



SUSTAINABLE RESOURCES
Verification Scheme GmbH

Technical guidance for mass balancing

Version: TG-MASS-en-3.0

Date: May 20th, 2025

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1 Introduction

The term “traceability chain” describes the chronological documentation of a process. It is a tool to track material through every step in the process.

The mass balance system is a central element of the sustainability scheme. It establishes a connection between information or claims related to raw materials or intermediate and end products. It is an essential component of the scheme which ensures that information about the sustainability of raw materials, intermediate and end products is credible in relation to its origin and type and can be verified along the entire production and supply chain.

If a consignment of raw material or fuel has already been included in the calculation of the share of renewable energy in any member state, no further sustainability claims may be issued for the consignment.

A mass balance system must be managed for *each site of an interface* for all different types of raw materials and biomass fuels. Inputs and outputs must be accompanied by a set of sustainability characteristics.

The use of the mass balance system for different types of raw materials and fuels may not lead to a situation or risk where the rules set out in Revised Directive (EU) 2018/2001 (RED III) that apply for determining the contribution of biomass fuels towards the targets for renewable energy are not correctly applied or circumvented.

RED III *requires* economic operators to use a mass balance system for sustainably produced biomass fuels to produce electricity and/or heat. There are several ways to provide this proof.

This document describes the requirements for a mass balance system in the SURE system to comply with the requirements of Revised Directive (EU) 2018/2001 Article 30 (1) and 30 (2). They guarantee the traceability of quantities of biomass in all phases of production, delivery and processing in the supply chain for biomass fuels.

The on-site inspections carried out in the SURE system by recognised certification bodies ensure that the economic operator meets the mass balancing requirements, including proper allocation of sustainability characteristics, where relevant. The inputs, outputs and amounts carried forward have to balance out and are checked during the audit against the accounting system.

2 Technical guidance for mass balancing

If biomass fuels are to be used to produce electricity or heat in the SURE system, economic operators must use a mass balance system which

- ✓ allows consignments of raw materials or fuels with differing sustainability and greenhouse gas emission saving characteristics to be mixed (e.g. in a container, processing or logistics facility or a transmission and distribution infrastructure),
- ✓ allows consignments of raw materials with different energy contents to be mixed for the purposes of further processing at the fuel production plant for the purpose of producing biomass fuels, provided that the size of the consignments is adjusted according to their energy content,
- ✓ requires information about the sustainability and greenhouse gas emission saving characteristics and sizes of the consignments remain assigned to the mixture and,
- ✓ provides for the sum of all consignments withdrawn from the mixture to be described as having the same sustainability characteristics, in the same quantities, as the sum of all consignments added to the mixture and requires that this balance be achieved over an appropriate period of time.

These requirements are to be considered “minimum requirements” that have to be met by the economic operators. Depending on their individual process related to scope and complexity, they can opt for “stricter” specifications such as the identity preservation method.

Options for the traceability chain	Information about the biomass properties (“certificate”/delivery slip) for every consignment	The biomass can be completely traced back to cultivation/production	Complete separation of certified and non-certified biomass at one site
“Book & claim”	✓	X	X
“Mass balancing”	✓	✓	X
“Identity preservation (hard/soft IP)”	✓	✓	✓

Table 1: Simplified diagram of “mass balancing” compared to other traceability processes:

The methods mentioned are described below.

2.1 Identity preservation through physical separation

The most reliable process of preserving identity is the “hard IP method”.

When this method is used, the economic operators ensure that no consignment with biomass or biomass fuels is mixed with other products. It also has to be ensured that the sustainable product can be identified as sustainable throughout the entire process with no changes.

Individual consignments that are certified as sustainable are kept strictly separate from other products and raw materials during processing and storage so that their original characteristics are retained through to the end of the supply chain.

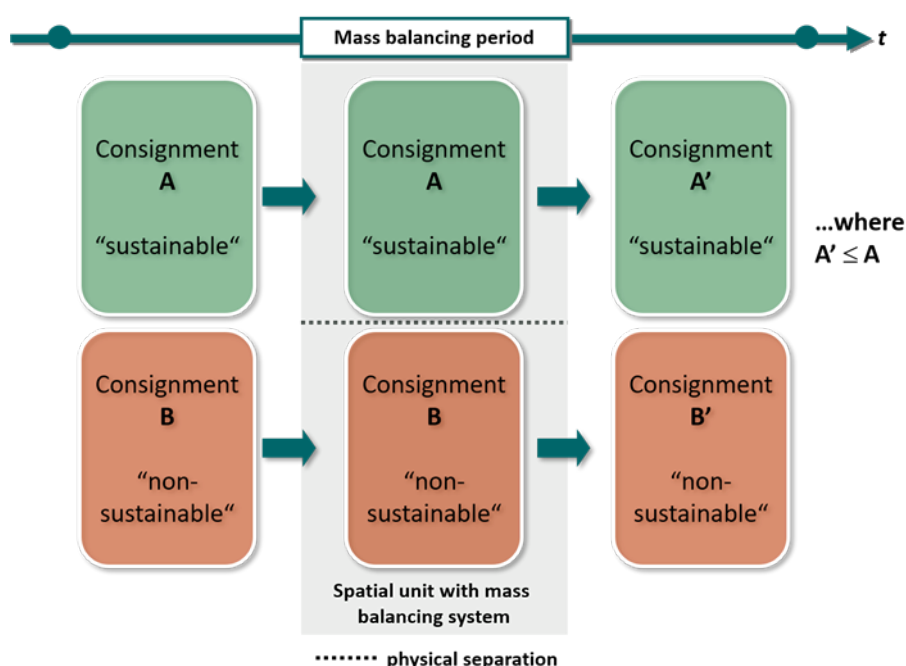


Figure 1: “Identity preservation (“hard IP” method)”

Consignments are also kept strictly separate during processing. This gives rise to the following mass balancing formula:

$$A' \leq A$$

where $A' = A * [\text{conversion factor}]$

Side note: Conversion factors describe the ratio of biomass input to biomass output after a conversion process or after natural leakage, e.g. during storage or transport.

Another way to preserve identity is the “soft IP” method. Sustainable and non-sustainable biomass is also segregated here. However, consignments with sustainable products can also be mixed if they belong to the same product group or for the purpose of further processing at

the fuel production plant for the purpose of producing biomass fuels (e.g. co-digestion plant), as long as the requirements shown in Figure 2 are met.

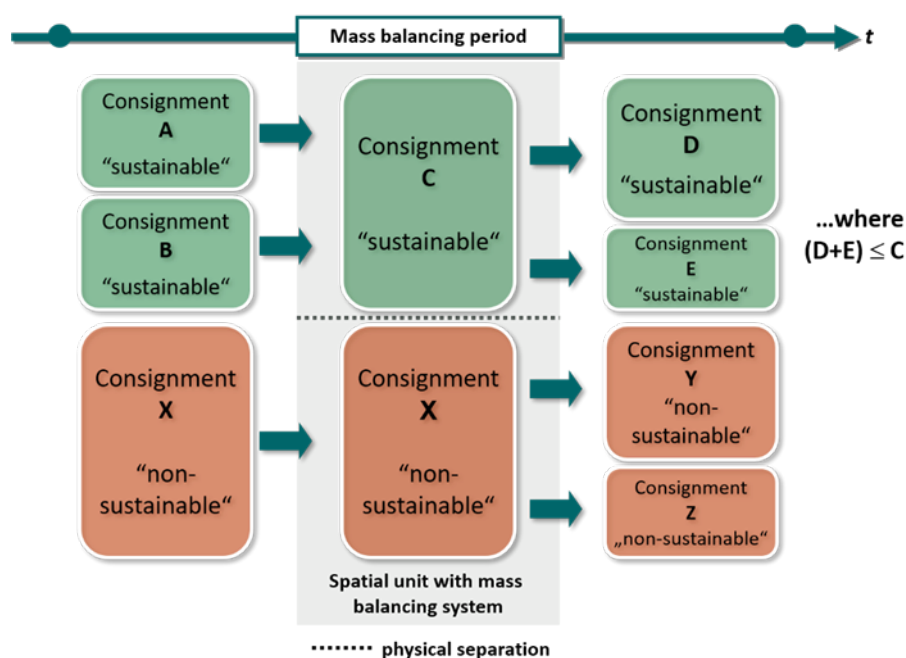


Figure 2: "Identity preservation ("soft IP" method)"

Sustainable and non-sustainable consignments are kept separate during processing. This gives rise to the following mass balancing formula:

$$(A + B) = C \quad \text{and} \quad (D + E) \leq C$$

where $(D + E) = C * [\text{conversion factor}]$

2.2 Mass balancing

The principle of mass balancing requires that a certain set of sustainability characteristics remain assigned to a physical consignment. This means that these characteristics can only be transferred from one interface to the next when this transfer is accompanied with physical transfer of the consignment.

Sustainability characteristics are e.g.:

- ✓ evidence showing compliance with the RED III sustainability criteria, and/or
- ✓ a statement that the raw materials used were obtained in a way that complies with the Directive's (e.g. land-related) sustainability criteria, and/or
- ✓ a greenhouse gas emission value and/or

- ✓ a description of the raw materials used while preserving product identity as well as their origin, and/or
- ✓ the statement “production has been awarded a certificate of type X from recognised voluntary scheme Y”, etc.

