



# **Scheme principles for the certification of sustainable material flows in the chemical industry**

**Version: RC² 1.3**

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## 1 Introduction

To make a significant contribution to reducing greenhouse gases and conserving resources, the chemical industry is increasingly relying on sustainably produced and certified *biomass* to replace fossil-based raw materials. In addition, the recycling of materials with the aim of reducing the use of *fossil-based* or *mineral resources* is gaining in importance and is consistent with the concept of the *circular economy*. In the context of highly complex chemical manufacturing processes, biomass or *recovered (reclaimed) materials* used as sources of feedstock can be deployed in the same way as conventional (“virgin”) materials. The nature of certain processes can cause the sustainable biogenic content or physical *recycled content* in these products to vary considerably, making it virtually impossible to reach a valid conclusion about the content in the end product on the basis of analytical evidence following large-scale chemical processes.

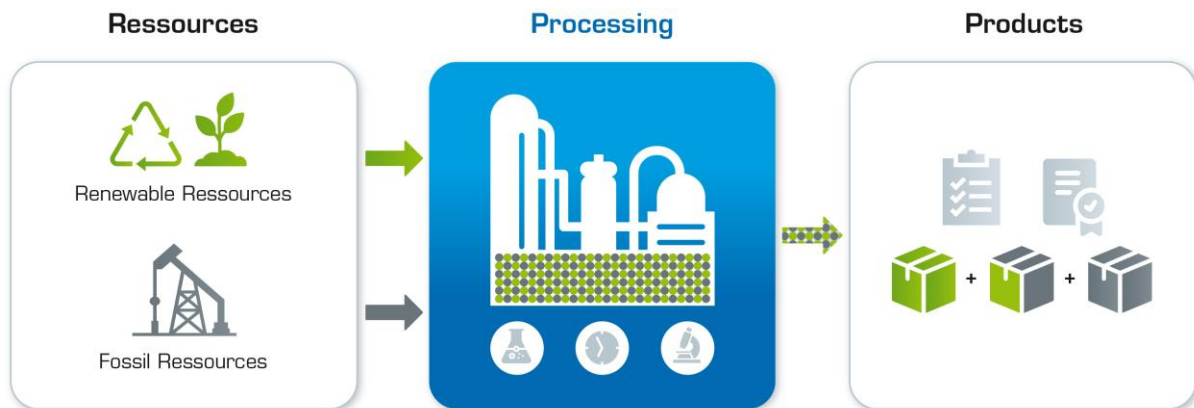


Figure 1: Diagram outlining the mass balance approach. Sustainable properties are attributed taking into account all conversion rates.

Using the mass balance approach (figure 1), businesses in the chemical industry and downstream businesses can provide proof that a certain quantity of fossil-based raw material has been saved by replacement with certified sustainable biomass or recovered materials during the production process. Mass balancing ensures the traceability of certified sustainable feedstock and enables a neutral certification body to verify the use of certified sustainable inputs throughout the value chain of a product.

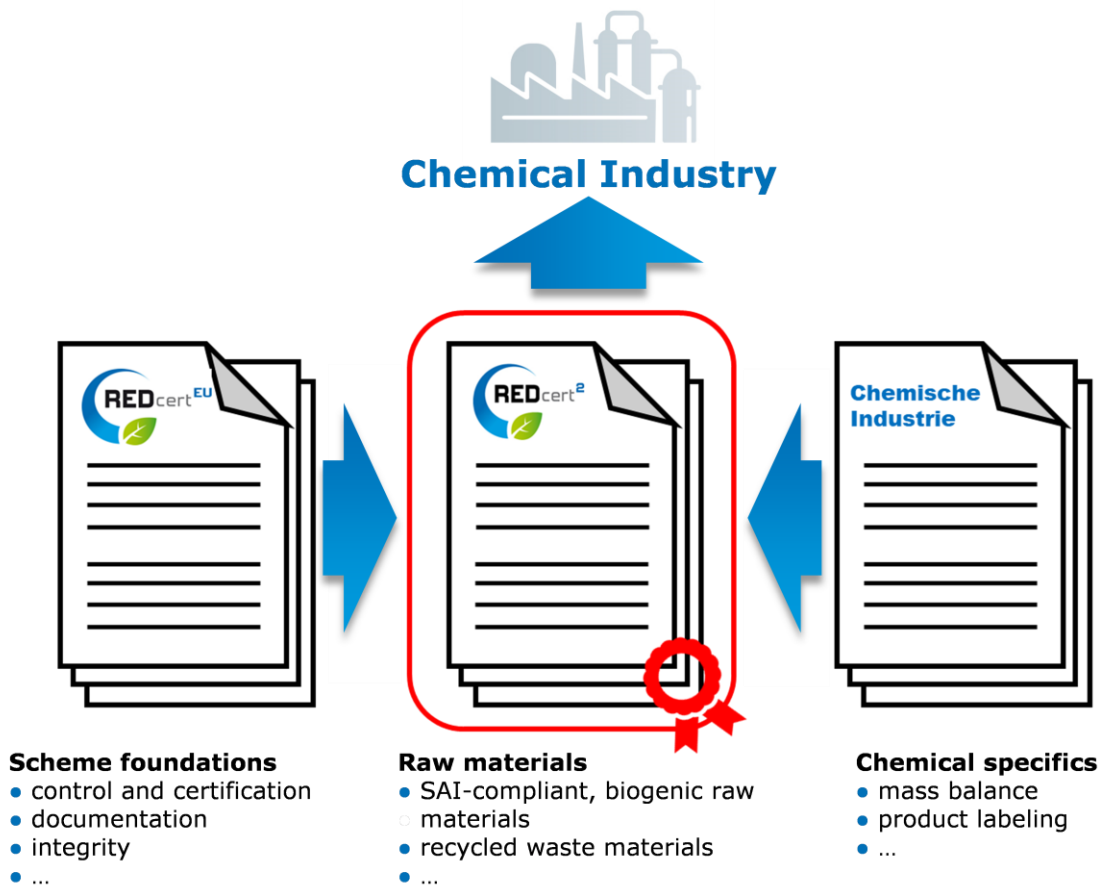
The complexity of large-scale chemical processes often means that balancing based purely on “mass”, i.e. the weight of the feedstock used, no longer suffices. The reason is that in every process step, new products and/or intermediates are created whose conversion rate is almost impossible to determine or verify with respect to the biomass or recovered materials used.

