Sustainability certification of solid biomass for energy production
A guide for market players and other stakeholders

Sustainability certification of solid biomass is gaining increasing interest, in particular for biomass used for bio-energy production. Sustainability certification is used as an ‘independent stamp’ showing that biomass has been produced, processed and/or used sustainably. To facilitate market players and other stakeholders in information gathering and informed decision-making we developed a ‘Handbook on sustainability certification of solid biomass for energy production’.

1. Introduction
There are numerous and fast developments in this area: market players work on voluntary certification of biomass they produce, supply or use for energy production. Certification schemes are being developed and further detailed, in many cases with the involvement of a variety of stakeholders. Last but not least, both European and national governments are considering proposals for (mandatory or voluntary) sustainability requirements for solid biomass used for energy production.

For market players and other stakeholders it is often difficult to obtain and maintain an accurate overview of these developments, in particular in relation to the individual choices they should or could make.

To facilitate market players and other stakeholders in information gathering and informed decision-making, Brinkmann Consultancy on behalf of NL Enterprise Agency has developed a ‘Handbook on sustainability certification of solid biomass for energy production’. The primary target audience of this Handbook includes market players in (inter)national chains of solid biomass production, processing and use (bio-energy producers). The Handbook also contains relevant information for other stakeholders in sustainability certification of solid biomass, e.g. policy makers, non-governmental organizations (NGO’s), consultants and researchers.

2. Structure of the Handbook
The Handbook has a modular structure. Each module has a number and a title, and represents a ‘chapter’ in the Handbook. Depending on the reader’s existing knowledge and information needs, he may read only one or some of the modules. Each module can be read independently from the other modules.

The Handbook comprises seven main categories of modules. Under each category, various separate modules have been structured. The key structure has been depicted in Box 1.

**Box 1 Key structure of the Handbook**
- Module 100 Introduction
- Module 200 Sustainability certification of biomass – background and objectives
- Module 300 Certification schemes
- Module 400 Practical tools for assessing sustainability impacts
- Module 500 Related legislation
- Module 600 Other sustainability aspects of biomass use for energy production
- Module 700 Glossary of terms and abbreviations

3. Background of sustainability certification of biomass (Module 200)
Module 210 starts by explaining how the increasing use of biomass for energy production has led to growing concerns over possible negative environmental and socio-economic impacts of biomass chains. In many cases, concerns were first raised by non-governmental organizations (NGOs) and – following sufficient mainstream media attention - subsequently became part the agendas of policy makers in industry and government.

In response to these concerns, there have been a variety of initiatives aimed at setting standards for sustainable biomass production and use, including sustainable forest management schemes, crop-specific certification schemes, and bio-energy schemes.

Module 220 then continues by explaining which objectives companies may have to certify their biomass cultivation, processing and or bio-energy production. It elaborates that, generally four categories of objectives can be distinguished, i.e.:
1. Compliance with regulatory requirements;
2. Compliance with market requirements, or developing new market opportunities;
3. Corporate Social Responsibility;
4. Quality assurance.

In Module 230, the relation between legal requirements and biomass sustainability certification is explained in detail. It first explains the sustainability requirements for transport biofuels and bioliquids laid down in the EU Renewable Energy Directive, and how market players can use approved ‘voluntary schemes’ to show compliance with these requirements. It also explains that these requirements do currently not apply to solid biomass used for electricity and/or heat generation, and that it is unlikely that the European Commission will impose such requirements on a European level in the near future.

Module 230 concludes by elaborating on the sustainability requirements for solid biomass for energy which have been imposed by individual European countries, i.e. the United Kingdom and the Region of Flanders in Belgium. It also highlights the sustainability requirements laid down in the Dutch SER ‘Energieakkoord’.

Module 240 comprises a decision tree which helps market players decide whether biomass sustainability certification is necessary or useful in their particular situation.