The minimum of sustainability characteristics and information to be documented and transferred through the entire value chain of renewable fuels or recycled carbon fuels are listed in chapter 3.1 and 3.2.

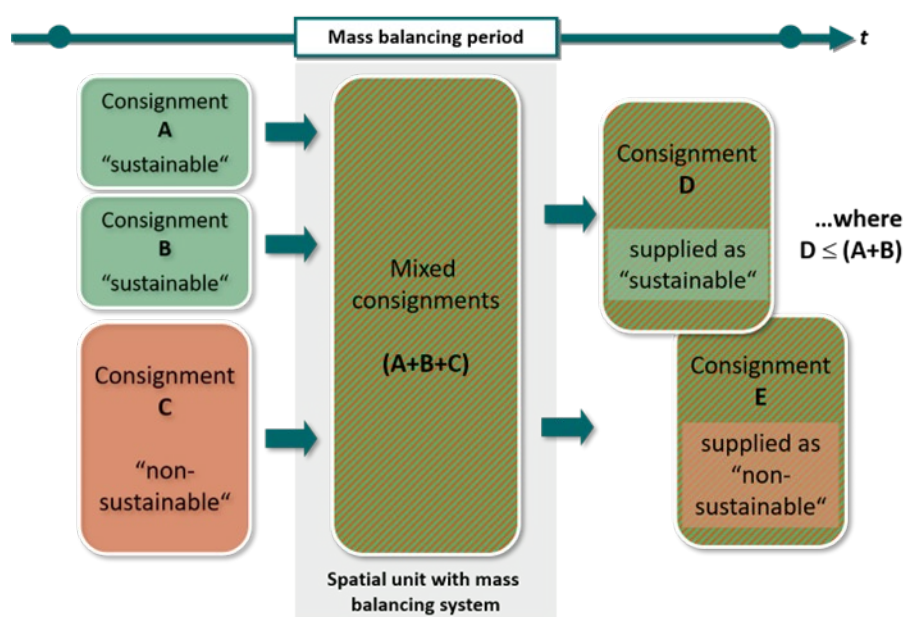


Figure 3: Mass balancing

This gives rise to the following mass balancing formula:

$$D \leq (A + B)$$

where $D = (A + B) \times [\text{conversion factor}]$

The mass balance system must include both information on the input/output of raw materials and fuels for which the sustainability characteristics listed in chapter 3 have been determined (sustainably certified raw materials and fuels) *and information on the input/output of raw materials and fuels, including fossil fuels, for which no sustainability characteristics have been determined.*

It is important that the “product identity” be preserved within a site. This means that sustainability characteristics can only be assigned to the same material type from which they originated. This applies to raw materials as well as final biomass fuels.

In addition, information about raw materials may not be flexibly re-assigned if the final fuels/fuels have different rules for calculating their contribution to renewable energy targets (e.g., Annex IX fuels, high/low ILUC fuels).

When consignments with different sustainability characteristics (e.g. A, B) or no sustainability characteristics (e.g. C) are mixed, the respective conversion factors and sustainability characteristics as well as the size of the individual consignments remain assigned to the mixture.

If different GHG emissions, however, are assigned to these sustainability characteristics, these values must be kept separate for the respective consignments. These values cannot be averaged by aggregating batches to prove that the sustainability requirements are fulfilled. Substrates used for the production of biomethane are an exception to this rule. For biomethane produced from different substrates, it is required to average the GHG emissions.

If consignments with identical sustainability characteristics are mixed, only the size of the consignment is adjusted accordingly. Sustainability characteristics are likely to be the same where the same raw materials are used and use is made of “default values” or “actual regional values” for the GHG calculation.

If a mixture is split, any consignment taken out of it (e.g. $D_1 \dots D_n$) can be assigned any of the sets of sustainability characteristics as long as the combination of all consignments taken out of the mixture – in addition to the weight – has the same sizes for each of the sets of sustainability characteristics that were in the mixture. A “mixture” can have any form where consignments would normally be in contact, such as in a container, processing or logistical facility or site (defined as a geographical location with precise boundaries within which products can be mixed) as well as in a transmission and distribution infrastructure. Raw material or fuels is only considered to be part of a mixture if they are physically mixed. Only raw materials or fuels that are physically identical or belong to one product group can be considered as part of a mixture if they are not physically mixed. However, they must be stored in the same interconnected infrastructure, processing or logistical facility, transmission and distribution infrastructure or operating site.

Different raw materials are only considered to be part of a mixture if they belong to the same product group, except where the raw material is mixed for the purpose of further processing at the fuel production plant for the purpose of producing biomass fuels (e.g. in a co-digestion plant). A product group can comprise for instance different types of non-food cellulosic material with similar physical and chemical characteristics, heating values and/or conversion factors or the types of lignocellulosic material covered under point q of Annex IX Part A to Revised Directive (EU) 2018/2001. Raw materials, however, that can be used to produce biofuels, bi-liquids and biomass fuels which are subject to different rules concerning their contribution towards the targets for renewable energy should generally not be considered to be part of the same product group as this would risk to undermine the objectives of Revised Directive (EU)

2018/2001. An example explaining the principle of the product group can be found in Annex I of this document.

A separate mass balance system must be kept for different mixtures or for raw materials and biomass fuels that cannot be considered part of a mixture. The transfer of information about the sustainability characteristics is not permitted between different mass balance systems. For example, if raw materials in different product groups (e.g. woodchips from forestry and waste wood) are kept on the same site, the sustainability characteristics for outgoing consignments need to correspond to the raw material actually delivered etc.

In processing plants where different raw materials are processed together for the purpose of producing fuels, a separate mass balance system does not need to be kept.

Where a consignment of raw material or fuel is delivered to an economic operator, even if the operator is not participating in a voluntary scheme or national scheme confirming compliance with Revised Directive (EU) 2018/2001, the delivery must be reflected in the mass balance system by withdrawing an equivalent quantity of raw material or fuel from the balance. The type of fuel to be booked out must correspond to the physical nature of the raw material or fuel delivered. This also applies if the consignment of a fuel is used to meet an obligation imposed by a member state.

At each processing step or for losses, appropriate conversion factors must be used to adjust the size of a consignment. If processing of a raw material consignment results in only one output, the information on sustainability characteristics and characteristics related to greenhouse gas savings must be adapted to the consignment and assigned to the output intended for fuel production – expressed in the size of the consignment and the associated quantities of sustainability characteristics and characteristics related to greenhouse gas savings, using a conversion factor representing the ratio between the mass of the output intended for such production and the mass of the raw material entering the process (see Art. 30 (2) (a) of Revised Directive (EU) 2018/2001).

Furthermore, it should be kept in mind that the sustainability characteristics of the processed raw materials must be assigned in the same ratio to products and residues of this process. For example, if 50 % of a mixture has been certified as sustainable, 50 % of all products and residues of this mixture should also be considered sustainable. The only exception is the allocation of greenhouse gas emissions, which is subject to the rules in Annex VI of Revised Directive (EU) 2018/2001.

Where biofuels, bioliquids or biomass fuels are blended with fossil fuels, the information about the sustainability and GHG emissions saving characteristics assigned to the blend must correspond to the physical share of the biofuel, bioliquids or biomass fuels in the blend.

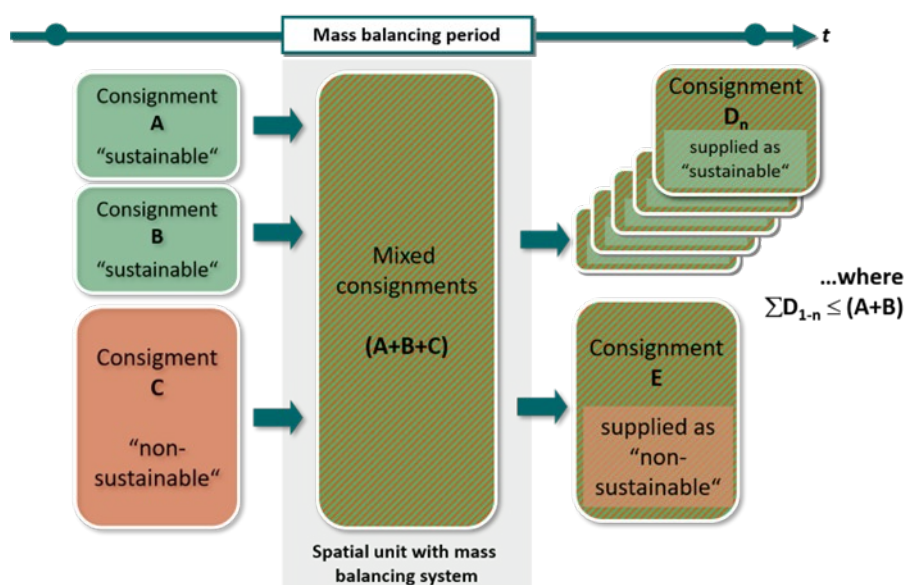


Figure 4: Mass balancing

The following mass balancing formula applies here:

$$\sum D_{1...n} \leq (A + B)$$

where: $\sum D_{1...n} = A * [\text{conversion factor}]_A + B * [\text{conversion factor}]_B$

When a raw material consignment is processed into more than one output declared “sustainable” for the production of biomass fuels, the economic operator must apply a separate conversion factor and mass balance for each output (see Art. 30 (2) (b) of Revised Directive (EU) 2018/2001).