As a result, the REDcert<sup>2</sup> scheme for the certification of sustainable material flows in the chemical industry, alongside the “process-specific mass balance approach” based on mass, contains the option of an additional approach based not on the mass of the biomass or recovered materials used but on the chemical value of the feedstock used throughout the value chain. This “process-non-specific mass balancing” represents a stoichiometric balancing approach based on an equivalence analysis and documented in a corresponding accounting system.

In addition to the mass balance and the equivalence analysis, the definition of countable subunits (“unit counting”) in combination with a suitable accounting system can also be used to prove that a certain quantity of fossil-based or mineral resources has been substituted with an equivalent quantity of certified sustainable feedstock.

The present document defines a catalogue of requirements for the certification of sustainable products produced in either segregated or mass-balance terms from certified sustainable biomass or recovered materials and of downstream processing and trade. By adopting this approach, REDcert is encouraging the increased use of biogenic feedstock and at the same time creating incentives for the continued use of valuable recovered materials. The aim of these measures is to reduce the use of fossil-based primary raw materials in the chemical industry, which is traditionally high.

The present REDcert<sup>2</sup> document “Scheme principles for the certification of sustainable material flows in the chemical industry” is designed as a supplementary set of rules and directly references the principles set forth in the REDcert-EU scheme in many aspects. As a result, companies operating in the chemical industry and downstream businesses can obtain REDcert<sup>2</sup> certification. Certification is possible both for products containing biogenic feedstock and for products containing recycled materials as defined in ISO 14021:2016.



The REDcert<sup>2</sup> scheme for the certification of sustainable material flows in the chemical industry allows product-specific conclusions to be drawn about the amount of fossil-based raw material and/or intermediates saved (substituted) during production. However, if a mass balance approach is chosen rather than a dedicated procedure, then no conclusions can be reached about the percentages of biomass or recovered and recycled materials physically contained in the specific products.

REDcert<sup>2</sup> is a certification scheme for the production of *biomass* for the food and animal feed industries as well as the use of biomass as feedstock. The scope of the scheme can be expanded to include processing (conversion) and supply/trade. For the chemical industry, it is a scheme used to show that fossil-based raw materials have been replaced by certified sustainable materials using the mass balance approach. For information on the requirements for sustainably produced biomass in the REDcert<sup>2</sup> scheme for the chemical industry, see sections 5.1 and 5.2 and [Annex 2c](#).

The *recovered materials* used do not have to be certified in terms of their origin or life cycle. Proof that the recovered materials used are derived from waste must be provided by the first interface, meaning the first user in the certification chain.



To this end, a self-declaration is provided by the disposal or waste processing company, which indicates its general consent to allow inspections to verify that information.

REDcert can accept other certification schemes as “equivalent”, similar to the provisions for biogenic feedstock, in so far as sourcing recovered or recycled materials from companies that are not part of the chain certified in the REDcert<sup>2</sup> scheme requires this (see sections 5.10 and 5.11).

For the sake of clarity, the table below shows how the essential elements of the REDcert-EU scheme document “Scope and basic scheme requirements” (based on Directive (EU) 2018/2001) correlate to the REDcert<sup>2</sup> scheme requirements for the certification of sustainable material flows in the chemical industry.

<b>REDcert-EU</b>	<b>REDcert<sup>2</sup></b>
<b>Scope and basic scheme requirements, section...</b>	<b>Scheme principles for the use of biomass-balanced products in the chemical industry, Version 1.2</b>
1 Introduction	✓ Reference
2 REDcert’s self-defined role	✓ Reference
3 Conditions and scope of validity	✓ Reference; see supplementary requirements below
4 REDcert’s organisational structure	✓ Reference
5 The REDcert certification scheme	✓ Reference; special requirements for the GHG emissions saving and the calculation methods
5.1 Sustainability requirements for cultivating and producing biomass	✓ Reference
☒ not applicable	5.2 Requirements for biomass-balanced feedstock
5.2 Special requirements for the collection and use of waste and residues	5.3 Requirements for the collection and use of waste, residues and recovered materials
5.3 Requirements for GHG emissions saving and the calculation methods	5.4 ✓ Optionally applicable; methodology according to reference
5.4 Requirements for traceability and mass balancing for the continuous proof of origin of biomass	5.5 Requirements for traceability and mass balancing to provide continuous proof of origin for biomass and recovered materials

5.5 Documentation requirements	5.6 ✓ Reference; in addition to the following requirements
☒ not applicable	5.7 Requirements for certified products and for communication and use of advertising claims
5.6 Scheme function	5.8 ✓ Reference; in addition to the following requirements
5.7 Registration and certification	5.9 ✓ Reference; in addition to the following requirements
5.8 Other certification schemes	5.10 ✓ Reference; in addition to the following requirements
☒ not applicable	5.11 Other feedstock
☒ not applicable	5.12 Use of renewable energy sources
☒ not applicable	5.13 Special requirements for recycling processes
<hr/>	
6 Measures for transparency and prevention of misuse and fraud	✓ Reference
6.1 Transparency in scheme representation	✓ Reference
6.2 Transparency in scheme membership	✓ Reference
6.3 Transparency in scheme administration	✓ Reference
6.4 Transparency in scheme certification	✓ Reference
6.5 Assuring scheme integrity and preventing misuse and fraud	✓ Reference
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7 Costs for participating companies	✓ Reference
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## 2 REDcert's self-defined role

See the REDcert-EU document "Scope and basic scheme requirements".

## 3 Conditions and scope of validity

The requirements criteria outlined in this document apply to *suppliers* and *conversion plants* – including upstream and downstream companies – in the chemical industry that replace fossil-based raw material with certified sustainable materials and produce chemical products from them (figure 2). If companies in the value chain want to advertise using their REDcert<sup>2</sup> certification or to label products as certified, this must be backed by the relevant certification for all conversion activities and B2B as well as B2C distribution activities. In particular cases of B2C distribution activities, licensing is an option. For specific information on licensing, see the document "Logos and claims".

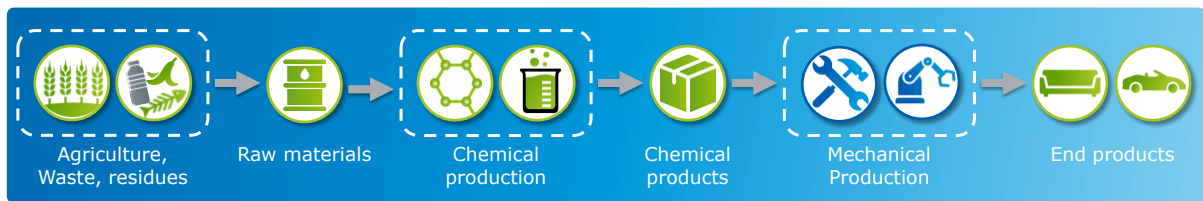


Figure 2: Diagram depicting the entire value chain of the REDcert<sup>2</sup> scheme for the chemical industry.

