

ABENGOA BIOENERGY

RED Bioenergy Sustainability Assurance Scheme

Title:	Mass Balance System Requirements				
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Principle reference: Directive 2009 / 28 / EC (RED) of the European Parliament and of the Council of 23rd April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001 / 77 / EC and 2003 / 30 / EC.

Secondary reference:

- Communication from the Commission to the Council and the European Parliament on voluntary schemes and default values in EU biofuels and bioliquids sustainability schemes.
- RED Bioenergy Sustainability Assurance Scheme, reference RBSA_001.

1 Introduction

Abengoa Bioenergy has chosen to establish and implement a voluntary scheme as a mechanism for companies involved in bioenergy production to show that the sustainability criteria included in RED relating to GHG savings, land with high biodiversity value and with high carbon stock have been met, demonstrating compliance with the sustainability regime established in Article 17.2 to Article 17.5 of the RED.

The method to verify compliance with the aforementioned sustainability criteria is the Mass Balance system, as stipulated in the RED.

The general rules and requirements of this scheme entitled "RED Bioenergy Sustainability Assurance" are described in reference RBSA_001. The specific objective of this document is to describe the operating requirements to be followed by the different agents involved in the supply chain for biofuel production and distribution, including all stages from biomass production until the release of the fuels for consumption, in order to achieve a "Mass Balance system", as stipulated in Article 18.1 of the RED.

In general, wherever RBSA products with different sustainable attributes are mixed, a Mass Balance system must be in place to properly manage the allocation of these sustainable attributes.

The biofuel produced must be linked to the sustainable biomass following a Mass Balance system. The main rule of the Mass Balance system is to demonstrate that "sustainability attributes in" are equal to "sustainability attributes out". This balance between sustainable attributes can be achieved by allocating the different set of "sustainability attributes" associated to each biomass or biofuel consignment entered into the pre - defined storage facilities to the total volume considered in the mixture.

The balance of quantities according to the Mass Balance system rules is completed through the allocation of a corresponding quantity of "sustainability attributes" to each physical outgoing dispatch, and the further recalculation of the available information allocated on stored facility volume.

Regarding the information to be transferred, Annex V of the RED, and also relevant EC communication (reference 2010 / C 160 / 01 and reference 2010 / C 160 / 02), allows the calculation of emissions from cultivation using averaged data (for a particular smaller area) as an alternative to default values for regions with NUT 2 level definition.

This RBSA scheme enables this option and allows the calculation of GHG emissions associated with the agricultural processing of biomass only requesting the origin of harvesting.

Therefore, the zoning level of an area to be assessed as RED sustainable or not is:

- EU 27: at least NUT 3 (corresponding GAUL level) or below.
- Outside EU27: at least similar division to NUT 3 level in the corresponding GAUL level or below.

As information on the origin is the main parameter (in addition to biomass type) necessary to calculate GHG emissions using this approach, this is the minimum information that the Mass Balance system must allocate to outgoing dispatches of biofuel or biomass¹ in the RBSA scheme.

Accordingly, no other information than that previously presented needs to be forwarded to the next step in the supply chain, for both routes envisaged in this Agricultural production units scheme (RBSA sustainable origin list and Agricultural production unit self – declaration).

Finally, as the RED requests for external auditing guarantees, to demonstrate that the Mass Balance rule is fulfilled, the system requires written instructions describing the scope of the operations and appointment of responsible parties, and to keep records of the relevant commercial documents and the balances carried out, in order to demonstrate to a certification body that the system is well - operated.

These requirements can be adapted for Agricultural production units as they are the starting point of the Mass Balances system. It is possible to establish specific requirements for them to demonstrate necessary consistency of quantities produced and declared but with a reduction in the burden, as RED expressly states.

¹ Note that the RBSA scheme does not allow biomass from areas with change in land use category since January 2008, providing proper evidence through the RBSA sustainable origin list or Agricultural production unit self-declarations.