2.3 Traceability in the mass balance system

2.3.1 Traceability of biomass and biomass fuels

The correct implementation of a mass balance system in all phases of production makes it possible to trace every step in the handling of a quantity of sustainable biomass or biomass fuels along the production and supply chain, from the cultivation/waste and residue producer to the last interface, and to seamlessly verify the origin of the biomass. However, this requires that every interface, operation or operating site responsible for handling the quantity of sustainable biomass also assumes responsibility for correctly implementing the mass balance system.

The responsibility is based on the fact that the operation or operating site responsible has the power and control over the sustainable biomass. Each amount of sustainable biomass must be recorded in the internal mass balance system as soon as the interface, the operation or the

operating site has obtained the legal and actual, physical control over the sustainable biomass. Here, the presence of the sustainable biomass at the respective site is the prerequisite for scheme-compliant handling of sustainable biomass.

Biomass that is not physically present at the respective site cannot be recorded in the mass balance system or removed from it. One exception is direct-to-customer commerce. In this case, the movements of goods are to be represented in a mass balance system and the necessary verification for tracing the sustainable biomass managed.

The seamless traceability of every quantity of sustainable biomass distributed along the production and supply chain can only be guaranteed when the data required to identify this biomass is consistently passed on. For this, the SURE form “Proof of Sustainability (PoS) for the delivery of biomass fuels” can be used.

The data that is necessary to identify supplied amounts of sustainable biomass for accounting purposes and to distinguish other supplies quantities of sustainable biomass are called tracking attributes and accompany the supplied amount of sustainable biomass along the production and supply chain. Here, however, all of the documentation starting from cultivation (or production) up through the last interface does not have to be passed on, only the information that is required for the respective downstream operations, operating sites and interfaces with a view to issuance of the proofs of sustainability (e.g. the proof of sustainability number, origin and type of biomass, quantity supplied and GHG emissions of the supplied quantity, name and address of the supplier, etc.).

The handling of the sustainable biomass within the interface, the operation or the operating site also has to be tracked and documented as an internal process in the internal mass balance system. Quantities of sustainable biomass can be merged, split or processed in internal processes in compliance with the requirements of the respective phase as long as this involves the same product or same product type and new quantities of biomass are subsequently created. The product identity must be preserved up through and including the last interface, i.e. mass balancing is specific to a product type or raw material. Mass losses, e.g. in internal company processes or transport (also in the case of on-grid transmission of gaseous biomass fuels), must be taken into account via conversion factors.

The mass balance system also makes it possible to mix sustainable biomass with non-sustainable biomass but, in this case, it must be ensured that the quantity of sustainable biomass is identified prior to mixing. At the same time, the mass balance system also must guarantee that the quantity of scheme-compliant biomass taken from this mixture is not higher than the quantity that was identified before mixing. Raw material or fuels may only be mixed in a container, at a processing or logistical facility or at a transmission and distribution infrastructure or operating site. The physical biomass that is supplied to downstream interfaces, operations

or operating sites does then not necessarily correspond to the quantity of biomass that was originally purchased as sustainable, but only to an equivalent quantity of biomass.

The sourced quantities of sustainable biomass have to be balanced daily, monthly or quarterly. The timeframe for balancing must be defined ahead of time in accordance with the requirements for the mass balance period in Section 2.4 and applied consistently thereafter. More sustainable biomass may not leave the premises than physically arrives at the premises within the defined balancing timeframe. Having control over the sustainable biomass means that the interface, the operation or the operating site has physically taken the sustainable biomass directly or indirectly into its possession, may carry out transport, storage, shipping and processing and may physically transport the biomass to a downstream interface or a downstream operation or operating site.

Upon initial certification in the SURE-EU system, biomass raw materials received no more than 12 months before the initial audit can be considered sustainable biomass in the mass balance. The prerequisites are:

- ✓ the biomass has not been processed and has already been included in the mass balance,
- ✓ conformity with the sustainability requirements in the SURE-EU system is fully documented, and
- ✓ a self-declaration of the producer/waste and residue producer was submitted retroactively.

When handing off a quantity of sustainable biomass to the downstream interface, the downstream operation or the downstream operating site, the respective quantity must be removed from the internal mass balance system for the respective step. The data necessary is transmitted together with the consignment to the downstream interface, the downstream operation or the downstream operating site.

In certain cases, for example, due to changing legal bases, a registration of all relevant transaction data of the economic operator in the [Union Database \(UDB\)](#) of the European Commission may be required in addition to the maintenance of the internal mass balance system, e.g. in case of transit or storage of biomethane in an interconnected infrastructure (see following chapter). This means that keeping the internal mass balance system will be complementary to the mandatory use of the Union Database.

In this case, auditors verify that the entries in the Union Database of the certified economic operator correspond with the figures that are part of the economic mass balance system or other encoded information on their entities or sites. Any deviations between data that has been registered in the Union Database and the respective data from the economic operator's

documentation can lead to major non-conformities identified in the audit report and might trigger a suspension of the certificate of the economic operator.

2.3.2 Traceability of biogas or biomethane transported via a gas grid

Renewable biogas is processed to biomethane (additional conversion step) – if it is not consumed directly on site for electricity generation – and injected into the natural gas grid. The gas grid serves as both the transmission infrastructure and the storage facility. Biomethane can therefore be mixed in this distribution network (gas grid) provided that the infrastructure is interconnected.

Economic operators injecting biomethane into an interconnected gas grid are subject to certification within the SURE-EU-scheme up to the point of injection, while economic operators who produce heat or electricity from biomethane withdrawn from the gas grid are to be certified from the point of withdrawal. However, as a voluntary scheme alone is not able to guarantee the mass balance of a whole interconnected gas grid, the mass balance of the gaseous fuels in the gas grid has to be implemented in the Union Database, which is therefore mandatory to use for all economic operators injecting biomethane into or withdrawing biomethane from an interconnected gas grid.

The input (injection) and output (withdrawal) of gas in interconnected infrastructure must be documented by economic operators as part of their mandatory mass balance records, which are essential for the certification procedure. For this purpose, the quantities of gas injected and withdrawn must be measured using calibrated systems. If deliveries of gas with different sustainability characteristics, which are part of the same mass balance system, are injected into an interconnected transmission and distribution infrastructure, the sustainability characteristics must be assigned to the consignment which is injected into the transmission and distribution infrastructure and withdrawn from the transmission and distribution infrastructure. Sustainability characteristics can only be assigned to consignments of gas that have been registered in the Union Database. The mass balance of the *European interconnected gas grid (or other grid)* carrying the gas has to be in its entirety covered by the Union Database.

The physical injection of gas from renewable resources into the grid is usually accounted for on a monthly basis. At the end of the mass balance period, it may not show a deficit, as specified in Section 2.4. The input (injection) and output (withdrawal) of gas in interconnected infrastructure must be documented by economic operators and subject to independent auditing.

Since balancing is based on the energy value of the gas [unit kWh], SURE has defined a standard procedure¹ to convert the gas quantities from the energy value to metric tonnes.

Traders of gas from renewable resources must set up their own balancing system. The balancing group must contain all movements of gas from renewable resources that have been balanced and certified under the SURE scheme and is therefore essential for mass balancing. A balancing group is the connected transport and distribution infrastructure (e.g. the European gas grid) that physically connects the injection point with the withdrawal point. Economic operators must grant auditors full access to the balancing group and all associated documentation as part of a certification procedure prior to an audit (see Section 3).

Renewable gas can only be transferred from one country to another via the grid if all countries involved (i.e. also the transferring countries) are connected to the European gas grid. If an economic operator located in a country that is not connected to the European gas grid or to an isolated gas grid (“island grid”) wants to import biogas, it must demonstrate that the gas was physically transported by another means of transmission to its site/consumption point or the entry point of the island grid.

The economic operator injecting and transporting biomethane into the European gas grid must take into account the gas losses during transportation via the gas grid. The gas loss to be assumed is 0.01 gCH₄/MJ. If an actual GHG value is used for gas losses, plausibility checks must be performed by a qualified auditor or technical expert to confirm the accuracy of the data used for the calculation.

In case an economic operator processes different sources of (bio)methane into another gaseous biomass fuel, evidence shall be checked to ensure an appropriate mass balance of bioenergy content claims that enter and leave the process. For example, if biomethane is sourced via a direct connection to a biomethane plant, it must be checked that the capacity coming from the plant is consistent with the claim made by the receiver of the biomethane and the biomethane raw material is not also claimed by another economic operator. In case of multiple inputs of methane, the biogenic energy content of the resulting output could be subject to testing in accordance with the verification methods described in chapter 4 “Determining the biogenic content in fuel and material mixtures”.

For a detailed description of the documentation requirements of economic operators who inject, deliver or withdraw biogas or biomethane into a gas grid, please see the SURE document “Scheme principles for the use, processing and distribution/trade of biomass fuels and their conversion to electricity and heat”.

2.4 Mass balancing period

Economic operators are required to define a balancing period after which the balance is positive (less outgoing than incoming biomass). In the case of producers of agricultural and forest biomass and first gathering points that only source agricultural or forest biomass, it is possible

to extend the balance period to 12 months, provided the parties do not have a negative balance from the 4th balance month onwards. For all other scopes, a mass balance period of maximum **3 month** is allowed.