4. Certification schemes (Module 300)
Module 310 elaborates the general structure of biomass certification schemes, as depicted in the Figure below.
It discusses in detail the following key elements of any biomass certification scheme:

1. **Principles & Criteria** for sustainable production of biomass or for sustainable forest management;
2. **A chain of custody** which allows tracing of certified material through the supply chain (from producer up to the bio-energy plant), and which ensures that no more sustainable material is claimed than has been produced/harvested;
3. **Certification requirements**, which specify the rules of play for verification of the biomass by independent auditors, as well as the certification process. Certification requirements include both the production of biomass/forest management, and the chain of custody;
4. **Rules on claims and communications** that can be made by certified operators;
5. The **governance structure** of the scheme, i.e. the way in which the scheme is governed and managed.

In Module 320, key features of nine selected biomass certification schemes are discussed. These include schemes which already have acquired a market position in the certification of solid biomass used for bio-energy production, or which are likely to obtain such a position in the future.

Names and short descriptions of the nine biomass sustainability schemes discussed in the Handbook have been summarized in Box 2 below. The schemes can be categorized in three groups: (a) forest management schemes, (b) power utilities’ schemes, and (c) ‘generic’ bio-energy schemes.

**Sustainable forest management schemes**
These schemes focus on certification of pieces of (sustainably managed) forested land, and cover biomass harvested from that forest, regardless of the application of the biomass (e.g. wood for furniture, paper or bio-energy). In addition, these schemes may also cover waste wood applications. Sustainable forest management schemes covered in this Handbook include FSC, PEFC, CSA-SFM and SFI.

**Power utilities’ schemes**
These schemes focus on biomass for bio-electricity generation, in particular wood pellets. The schemes have been developed by power utilities, while other stakeholders play a role in scheme governance. Power utilities’ schemes covered in this Handbook include GGL and IWPB.

**Generic bio-energy schemes**
These schemes focus on biomass for all types of bio-energy applications, including transport biofuels, electricity and heating. The scope of biomass included is broad, and may include solid, liquid and gaseous biomass.

The generic bio-energy schemes do include sustainability criteria for the production of the biomass, in plantations/agriculture as well as in forests. Sustainable bio-energy schemes covered in this Handbook include NTA 8080, ISCC, RSB.
NTA 8080 – a certification scheme focusing on biomass for all types of bio-energy application. Currently the leading scheme for the certification of solid biomass (residues) in the Netherlands.

International Sustainability and Carbon Certification Scheme (ISCC) – a biomass certification scheme, currently focusing on (feedstocks for) transport biofuels. Market leader amongst schemes that can be used for biofuels in the EU.

Roundtable on Sustainable Biomaterials (RSB) - a certification scheme focusing on biomass for all types of bio-energy applications, as well as other bio-based applications (food, feed, chemicals, etc.). Certification activities are in the infant phase. Scheme is being hailed for its robustness.

Green Gold Label (GGL) - scheme focusing on traceability of certified solid biomass for large power plants. Uses a meta-standard approach for certification of biomass production/forest management.

Initiative Wood Pellet Buyers (IWPB) - this scheme is under development, and includes sustainability criteria for wood pellets. It is an initiative from seven major power utilities in Europe, and expected to play a major role in wood pellet trade.

Forest Stewardship Council (FSC) - one of two leading forest management schemes with global coverage (together with PEFC). Focus is on certification of forest biomass, regardless of the application of the biomass.

Programme for the Endorsement of Forest Certification (PEFC) - one of two leading forest management schemes with global coverage (together with FSC). Focus is on certification of forest biomass, regardless of the application of the biomass.

Canadian Standards Association – Sustainable Forest Management (CSA-SFM) - A Canadian sustainable forest management scheme. Covered in this Handbook because of the expected importance of wood pellet imports from Canada and USA for use in European power plants.

Sustainable Forest Initiative (SFI) - A US/Canadian sustainable forest management scheme. Covered in this Handbook because of the expected importance of wood pellet imports from Canada and USA for use in European power plants.

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Module 330 contains a decision tree which helps market players decide which certification scheme is most appropriate in their particular situation.