*Integrated manufacturing sites and plants* typical of the chemical industry can be considered as contained within a single set of spatial boundaries for mass balancing if there is a physical connection (e.g. pipelines) between the *operating sites* at the locations that are included in the scope of REDcert<sup>2</sup> certification. However, this does not always apply to third parties that are also based on the site but not part of the company. They may require independent certification if the parent company is not responsible for implementation in operations (e.g. joint venture).

The present document describes, among other things, the principles of *mass balancing* for several permanently interconnected operating sites (see above definition of site) using dedicated transport routes. It does not cover the options for physical and chemical verification of the presence of certified sustainable materials in the company's products. Please see the REDcert-EU document "Scheme principles for mass balancing" for details on the possibility of physically separating sustainable and non-sustainable biomass or non-biogenic raw materials in the context of a dedicated production process (*identity*

*preservation*, segregation, controlled blending).<sup>1</sup> The present document does not include the REDcert<sup>2</sup> requirements for the production of *biomass*.

All operations and production units associated with the certified company that are involved in the implementation of the standard must be identified, documented and integrated into the certification process.

This applies in particular to:

- the purchase and transport of renewable raw materials
- the purchase and transport of recovered or recycled materials
- the purchase and transport of certified products from upstream companies
- the transport of intermediates
- trade with certified products and
- chemical processing steps (intermediates)

When describing the scope of certification, the following information must be documented at a minimum:

- name of the company/companies
- functions
- role in the implementation of the standard
- responsibilities

If renewable feedstock is used for both mass-balanced and bio-based products, the following must be documented for the production of *dedicated products*:

- locations of production sites for dedicated products
- production volume in the last three years
- quantity of renewable feedstock used in the last three years and planned quantity for the current year
- self-declaration stating whether the product is sold as dedicated

The use of sustainably produced biogenic feedstock and intermediates in the context of dedicated production results in what are called bio-based products, for which the presence of the sustainable material can also be proved by analysis. Using recycled materials in the

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<sup>1</sup> The definitions set out in ISO 22095:2020 apply.

same way results in recycled products which cannot necessarily be distinguished from conventional products by analysis.

Both biogenic raw materials and *recovered material* can be used for the production of mass-balanced products.

All *products to be certified* must be identified by their trade name and the name that appears in the safety data sheet. It must be possible to unambiguously identify the products by their names.

To the extent necessary to enforce the scheme requirements, the scheme participant has entered into contractual agreements with the companies identified in the scope of certification regarding this standard. The contractual agreements include a requirement to implement and comply with the present standard, as well as a statement of consent to grant the commissioned certification body access to all necessary operating sites and to ensure that all necessary documents are provided.

## 4 REDcert's organisational structure

See the REDcert-EU document "Scope and basic scheme requirements".

## 5 The REDcert certification scheme

See the REDcert-EU document "Scope and basic scheme requirements".

### 5.1 Sustainability requirements for cultivating and producing biomass

See the REDcert-EU document "Scope and basic scheme requirements" as well as the REDcert<sup>2</sup> scheme principles for the production of biomass in food and animal feed production.

On the recognition of other schemes, see sections 5.10 and 5.11 and [Annex 2c](#).

### 5.2 Requirements for biomass-balanced input materials

#### **Biomass**

The *biomass* used must be certified as sustainable, and a valid REDcert<sup>2</sup> or REDcert-EU certificate must be available as proof of sustainability. Biomass from other sustainability schemes can be accepted under certain circumstances (see also sections 5.10 and 5.11 and [Annex 2c](#)).

Proof of the origin of the certified sustainable biomass used for the certified products must be furnished in the form of appropriate identification in the documents accompanying the goods or comparable proof accompanying receipt/purchase of the feedstock.

#### **Use of intermediates**

If feedstock that has already been processed (*intermediates*) is used, a distinction must be made between the following categories:

- *bio-based* intermediates from *dedicated production*
- *biomass-balanced* intermediates from *integrated production*
- intermediates from recovered materials (*recycled products*) from dedicated production
- *circular mass-balanced products* from integrated production
- fossil-based intermediates

The sustainable product components can only be transferred to the accounting system to the extent that they have been confirmed/declared by the manufacturer in the context of certification.

### Sourcing sustainable intermediates

If sustainable intermediates from *dedicated production* or *integrated production* are to be counted towards the mass balance, proof of the sustainability properties must be provided as part of certification recognised by REDcert (see section 5.10). Only physically existing stocks with a valid certificate can be carried over in the transition to the next accounting period.

### Use of fossil-based intermediates

The *mass balance approach* enables sustainable properties to be attributed to materials of fossil origin for the production of *certified products* if, at the same time, the corresponding quantity of certified sustainable *mass balance units* (MBU) for the production of those intermediates is removed from the accounting system (figure 3). This is intended to ensure flexible handling of intermediates and minimise transport distances. The basis for this is the documentation of the quantities of fossil-based raw material required for the production of the intermediate. If no data of *bill of material* quality is available, a conservative estimate based on values from relevant literature must be used.