2 Definitions

- **Agent** within the framework of this scheme entails both economic operators and EC recognized economic suppliers, as defined in other parts of this section.
- **Agricultural Production units** include operational sites involved in the operations for the cultivation and subsequent harvesting of the biomass (as defined in this scheme), to be later converted into biofuels.
- **Agricultural Production Unit Self – Declaration:** this document is a declaration whereby the farmer confirms that:
 - The biomass dispatched has been produced in areas that fulfill RED requirements, and
 - Agricultural use since January 2008 has been maintained.
- **Batch of biomass / biofuel:** set of sub - batch(es) of biomass / biofuel.
- **Biofuel conversion unit** includes the facilities and related installations where the biomass is transformed into biofuel, with the quality level required for its use as fuel or blending of fuels.
- **Biofuel final consumer** include those agents that take legal ownership of the biofuel at the point where the energy consumption is accounted to the purposes referred to in Article 17.1 of the RED in accordance with national regulation (typically, in the excise duty point).
- **Biofuels** are defined as liquid or gaseous fuel for transport produced from biomass.
- **Biomass** is defined as the biodegradable fraction of products, waste and residues of biological origin from agriculture (including plant and animal substances), forestry and related industries including fisheries and fish farming, as well as the biodegradable fraction of industrial and municipal waste.
- **Certification Body** is defined as a certification agency that has been independently accredited and approved by Abengoa Bioenergy as being able to partially or totally conduct verification audits against the requirements of this scheme (see section 9 of RBSA_001 and RBSA_005).
- **Control system** is defined as those facilities (agricultural fields, warehouses, silos or biofuel depots) included in the scope of Mass Balance system requirements.
- **EC recognized biomass supplier** is defined as a biomass supplier that can provide external guarantees for specific biomass dispatches on complying with all or part of the RED sustainability criteria (Article 17. 2 to 17.5) through an EC recognized Scheme or agreement.
- **EC recognized biofuel supplier** is defined as a biofuel supplier that can provide external guarantees for specific biofuel dispatches on complying with all or part of the RED sustainability criteria (Article 17. 2 to 17.5) through an EC recognized Scheme or agreement.
- **Economic operators** within the framework of this document are those agents involved in a biofuel pathway (physical or commercial) that could be subject to an audit on compliance with RBSA scheme requirements. This comprises:

- Agricultural production unit.
- First collector supplier.
- Intermediate biomass supplier.
- Biofuel conversion unit.
- Intermediate biofuel supplier.
- **EC recognized economic suppliers** in the framework of this document are those agents involved in a biofuel pathway (physical or commercial) that can provide external guarantees for the biomass or biofuel that they supply, not being subject to an audit on compliance on the RBSA scheme to qualify their products.
- **Final EC recognized biomass supplier** is defined as the final supplier (physical or commercial) to a Biofuel conversion unit that provides external guarantees for specific biomass dispatches on complying with all or part of the RED sustainability criteria (Article 17.2 to 17.5) through an EC recognized Scheme or agreement.
- **First collector supplier** includes those agents different to the Agricultural production units that receive biomass directly from the Agricultural production unit, and supply it to following agents in the supply chain, in the procurement of biomass into a Biofuel conversion unit.
- **GAUL** (Global Administrative Unit Layer) is a spatial database of the administrative units for all countries in the world, corresponding to NUT in Europe, and similar divisions in the remaining countries. It is a project of the United Nations Food and Agriculture Organization (FAO).
- **Intermediate biomass supplier** includes those agents (physical or commercial) that receive biomass from a First collector supplier or another Intermediate supplier (not from an Agricultural production unit), in the procurement of biomass into a Biofuel conversion unit.
- **Intermediate biofuel supplier** includes those agents (physical or commercial) that receive biofuel from an upstream supplier (typically a Biofuel conversion unit or another Intermediate biofuel supplier) and transfer the biofuel to the next step in the biofuel supply chain through a commercial trading process.
- **Involved suppliers** are those economic operators that comply with the requirements set out in the RBSA scheme, and are allowed to supply RBSA products (biomass or biofuel) under the certificate of a validated supplier when they pass a qualifying audit prior to any RBSA claims. Involved suppliers can supply from the installations / premises covered under their RBSA verification of conformity, which is addressed to their validated supplier.
- **IT system** is a set of computer applications or related software developed in order to facilitate and systematize relevant parts of this scheme; mainly for the practical GHG calculations and the development of sustainable maps.
- **NUT** is defined as stipulated in Regulation (EC) No 1059 / 2003.
- **Operation** is defined as a commercial process for the procurement of biomass, or a retailing process for the supply of biofuel with sustainable characteristics, both to a consumer.

