

RSB – ROUNDTABLE ON SUSTAINABLE BIOMATERIALS

RSB Standard Amendment
RSB requirements for woody biomass

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Introduction

The demand for woody or wood-derived material for electricity, heat and fuel generation as well as for the production of bio-based products has grown significantly in recent years and has the potential to continue to do so. On the one side, it represents a relatively cheap and flexible way of supplying renewable energy and constitutes therefore an important building block of the bioeconomy, on the other side concerns have been raised about the climate impact as well as about unintended consequences on ecosystems.

In the context of the current RSB GHG calculation methodology (also in line with EU RED and ICAO CORSIA), the combustion of crop-based biofuels is considered carbon neutral based on the rationale that the emitted carbon is sequestered during the growth of the plant over a relatively short period (less than 12 months). For woody material for bioenergy purposes, this assumption has been questioned as the harvest of the wood for bioenergy causes a decrease of the forest carbon stock which may not be recovered in the short-term.

In order to ensure that a greenhouse gas emission reduction is significant compared to fossil fuels it is therefore essential to correctly account for carbon stock changes in the forest. This requires that that all carbon pools of the forest are considered (i.e. living biomass, dead wood and litter and soil organic matter) as well as the development of the carbon stock held within the pool for both the bioenergy scenario and the scenario without the demand for bioenergy.

Forests are a vital component in combatting climate change, the adaptation of forests to climate change will be necessary to ensure a sustained mitigation effect. Expanding forest area as well as sustainably managed forests provide a significant potential for carbon sequestration and storage in forest biomass and soil as well as in forest products. Forests also have a protective role for preventing land degradation and desertification by stabilizing soils, reducing water and wind erosion and maintaining water and nutrient cycling in soils.

Main changes from the previous version (Version #)

Not applicable

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Aim of this document

This RSB Standard Amendment has been developed with the aim to review and clarify the approach of the RSB towards woody biomass, related to adequate sustainability requirements (RSB Principles & Criteria) as well as the calculation of Greenhouse Gas emissions. The RSB certification system is a risk-based system which means that several tools and mechanisms are available to ensure that the focus of the implementation and auditing is set at areas that matter most in a specific context (for example: RSB Screening Tool, RSB Approach for Waste and Residues reflected in the RSB Standards for Advanced Fuels and Advanced Products) while removing barriers to certification for low-risk feedstocks.

Based on the already established risk mechanisms, this standard amendment aims at defining how this risk-based approach is applied in the context of woody biomass and clarifying the applicability of the RSB Standard to different types of woody materials.

In the context of GHG emissions, RSB requires that bioenergy achieves significant emission reductions compared to the fossil equivalent. Research has shown the importance of correctly accounting for GHG emissions resulting from the use of bioenergy from forest material or other woody biomass. Several factors impact the GHG emission potential of a certain woody biomass source, such as

- Forest management
- Types of wood feedstock
- Growth and decay rates

To ensure that RSB certified materials deliver significant GHG emission savings, this standard amendment defines feedstock categories with a relatively low risk of additional GHG emissions, i.e. emissions that have not been correctly accounted for through the GHG calculation methodology.

Only low risk feedstocks are eligible for RSB certification. Feedstocks that have a medium or high risk for additional GHG impacts, such as stumps or low quality roundwood are not eligible for RSB certification for fuel, heat or electricity generation.

This document also defines specific practices for sourcing feedstock to address specific risks and to ensure that only those feedstocks that are sustainably produced and achieve significant emission reductions compared to the fossil reference are certified in the RSB system.

Scope

This RSB Standard Amendment clarifies how different types of woody biomass are treated in the RSB system and specifies requirements for woody biomass which are intended to ensure that RSB-certified feedstocks and products are sourced sustainably, with a particular focus on ensuring:

- The effective management of forests to conserve biodiversity, as well as ecosystem services like those that protect watersheds and maintain carbon sinks;
- That carbon extracted from forests is effectively accounted for; and
- That harvesting and processing residues are true residues.

In order to meet these objectives, the Standard Amendment will clarify requirements that apply to specific types of woody biomass.

These include requirements related to: the sustainability of forestry feedstocks, the greenhouse gas calculation methodologies and the categorisation of material as main product, residue or end-of-life product. This Standard Amendment intends to clarify requirements that apply to specific types of woody biomass to meet the objectives above.

While this document intends to meet the general requirements of the EU Renewable Energy Directive II for woody biomass, RSB provides the *RSB EU Market Access Standard* outlining details of those requirements for all operators intending to deliver into the EU RED market.

Terms and Definitions

Alien Species

An alien species is a species, subspecies or lower taxon, introduced outside its natural past or present distribution (Source: Decision VI/23 of the Conference of the Parties to the CBD (Convention on Biological Diversity)).

Alien Invasive Plant

An alien invasive plant is an alien plant species which becomes established in natural or seminatural ecosystems or habitat, is an agent of change, and threatens native biological diversity, food security, human health, trade, transport and or economic development (Source: IUCN – ISSG & 2010 Biodiversity Partnership).

Forest

National forest definition under IPCC guidelines¹. If not available, use FAO definition: Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or other land use (Source FAO).

