess of 10,000 km</td>
<td>21 23 27</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Configuration 3: Wood chip - CHP 1 - 500 km 500 - 10,000 km In excess of 10,000 km</td>
<td>9 11 15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10 Depending on further conditions for biomass to be met.
<table>
<thead>
<tr>
<th>Biomass energy carrier</th>
<th>Feedstock</th>
<th>(where relevant) Configuration of pellet mill</th>
<th>Transport distance</th>
<th>Default value (g CO₂-eq per MJ&lt;sub&gt;biomass&lt;/sub&gt;)</th>
<th>Possible biomass category</th>
</tr>
</thead>
</table>
| Short rotation coppice (Poplar – non-fertilised) | Configuration 1: Natural gas boiler | 1 - 500 km  
500 - 10,000 km  
In excess of 10,000 km | 36  
38  
42 | 1 & 2 |
|  | Configuration 2: Wood chip boiler | 1 - 500 km  
500 - 10,000 km  
In excess of 10,000 km | 19  
21  
25 | |
|  | Configuration 3: Wood chip - CHP | 1 - 500 km  
500 - 10,000 km  
In excess of 10,000 km | 7  
9  
13 | |
| Stemwood | Configuration 1: Natural gas boiler | 1 - 500 km  
500 - 2,500 km  
2,500 - 10,000 km  
In excess of 10,000 km | 36  
36  
38  
42 | 1 & 2 |
|  | Configuration 2: Wood chip boiler | 1 - 500 km  
500 - 2,500 km  
2,500 - 10,000 km  
In excess of 10,000 km | 19  
18  
20  
25 | |
|  | Configuration 3: Wood chip - CHP | 1 - 500 km  
500 - 2,500 km  
2,500 - 10,000 km  
In excess of 10,000 km | 6  
6  
8  
12 | |
| Wood industry residues | Configuration 1: Natural gas boiler | 1 - 500 km  
500 - 2,500 km  
2,500 - 10,000 km  
In excess of 10,000 km | 22  
21  
23  
27 | 5 |
|  | Configuration 2: Wood chip boiler | 1 - 500 km  
500 - 2,500 km  
2,500 - 10,000 km  
In excess of 10,000 km | 11  
11  
13  
17 | |
|  | Configuration 3: Wood chip - CHP | 1 - 500 km  
500 - 2,500 km  
2,500 - 10,000 km  
In excess of 10,000 km | 4  
4  
6  
10 | |
| Agricultural production systems | Agricultural residues – density < 200 kg/m³ ¹¹ | n/a | 1 - 500 km  
500 - 2,500 km  
2,500 - 10,000 km  
In excess of 10,000 km | 4  
9  
17  
32 | 4 |
|  | Agricultural residues – density > 200 kg/m³ ¹² | n/a | 1 - 500 km  
500 - 2,500 km  
2,500 - 10,000 km  
In excess of 10,000 km | 4  
6  
9  
17 | 4 |
|  | Straw pellets | n/a | 1 - 500 km  
500 - 10,000 km  
In excess of 10,000 km | 10  
12  
16 | 4 |
|  | Bagasse briquettes | n/a | 500 - 10,000 km  
In excess of 10,000 km | 6  
10 | 4 |
|  | Palm kernel meal | n/a | In excess of 10,000 km | 61 | 4 |
|  | Palm kernel meal (no CH₄ emissions from oil mill) | n/a | In excess of 10,000 km | 40 | 4 |

¹¹ This group of materials includes agricultural residues with a low bulk density and comprises materials such as straw bales, oat hulls, rice husks and sugar cane bagasse bales (non-exhaustive list).

¹² The group of agricultural residues with higher bulk density includes materials such as corn cobs, nut shells, soybean hulls, palm kernel shells (non-exhaustive list).
Appendix 3
Disaggregated default values for GHG intensities (normative)

See also the introduction to Appendix 2.

Emission values are expressed per delivered MJ biomass. For ‘total’ default values please refer to Appendix 2.