- **Origin** is the geographical denomination that stands for the cultivation and harvesting zone of the biomass to be further processed into biofuel.
- **RBSA certificate** this may also be interpreted or presented as a “certificate” on compliance with the requirements described in this scheme for validated suppliers as defined in other parts of this section.
- **RBSA or RBSA scheme** (RED Bioenergy Assurance) is the sustainability assurance scheme that Abengoa Bioenergy has developed in order to comply with the RED sustainable regime in its operations as biofuel producer (also useable for other economic operator in the supply chain).
- **RBSA products** are those quantities or volumes of biomass or biofuel (respectively) that are deemed to comply with requirements of the RBSA scheme in their production, and distribution process.
- **RBSA sustainable area** is defined as agricultural land included in the RBSA sustainable origin list or it has been declared under Agricultural production self - declaration.
- **RBSA sustainable claims** are those statements regarding compliance with the requirements included in the RBSA scheme by the validated (biomass / biofuel) suppliers. Sustainable claims within the framework of this scheme are those included in section 4.3.1 to section 4.3.4 of RBSA_001.
- **RBSA sustainable origin** is the origin of the biomass which is deemed to comply with the RED sustainability criteria (Article 17.3 to 17.5) and in which land use change since 2008 has not been observed through external guarantees (section 8 describes the process to generate RBSA sustainable origins within the framework of RBSA_001).
- **Sub - batch of biomass / biofuel:** consignment of biomass / biofuel with the same sustainability attributes.
- **Sustainable attributes** are considered the following characteristics of a sub - batch of biomass / biofuel:
 - Biomass type.
 - Origin of the biomass.
 - GHG data (not necessary for economic operator for whom RBSA_003 could be used).
- **Validated suppliers** are those economic operators that comply with the requirements set out in the RBSA scheme, and are allowed to supply RBSA products (biomass or biofuel) to another Validated supplier when they pass a qualifying audit prior to any RBSA claim.

Validated suppliers can supply RBSA products from the installations / premises covered under their RBSA certificate, or from the installations of their Involved suppliers - in the terms described for them.

3 Objectives and scope

The objective of this document is to describe the operating requirements to be followed by the different agents involved in the supply chain for biofuel production and distribution, including all stages from biomass production until the release of the biofuels for consumption, in order to achieve a "Mass Balance system", as stipulated in Article 18.1 of the RED.

The following economic operators shall have to comply with the Mass Balance system requirements, within the framework of the RBSA scheme:

- Agricultural production units.²
- First collector suppliers.
- Intermediate biomass suppliers.
- Intermediate biofuel suppliers.
- Biofuel conversion units.

4 Instructions for the management of a Mass Balance system

This section describes the actions and requirements that should be carried out in the practical implementation of the Mass Balance system by economic operators under the scheme. Two sections are included: 4.1 Operating management instructions, that include those operations and provisions necessary to achieve consistency of quantities, and 4.2 Documentary instructions, dealing with necessary administrative requirements.

4.1 Operating management instructions

The following rules should be considered:

- **Definition of the scope for the control system:** before the start of operations management, it shall be necessary to define the control system that will be included under the boundaries of the Mass Balance system requirements.

Within the framework of this RBSA scheme, the Mass Balance system is a set of rules where sustainable attributes remain assigned to consignments and it is applied at physical facility level (site).

In this way, a processing or logistical facility or site applying Mass Balance shall be defined as a geographical location with precise boundaries within which products can be mixed. Typically, for a biomass warehousing facility, all silos operated by the same economic operator in a logistical establishment can be included. The same applies for all the existing biofuel depots in a storage terminal. Facilities located in different geographical locations will not be accepted.

Irrespective of the above, including some specific storage facilities within this facility level are also permitted.

² Only applicable to Section 5 and Section 6 of this document.

Whenever there is a modification in the individual silos, warehouses or biofuel depots included in the scope, it shall be recorded prior to its inclusion / exclusion in the control system.

- **Definition of the timeframe for the balancing period over which the Mass Balance system operates:** the consistency of the quantities balanced in the Mass Balance system should be achieved through closing balance calculations carried out over an appropriate period of time. This **shall be a maximum of three months**, both for incoming and outgoing sustainable products under the RBSA scheme and total products, in order to demonstrate an appropriate balance.

In spite of that, shorter periods of time for the balances may also be allowed³ in order to demonstrate that specific ingoing RBSA dispatches sourced to the control system have been assigned to corresponding outgoing RBSA batches, and that no RBSA sustainable stocks are remaining. In this case, the balances of RBSA products could only be performed in the time between the sourcing and dispatching of the RBSA products.⁴

Suitable registers shall be maintained for all the balances, including an explanation by economic operators for each adopted balancing period used.

- **Allocation rules for biomass / biofuel supplied and dispatched in the control system:** during a balancing period, it is not possible to dispatch more quantity of biomass / biofuel with a specific sustainability attribute than the quantity of biomass / biofuel entered into the control system defined in the same balancing period, plus the quantity of biomass / biofuel stored in the same period with that specific sustainability attribute.