Guidance (Source: The Accountability Framework):

- Forest includes natural forests and tree plantations. For the purpose of implementing no-deforestation supply chain commitments, the focus is on preventing the conversion of natural forests.
- Quantitative thresholds (e.g. for tree height or canopy cover) established in legitimate national or subnational forest definitions may take precedence over the generic thresholds in this definition if they are stricter than the generic threshold
- This standard should not be interpreted as weakening or qualifying any protection or provision of national forestry laws, including when these laws apply to legally classed forests that are tree plantations or presently have little or no tree cover.
- Natural forests shall be distinguished from tree plantations for the purpose of conducting forest inventories and quantifying forest loss and gain. This will facilitate comparability between government forest monitoring and the tracking of supply chain commitments focused on human-induced conversion of natural forests.

¹ Under the IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry, Designated National Authorities are required to register a nationally specific-benchmark for forests.

Natural forest

A forest that is a natural ecosystem.

Natural forests possess many or most of the characteristics of a forest native to the given site, including species composition, structure, and ecological function. Natural forests include:

- **Primary forests** that have not been subject to major human impacts in recent history
- **Regenerated (second-growth)** forests that were subject to major impacts in the past (for instance by agriculture, livestock raising, tree plantations, or intensive logging) but where the main causes of impact have ceased or greatly diminished and the ecosystem has attained much of the species composition, structure, and ecological function of prior or other contemporary natural ecosystems
- **Managed natural forests** where much of the ecosystem's composition, structure, and ecological function exist in the presence of activities such as:
 - Harvesting of timber or other forest products, including management to promote high-value species
 - Low intensity, small-scale cultivation within the forest, such as less-intensive forms of swidden agriculture in a forest mosaic
- **Forests that have been partially degraded** by anthropogenic or natural causes (e.g., harvesting, fire, climate change, invasive species, or others) but where the land has not been converted to another use and where degradation does not result in the sustained reduction of tree cover below the thresholds that define a forest or sustained loss of other main elements of ecosystem composition, structure, and ecological function.

The categories “natural forest” and “tree plantation” are mutually exclusive, though in some cases the distinction may be nuanced.

(Source: The Accountability Framework)

Roundwood

Includes all wood removed with or without bark, including wood removed in its round form, or split, roughly squared or in other form.

Stump

The part of the tree that remains attached to the roots after felling (JRC).

Tree plantation

A forest predominantly composed of trees established through planting and/or deliberate seeding that lacks key elements of a natural forest native to the area, such as species composition and structural diversity.

- Tree plantations generally have one or a few tree species and tend to include one or more of the following characteristics:
 - i) planted on cleared land
 - ii) harvested regularly
 - iii) trees are of even ages

- iv) products from the plantation are managed and processed for commercial production
- Tree plantations can consist of trees planted for timber, pulp, non-timber forest products (e.g. rubber latex), or ecosystem services (e.g. soil stabilisation). Plantations dominated by agricultural species (e.g. fruits or oil palm) are considered agriculture, not tree plantations.
 - There exist a range of “boundary cases” where sites have some characteristics of tree plantations and some characteristics of natural forests.

(Source: The Accountability Framework)

Acronyms and Abbreviations

CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DBH	Diameter at breast height
GHG	Greenhouse gases
ILUC	Indirect land use change
ISO	International Organization for Standardization
LCA	Life cycle assessment

Referenced RSB Standards

[RSB Principles & Criteria](#) [RSB-STD-01-001] Version 3.0

[RSB GHG Calculation Methodology](#) [RSB-STD-01-003-01] Version 2.3

[RSB Low iLUC Risk Biomass Criteria and Compliance Indicators](#) [RSB-STD-04-001] Version 0.3

[RSB Methodology for Displacement Emissions](#) [RSB-STD-04-002] Version 1.0

[RSB Standard for Advanced Fuels](#) [RSB-STD-01-010] Version 2.2

Requirements

Summary

The following table presents an overview of the requirements of this document:

Feedstock	Assessment of eligibility criteria required ²	Requirements for Forest Management / Generation of residues	Requirements for the collection of material	Requirements for mechanical processing	Requirements for chemical processing	Other specific requirements
End-of-life woody materials						
Woody material from park and garden maintenance	No	No	P. 3 (GHG). From point of origin.	P. 3 (GHG)	All P&Cs	Waste hierarchy
Recycling wood such as construction and demolition waste wood	No	No	P. 3 (GHG). From point of origin.	P. 3 (GHG)	All P&Cs	Waste hierarchy
Woody material from trees that are removed from: Orchards and plantations	No	Evidence of origin	P. 3 (GHG). From point of origin.	P. 3 (GHG)	All P&Cs	Waste hierarchy
Woody material from trees that are removed from Construction sites	No	Evidence of origin	P. 3 (GHG). From point of origin.	P. 3 (GHG)	All P&Cs	Waste hierarchy
Wood material from tree hedges	No	No	P. 3 (GHG). From point of origin.	P. 3 (GHG)	All P&Cs	Waste hierarchy
Alien invasive plants						
	No	No	P1, 2, 4, 7, 8, 9 & 10 P&C apply	P. 3 (GHG)	All P&Cs	Evidence of AIP status & reason for removal.

² This refers to the assessment to classify feedstocks as either co-products or residues based on eligibility criteria related to the economic value ratio (EVR) and the elasticity. Please see RSB Standard for Advanced Fuels [RSB-STD-01-010] for more information.