<table>
<thead>
<tr>
<th>Biomass energy carrier</th>
<th>Feedstock</th>
<th>(where relevant)</th>
<th>Transport distance</th>
<th>Default value (g CO₂-eq per MJ biomass)</th>
<th>Possible biomass category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(Configuration of pellet mill)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Transport distance</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood chips</td>
<td>Forestry residues</td>
<td>n/a</td>
<td>1-500 km</td>
<td>0.0</td>
<td>1 &amp; 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>500-2,500 km</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2,500-10,000 km</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>In excess of 10,000 km</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short rotation coppice (Eucalyptus)</td>
<td>n/a</td>
<td></td>
<td>2,500-10,000 km</td>
<td>13.6</td>
<td>1 &amp; 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short rotation coppice (Poplar – fertilised)</td>
<td>n/a</td>
<td></td>
<td>1-500 km</td>
<td>3.9</td>
<td>1 &amp; 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>500-2,500 km</td>
<td>3.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2,500-10,000 km</td>
<td>3.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>In excess of 10,000 km</td>
<td>3.9</td>
<td></td>
</tr>
<tr>
<td>Short rotation coppice (Poplar – non-fertilised)</td>
<td>n/a</td>
<td></td>
<td>1-500 km</td>
<td>2.3</td>
<td>1 &amp; 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>500-2,500 km</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2,500-10,000 km</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>In excess of 10,000 km</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td>Stemwood</td>
<td>n/a</td>
<td></td>
<td>1-500 km</td>
<td>1.1</td>
<td>1 &amp; 2</td>
</tr>
<tr>
<td></td>
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13 Depending on further conditions for biomass to be met.
14 A combined harvester + chipper is considered to be used for the harvest of short rotation coppice. The disaggregated values for ‘cultivation’ of eucalyptus and poplar thus include the production of chipped wood.
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<th>Biomass energy carrier</th>
<th>Feedstock</th>
<th>(where relevant)</th>
<th>Configuration of pellet mill</th>
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<th>Default value (g CO₂-eq per MJ biomass)</th>
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SDE Verification Protocol transition period | 66
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<td>4</td>
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</table>

<sup>15</sup> This group of materials includes agricultural residues with a low bulk density and comprises materials such as straw bales, oat hulls, rice husks and sugar cane bagasse bales (non-exhaustive list).

<sup>16</sup> The group of agricultural residues with higher bulk density includes materials such as corn cobs, nut shells, soybean hulls, palm kernel shells (non-exhaustive list).
Appendix 4
The relevance of the ILUC sustainability criterion to the co-firing and co-gasification of solid biomass (informative)

The General Regulations Implementing SDE+ (http://wetten.overheid.nl/BWBR0023563/2016-02-27) contain sustainability criteria for solid biomass that is used for co-firing and co-gasification and large-scale heat projects. The Regulations also include the below criterion for Indirect Land Use Change (ILUC).

In accordance with Article 19(6) of the European Renewable Energy Directive and Article 23(4) of that Directive as amended in 2015 by the ILUC Directive (EU) 2015/1513, it is assumed that the ILUC effect is viewed from the perspective of greenhouse gas emissions caused by changes in land use.

**Principle 5:** Biomass production may not result in Indirect Land Use Change (ILUC).

**Criterion 5.1** Biomass sourced from new bioenergy plantation systems that were planted after 1 January 2008 shall have a demonstrably low ILUC risk.

**Explanation:**
Small category 2 FMUs are exempted from this requirement.

ILUC risks must be identified on the basis of the LIIB method and requirements (LIIB = Low Indirect Impact Biofuels) or an equivalent method. This method is reviewed every three years if there is cause to do so, and adapted if an improved method has become available.

In this connection, ‘new bioenergy plantation systems’ are defined as:

'A plantation system that is developed for the production of biomass for energy generation, whereby fast-growing tree species (e.g. willow, poplar, eucalyptus and acacia) are planted in dense plantations and harvested in short rotation periods. These systems also include: (i) short rotation coppicing systems, whereby the new crop grows from the stumps of previously harvested stems and/or sprouts with rotations between two and ten years, and (ii) short rotation forest plantations using tree species that are harvested within 20 years or less.'