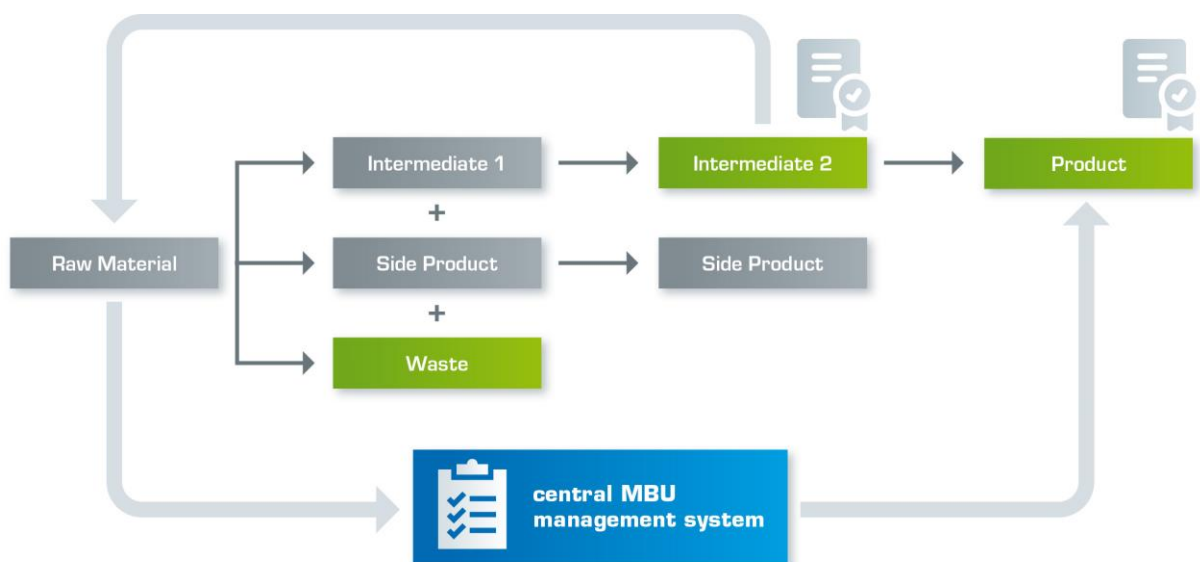


Figure 3: When using sustainable intermediates, MBUs can be booked into a central accounting system in the amount of the feedstock (e.g. bionaphtha or biomethanol) required for the production of those intermediates. Those MBUs can then be attributed to different products, taking into account all conversion factors.

## Aggregates

Non-certified aggregates with a total organic content of less than 1% of the end product by mass can be disregarded. Non-certified aggregates with an organic content greater than or equal to 1% by mass of the end product and less than or equal to 5% by total mass must be compensated for using a higher percentage of MBUs. Either the actual value or, for the sake of simplicity, the product-specific average with an additional surcharge of 10% can be used to calculate the quantity of additional MBUs to be removed from the accounting system.

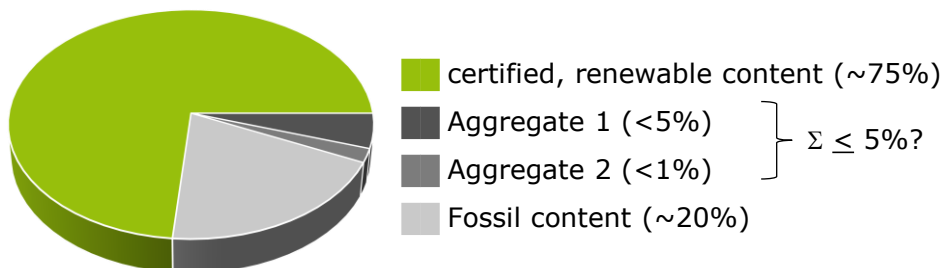


Figure 4 (example): The content of aggregate 1 is between 1% and 5% of the total mass. This therefore needs to be reflected in the calculation of the MBUs by an actual value or 1.1 times the product-specific average. The content of aggregate 2 is less than 1%, which means that it can be disregarded if the total of the aggregates is less than 5% of the total mass.

## 5.3 Requirements for the collection and use of waste, residues and recovered materials

For a company which runs a recycling facility to be certified, appropriate operating licences must be available for all the feedstock used in the facility as well as for intermediates and end products. The system technology used in one of the conversion plants in the value chain must ensure that the recovered material is suitable to replace conventional materials in downstream conversion plants with regard to its chemical, physical and, if applicable, biological properties.

All recyclable *waste and residue flows* can generally be used for *chemical* or *mechanical* recycling. For biogenic waste and residues (e.g. food waste and agricultural residues), the requirements of the REDcert-EU document "Scope and basic scheme requirements" apply; the products and intermediates gained from that feedstock are considered biogenic within the framework of the REDcert<sup>2</sup> standard.

In addition to the use of biogenic waste and residues, the REDcert<sup>2</sup> scheme for the certification of sustainable material flows in the chemical industry also allows the use of non-biogenic *recovered materials* for recycling. In contrast, the use of non-biogenic waste and residues (e.g. used plastics and rubbers) and/or homogenous, inorganic waste and



residues (e.g. pigments and glasses) results in recycled products. Additional provisions apply here alongside the requirements outlined in the REDcert-EU document "Scope and basic scheme requirements". In light of the Waste Framework Directive (2008/98/EC), the following order of priority applies on the basis of the waste hierarchy:

1. prevention
2. preparation for reuse
3. recycling
4. other use (e.g. for energy purposes)
5. disposal

In this context, the most efficient recycling method overall should always take precedence in point 3, taking into account relevant conversion factors and the value of the material obtained. The REDcert<sup>2</sup> scheme differentiates here between *chemical* and *mechanical* recycling methods (see also section 5.5). Compliance with cascaded use will reduce the amount of waste produced, as well as lowering greenhouse gas emissions and the environmental impact caused by improper disposal in landfills.

In addition to the provision of a waste code under the European Waste Catalogue (2014/955/EU) to identify a waste stream, the definition of terms according to ISO 14021:2016 applies (see *Annex 1* – Definition of terms). If a waste code is not available or if one of the requirements of ISO 14021:2016 does not apply, the company has to use the decision tree published by the European Commission (COM(2007) 59) to prove that the material has no other positive economic value or meaningful further use.<sup>2</sup>

Additional, optional specifications for the mechanical recycling of used plastics in compliance with standard EN:15343 are set out in the document "Specific requirements for recycling processes in the chemical industry".

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<sup>2</sup> Communication of 21 February 2007 from the Commission to the Council and the European Parliament on the Interpretative Communication on waste and by-products (COM(2007) 59)