Feedstock	Assessment of eligibility criteria required ³	Requirements for Forest Management / Generation of residues	Requirements for the collection of material	Requirements for mechanical processing	Requirements for chemical processing	Other specific requirements
Forest Harvesting Residues						
Slash	No	RSB, FSC or equivalent certification	P. 3 (GHG). From point of origin.	P. 3 (GHG)	All P&Cs	N/A
Salvage logging wood in forest management units	No	RSB, FSC or equivalent certification	P. 3 (GHG). From point of origin.	P. 3 (GHG)	All P&Cs	N/A
Early/non-commercial thinnings	No	RSB, FSC or equivalent certification	P. 3 (GHG). From point of origin.	P. 3 (GHG)	All P&Cs	Evidence of thinning practices
Tree stumps	Not eligible	N/A	N/A	N/A	N/A	N/A
Forestry industry processing residues						
Sawmill residues	Yes	No	P. 3 (GHG). From point of origin.	P. 3 (GHG)	All P&Cs	No
Tall oil, brown and black liquor	Yes	No	P. 3 (GHG). From point of origin.	P. 3 (GHG)	All P&Cs	No
Other	Yes	No	P. 3 (GHG). From point of origin.	P. 3 (GHG)	All P&Cs	No
Short Rotation Woody Crops (SRWC)⁴						
	No	All P&Cs	P. 3 (GHG)	P. 3 (GHG)	All P&Cs	No
Roundwood						
	Only eligible for non-energy markets	RSB, FSC or equivalent certification	P. 3 (GHG)	P. 3 (GHG)	All P&Cs	Carbon sink levels

³ This refers to the assessment to classify feedstocks as either co-products or residues based on eligibility criteria related to the economic value ratio (EVR) and the elasticity. Please see RSB Standard for Advanced Fuels [RSB-STD-01-010] for more information.

⁴ SRWC are considered as agricultural crops under the RSB Standards.

0. General requirements for all feedstocks

0. 1. The RSB Principles & Criteria [RSB-STD-01-001] shall apply from the collection of the material onwards to all industrial operators, such as feedstock processors, intermediary producers as well as fuel or advanced product producers. The RSB Principles & Criteria do not apply to operators only conducting mechanical processing, for example sorting, sawing, drilling, etc.
0. 2. The RSB Procedure for Traceability [RSB-PRO-20-001] applies to all operators from the point of origin onwards.

The operator shall specify the material type (for example: “Recycling wood: Construction wood”) on the production documentation (see annex RSB-PRO-20-001) and inform the buyer if a simplified audit procedure for end-of-life products or production residues was followed that does not include the full set of RSB Principles & Criteria.

Please note:

The RSB Standard for Advanced Fuels provides a methodology to assess and verify whether an output of a process is a co-product or a production residue. This is important for the allocation of the environmental impact. In the context of this document, the verification of the feedstock eligibility is only required for forestry processing residues. For the other feedstocks included in this document the eligibility verification is not required.

1. End-of-life forestry materials

1. 1. Specification:

The following material types are considered end-of-life forestry material:

- Woody material from park and garden maintenance;
- Recycling wood, such as construction and demolition waste wood;
- Woody material (including whole trees) from:
 - Orchards (e.g. mango trees) or plantations dominated by agricultural species (e.g. palm or rubber) as part of pruning activities or re-planting where old trees are replaced by new trees⁵, or
 - Construction sites (e.g. housing or infrastructure) as part of the clearing of the site, or
 - Tree hedges (waste pruning material), defined as a fence formed by trees or woody shrubs, usually planted to protect crops from the wind or to define a boundary).

1. 2. Feedstock specific sustainability requirements

⁵ Please note : This does not include tree plantations such as pine plantations

1. 2. 1. The following requirements apply to woody material from orchards or plantations:

The operator shall provide evidence

- that the point of origin of the material is an orchard, or a plantation dominated by agricultural species (for example palm);
- documenting the tree species that was collected at the point of origin;
- about the frequency at which re-planting activities are conducted as well as information about regional and species-specific practices;
- documenting that the trees were not left on the ground for soil health or contributing to biodiversity preceding their use for bioenergy purposes;
- that the plantation/orchard has been in operation since before 1 January 2008.

1. 2. 2. The following requirement applies to woody material from construction sites:

The operator shall provide evidence that the material does not originate from land that had the status of forest on or after 1 January 2008.

1. 2. 3. Sustainability requirements do not apply for the following activities:

- Activity that generates the material (e.g. garden maintenance);
- Collection of the material;
- Mechanical processing⁶ of the material

1. 3. **Requirements related to the GHG calculation**

The GHG calculation shall start from the collection at the point of origin onwards. The material has a GHG intensity of 0 kg CO₂e/kg at the point of origin.

Emissions associated with the activity that generates the material, e.g. energy demand for garden maintenance, construction, pruning, etc. do not need to be included.

1. 4. **Other requirements**

1. 4. 1. The operator shall provide evidence about the material type in order to demonstrate that the material was not produced for the purpose of biofuel or biomaterial production. For example, for woody material from construction sites, evidence shall be available that the clearing of the site would have happened also without the material demand (e.g. a development plan).