The start and end of the period shall be aligned with the calendar year or, where applicable, the four quarters of the calendar year. As alternatives to the calendar year, economic operators may also use either the economic year that they use for bookkeeping purposes or another starting point for the mass balance period, provided that the choice is clearly indicated and applied consistently.

Within three months of the **balance period**, the balance may be temporarily negative (temporarily more outgoing sustainable biomass (sold/supplied) than incoming). In the case of balancing periods exceeding three months, a temporary negative balance is also only permissible for the first three balancing months. In all cases, temporary negative balances within the balance period of three months must be compensated for by acquiring appropriate quantities of sustainable biomass.

If the economic operator decides to balance the sustainability data on an ongoing basis, the balance may never be negative.

At the end of the mass balance period, the sustainability data carried forward should be equivalent to the physical stock in the container, processing or logistical facility, transmission and distribution infrastructure or site.

This means: If the quantity of sustainable biomass in the balance exceeds the physical quantity of biomass in the operation, only the physically existing biomass can be carried forward to the next balancing period. Credit balances of sustainable biomass only recorded for accounting purposes but not physically available may not be transferred to the next balancing period. This kind of situation can occur, for example, if sustainably produced wood pellets are included in the mass balance but during the balancing period a large quantity of them was sold for a use other than for the production of electricity or heat in biomass installations required to provide proof of compliance (e.g. for heat production in the private sector).

2.5 Spatial boundaries

For every company that produces, processes or stores biomass or biomass fuels, the property line of the premises defines the geographic location. This demarcation is to be identified by clearly identifying the address of the property where the facility is located.

A mass balance system must be set up for every operation/operating site. The balancing systems can either be physically separate in the operation, or every operating site can have its

own balancing system if every consignment is documented is clearly identified by its location (operating site).

For example, a first gathering point can operate two similar facilities in close proximity to one another (e.g. on both sides of a street). If these facilities have different addresses, two mass balance systems have to be set up (one for each facility).

2.6 External storage facilities/storage facilities with several users

If several economic operators supply biomass to an external storage facility, shipping, leased or tank warehouse, for storage, each of these economic operators has to keep a mass balance system for the product the economic operator delivered.

3 Documentation requirements

The document requirements of the mass balance system do not relate to the format or medium of the documentation, but rather to the type of information to be documented. It is therefore largely left to the facilities and operating sites of the individual economic operator to decide how to set up a mass balance system for every operating unit that produces, processes or stores sustainability biomass or biomass fuels. Existing enterprise resource planning systems, for example, can be used as long as they have the capability to record and process all of the necessary information.

The general specifications for documentation relate to

- ✓ reliability (verifiable accuracy of the balance figures)
- ✓ accessibility (time and format of the documentation archive)
- ✓ certainty (no subsequent changes to balances)

of the documentation of the mass balance system. This must be verified by the independent certification bodies as part of the on-site inspections (for more information, see “Scheme principles for the certification process – Requirements and specifications”).

All of the documents in the document management system must be kept for at least 5 years regardless of any other legal requirements relating to retention period.

Economic operators must provide the auditor with all relevant mass balance information in advance of the planned audit. The last mass balances completed during the period under review must be inspected.

During initial audits, the auditor must check whether a mass balance system has been set up and is functioning.

The documentation of mass balancing must at least contain the following information, which is to be verified as part of an audit:

- ✓ proof of all operating sites to be subject to certification (each operating site must have its own mass balance system)
- ✓ proof of all incoming and outgoing consignments of sustainable biomass or biomass fuels in the mass balance system (input/output) per facility, including a description of the material and the suppliers or customers
- ✓ proof of every conversion step (applied conversion factor) that takes place when processing biomass raw materials to allow this result to be incorporated into the calculation (in particular in the case of installations processing waste or residues to ensure that the process is not modified to produce more waste or residue material)
- ✓ Information about mass balancing should be provided through contracts, commercial documents, etc. documents, and should be traceable in accounting
- ✓ a defined period for the mass balance (no longer than 3 months, no longer than 12 months for producers of agricultural and forest biomass and first gathering points that only source agricultural or forest biomass)
- ✓ the results of each sustainable biomass balance (positive/balanced/negative balance) which must be checked for any discrepancies between bookkeeping system and inputs, outputs and balances
- ✓ allocation of sustainability properties
- ✓ equivalence of the sustainability data and the physical stock at the end of the mass balance period

In addition, the auditor must check:

- ✓ That mass balance records contain information on both the inputs and the outputs of sustainable and unsustainable material (including where relevant fossil fuels) handled by the sites
- ✓ Samples of the calculations (inputs, outputs, conversion factors, and any balances carried forward). All data should be checked against the book keeping system
- ✓ That the mass balance period is transparent, documented and consistent, and an appropriate period of time

Phase-specific documentation requirements (interfaces, suppliers, conversion facilities) are set out in the SURE document “Scheme principles for the use, processing and distribution/trade of biomass fuels and their conversion to electricity and heat”.

3.1 Sustainability characteristics to be documented

Information on the sustainability characteristics of the raw material, intermediate product, final biomass fuel, electricity, heating and cooling must be passed along the supply chain from one production stage to the next. New information can be added or the existing information can be aggregated during each phase. Sustainability characteristics transferred from one phase to another, as well as between different sites at the same phase, must always be accompanied by a physical transfer of material.

For a transparent and clear disclosure of the required sustainability characteristics of the raw materials, intermediate products or final biomass fuels in the supply chain, the SURE form "Proof of Sustainability (PoS) for the delivery of biomass fuels" can be used, which is provided to certified system participants in the SURE database.

The following type of information must be documented at each phase (if applicable) and passed on to the next phase.

- ✓ voluntary scheme and certificate number
- ✓ proof of sustainability number (only for biofuels, bioliquids and biomass fuels)
- ✓ name of the raw material
- ✓ scope of raw material certification (e.g. whether the raw material is certified according to sustainability criteria)
- ✓ waste or animal by-product permit number (if applicable) (waste code and/or biomass code according to “nabisy”)
- ✓ fuel type
- ✓ country of origin of raw material
- ✓ country of fuel production
- ✓ GHG emissions data (clearly statement of the default or actual value per phase of the supply chain)
- ✓ date when the fuel production installation started operation

- ✓ information on any support/subsidies and the type of support (in the renewable energy sector) that the material has received so far (important for biogas/biomethane because it can be used in both the transport and electricity sectors)
- ✓ if applicable, proof that the raw material/fuel meets the criteria for raw materials/fuels with low indirect land use change risk (low ILUC)

3.2 Tracing information to be documented

To be able to trace a consignment of raw materials, intermediate products, biomass fuels, electricity, heating and cooling along the supply chain, transaction data is required and must be documented:

- ✓ supplier company name and address
- ✓ buyer company name and address
- ✓ unique transaction ID (e.g. consignment number)
- ✓ date of (physical) loading
- ✓ place of (physical) loading or logistical facility or distribution infrastructure entry point
- ✓ place of (physical) delivery or logistical facility or distribution infrastructure exit point
- ✓ volume or weight (at a certain density) of the consignment. For fuels, the quantity of energy must also be included. To calculate the energy quantity, the conversion factors in Annex III of Revised Directive (EU) 2018/2001 must be used

For a transparent and clear disclosure of the required sustainability characteristics of the raw materials, intermediate products or final biomass fuels in the supply chain, the SURE form "Proof of Sustainability (PoS) for the delivery of biomass fuels" can be used, which is provided to certified system participants in the SURE database.

3.3 Issuing proofs of sustainability

Economic operators must issue a proof of sustainability (PoS) containing all the necessary information on the sustainability characteristics of a consignment. Generally, this proof is issued at the time of delivery to provide the recipient with all necessary information for further processing and handling, but not later than the end date of the relevant mass balance period.

Taking into account the special circumstances in the biomethane sector, these deadlines may be postponed by another 30 days due to the additional time needed for the confirmation of

the grid operators about the injected amount of biomethane, which may differ from the values measured at the injection point.

If sustainability proofs are not already produced via government-monitored database systems such as Nabisy in Germany, the SURE form "Proof of Sustainability (PoS) for the production of heat and/or electricity" must be used, which is provided to certified system participants with the corresponding scope via the SURE database.

3.4 Documentation in the Union database

Economic operators may be required to register any transactions of liquid and gaseous renewable fuels and recycled carbon fuels in the Union Database due to the requirements of Revised Directive (EU) 2018/2001 or Implementing Regulation (EU) 2022/996 or changing legal basis. The Union database spans the entire value chain of liquid and gaseous renewable fuels and recycled carbon fuels that are eligible for being counted towards the targets, of Revised Directive 2018/2001. Economic operators that are part of the above-mentioned value chain and fall within the scope of the reporting obligation of the Union Database are required to enter all relevant information on incoming and outgoing sustainably produced supplies into the Union database in a timely manner.

Further, those information are transactions made and the sustainability characteristics, including their life-cycle greenhouse gas emissions, starting from their point of production to the moment they are placed on the market in the Union. Referring to Article 18 (1) of the Implementing Regulation (EU) 2022/996 the information shall include data to be transmitted through the whole supply chain as well as data that is specific for the individual transaction, as described in Chapter 3.2 and 3.3.