5. Practical tools for assessing sustainability impacts (Module 400)
Companies producing, processing and/or using biomass may wish to assess how their particular project ‘scores’ against a certification scheme’s set of sustainability criteria. For this purpose, a company can execute a sustainability self-assessment. A company may do this in-house, or hire external expertise to assist them with the assessment.

Module 410 explains the objective of sustainability self-assessments, and presents two examples of self-assessment tools. Module 420 provides references to a variety of guidance documents and tools for assessing specific sustainability aspects of biomass projects.

6. Other legislation related to biomass use for energy and to biomass certification (Module 500)
Module 500 contains information on other legislation related to biomass use for energy and to biomass certification. This first version of the Handbook focuses on the EU Timber Regulation (in Dutch ‘Europese Houtverordening’). This Regulation prohibits placing illegally harvested timber on the EU market. To achieve this, the Regulation sets out procedures which market players trading timber within the EU must put in place to minimize the risk of illegal timber being sold. In relation to forest biomass for energy, the following categories have to comply with the Regulation requirements:

‘4401 Fuel wood, in logs, in billets, in twigs, in faggots or in similar forms; wood in chips or particles; sawdust and wood waste and scrap, whether or not agglomerated in logs, briquettes, pellets or similar forms’ and
‘4403 Wood in the rough, whether or not stripped of bark or sapwood, or roughly squared.’

Used timber and timber products that have completed their lifecycle, and would otherwise be disposed of as waste, are excluded from the scope of the Regulation.

Module 510 provides guidance on the practical implications of the Regulation on biomass trade and use, with specific references to wood used for bio-energy generation.

7. Other sustainability impacts of biomass use for energy production (Module 600)
Modules 610 and 620 provide background information on two key sustainability aspects of solid biomass, i.e. ‘carbon debt’ and ‘indirect effects’ of biomass production. While these aspects are currently outside the scope of sustainability certification, further policy developments and standard setting may lead to additional sustainability requirements covering these aspects.

Carbon debt
In the past two years, the issue of carbon debt has caused a political debate about the desirability of certain forms of wood bio-energy. The discussion on carbon debt relates to the following:
When forest biomass is harvested and burned for bio-energy generation, a forest may become a temporal carbon source: CO₂-emissions from burning are released immediately, while ‘offsetting’ the CO₂-emissions by forest regrowth (carbon sequestration) takes time. This temporal imbalance between carbon emission and carbon sequestration is referred to as ‘carbon debt’.
The carbon debt needs to be ‘paid back’ before the forest bioenergy system is a net contributor to climate change mitigation.

There are still many scientific uncertainties as to the way in which carbon debt shall be calculated. In addition, it is yet difficult to decide which level of carbon debt would be politically acceptable.

Module 610 provides a general introduction to the issue of carbon debt, as well as a reference list for readers which wish to learn about the issue in more detail.

Indirect effects of increased biomass use for energy production
Increased demand for solid biomass for bio-energy may have unintended consequences well outside the area where the biomass is harvested, i.e. the forest or the plantation. These are so called indirect effects, which cannot be directly attributed to a particular operation or a specific location.
Indirect effects are currently not covered by biomass certification schemes, as these schemes always have a specific production unit or forest as the ‘unit of certification’, and focus on effects directly attributable to that unit.
The most cited indirect effects are indirect land use change (ILUC), indirect wood use change (IWUC) and indirect fuel use change (IFUC). In Module 620, each of these three effects is introduced.

8. References
The complete Handbook or the separate modules can be downloaded from www.rvo.nl/biomass
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The Netherlands Programmes for Sustainable Biomass (NPSB) bundle and disseminate knowledge from the biomass project portfolio of Netherlands Enterprise Agency and complete knowledge gaps with supplementary research. The NPSB project portfolio consists of the Global Sustainable Biomass Fund and the Sustainable Biomass Import Fund.

These programmes are funded by the Dutch Ministry of Economic Affairs and the Dutch Ministry of Foreign Affairs.