⁶ Mechanical operators are defined under the RSB as a subgroup of industrial operators only conducting mechanical or physical processing (see PG-2020-03 for the positive list of mechanical operators).

1. 4. 2. Whenever there is any indication that the material was diverted from a use with higher priority in the following waste hierarchy, the material is not eligible for certification:
 - 1) Re-use, i.e. products or components are used again for the same purpose;
 - 2) Recycling, i.e. recovery operation by which waste materials are re-processed into products, materials or substances for the original or other purposes;
 - 3) Recovery, operation resulting in end-of-life materials replacing other materials, including energy recovery or material recovery;
 - 4) Disposal, e.g. landfill or incineration.

The materials listed in 1.1 are eligible for certification without the need to demonstrate compliance with the eligibility criteria of the RSB Advanced Fuels Standard [RSB-STD-01-010].

2. Alien invasive plants

2. 1. Specification

Material from alien invasive plants (AIP) that is generated as a waste by an operation cleaning an invaded area. Areas that have been recently (i.e. 10 years ago or less) cultivated with AIP on purpose do not fall into this category.

Please note: This standard amendment specifically covers woody AIP. Upon approval of this standard amendment the approach for woody AIP will also be applicable for non-woody AIP.

2. 2. Sustainability requirements

The eradication of AIP shall comply with the RSB Principles & Criteria as follows to address sustainability risks that are relevant in the context of AIP eradication⁷.

Please note: The term *the operator* always refers to the operator applying for certification. It is the responsibility of this operator to provide all necessary evidences that the criteria are complied with, while the required activities may be implemented by a third party. It may also be the case that activities related to the eradication and activities related to follow-up activities for the restoration of the land are conducted by different operators.

2. 2. 1. RSB Principle 1 Legality

⁷ The RSB requirements were selected based on a risk assessment that was conducted by the RSB Secretariat based on a pilot project in South Africa (see Annex I). The requirements may be amended by the RSB to ensure that different ecological requirements and feed-stock-specific sustainability risks are adequately addressed.



The operator shall provide evidence that a system is implemented and maintained that ensures the compliance with all relevant national or sub-national legal requirements that apply for the eradication of AIP.

2. 2. 2. **RSB Principle 2 Planning, Monitoring and Continuous Improvement**

The operator shall provide documentation evidencing the planning and monitoring of follow-up activities to ensure the rehabilitation of the land and permanence of environmental gains. This documentation shall include the specification of the intended future land use, a detailed description of follow-up activities as well as the responsible contracted party for each activity. The follow-up activities shall include the applicable aspects mentioned in 2.2.4 (Soil) and 2.2.5 (Water)

Note 1: The responsible party may not be the operator conducting the clearing, but can also be the landowner, or a governmental authority.

Note 2: The future land use may be an agricultural land use or non-agricultural land use

2. 2. 3. **RSB Principle 4 Human and Labour Rights**

The operator shall provide evidence that all criteria and minimum requirements of RSB Principle 4 are implemented to ensure that the eradication operations do not violate human rights or labour rights and promote decent work and the well-being of workers. Requirements apply to directly employed workers as well as to sub-contracted labour.

2. 2. 3. **RSB Principle 7 Conservation**

2. 2. 3. 1. The operator shall provide evidence that ecosystem functions and services that are directly affected by the operation are maintained or enhanced, i.e. evidence that document that biodiversity and surrounding ecosystems are not damaged

- a) by the use of chemical and biological agents contained in herbicides and other chemical control products;
- b) through the transport and storage of chemicals and equipment;
- c) through the disposal of chemicals;
- d) when accessing and clearing invaded areas.

2. 2. 3. 2. The operator shall provide evidence that no indigenous vegetation is disturbed or harvested in the process of the AIP eradication.

2. 2. 3. 3. The operator shall provide evidence that the eradication only takes place within the farm boundary or the boundary as permitted by the authorities and that no adjacent areas are cleared.

2. 2. 4. **RSB Principle 8 Soil**

The operator shall provide evidence about the implementation of practices to maintain or enhance soil physical, chemical and biological conditions, specifically efficient methods and practices

- a) to ensure that machinery used for the eradication does not cause compaction of soil layers;



- b) to control erosion and maintain soil stability to prevent erosion run-off and sedimentation of waterways, which needs special attention when clearing on steep slopes and in rivers/streams (AIP tend to accumulate large amounts of soil with their roots on river banks and when removed there could be serious soil erosion and flooding if not properly managed);
- c) to ensure that potential damages to soil due to biomass burning is mitigated;
- d) to ensure that any negative impacts related to the removal of cleared biomass as soil cover are mitigated, such as
 - o the deterioration of soil fertility;
 - o increased wind and water borne soil erosion;
 - o unmoderated soil temperature and increased evaporation of moisture from the soil, reduction in soil organic matter.

Please note: The methods and practices described above may also be implemented by another party, for example the landowner or a governmental authority (see 2.2.2. on follow-up activities).

2. 2. 5. RSB Principle 9 Water

The operator shall provide evidence about the implementation of practices to maintain or enhance the quality of the surface and groundwater resource, specifically practices to

- a) prevent the contamination of surface and/or groundwater from run-off and leaching of water containing chemical or biological agents;
- b) prevent the blockage of waterways leading to increased flooding potential.