In case of gaseous fuels injected into an interconnected infrastructure, the information (e.g. sustainability characteristics) must be registered in the Union database at the first entry point (point of first injection) and registered out as consumed at the point of final consumption. If gaseous fuels are withdrawn from an interconnected infrastructure and further transformed into gaseous fuels, the point of final consumption is considered to be the point of final consumption of the final gaseous fuels. In such a case, all intermediary stages from the withdrawal of the gaseous fuels from the interconnected infrastructure until the point of final consumption of the final gaseous fuels have to be registered in the Union database. The interconnected gas infrastructure shall be considered to be a single mass balance system. Data on whether support has been provided for the production of a specific consignment of fuel, and if so, on the type of support scheme, shall also be entered into the Union database.

Economic operators shall, in the event that the Member State decides to complement a mass balance system by a system of guarantees of origin, enter into the Union database data on the

transactions made and on the sustainability characteristics and other relevant data, such as greenhouse gas emissions of the fuels up to the injection point to the interconnected gas infrastructure.

Auditors need to verify that the entries in the Union Database or relevant national database of the certified economic operator correspond with the figures that are part of the economic operator's book keeping and net mass balance data or other encoded information on their entities or sites. Any deviations between data that has been registered in the Union Database and the respective data from the economic operator's documentation must be included in the in the audit report and immediately reported to SURE. Such discrepancies can lead to major non-conformities identified in the audit report and trigger a suspension of the certificate of the economic operator.

4 Co-conversion and co-processing

Under the SURE-EU scheme, a distinction is made between co-conversion and co-processing:

- ✓ Co-conversion refers to the conversion of homogenous mixed fuels (usually waste and residues) with fractions of biogenic- and non-biogenic resources in an installation producing heating and cooling or electricity (including Refuse Derived Fuels (RDF)) that must comply with the sustainability and greenhouse gas emissions saving criteria laid down in Article 29 (2) to (7) and (10) of Revised Directive (EU) 2018/2001. In case of co-conversion the requirements described in Chapter 4.1 apply.
- ✓ Co-processing is defined as the targeted processing of biomass feedstock together with fossil resources in a common process aiming to produce a fuel, for example, in refineries producing a (transport) fuel with fossil and biogenic feedstock as input in a common process. Fuels from co-processing can only be considered as partially produced from biomass. In general, co-processing mainly applies to biofuels or bioliquids production that take place in refineries and are therefore outside the scope of the SURE-EU system (production of heating/cooling or electricity from biomass fuels). However, in some cases a co-process may also fall within the scope of the SURE-EU-scheme (e.g. biogas production from biogenic and partially biogenic wastes). In this case, the requirements of Delegated Regulation (EU) 2023/1640 must also be followed in the SURE-EU-scheme and are described in chapter 4.2.

4.1 Determining the biogenic share in fuel and material mixtures for co-conversion

In addition to waste and residues that consist of 100 % biomass, e.g. wood chips, there are waste and residue streams for which only part of the biogenic content can be verified (e.g. used tires, whose biogenic content consists of natural rubber and fibres). Co-conversion of such waste and residue streams, require specific rules in order to guarantee traceability and verifiability of data. Since it is not possible to rule out the possibility of a variance in biogenic content in the waste and residue streams depending on the manufacturer, and thus no plausible standard values can be determined for the respective waste and residue stream, the biogenic content in such cases must be determined using the procedure described below.

The procedure for determining the biomass content in fuel or material mixtures must be carried out in accordance with Article 39 of Implementing Regulation (EU) 2018/2066.

At any given time, it may be conservatively assumed for fuel or material mixtures that the content of biomass in the mixture at hand is equal to zero percent. This should be taken into account especially if it can be assumed that the biogenic content of the fuel or material mixture is very low (e.g. < 1 %). If this approach is not followed, it may be determined by one of the following methods:

- 1) The biogenic content of the fuel or material mixture is determined by a suitable analytical laboratory method in an accredited laboratory
- 2) The biogenic content of the fuel or material mixture is determined by means of an estimation method and validated by an analytical laboratory procedure on a sample basis
- 3) The biogenic content of the fuel or material mixture has a default value specified by a competent authority or the European Commission

Whenever possible, the method expected to be the most accurate when determining the biogenic content must be used. The methods are prioritised as follows: Method 1 > Method 2 > Method 3.

If Method 2 is used, the estimate must be randomly validated, but at least four times per year or every 5,000 tonnes of the specific fuel or material mixture used, using an analytical laboratory procedure common. In absolute terms, the estimate may not deviate by more than 1 % from the measured value. If the discrepancy is >1 %, the method used for the estimate is not trustworthy and must be adjusted. As soon as a discrepancy is found, the conservative value must be assumed from that point in time.

The biogenic content of the fuel and material mixture determined by the analytical laboratory method or assumed by a default value must be passed on immediately to the upstream

interface, regardless of which method is used, so that the mass balance kept by the upstream interface can be corrected based on the actual values.

Economic operators must provide the auditor with all relevant information on how the biogenic content of the specific waste and residue streams was determined in advance of the planned audit. Special attention needs to be paid to the methodology used to estimate the biogenic content of a waste and residue stream.

4.1.1 Selecting analytical laboratory methods for determining the biogenic content

If the biogenic content of a fuel or material mixture is determined using an analytical laboratory method, it must be ensured that it is determined on the basis of a relevant standard and the relevant analytical methods.

ISO 21644:2021-07 can be used as an example here. It specifies three methods for determining the biomass content in solid secondary fuels and when they are to be used. The ^{14}C -process, the selective dissolution process and the manual sorting process are described. The use of the methods described in ISO 21644:2021-07 represent, under the conditions defined in the standard, a method for determining the biogenic content using an analytical laboratory procedure that is in conformity with the system.

4.1.2 Methods for estimating the biogenic content

If it is not technically possible to carry out the analytical laboratory procedure or if it is proven to be disproportionately expensive, the biogenic content of the fuel or material mixture may be estimated using an estimation method, provided that it can be assumed that the fuel or material mixture is a constant material flow used over a longer period of time. In the case of one-off consignments, estimates are not permitted.

The estimation method, if available, must be based on a method recognised by the European Commission or on a method recognised at national level for estimating the biogenic content in fuel and material mixtures. If this kind of method does not exist, a method based on a scientific, peer-reviewed publication must be chosen, which relates in parts to an EN, ISO or national standard. The chosen estimation method must be applicable to the specific process. For example, a method for estimating the biogenic content in solid fuels cannot be used to estimate the biogenic content in non-solid fuels.

If the fuel and material mixtures originate from a standardised production process with defined and traceable input material flows, the biogenic content can be estimated on the basis of the mass balance.

When an estimation method is used, the estimate must be randomly validated, but at least 4 times per year or every 5,000 tonnes of the specific fuel or material mixture used, using an analytical procedure common in laboratories. In absolute terms, the estimate may not deviate by more than 1 % from the measured value. If the discrepancy is >1 %, the method used for the estimate is not trustworthy and must be adjusted. As soon as a discrepancy is found, the conservative value must be assumed from that point in time.

4.1.3 Documentation requirements for suppliers before the last interface

If the supplier delivers a fuel and material mixture before the last interface with an unknown biogenic content, the supplier must determine a reference value for the biogenic content of this fuel and material mixture using an analytical laboratory method or a suitable estimation method. The supplier's mass balance must initially be kept based on this reference value. This mass balance must be corrected immediately after the actual value, which is determined by the last interface, is sent and reported to the supplier before the last interface.

At any given time, it may be conservatively assumed for fuel or material mixtures that the content of biomass in the mixture at hand is equal to zero percent. This should be taken into account especially if it can be assumed that the biogenic content of the fuel or material mixture is very low (e.g. < 1%).

4.2 Determining the biomass fuel share from co-processed biogenic and non-biogenic materials

Economic operators that co-process biomass and fossil fuels are required to determine the share of biomass fuel, resulting from that common process pursuant to Delegated Regulation (EU) 2023/1640. This must be performed on the basis of the testing methods described in the present section.

So that the amounts of each type of biomass processed as well as the amounts of biomass fuel resulting from that co-processing can be verified, economic operators must document the source streams with all possible precision and regularly substantiate the results of the testing method used by means of suitable verification tests (radiocarbon testing).

4.2.1 Testing methods

To determine the biogenic share of the co-process output, at least one of the following main testing methods must be used within the system boundaries defined in section 4.2.2:

- 1) Mass balance method
- 2) Energy balance method
- 3) Yield method
- 4) Radiocarbon (^{14}C) testing

The calculation using the main testing method or the analysis to determine the bio-content using radiocarbon testing as the main testing method must be performed for each batch or for each consignment.

In addition, the results of main testing methods 1, 2 and 3 must be reviewed and verified on a regular basis using radiocarbon testing. The frequency for carrying out the main testing method, and the radiocarbon testing method to check the alternative main testing method, must be determined on the basis of the complexity and variability of the key parameters of the co-processing. This must be done in such a way as to ensure that, at any time, the claims about the bio-content share are within the permissible margins for error or inaccuracy. Economic operators take account of at least the following points in assessing the complexity and variability:

- ✓ system boundaries (whole refinery or installation-specific)
- ✓ amount and quality of the biogenic input
- ✓ variability of the biogenic input
- ✓ share of biogenic input in the total input subjected to co-processing.