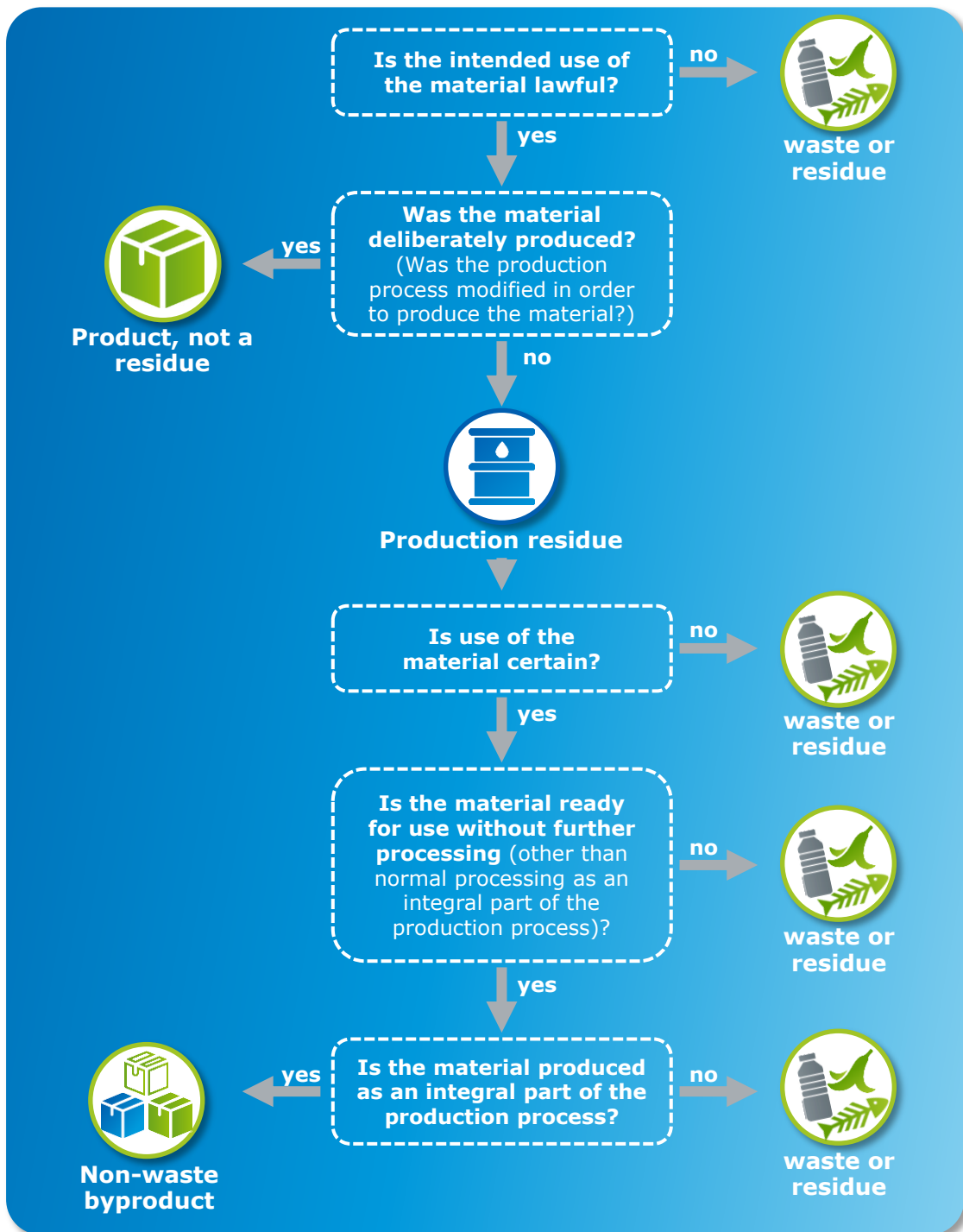


Figure 5: Decision tree for categorising materials as products, by-products or waste/residues (COM(2007) 59)<sup>Fehler! Textmarke nicht definiert.</sup>

## 5.4 Requirements for GHG emissions saving and the calculation methods

Unlike the REDcert-EU scheme, the REDcert<sup>2</sup> scheme does not require GHG emissions to be specified or the GHG emissions savings of particular materials to be fulfilled in accordance with prescribed requirements. However, GHG emissions can optionally be reported under that scheme. Default values must not be used; GHG calculations must always be individual and process-specific. The underlying calculation methodology must either follow the principles described in the REDcert-EU scheme documents “Scope and basic scheme requirements” and “Scheme principles for GHG calculation” or meet the requirements of a valid life cycle assessment, e.g. according to ISO 14040:2006, 14044:2006 or 14067:2018. This means that GHG calculations already verified by an independent body in accordance with one of the above-named standards can also be taken into account in the context of REDcert<sup>2</sup> certification.

For information on separate certification of the use of electricity from renewable sources, see section 5.12.

## 5.5 Traceability and mass balancing to provide continuous proof of origin for sustainable materials

For *bio-based products*, the requirements of the REDcert-EU document “Scope and basic scheme requirements” apply, as do the principles of the balance system in section 8. The requirements described in the document “Scope and basic scheme requirements” can also be applied analogously to recovered and recycled materials.

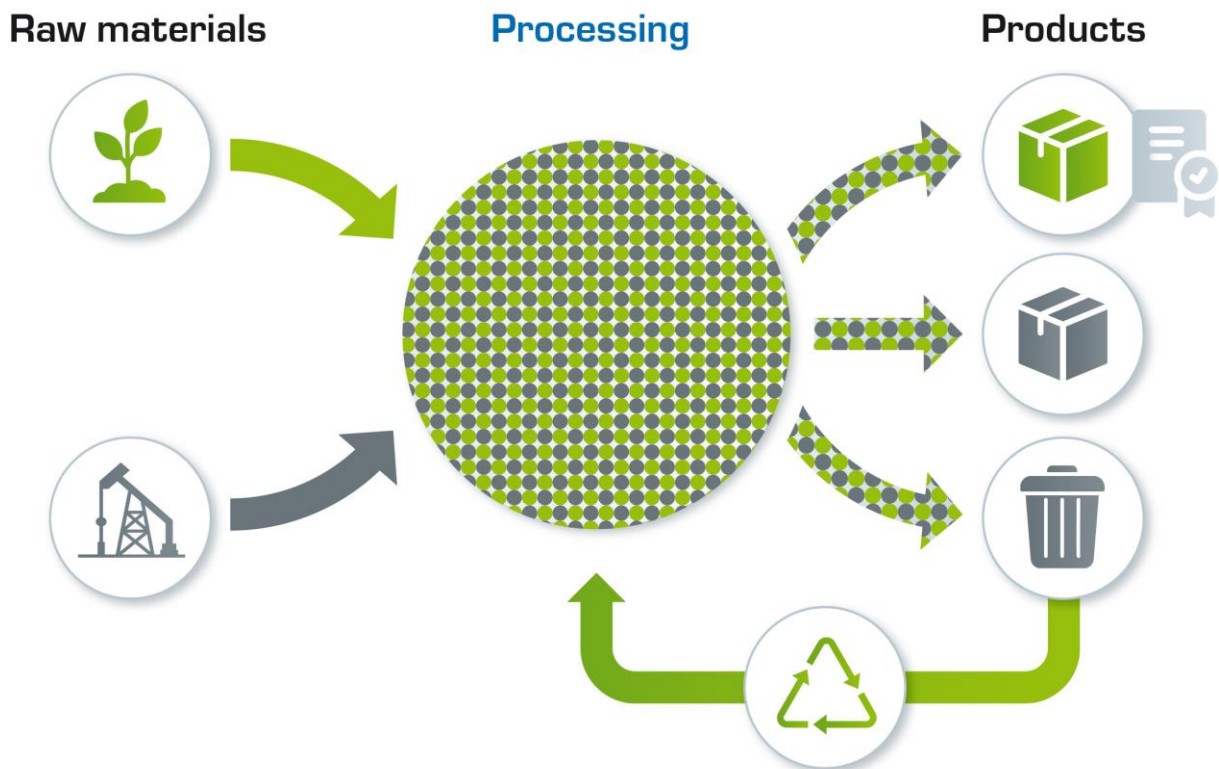


Figure 6: Diagram depicting mass balancing.