Please note: The methods and practices described above may also be implemented by another party, for example the landowner or a governmental authority (see 2.2.2. on follow-up activities).

2. 2. 6. RSB Principle 10 Air Quality

The operator shall provide evidence that open-air burning to clear the land is avoided and, where possible, eliminated.

A plan shall be put in place to phase out any open-air burning of AIP within three years following certification. If workers' health and safety is at stake or when no viable alternative is available or affordable in the local context, or if burning may prevent natural fires, limited open-air burning practices may occur.

2. 3. Requirements related to the GHG calculation

The GHG calculation shall start from the collection at the point of origin onwards. The material has a GHG intensity of 0 kg CO₂e/kg at the point of origin.

Emissions associated with the activity that generates the material, i.e. clearing of the site, do not need to be included.

In addition, all AIP material shall carry a default land use change GHG value, DLUC, to represent emissions that result following land clearance of AIP, where land is not converted into native vegetation. The default DLUC value may be excluded under the following conditions:

- i. The default DLUC value may be replaced with an actual DLUC value where evidence can be provided to demonstrate that this is justified and calculated according to scientific literature relevant for the local context, or
- ii. The DLUC value can be reduced to zero where operators can demonstrate that land has been returned to native vegetation following clearance of AIP, or
- iii. Where land following AIP clearance is immediately converted to cropland, and the crop will enter a certification scheme such as RSB or any EU RED scheme (scheme list to be confirmed by RSB), then the LUC emissions from conversion of land to cropland will be attributed to crop production and DLUC emissions should be excluded from AIP GHG calculation. Evidence must be provided to demonstrate that LUC emissions will be accounted for in the crop GHG assessment.

The default DUC value will be based on research by the University of Utrecht – final value to be determined.

2. 4. Other requirements

2. 4. 1. The operator shall provide evidence that the plant is classified as alien and that it is an agent of change within the region from which it was obtained. For that purpose, the operator shall provide country-specific documentation (e.g. national invasive species lists). In instances where country specific information is not available, global databases may be used, for example:
 - Global Invasive Species Database (GISD)⁸
 - Centre for Agriculture and Bioscience International Invasive Species Compendium (CABI ISC)⁹

In the case that global databases are used, the information shall be supported by local expert opinion (e.g. local universities, government organisations, non-profits, or consultants).

2. 4. 2. The operator shall also provide evidence that the eradication of the AIP is either mandated by law (e.g. legislation or government guidelines) or that it is removed in order to restore areas that are or in future will be negatively affected by AIP (e.g. reference to an approved and operational project that has funding to undertake restoration of the cleared area, agreement of action by a reputable local conservation agency, a Management Unit clearing Plan (MUCP).

⁸ <http://www.iucngisd.org/gisd/?st=100ss&fr=1&sts=>

⁹ <https://www.cabi.org/isc/>

3. Forestry harvesting residues

The requirements for the certification of forestry harvesting residues will be further clarified in an additional normative guidance document, which is planned for release in 2022. Certification of forestry harvesting residues may only begin once additional normative guidance on forestry harvesting residues is published.

3. 1. Specification

The following material types are considered forestry harvesting residues:

- Slash (i.e. treetops, branches and bark), left on the ground after logging or accumulating as a result of a storm, fire, delimiting or other similar disturbance;
- Salvage logging wood in forest management units: Damaged, dying or dead trees removed in order to prevent further natural damages (wind, storm, pathogens, etc.);
- Early/non-commercial thinnings: Thinning performed for silvicultural or ecological reasons, including pre-commercial thinning (i.e.: thinning of trees with a typical diameter at a breast height (DBH) below 10 inches/25.4 cm.

Please note 1: Stumps are not considered forestry harvesting residues and are not eligible for RSB certification unless the operator can demonstrate that these stumps had to be removed from the site for other reasons than biofuel / bio-material production.

Please note 2: Low quality roundwood from a final harvest, i.e. size or quality of the material is not sufficient to be accepted by a sawmill, are not considered forestry residues and not eligible for RSB certification (for energy purposes).

3. 2. Sustainability requirements

3. 2. 1. The Forest Management shall comply with the RSB Principles & Criteria, with the FSC Principles & Criteria or equivalent.

Please note 1: The RSB Principles & Criteria describe how to produce biomass in an environmentally, socially and economically responsible way. Their application ensures, inter alia, the legality of the operation, decent work conditions and well-being of the workers and that there is no negative impact on soil health, water resources, biodiversity, ecosystems and conservation values, including a strict ban on deforestation (including converting forests to plantations) and sourcing biomass from primary forests.

Please note 2: RSB may accept other certification standards as equivalent if:

- a benchmark study was conducted to assess if all RSB requirements are covered by the other certification standard, and
- this benchmark study was recognised by the RSB Board of Directors, and
- any gaps between the other certification standard and the RSB standard have been covered by a certificate issued through an RSB recognised certification body.

3. 2. 2. As part of the forest management certification, the operator shall ensure that sufficient biomass is left on the ground to minimize the loss of soil organic carbon and maintain or improve soil health and biodiversity. To this end, the operator shall
- a) define management practices and specify the amount of residues and deadwood that need to be retained on the basis of a context specific assessment or context specific information,
 - b) provide soil management planning (e.g. as part of the forest management plan), including specification that residues should be collected after majority of needles / leaves have fallen, and
 - c) provide records of the implementation of the planning.