Economic operators must document, and provide to auditors prior to any audit, the assessment of complexity and variability as well as a detailed description of the testing method they used, including an indication of its accuracy and precision as also verified through the application of the radiocarbon testing. The auditor must also be provided with a procedure for applying the main testing method.

The main testing methods must be reviewed on a regular basis to correct potential system errors which may lead to deviations and calibrate the testing method if needed. Economic operators must ensure that the detection limit of the testing method can effectively determine the biomass fuel share.

4.2.2 Defining system boundaries

Economic operators can define the system boundaries within which the main testing method is used on the basis of local circumstances.

System boundaries may be chosen as follows:

- ✓ whole refinery
- ✓ installation co-processing fuels
- ✓ installation co-processing waste inputs (e.g. gasification)

Testing and verification based on radiocarbon testing must be carried out in respect of the output of the whole refinery, the installation co-processing fuels or the installation co-processing waste inputs before it is mixed with other fuels.

One and the same testing method must be used within the selected system boundary. If installations are not connected and there are no flows between them, then different testing methods can be applied.

Installations co-processing waste-based, partially biogenic inputs, can use a main testing method together with verification by means of radiocarbon testing if a reliable and representative set of samples can be performed at the level of the inputs that make it possible to establish the bio content in the total inputs.

4.2.3 Main testing methods

4.2.3.1 Mass balance method

Under the mass balance method, full mass balance analysis of the total mass of inputs and outputs must be performed. Non-fuel impurities, such as moisture content, must be taken into account both when assessing the feedstock used and when calculating the outputs of co-processing. The bio-content of all outputs is proportional to the bio-content of the inputs. The characteristic “biomass fuel” is allocated to the specific fuel outputs on the basis of output-specific conversion factors. These should be determined on the basis of the bio-content share, as actually measured in radiocarbon testing, of the specific fuel output.

Mass lost in conversion (e.g. in off-gases, in liquid industrial wastewaters and in solid residues) must be considered when calculating the sustainability characteristics of the output and reflected in pro-rata reductions.

In addition to the balance-based analysis, analytic characterization of feedstocks and products must be carried out. This might involve, for example, ultimate and proximate analyses of system mass flows.

4.2.3.2 Energy balance method

Under the energy balance method, economic operators determine the biomass fuel share in the total fuel output on the basis of the biomass fuel share in the energy content of all the co-processing inputs in accordance with formula 1.

$$S_{\text{bio}} = \frac{\epsilon_{\text{bio,relevant}}}{\epsilon_{\text{total}}} = \frac{M_{\text{bio,relevant}} \cdot \text{LHV}_{\text{bio}}}{\sum_i M_{\text{feedstock},i} \cdot \text{LHV}_{\text{feedstock},i} + \epsilon_p}$$

S_{bio}	<i>Biomass fuel share in the total output of the common process</i>
$\epsilon_{\text{bio,relevant}}$	<i>Relevant energy input in the process from biomass [MJ]</i>
ϵ_{total}	<i>Total relevant energy input in the process [MJ]</i>
$M_{\text{bio,relevant}}$	<i>Mass of the biomass input in the common process [kg]</i>
LHV_{bio}	<i>Heating value of the biomass input in the common process [MJ/kg]</i>
$M_{\text{feedstock},i}$	<i>Mass of the feedstock i input in the common process [kg]</i>
$\text{LHV}_{\text{feedstock},i}$	<i>Heating value of the feedstock i input in the common process [MJ/kg]</i>
ϵ_p	<i>Process energy input in the common process [MJ]</i>

The characteristic “biomass fuel” is allocated to the specific fuel outputs on the basis of output-specific conversion factors. These should be determined on the basis of the bio-content share, as actually measured in radiocarbon testing, of the specific fuel output. This means that, for example, if 10 % of the total relevant energy input in the common process comes from biomass, then a maximum of 10 %, in sum, of the total fuel output can count as biomass fuel, while individual fuel fractions may, as a result of the specific conversion factors, have a fuel share greater or smaller than 10 %.

4.3.2.3 Yield method

The yield method is based on the change in the total fuel output resulting from the addition of biomass to a process. Economic operators have the methods described in the following at their disposal. These can only be used as main testing methods if the process is run constantly under the defined reference operating conditions (e.g. biomass fraction, process temperature), including feedstock quality, within the system boundaries.

The continuous operation of the process in respect of feedstock quality must be demonstrated by running each specific bio-input through ¹⁴C analysis by means of radiocarbon testing and using that, in turn, as the basis for calculating its specific conversion factor.

For the yield method, the share of biogenic carbon in the co-processing output should be checked in accordance with the stipulations described in section 5.4.

Method A

Under Method A, economic operators determine the biomass fuel share in the co-processing fuel output by observing and recording the increase in fuel output resulting from the additional input of biomass into the process. First, the fuel yields resulting from operation with only pure fossil feedstock should be determined. For pilot-scale units, even when using limited concentrations of biogenic or waste-based inputs, all conditions should be selected to be representative of the planned commercial-scale operation. The reference data thus established serve as the basis for determining the increase in fuel output caused by the addition of biomass to the process.

The characteristic “biomass fuel” must be allocated to the fuel in question on the basis of the increase in output specific to that fuel. That yield factor is valid only for the operation conditions (biomass fraction and relevant process parameters) for which it was established. Economic operators can determine different yield factors to refer to different processes and operating conditions. If economic operators switch from one operating condition for which a yield factor has been determined to another operating condition for which a yield factor has been determined, then the biomass fuel yield must be checked using radiocarbon testing and, if necessary, the yield factor updated.

If specific yield factors have been defined in the Member State in which economic operators are active, then they must use those yield factors.

Method B

Under Method B, economic operators determine the relationship between the bio-share of input and the bio-share of output on the basis of reference measurements. To that end, several batches of feedstock of known composition are processed at constant processing conditions. To determine the relationship between the bio-input and the bio-output, both the input and the output need to be fully characterised.

The relationship thus determined can be applied to biogenic feedstock of the same type and quality. In line with the determined relationships, economic operators can use different feedstock compositions and attribute the bio-shares on the basis of the yield factors.

4.2.4 Radiocarbon testing

Radiocarbon testing (^{14}C spectrometry) can be deployed either as a main testing method or as a verification method for one of the main testing methods described above. When

radiocarbon testing is used as a verification method, all the outputs of the co-processing for which a bio-share is declared must be verified. If a deviation of more than 1 % in absolute terms is found compared to the results of the main testing method, the values of the radiocarbon testing are considered valid.²

The following requirements must be fulfilled in this context and when carrying out radio-carbon testing:

- ✓ Testing and verification of the bio-share of the co-processing output must be carried out in respect of the output of the whole refinery, the installation co-processing fuels or the installation co-processing waste inputs before the co-processing output is blended with other fuels.
- ✓ If a mass spectrometry method is used, then the Accelerator Mass Spectrometry (AMS) method must be chosen.
- ✓ Economic operators must ensure that the method of analysis selected can reliably detect and quantify the bio-share of the sample. Details on the accuracy and precision of the results must be documented.
- ✓ Any loss of carbon of biogenic origin due to the process of removing oxygen from the biogenic feedstock must be quantified. This is done by making a comparison between the biogenic and fossil carbon in the inputs and the biogenic and fossil carbon in the output products.

Radiocarbon testing as a verification method

Where radiocarbon testing is used as a verification method for a main testing method which cannot map the operating conditions related to carbon content in the output for each batch or consignment, radiocarbon testing must be carried out every time that

- ✓ a change in the share of biogenic input or
- ✓ a change in the amount of hydrogen and catalyst inputs or
- ✓ a change in the process parameters (in terms of process temperature in absolute [K] or process pressure in absolute pressure [Pa]) or
- ✓ a change in the product composition

of more than 5 % compared to the baseline conditions is effected or occurs.

If no change is effected or occurs in the co-processing for which the carbon content in the output cannot be mapped for each batch or consignment, then measurements using radiocarbon testing must be carried out after no more than 4 months to verify the biogenic carbon content that has been calculated using the main testing method.

4.2.5 Establishing the share of hydrogen of biological origin

If renewable hydrogen of biological origin is used in a hydrotreater or other co-processing unit, economic operators using renewable hydrogen of biological origin in a production system must provide proof that the hydrogen used

- ✓ has not been counted as renewable energy elsewhere, in order to avoid double-counting, and
- ✓ has been incorporated into the final fuel and not simply used to remove impurities.

The evidence that the hydrogen has been incorporated into the fuel can be quantified using the CHN test. To that end, scheme participants must document the hydrogen content of the fuel before and after hydro treating. If the hydrogen content of the fuel has risen, an amount equivalent to the increase can be declared as additional biomass fuel in the output.

For hydrogen of biological origin to be used as such, it must have proof of sustainability in a form recognised under the SURE-EU scheme.

4.2.6 Specific documentation requirements for co-processing

Economic operators must document the amount and type of co-processed biomass and the amount of biomass fuels resulting from the process in such a way as to guarantee the reliable implementation of the selected main testing method. In addition, an overall mass balance calculation that indicates the biogenic share of input and output must be performed alongside the main testing method. For downstream mixing and further processing, a mass balance system must be maintained in accordance with chapter 2.

Economic operators must document details on the accuracy and precision of the testing method used as well as any inaccuracies in their measurements of flows or heating values. Any inaccuracies found must be explained.