Unlike *mechanical recycling*, *chemical recycling* can produce virgin quality recycled material with no loss of material properties. If this is the case, the corresponding intermediates can then be entered in a central accounting system not only as part of conventional mass balancing but also as *mass balance units*.

If the upstream conversion plant carries out chemical recycling by pyrolysis or gasification, the conversion products (e.g. pyrolysis oil or synthesis gas) resulting from those processes are not to be considered intermediates in the chemical recycling value chain but are to be seen as feedstock that can be converted into MBUs according to its lower heating value (LHV) (figure 6).

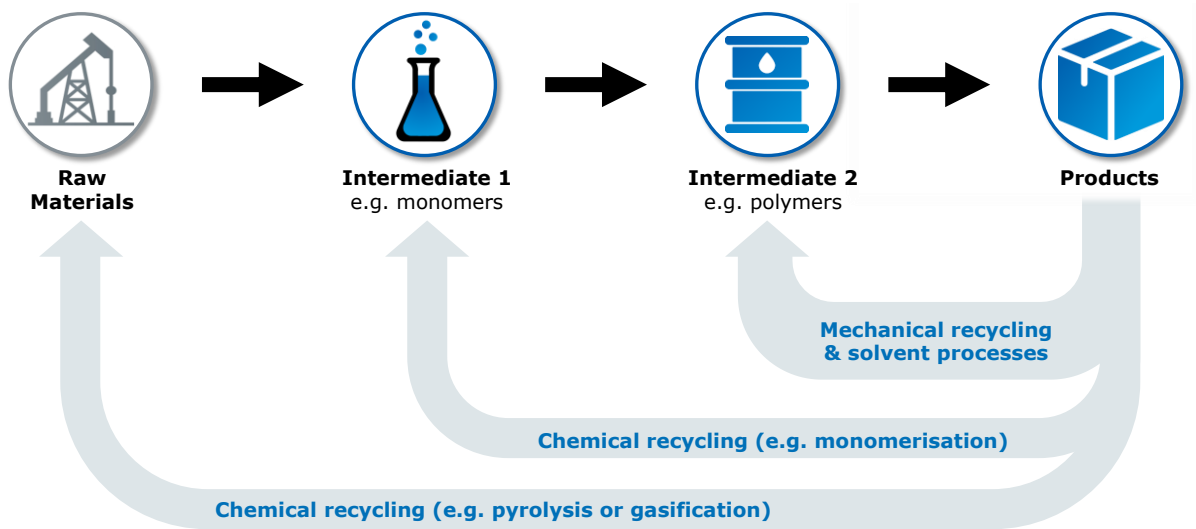


Figure 7: Diagram outlining the classification of recovered materials. While mechanical recycling always results in recovered intermediates, pyrolysis oil and synthesis gases, for example, directly replace fossil-based raw material and can be accounted for accordingly in the MBU system.

In this case, the upstream conversion unit is required to furnish proof of the waste properties or waste origin of the *recovered materials*. If the materials originate from internal company processes, proof must be provided using the approach described in section 5.3. The waste properties or waste origin of externally sourced recovered materials are guaranteed by the submission of a self-declaration (see introduction: self-declaration provided by the disposal or waste processing company).

The traceability of quantities of waste and non-waste conversion products must be ensured by a mass balance system to be structured on the basis of the requirements outlined in the REDcert-EU document "Scheme principles for mass balancing". Other companies along the production and supply chain of chemically recycled materials must follow the principles of the balance system in section 8.

In the case of purely mechanical processing of materials, the mass balance system must be applied along the entire production and supply chain in accordance with the requirements outlined in the REDcert-EU document "Scheme principles for mass balancing". In that case, the information and traceability scheme applies from the moment when a waste fraction, collected separately or from a sorting facility, is used to produce mechanically recycled materials.

Waste producers and collection points/sorting facilities for fossil-based waste materials are not subject to inspection and certification but can also be inspected if this is deemed necessary. Whether or not such an inspection can be carried out is the responsibility of the first contract partner in the chain of custody.

<b>Recycling</b>	<b>Recycled material</b>	<b>Mass balancing</b>
Mechanical	Intermediates	Only process-specific
Chemical <sup>1</sup>	Intermediates	Process-specific or process-spanning
Chemical <sup>2</sup>	Feedstock	Process-specific or process-spanning

<sup>1</sup> For example, extractions or monomerisations (see page 57)

<sup>2</sup> For example, pyrolysis

## 5.6 Transparency in certification

REDcert keeps all valid participant certificates in a scheme-specific and publicly accessible database. The scheme participants may also voluntarily decide to include a list of their respective certified products in the certificate annex. In a protected area of the REDcert database, certificate holders can create product certificates with appropriately certified advertising claims at any time. When this kind of product certificate is created, a copy is automatically sent to the responsible certification body and to REDcert, which can conduct risk-based checks on the accuracy of the statements made therein at any time. Certification bodies must keep a list of the products they certify. This list must show the sales name of each product as well as the name of the corresponding certificate holder.

It is possible to add new products intended for sale to the product list in the course of the year, within the same certificate period, after passing the desk audit. The product list must show the sales name of the product. The requirements for bills of material outlined in section 5.7 "Requirements for certified products or for communication and use of advertising claims" apply in respect of all products.

In addition, the quantity of feedstock or MBUs used for production must be reported annually to REDcert via the REDcert database.

## 5.7 Requirements for certified products and for communication and use of advertising claims

### Minimum percentage of renewable raw materials or recovered or recycled materials

For certification of a *biomass-balanced product* under the REDcert<sup>2</sup> scheme for sustainable material flows in the chemical industry, at least 20% of the fossil-based raw material required for its production must have been verifiably replaced by an equivalent amount of certified sustainable *biomass* in the production or purchasing process in the integrated manufacturing sites and plants or within the scope of the extended mass balance. Similarly,

in order for a *recycled product* made from *recovered* or *recycled* materials to be certified in accordance with the present document, at least 20% of the fossil-based raw material required for its production must be replaced by an equivalent quantity of certified sustainable recycled feedstock in the integrated manufacturing sites and plants.