The way stipulated in the RBSA scheme to ensure that this balance complies with Article 18.1 of RED, is to use an internal code that allocates the biomass / biofuel entered to the corresponding biomass / biofuel dispatched, enabling the later match up of quantities / volumes⁵.

The rule of allocation is that different sustainability attributes cannot be mixed. Specifically, GHG emissions must remain separate and cannot be averaged.⁶

Within these rules, the conversion factors and humidity will be taken into account in their appropriate steps.

- **Balance of the quantities / volumes in the control system:** at the end of each balancing period, a specific balance would be executed of the amount of biomass / biofuel that has been:
 - Entered.

³ Potential reasons for this can be commercial matters, continuous lack of sustainability inputs, or for better managing of the system through shorter periods of balances.

⁴ This option has been included in order to reduce the burden for those cases where RBSA products are a minor percentage of total entries to storage facilities.

⁵ If sustainable attributes have been allocated in terms of labels, the accountability can be reduced to check that quantities of labels match. Biofuel conversion factors shall be properly included for processing units.

⁶ The allocation of sustainability attributes in terms of internal codes (labels) for volumes of sub-batches is a recommended option for this.

- o Stored.
 - o Dispatched,
- during the previous balancing period in the control system defined.

This balance shall be executed for both RBSA and total biomass / biofuel quantities managed during each balancing period.

If, during a balancing period, biomass / biofuel is sourced in the control system with external guarantees of complying with an EC recognized scheme or agreement (on fulfillment of the Articles 17.3 to 17.5 of the RED), this biomass / biofuel can be automatically considered as RBSA compliant, and included in the RBSA balance.

The only condition for that is that ingoing sustainability information for biomass includes harvesting origin (at NUT 3 level or lower) – GHG figures are not forwarded in the RBSA scheme as with this origin definition RBSA_003 can be used for GHG calculation.

Suitable evidence or certificates shall be maintained by the parties responsible for management of the Mass Balance system to justify all quantities balanced (specifically in later audit processes).

The quantities balanced should be reconciled at the end of each balancing period, in order to determine the accuracy of the balance carried out⁷. Remaining sustainable attributes will be available for the start of the next balancing period.

Differences due to biomass / biofuel losses would be sufficiently documented, and reset for the next balancing period.

Conversion factors would be kept for each balancing period, when biomass conversion process (pre - treatment of biomass and / or biofuel production) takes place.

- **Sustainability information in commercial documents:** the following information shall be available within the commercial purchase information and commercial sales information (purchase orders, invoicing, etc.) for each individual dispatch or consignment under the RBSA scheme:
 - o Quantity supplied for each individual sub - batch within the dispatch (in terms of tons or cubic meters).
 - o Name and address of the dispatch supplier.
 - o Name and address of the dispatch receiver.
 - o Sustainability attributes for each individual sub - batch within the dispatch: origin of the biomass⁸, type of biomass and GHG data⁹.

⁷ For system start up, provisional allocation of information could be made until achieving normal system operation. Decisions on initial allocation shall be properly justified.

⁸ The origin of biomass is NUT 3 / GAUL 2. In case First collector supplier receives origin of biomass at city / town level, it is obliged that they shall issue in the commercial information the origin of harvesting at NUT3 / GAUL 2 to the following step.

⁹ This information is only necessary for Final EC recognized biomass suppliers and biofuel suppliers.

- o Mass Balance reference: the commercial information (purchase order, delivery note, etc.) shall include a reference code that allows tracing back the Mass Balance assignment of each dispatch. This code will enable later checking of the internal allocation process from inputs to outputs.

For biomass other than that supplied under the RBSA scheme but also included in the management scope of the economic operator, quantities shall be accounted, controlled and should be audited, but no concrete provision of information is specified for passing on.

A RBSA attestation or declaration shall be issued by the dispatch supplier when passing on information from one validated (biomass / biofuel) supplier to another, showing the characteristics of each sub - batch declared. As described in reference RBSA_001, the validated supplier can choose between giving the origin or providing GHG figures¹⁰ for each sub - batch.

Finally, pre - processed biomass could also be permitted and balanced in a Biofuel conversion unit, only if provided by a Final EC recognized biomass supplier. A Sustainable biomass attestation will make it possible to gather the relevant data needed for balances.

- **Internal control of the Mass Balance system:** specific checks and controls should be carried out by the appointed responsible party to ensure the proper management of the Mass Balance system (with focus on the integration of the GHG figures).

It should be necessary to match the quantities entered and dispatched with the corresponding purchasing and sales information (biofuel conversion process in facilities will also be accounted).