The results of the main testing method calculations or radiocarbon analysis to determine the bio-share (regardless of whether the latter was used as the main testing or verification method), as well as records, must be archived for at least 5 years, or longer if required by the competent national authority. Physical samples must be kept for at least 2 years.

4.2.7 Specific requirements for the co-processing certification process

During audits, not only the general scheme requirements but particularly the consistency between the amounts of biomass entering the process and the amounts of biomass fuel that are recorded as being produced from the biomass need to be verified. The evidence supplied by

economic operators for the plausibility of those amounts must be assessed with reference to industry standards. The focus here is on the main testing method chosen by the economic operator as well as, in the case of the mass balance, energy balance or yield methods, the verification method.

If an audit finds significant deviations in the main testing method or the final calculation of the bio-share, these must be treated as critical non-conformity. In the context of the agreed corrective measures, economic operators must update the calculation of the bio-share in the output, doing so on the basis of the lowest value determined by radiocarbon testing.

5 Relevant documents

With regard to the documentation (scheme documents) in the SURE-EU system, reference is made here to the document “Scope and basic scheme requirements”.

SURE reserves the right to create and publish additional supplementary scheme principles if necessary.

The legal EU regulations and provisions for sustainable biomass and biomass fuels including other relevant references that represent the basis of the SURE documentation are published separately on SURE’s website at www.sure-system.org. References to legal regulations always relate to the current version.

6 References

¹

Reference value for biomethane conversion calculation: 50 MJ/kg (at a standard density of 0.72 kg/m³)

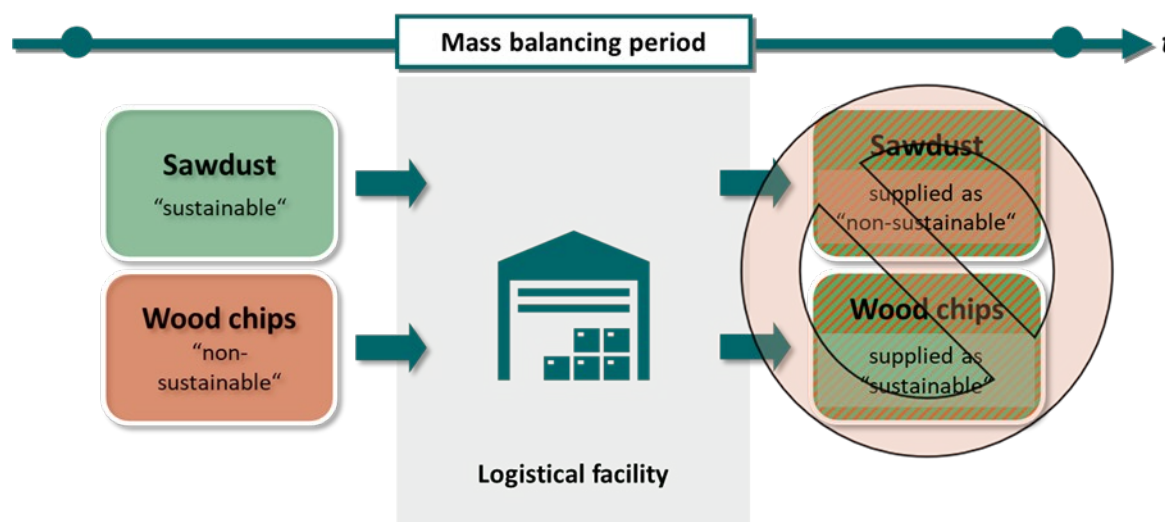
²

In the first year of application of this methodology, an increased deviation of 3 % instead of 1 % in absolute terms can be applied

Annex I: Examples for mass balancing

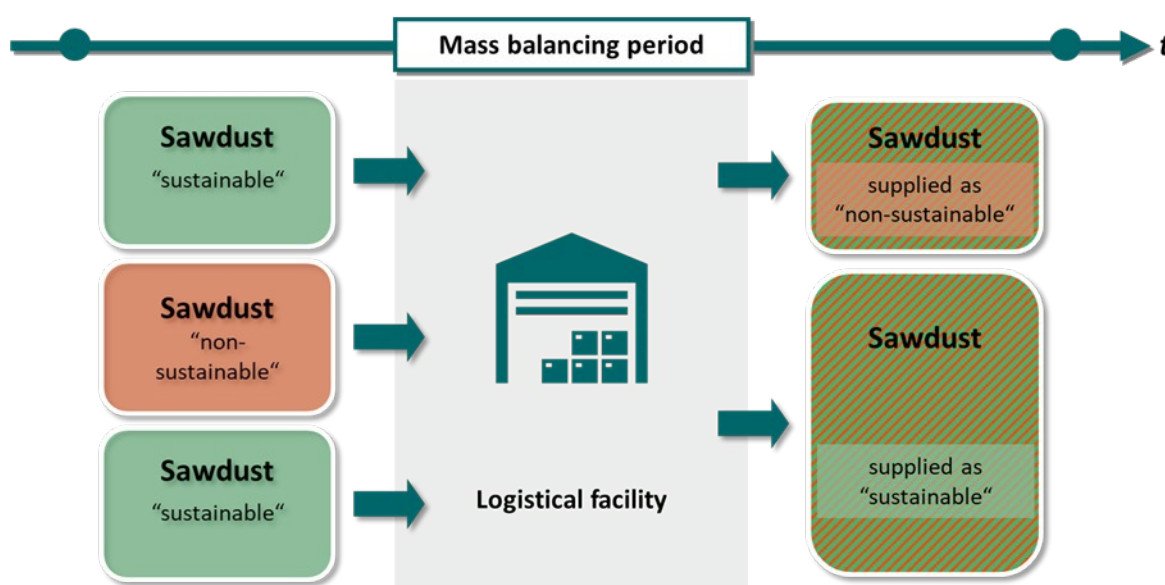
In general, only if materials can be considered as part of a mixture (identical materials, same product group or physically mixed feedstocks for the purpose of further processing), the allocation of sustainability characteristics to the output is permissible. Below several examples are given to explain the principles of allocating sustainability characteristics in the context of the product group and physical mixing.

Example 1 shows a trader that received a consignment of sustainable sawdust and a consignment of non-sustainable wood chips in a mass balancing period. As the two raw materials are neither identical nor belong to the same product group and therefore cannot be considered as part of a mixture, the economic operator is not allowed to allocate the set of sustainability characteristics of the sawdust to the wood chips.



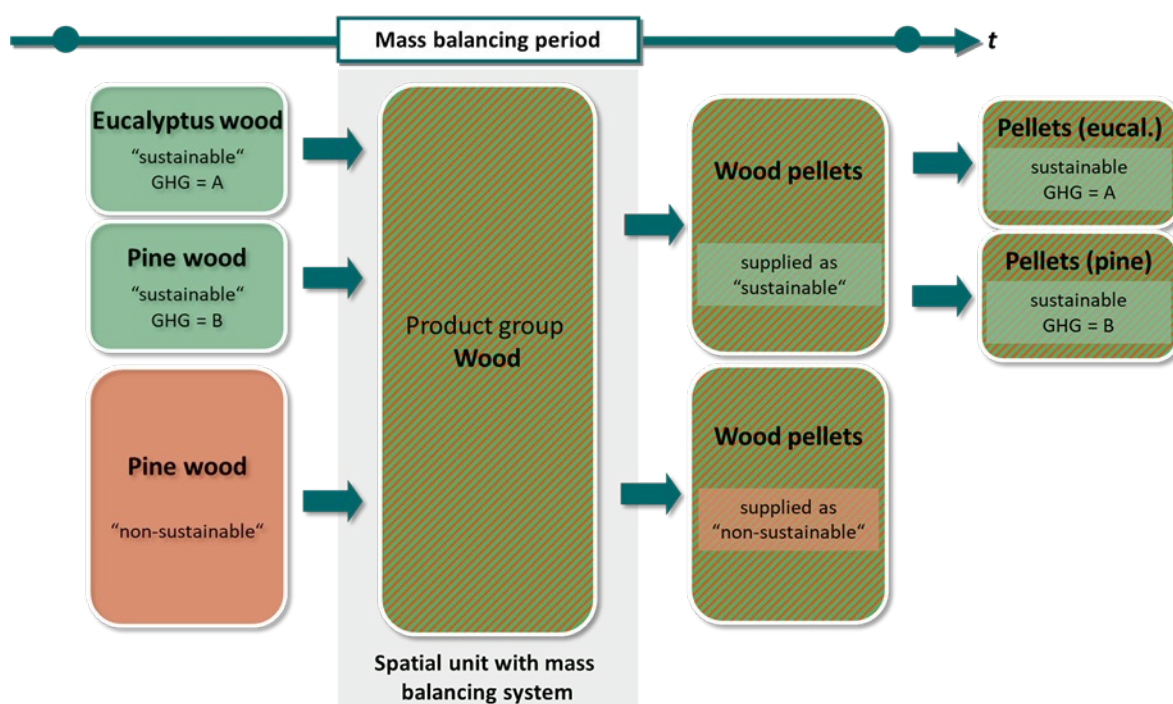
Example 1: Mass balancing of raw materials.