Furthermore, materials of both categories may be combined in one product. In the case of these "hybrid products", the respective percentages of biomass-balanced and recycled-mass-balanced feedstock can be added up to determine the product's sustainability characteristics; a minimum content of 20% also applies.

### **Bills of material**

Bills of material are available for the certified products and define the quantity of fossil-based (or mineral) inputs required for the production of the product in question. Bills of material are determined specific to the process on the basis of the conversion factors. Actual formulations from the past three years can also be used instead of bills of material.

The prerequisite for the use of bills of material is that they are determined under an existing scheme that is documented in quality management processes. At least once a year, bills of material must be reviewed for accuracy and changed if necessary. The annual review must be documented and any changes archived for a period of at least five years.

Bills of material may be used if the non-conformity arising from the annual review is documented over a period of five years. During the initial certification, documentation pertaining to three years can be accepted. If the maximum deviation from the bill of material was more than 5% in that period, the maximum deviation is the determining factor in conservatively estimating the need for feedstock or intermediates certified as sustainable.

In the case of newer products for which no long-term empirical data are available, a conservative bill of material must be defined in consultation with the auditors and reviewed annually. If events occur during the year that have a major effect on the bill of material, it must be adjusted in the course of that year.

### **General communication and advertising claims**

After successful certification, every scheme participant may generally use the "REDcert<sup>2</sup>" logo for communication purposes. Changes to the appearance of the "REDcert<sup>2</sup>" trademark, in particular by combining it with other signs or seals, require the express consent of REDcert. Advertising claims may be used to market the products certified under that standard if they make it clear at what point the sustainable feedstock was introduced

into the process. The requirements for the use of the REDcert<sup>2</sup> logo as well as certain product statements are explained in the "Guidelines governing the use of the REDcert<sup>2</sup> logo and the representation of claims for bio-based and biomass-balanced products".

## 5.8 Scheme functionality

The figure below provides an overview of the structure and function of the REDcert<sup>2</sup> scheme for the certification of sustainable material flows in the chemical industry.

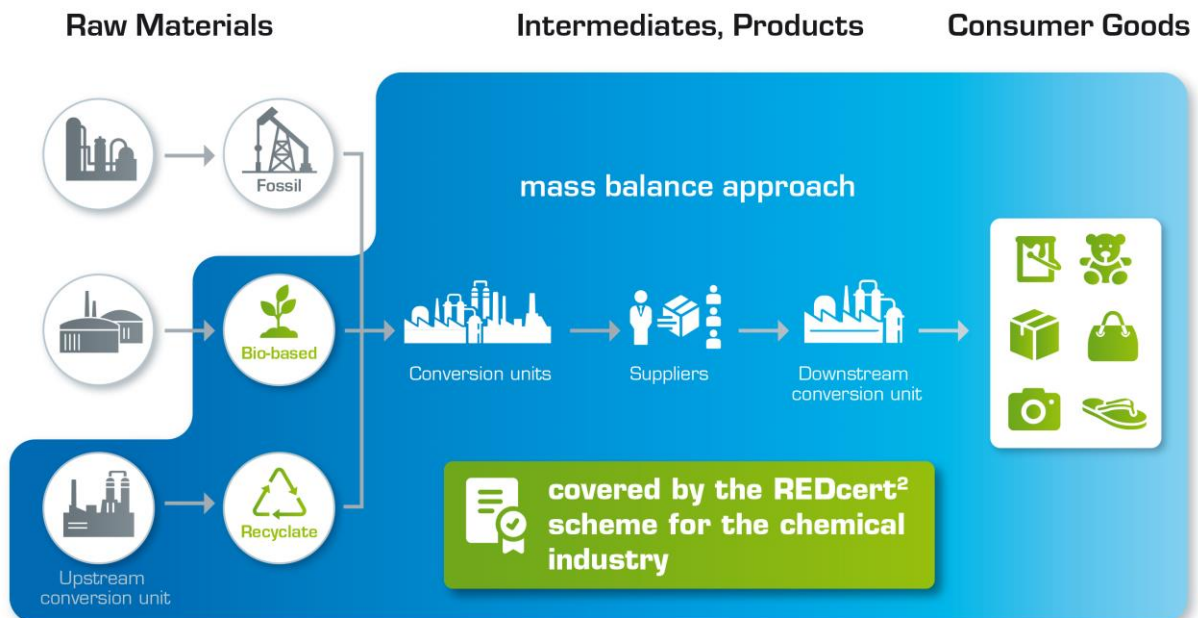


Figure 8: Diagram depicting the value chain of the REDcert<sup>2</sup> scheme for the chemical industry.

### Employee qualifications

To ensure compliance with the scheme principles along the entire value chain, companies must ensure that their employees are sufficiently qualified. This means that all individuals responsible for compliance with the requirements described in the present document must be familiar with them and receive regular training (e.g. annually).

The production and supply chain for feedstock and further-processed products used in the chemical industry includes the following players.



## Interfaces

Interfaces are economic operators along the production and supply chain that require certification under the REDcert<sup>2</sup> scheme. Distinctions are made between the following interfaces:

- Upstream conversion units conduct mechanical and/or chemical recycling processes or convert biomass into direct derivatives.
- Conversion units process inputs gained from biomass or recycling processes into intermediates in the chemical industry value chain.
- Downstream conversion units process intermediates into final products which can be used directly within the industry or by consumers.
- Suppliers and traders handle certified sustainable materials.

## Suppliers

Many economic operators along the production/supply chain up to the end user are involved in the trade or storage of feedstock or processed certified products or act as brokers. These economic operators are considered "suppliers" under REDcert<sup>2</sup>. Suppliers can handle sustainable feedstock and/or processed certified products (storage, mixing) without having to convert them. This definition also includes intermediate suppliers/steps that do not "physically" handle the biomass and/or processed certified products.

Suppliers are issued with certificates as proof that they satisfy the scheme requirements.

## Conversion plant/integrated manufacturing sites and plants

The conversion of feedstock or further processing of certified products takes place in chemical factories, paint and varnish plants, rubber and plastics factories, etc. Each of those companies must set up a mass balance and accounting system which records all quantities of sustainable and non-sustainable feedstock. The documentation includes all consignments of sustainable and non-sustainable biomass prior to conversion as well as all *certified products* removed from the system.