Please note 1: The amount of residues to be left on the ground varies significantly by site, and is influenced by factors such as moisture, temperature, particle size and biomass composition.

3. 2. 3. Areas that are identified as “no-go areas” shall not be used to source biomass. No-go areas are nationally, regionally or internationally protected areas including but not limited to the following:
- The World Conservation Union “IUCN” Category I-IV protected areas <http://www.protectedplanet.net/>
 - Wetlands of International Importance designated under the Ramsar Convention <http://ramsar.wetlands.org/>
 - World Heritage Sites designated under the UNESCO World Heritage Convention <http://whc.unesco.org/en/list>
 - Biosphere Reserves designated under the UNESCO Man and the Biosphere Programme <http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/>
 - Other legally protected areas
 - Primary Forest, i.e. naturally regenerated forest, where there are no clearly visible indication of human activities and the ecological processes are not significantly disturbed.
 - Ancient and Endangered Forests identified by the Canopy Forest mapper: <https://canopyplanet.org/tools/forestmapper/app/>
3. 2. 4. The use of forestry harvesting residues from natural forests (as defined in Section C. Terms and definitions of this Standard Amendment) shall be

based on additional normative guidance to specify further sourcing requirements. Forestry harvesting residues shall only be eligible for RSB certification once additional Guidance is published.

3. 3. Requirements related to the GHG calculation

The GHG calculation shall start from the collection at the point of origin onwards. The material has a GHG intensity of 0 kg CO_{2e}/kg at the point of origin.

Emissions associated with the activity that generates the material, i.e. harvesting, do not need to be included.

3. 4. Feedstock specific requirements for thinnings

3. 4. 1. The operator shall provide evidence that the pre- or non-commercial thinning was performed for silvicultural or ecological reasons. This includes:

- Pre-commercial thinning: Thinning performed prior to trees reaching maturity, as defined in the forest management plan, typically below 5-10 inches dbh (diameter at breast height), depending on tree species and site conditions. The operator shall provide evidence that the pre-commercial thinning is performed to reduce densities in overstocked stands to prevent stagnation and increase the growth of the remaining trees, provided substantial stock remains in the stand. The operator shall document the typical size threshold for pre-commercial thinnings applicable to the tree species and region.

Please note: Unmerchantable trees removed during a clear-cut would not be considered pre-commercial thinnings.

- Thinning performed for ecological reasons: Thinning performed for trees above 10 inches dbh, for example to thin out ecologically undesirable species. The operator shall provide evidence to the auditor about the ecological reason for the thinning. *Please note:* The RSB Secretariat will maintain a positive list of accepted ecological thinning practices. The decision to add a practice to the list will be taken by the RSB Board of Directors following a consultation of the RSB General Standards Working Group.

Wood resulting from other thinning activities that are performed additionally in order to supply biomass is not eligible for RSB certification. Evidence shall be available to the auditor (e.g. thinning records of previous years)

3. 4. 2. For operators delivering into the energy market, thinnings shall only be eligible for certification if they fall under the specification defined in 3.4.1

and there is no regional pulpwood market to which they could otherwise be sold or if there is sufficient surplus fibre available to serve the additional demand.

Please note: Operators delivering into non-energy markets shall clearly state to their customer (e.g. contract, delivery notes) that the RSB certification is only eligible for non-energy products.

3. 5. Requirements related to the maintenance of carbon stocks and sink levels

Please note: The specification of forestry harvesting residues as well as the additional requirements related to the management practices have been set-up in a way to ensure that only those materials are eligible for certification that have a low risk of decreasing forest carbon stocks and sink levels. As an additional safeguard, the following requirements apply. As guidance for implementation, the delegated act to be published by the European Commission may be consulted:

3. 5. 1. The country or regional economic integration organisation of origin of the forest biomass:
- a) is a Party to the Paris Agreement; and
 - b) has submitted a nationally determined contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC), covering emissions and removals from agriculture, forestry and land use which ensures that changes in carbon stock associated with biomass harvest are accounted towards the country's commitment to reduce or limit greenhouse gas emissions as specified in the NDC; or
 - c) has national or sub-national laws in place, in accordance with Article 5 of the Paris Agreement, applicable in the area of harvest, to conserve and enhance carbon stocks and sinks, and providing evidence that reported LULUCF-sector emissions do not exceed removals and that forest carbon sinks are maintained or strengthened over a relevant reference period.
3. 5. 2. If the above is not available, the operator shall demonstrate that management systems are in place at forest sourcing area level to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term

4. Forestry industry processing residues

4. 1. Specification

The following material types are considered forestry processing residues and can be certified under the RSB

- Sawmill residues (slabs and chunks of wood, sawdust, shavings, bark),
- Tall oil, brown liquor (from sulphite pulping) and black liquor (from Kraft pulping),

- Other forestry processing residues which comply with the eligibility requirements (refer to 5.3 below).

4. 2. Sustainability requirements

The point of origin (i.e. the processor generating the forestry processing residues) shall have a chain of custody certification in place issued for a sustainability certification system that ensures the legality of all wood sources (e.g. FSC Chain of Custody Certificate).

4. 3. Requirements related to the GHG calculation

The GHG calculation shall start from the collection at the point of origin onwards. The material has a GHG intensity of 0 kg CO₂e/kg at the point of origin.