If an economic operator only receives consignments of sawdust with different sustainability characteristics (e.g. sustainable and non-sustainable), these can be considered as part of a mixture without physical mixing as long as the sawdust is stored in the same site (e.g. logistical facility). Therefore, a flexible allocation of the sustainability characteristics to outgoing sawdust consignments is possible as long as the overall balance at the end of the mass balancing period is met.



Example 2: Mass balancing of identical raw materials.

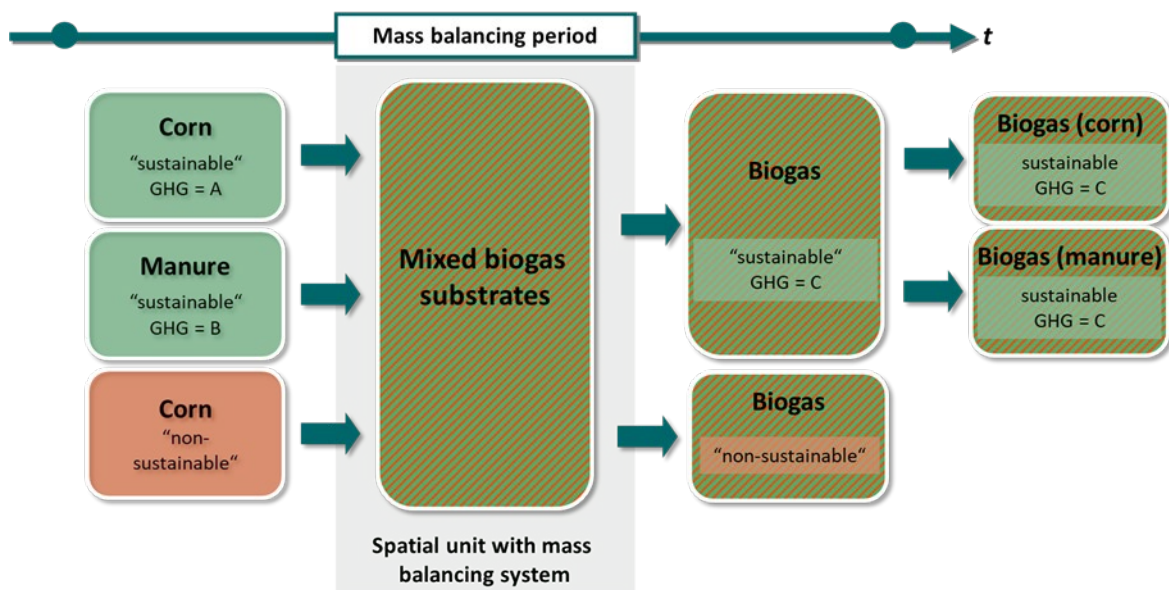
Example 3 shows an economic operator that produces wood pellets. During a mass balance period, the economic operator receives different consignments of certified sustainable eucalyptus and pine wood. Additionally, a consignment of non-sustainable pine wood was received. As these raw materials fulfil the requirements to be considered as belonging to the same product group, the wood can be considered as mixed without physical mixing as long as the wood is stored in the same site (e.g. logistical facility). Of this mixture, the economic operator can produce the respective amount of sustainable and non-sustainable wood pellets. The set of sustainability characteristics determined for consignments entering the mixture (including raw material type) can then be flexibly allocated to the outgoing consignments as long as the overall balance at the end of the mass balancing period is met.



Example 3: Producer of wood pellets.

Example 4 shows a biogas plant that receives different consignments of certified sustainable corn and manure during a mass balance period. Additionally, a consignment of non-sustainable corn was received. As these raw materials cannot be considered as part of the same product group, it is only possible to transfer sustainability characteristics from the input to the output if the raw materials are physically mixed for the purpose of further processing. In the context of biogas production, this means co-digestion.

The set of sustainability characteristics determined for consignments entering the mixture (including raw material type) can then be flexibly allocated to the outgoing consignments as long as the overall balance at the end of the mass balancing period is met. Since the total emissions from the use of a biomass fuel resulting from a co-digestion of different substrates must be calculated as a sum, taking into account on pro rata the share of the respective inputs and their emission factors, the sustainability characteristic "GHG-emission" is the same for each consignment of outgoing sustainable biogas.



Example 4: Biogas plant

Annex II: Revision Information

Revision Information Version 3

Section	Change	Date of change
whole document	Version 2.0 updated to 3.0	19.05.2025
whole document	Directive (EU) 2018/2001 resp. RED II changed to: Revised Directive (EU) 2018/2001 resp. RED III	19.05.2025
Section 2.1	deleted because mentioned twice: Sustainable and non-sustainable biomass is also segregated here	19.05.2025
Section 2.2	added: The principle of mass balancing requires that a certain set of sustainability characteristics remain assigned to a physical consignment. This means that these characteristics can only be transferred from one interface to the next when this transfer is accompanied with physical transfer of the consignment. deleted: The mass balance system described in Article 30 (1) of Directive (EU) 2018/2001 describes a system in which the “sustainability characteristics” remain assigned to “physical consignments”.	19.05.2025
Section 2.2	added: The minimum of sustainability characteristics and information to be documented and transferred through the entire value chain of renewable fuels or recycled carbon fuels are listed in chapter 3.1 and 3.2. deleted: Sustainability characteristics would have to include information on the country of origin of the raw material if several countries of origin can be specified for a certain consignment (for more information, see Article 7a (1) a) of Directive 2009/30/EC on fuel quality).	19.05.2025
Section 2.2	The mass balance system must include both information on the input/output of raw materials and fuels for which above the sustainability characteristics have been determined [...] changed to: The mass balance system must include both information on the input/output of raw materials and fuels for which the sustainability characteristics listed in chapter 3 have been determined [...]	19.05.2025

Section	Change	Date of change
Section 2.2	added: If processing of a raw material consignment results in only one output, the information on sustainability characteristics and characteristics related to greenhouse gas savings must be adapted to the consignment and assigned to the output intended for fuel production – expressed in the size of the consignment and the associated quantities of sustainability characteristics and characteristics related to greenhouse gas savings, using a conversion factor representing the ratio between the mass of the output intended for such production and the mass of the raw material entering the process (see Art. 30 (2) (a) of Revised Directive (EU) 2018/2001).	19.05.2025
Section 2.2	added: When a raw material consignment is processed into more than one output declared “sustainable” for the production of biomass fuels, the economic operator must apply a separate conversion factor and mass balance for each output (see Art. 30 (2) (b) of Revised Directive (EU) 2018/2001).	19.05.2025
Section 2.3.2	added: The economic operator injecting and transporting biomethane into the European gas grid must take into account the gas losses during transportation via the gas grid. The gas loss to be assumed is 0.01 gCH ₄ /MJ deleted: Gas losses during the production and processing of biomethane as well as during its transmission and distribution, must be taken into account when calculating GHG emission savings. For gas losses, an emission factor of 0,17 gCH ₄ /MJ biomethane must be applied by the last interface.	19.05.2025
Section 2.4	[...] in case of balance balancing [...] changed to: [...] in case of balancing [...]	19.05.2025
Section 3.1	Information on the sustainability characteristics of the raw material, intermediate product and final biofuel, bioliquid or biomass fuel must be passed [...] changed to: Information on the sustainability characteristics of the raw material, intermediate product, final biomass fuel, electricity, heating and cooling must be passed [...]	19.05.2025
Section 3.2	To be able to trace a consignment of raw materials, intermediate products or biofuels along the supply chain [...] changed to: To be able to trace a consignment of raw materials, intermediate products, biomass fuels, electricity, heating and cooling along the supply chain [...]	19.05.2025

Section	Change	Date of change
Section 3.4	<p>Economic operators may be required to register any transactions of biomass fuels in the Union Database [...] [...] The Union Database spans the entire value chain of biomass fuels that are taken into account for the purposes referred to in Article 29(1) points (a), (b) and (c), first subgraph of Directive [...] [...] into the Union database [...]</p> <p>changed to: Economic operators may be required to register any transactions of liquid and gaseous renewable fuels and recycled carbon fuels in the Union Database [...] [...] The Union database spans the entire value chain of liquid and gaseous renewable fuels and recycled carbon fuels that are eligible for being counted towards the targets, of Revised Directive [...] [...] into the Union database in a timely manner.</p>	19.05.2025
Section 3.4	<p>added: Further, those information are transactions made and the sustainability characteristics, including their life-cycle greenhouse gas emissions, starting from their point of production to the moment they are placed on the market in the Union. Referring to Article 18 (1) of the Implementing Regulation (EU) 2022/996 the information shall include data to be transmitted through the whole supply chain as well as data that is specific for the individual transaction, as described in Chapter 3.2 and 3.3.</p>	19.05.2025
Section 3.4	<p>added: The interconnected gas infrastructure shall be considered to be a single mass balance system. Data on whether support has been provided for the production of a specific consignment of fuel, and if so, on the type of support scheme, shall also be entered into the Union database. Economic operators shall, in the event that the Member State decides to complement a mass balance system by a system of guarantees of origin, enter into the Union database data on the transactions made and on the sustainability characteristics and other relevant data, such as greenhouse gas emissions of the fuels up to the injection point to the interconnected gas infrastructure.</p>	19.05.2025
Section 4.2.3	<p>Section devided in: 4.2.3.1 Mass balance method 4.2.3.2 Energy balance method 4.2.3.3 Yield method</p>	19.05.2025

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