An assessment of the general status of the allocation system will be the result of this internal control (to be carried out at least annually), expressing the general conformity of the system, and proposing improvement actions if necessary (including a suitable timescale for effective implementation). These actions should be approved by the leadership of the Company that manages the Mass Balance system.

IT systems to manage these records should be enhanced as the best way to properly manage the Mass Balance system in order to achieve a suitable balance of biomass / biofuel with sustainability characteristics, and the other related clauses.

4.2 Documentary instructions

The following issues should be observed for the documentary control of the Mass Balance system.

¹⁰ GHG developments in this scheme have been prepared to make use of origin as input data for GHG emissions calculation, but the provision of GHG figures is also permitted in order for RBSA biomass to be used by other Voluntary Schemes (that do not have similar GHG calculation IT systems like those included in the RBSA scheme).

- **Written operation procedure / instruction:** a written operation procedure or work instruction should be available, providing details on the way the operating instructions (section 4.1) are addressed, and specifically including:
 - Scope of the control system – facilities managed within the Mass Balance system, and therefore subject to balance. A general overview of the other facilities shall also be described.
 - Description of the operations to be managed under the scope of Mass Balance system.
 - Responsible party appointed to ensure the fulfillment of the Mass Balance operating instructions.
 - Documentary control and records issued to demonstrate the inventories and internal controls of the Mass Balance system.
- **Record keeping:** the following information should be kept for at least five (5) years:
 - Records of balances and internal controls undertaken (including conversion factors used).
 - Copy of commercial information (managed under the RBSA scheme and total products) for purchasing and sales operations (purchase orders, invoices, etc) that include the sustainability attributes.
 - Copy of Sustainable biomass / biofuel attestations or declarations and external certificates of EC recognized schemes and / or agreements (if used).

5 Specific requirements for the Agricultural production unit

5.1 Operating management instructions

The requirements included in this document for economic operators can be adapted for Agricultural production units as they are the starting point for the Mass Balance system and do not allocate biomass received from other upstream economic operators.

In addition, and to guarantee that no Agricultural production units sell more sustainable biomass than that produced from RBSA sustainable areas respectively, is possible to establish specific requirements for them to demonstrate necessary consistency of quantities produced and declared but with a reduced burden, as RED expressly states.

The following rules should be considered:

- **Definition of the scope for the control system:** before the start of operations management, it shall be necessary to determine which agricultural field / s) / is / are declared under the scheme.

In one hand, if an Agricultural production unit is taking the Agricultural production unit self - declaration route, the scope shall be registered in the Agricultural production unit self - declaration at below NUT 3 / GAUL 2. Only in case the Agricultural production unit has agricultural fields that are not covered

under the scope shall it be necessary to indicate which RBSA sustainable fields are declared.

In the other hand, if an Agricultural production unit is included in the RBSA sustainable origin list, agricultural fields are deemed to be sustainable only because of their origin. In this case, it is only necessary to document those agricultural fields assigned to the program.

Regarding the balancing period for the scope definitions of the control system, RBSA sustainable areas declared shall be valid unless any changes occur in the information stated or documented (new issuance of documents is necessary if this happens).

- **Balance of quantities and biomass allocation:** once RBSA sustainable areas / agricultural fields are declared, Agricultural production units are obliged to record all biomass dispatches from these areas.

Consistency of the quantities and biomass allocation shall be checked by certification bodies in the event of an audit. They are responsible for adding up, checking and controlling the consistency of quantities produced against the entire production recorded in the commercial information.

Any deviation in quantities shall be justified by the Agricultural production unit.

- **Sustainability information in commercial documents:** the following information shall be included within the commercial purchase information and commercial sales information (purchase orders, invoicing, etc) for each individual dispatch or consignment to a First collector supplier under RBSA scheme:
 - Quantity supplied (in tons).
 - Name and address of the dispatch supplier.
 - Name and address of the dispatch receiver.
 - Origin of biomass (at city / town level).
 - Type of biomass.

5.2 Documentary instructions

The following issue should be observed for the documentary control of the Mass Balance system:

- **Record keeping:** the following information should be kept for at least five (5) years:
 - Copy of commercial information for sales operations (purchase orders, invoices, etc) of biomass declared under the RBSA scheme and total.
 - Agricultural production unit self - declarations and documents stating the RBSA declared areas.

6 Verification method

In the event an auditing process should be carried out in the control system according to verification provisions in the RBSA scheme general document, the compliance audits on the accuracy of the rules for the Mass Balance operation

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hereby described will be conducted by a certification body accredited for the RBSA, according to section 9 of General Scheme, reference RBSA_001.

The verification process should be conducted following the document Audit Protocol for Certification Bodies, reference RBSA_005.