Emissions associated with the activity that generates the material, i.e. processing, do not need to be included.

Other requirements

The materials have to meet the eligibility requirements as defined in the RSB Standard for Advanced Fuels (RSB-STD-01-010) of the economic value ratio and elasticity which has to be evidenced on individual operator basis. If the eligibility requirements are not met, the materials are treated as main product and not as residues, so that sustainability requirements apply for the forest management and the greenhouse gas calculation starts at the forest management as well.

5. Short Rotation Woody Crops (SRWC)

5. 1. Specification

SRWC refers to perennial cropping systems in which fast growing tree or woody shrub species are planted to produce biomass or fibres with a system overall lifetime (i.e. from planting to final harvest) of less than 20 years and harvest taking place every 1-5 years while the plants are re-grown with single stems or as coppice systems.

Species such as *Eucalyptus*, poplars (*Populus* spp.), willows (*Salix* spp.), maples (*Acer* spp.), black locust, Acacia, Gmelina, among others may be covered by this specification

Please note: For Eucalyptus species, harvesting cycles up to every 10 years are also covered by this definition.

5. 2. Sustainability requirements

In the RSB certification system, SRWC shall be considered similar to perennial crops due to their management practices and potential impacts. Therefore, the RSB Principles and Criteria apply from the cultivation of the SRWC onwards. The following aspects covered by the RSB Principles & Criteria are of particular importance:

- **No conversion of high carbon stocks and forest land:** RSB Principle 7 on Conservation requires operators to maintain or enhance conservation values of local, regional or global importance that were identified within the area of operation. Areas that are identified as *no-go-areas* must not be used and areas identified as *no-conversion-areas* must not be converted by the operator. This means that for example land with high carbon stock as well as *forests* cannot be converted by the operator for the cultivation of SRWC. The applicable cut-off date is January 2008. The specific rule for forestry products, for which the cut-off date refers to the FSC Standard (i.e. November 1994), does not apply in this case as SWRC are regarded as perennial crops.¹⁰
- **Invasive Plants:** Some SRWC species may have a risk to spread beyond the area of operation and to become established in natural or seminatural ecosystems (for example Eucalyptus). Criterion 7e of the RSB Principles & Criteria specifies requirements that the operator has to implement to prevent invasive species from invading areas outside of the operation site.
- **Depletion of water resources:** RSB Principle 9 on Water requires operators to maintain or enhance the quality and quantity of surface and groundwater resources. Some SRWC species draw a significant amount of water from the soil through the process of transpiration. In line with criterion 9c, the operator shall implement practices to ensure that the plantation does not contribute to the depletion of surface or groundwater resources beyond replenishment capacities.

5. 3. Requirements related to the GHG calculation

The Greenhouse Gas calculation shall start from the cultivation of the SRWC onwards (including emissions from land use change, if applicable) and shall follow

- the RSB GHG Calculation Methodology [RSB-STD-01-003-01], or
- the RSB EU RED GHG Calculation Methodology [RSB-STD-11-001], or
- the calculation methodology set out in the Renewable Energy Directive as incorporated in the UK Solid or Gaseous Biomass Carbon Calculator (Ofgem).

¹⁰ This approach is in line with the major certification standards on forestry. The FSC and SFI – two of the most important forest certification systems - do not recognize SRWC as a type of forest management. It reinforces that - despite using woody species – such systems are closer to an agricultural system than to a silvicultural system. The rationale behind this is that “an area growing a very short rotation crop of trees would not normally be described as a forest, because the trees have not yet developed their ‘considerable height and size’” (FSC Directive on FSC Forest Management Evaluations (FSC-DIR-20-007 EN), updated in July 2018) and also are not able to deliver services and products as those obtained from a forest land.

5. 4. **Other requirements**
No further requirements

6. Roundwood

6. 1. Specification

Refers to merchantable portion of wood removed from natural or semi-natural forests and tree plantations with or without bark, including stemwood or trunk removed in its round form, or split, roughly squared, or in another form, e.g. branches, roots, stumps and burls.

Roundwood is only eligible for RSB certification under the RSB Standard for Advanced Products [RSB-STD-02-001], i.e. for the use in non-energy markets. The operator shall clearly state this limitation to their customer.

6. 2. Sustainability requirements

The Forest Management shall comply with the RSB Principles & Criteria, with the FSC Principles & Criteria or equivalent

6. 3. Requirements related to the GHG calculation

6. 3. 1. The Greenhouse Gas calculation shall start from the growth of the roundwood onwards (including emissions from land use change, if applicable) and shall follow
- the RSB GHG Calculation Methodology [RSB-STD-01-003-01], or
 - the RSB EU RED GHG Calculation Methodology [RSB-STD-11-001], or
 - the calculation methodology set out in the Renewable Energy Directive as incorporated in the UK Solid or Gaseous Biomass Carbon Calculator (Ofgem).

6. 4. Requirements related to the maintenance of carbon stocks and sink levels

The requirements related to the maintenance of carbon stocks and sink levels as outlined in 3.5 shall be applied.