Pursuant to the sustainability criteria, this means that the ILUC criterion applies exclusively to biomass from new category 1 bioenergy plantation systems with a maximum rotation period of 20 years. This period is in line with the definition used by the JRC in the study entitled ‘Solid and gaseous bioenergy pathways’ that it conducted on behalf of the European Commission (update 2015: p. 79, see here).

Greenhouse gas emissions from land conversion largely occur immediately after the land conversion. Model studies commissioned by the EC (such as the GLOBIOM study, March 2016, see here) apply the rule that emissions which occur immediately after conversion are distributed over a 20-year period, in line with the 20-year distribution period laid down in the EU Renewable Energy Directive (2009/28/EC) for direct land-use changes. Other emissions continue over a more prolonged period, such as methane emissions caused by draining peatland, which may occur for up to 70 years after conversion. In the model studies, these emissions are taken into account for a 20-year period. This means that even though these emissions will have been largely amortised after 20 years, emission effects will continue to occur. This is important, given the fact that fossil emissions do not decline over time.

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In the ILUC quantification study recently conducted by Ecofys, IIASA and E4tech on behalf of the European Commission (‘GLOBIOM’) includes a model for new bioenergy plantation systems with short rotation plantation wood. The reference year for this study (2008) coincides with the reference year used in the sustainability criteria for solid biomass. The outcomes for this scenario reveal that land conversion for new energy plantations occurs mainly on abandoned land and other natural land, without any displacement of food production. In addition, substantial negative ILUC emissions occur, particularly due to high carbon storage in biomass (also underground). This results in a net emission effect of minus 29 grams of CO$_2$/MJ biofuel, which is positive for the greenhouse gas balance of woody energy crops. Woody energy crops used for co-firing and co-gasification can also be expected to result in negative net emissions. This outcome applies to woody energy crops with a rotation period of 10 to a maximum of 20 years; with rotation periods in excess of that, short rotation coppicing is much less efficient in terms of carbon storage. As such, woody energy crops serve as a major carbon sink. This results mainly from the high carbon storage in woody energy crops from short rotation coppicing. (In the GLOBIOM study referred to above, short rotation coppicing is defined and the model outcomes are presented.)

The net outcome (negative ILUC emissions) is positive as regards the greenhouse gas balance, but there is an ILUC effect because part of the land used is agricultural land, resulting in displacement of food/feed production to other locations. However, this emission effect is amply compensated through carbon storage in biomass and in the soil via woody energy crops production.

The GLOBIOM study presents the outcomes for the situation within the EU, but these are comparable to the expected outcomes for biomass from outside the EU (e.g. North America), [personal comments from Daan Peters, Ecofys; Hugo Valin, IIASA].

In the most extreme case in which new short rotation bioenergy plantation systems are located on 100% agricultural land (in North America or elsewhere), this will result in higher LUC emission values. At the same time however, the negative emissions due to carbon storage will continue to be realised. On balance, this will probably still lead to negative net emission values and, hence, to a positive effect on the greenhouse gas balance (comparable to the scenario for perennial crops in de GLOBIOM study), but less so than in the current modelled scenario, in which by far the majority of land-use changes occurred on abandoned agricultural land or marginal land (determined by selecting plots in modelling based on lowest conversion values) [personal comments from Hugo Valin, IIASA].

The explanatory notes to the sustainability criteria state that ILUC risks must be determined on the basis of the LIIB method and requirements (LIIB = Low Indirect Impact Biofuels) or an equivalent method (see here). LIIB and GLOBIOM are compatible methods. While GLOBIOM involves modelling at the global level, the LIIB method can also be used at the regional level. The LIIB method affords better insight into the presence or absence of ILUC (Go/No go) but, unlike GLOBIOM, does not quantify emission levels. The LIIB method is only relevant in cases where ILUC actually occurs, i.e. with positive ILUC emissions (net CO$_2$ emission).

When there are no positive ILUC emissions, as indicated above, the LIIB method is superfluous.