Annex I Sustainability risks associated with clearing invasive alien species from invaded farms

Activity	Potential Sustainability Risks
Inadequate/poorly managed actions taken to eradicate and control invasive species.	Regeneration and propagation of invasive species.
	Contamination of surface and/or groundwater from runoff and leaching of water containing chemical and biological agents contained in herbicides and other chemical control products used to curtail regrowth.
	Damage to biodiversity and surrounding ecosystems through release of chemical and biological agents contained in herbicides and other chemical control products used to curtail regrowth.
	Damage to biodiversity and surrounding ecosystems through transport and storage of chemicals, equipment and cleared biomass when in field and disposal of mixed product.
	Damage to surrounding ecosystems, vegetation and fauna when accessing and clearing invaded areas.
	Natural vegetation unable to re-establish without external input (rehabilitation) at high cost.
	Use of heavy machinery causes compaction of soil layers leading to erosion of top soils.
Untrained or unethical operators	Purposeful or mistaken harvesting of indigenous biomass
	Inadequate methods taken to control erosion and soil stability, leading to erosion run-off and sedimentation of waterways ¹¹ .
	Clearance over the farm boundary (in order to gather more biomass that may be an indigenous and/or protected species) leading to damage to surrounding ecosystems, vegetation and fauna when accessing and clearing adjacent areas.
Open burning of residual/uncollected biomass	Air pollution emissions of CO ₂ , CO, particulate matter and other potentially harmful chemical substances.
	Fire spreading out of control and damaging surrounding areas.
	Damage to soil due to biomass burning.
Uncleared/unremoved residues	Risk of fire.
	Blockage of waterways leading to increased flooding potential.
Removal of cleared biomass as soil cover	Deterioration of soil fertility.
	Increased wind and water borne soil erosion.
	Unmoderated soil temperature and increased evaporation of moisture from the soil.
	Reduction in soil organic matter thus reducing the physical, chemical and biological status of the soil.
	Natural vegetation unable to re-establish without external input (rehabilitation) at high cost
Worker health and safety risks	Risks related to <ul style="list-style-type: none"> • non-use of appropriate protective equipment • ergonomics and carrying heavy loads • use of clearing machinery and other equipment • safety of women working in remote areas

¹¹ This is especially true when clearing on steep slopes and in rivers/streams. Alien invasive species tend to accumulate large amounts of soil with their roots on river banks and when removed there could be serious soil erosion and flooding if not properly managed.

	<ul style="list-style-type: none"> • access to ablution facilities • medical assistance (especially when working in remote areas)
Sub-contracted labour	<ul style="list-style-type: none"> • human and labour rights not equally applied/enforced • lack of formal employment contracts • unfair remuneration • unregulated working conditions • employment of migrant labour • lack of access to trade union

Annex II Literature

Forest Research 2015: Carbon impacts of biomass consumed in the EU: quantitative assessment; Robert Matthews et al.

ICCT 2014: Comprehensive Carbon Accounting For Identification of Sustainable Biomass Feedstocks; Anil Baral and Chris Malins.

ICCT 2019: Does Bioenergy demand improve forest management? Jacopo Giuntoli and Stephanie Searle

JRC 2021: The use of woody biomass for energy purposes in the EU; Camia A., Giuntoli, J., Jons-son, R., Robert, N., Cazzaniga, N.E., Jasinevičius, G., Avitabile, V., Grassi, G., Barredo, J.I., Mu-bareka, S.

JRC 2014: Carbon Accounting of Forest Bioenergy; Alessandro Agostini, Jacopo Giuntoli, Aiket-erini Boulamanti

Annex III: Further requirements relating to the sourcing of forestry residues from Natural Forests (ref. 3.2.4)

Terms: Natural forest

A forest that is a natural ecosystem.

Natural forests possess many or most of the characteristics of a forest native to the given site, including species composition, structure, and ecological function. Natural forests include:

- **Primary forests** that have not been subject to major human impacts in recent history
- **Regenerated (second-growth)** forests that were subject to major impacts in the past (for instance by agriculture, livestock raising, tree plantations, or intensive logging) but where the main causes of impact have ceased or greatly diminished and the ecosystem has attained much of the species composition, structure, and ecological function of prior or other contemporary natural ecosystems
- **Managed natural forests** where much of the ecosystem's composition, structure, and ecological function exist in the presence of activities such as:
 - Harvesting of timber or other forest products, including management to promote high-value species
 - Low intensity, small-scale cultivation within the forest, such as less-intensive forms of swidden agriculture in a forest mosaic
- **Forests that have been partially degraded** by anthropogenic or natural causes (e.g., harvesting, fire, climate change, invasive species, or others) but where the land has not been converted to another use and where degradation does not result in the sustained reduction of tree cover below the thresholds that define a forest or sustained loss of other main elements of ecosystem composition, structure, and ecological function.

The categories “natural forest” and “tree plantation” are mutually exclusive, though in some cases the distinction may be nuanced.

(Source: The Accountability Framework)

Feedstock related risks vary regionally based on the context of the feedstock production. Over the past years, useful databases have been established that support the assessment of sustainability risks on a regional level. The knowledge of regional risk variations helps to select a robust risk-based approach to sustainability that is appropriate to the region. Global Forest Watch (GFW) is an online platform that provides data and tools for monitoring forests. By harnessing cutting-edge technology, GFW allows anyone to access near real-time information about where and how forests are changing around the world.

<https://www.globalforestwatch.org/help/map/>