All companies or company groupings among the conversion plants mentioned above as examples are subject to certification in accordance with the provisions of the present document and receive certificates as proof of compliance with the scheme requirements.

## 5.9 Registration and certification

See the REDcert-EU document "Scope and basic scheme requirements".

Economic operators must document the scope of certification in writing and submit it to the certification body as an annex to the application for certification. To change the scope of certification, a new application must be submitted to the certification body.

## 5.10 Recognition of other certification schemes

The requirements of the REDcert-EU document "Scope and basic scheme requirements" apply. A list of recognised schemes can also be found in [Annex 2c](#) to the present document.

## 5.11 Other feedstocks

If a scheme participant uses sustainable feedstock that has not been certified by REDcert or by another certification scheme recognised as per section 5.10 when joining the scheme, REDcert will grant a transitional period for it to meet the requirements. In that case, recognition is possible if the following conditions are met.

From the time of certification, it must be ensured that, for each batch of a product, at least 25% by weight of the sustainable feedstock are REDcert<sup>2</sup> certified or have certification recognised as equivalent (see [Annex 2c](#)). That percentage increases to 50% after the first year, to 75% after the second year and to 100% of the sustainable feedstock after the third year.

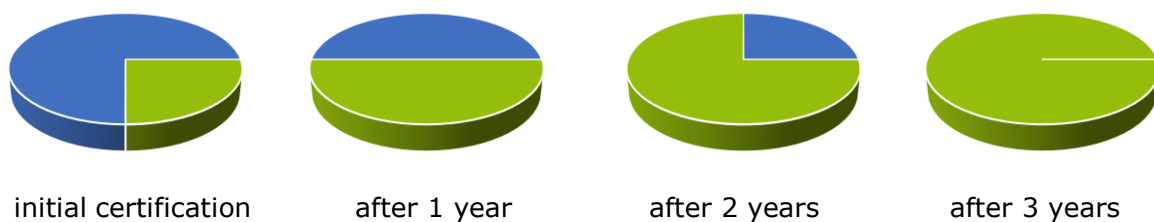


Figure 9: Minimum percentage of REDcert-certified sustainable feedstock or equivalent sustainable feedstock recognised as equivalent by REDcert (green) compared with the sustainable feedstock from other sources used when entering the system (blue)

## 5.12 Use of renewable electricity

This section outlines optional criteria for the use of sustainably generated electricity ("green electricity") under the REDcert<sup>2</sup> scheme. It contains a sample calculation and attribution principle, criteria for the generation and use of renewable electricity, documentation requirements and possible advertising claims.

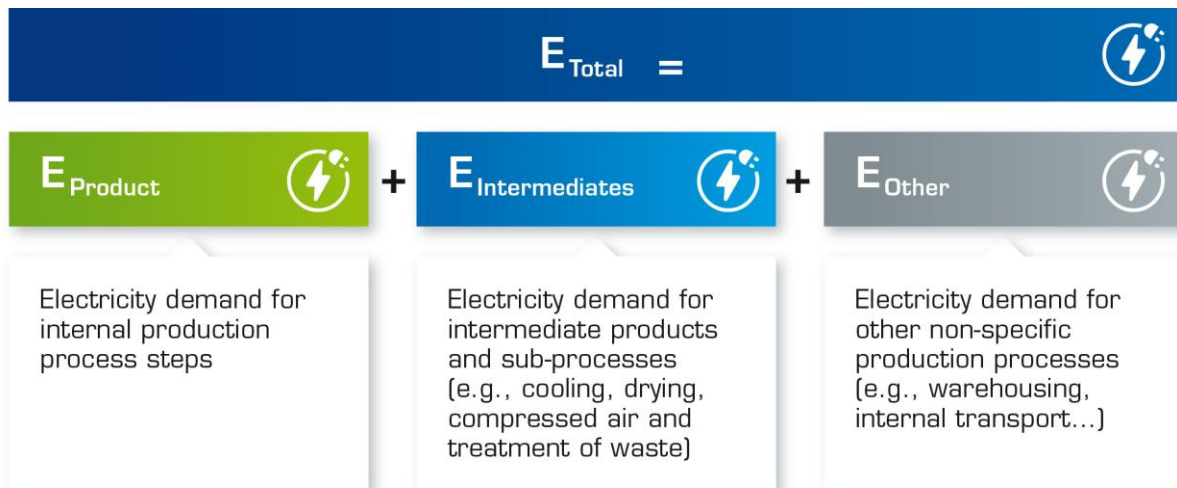
### Calculation of the amount of electricity used and attribution principle

The use of renewable electricity follows the mass balance model based on ISO 22095:2020 that is described in the REDcert<sup>2</sup> and REDcert-EU scheme document "Scheme principles for mass balancing". The calculation can be based either on a production site considered in isolation ("gate to gate") or on the value chain considered as a whole up to the point in question ("cradle to gate").

The total amount of renewable electricity ( $E_{\text{total}}$ ) attributed to the certified product includes

- the total electricity required for all processes listed in the *bills of material* of the product ( $E_{\text{product}}$ )
- all electricity used within the factory for the production of intermediates or feedstock that can be attributed to the product (e.g. cooling, drying, compressed air generation or waste treatment) ( $E_{\text{intermediates}}$ )
- all additional production-related electricity flows that are not included in bills of material (e.g. operation of warehouses or internal transport) ( $E_{\text{other}}$ ). All *essential* factors of  $E_{\text{other}}$  must be taken into account in the process. If the actual value is difficult to determine,  $E_{\text{other}} = 0.05 \times [E_{\text{product}} + E_{\text{intermediates}}]$  can be assumed.
- In the event of multi-location certification ("cradle to gate"), processes connected to the dissemination of the products must also be taken into account. This affects, in particular, loading and transport but also electricity consumption e.g. for refrigeration and storage.

This means that all intermediates necessary to produce the end product as well as all processes that require electricity must be listed and included in the electricity requirements of the product. For this calculation, the indirect electricity requirements that are difficult to attribute (shared consumption by e.g. office buildings, laboratories) can be excluded.



The renewable electricity used for the above processes can either be produced on site or sourced from electricity suppliers. Renewable energy certificates obtained (e.g. guarantees of origin (GO)) can be freely attributed to the electricity consumption of each product under consideration requiring certification, although double counting of renewable electricity must be ruled out. The total amount of certified renewable electricity purchased by the company in the corresponding defined balance period must not be exceeded (see figure 9).

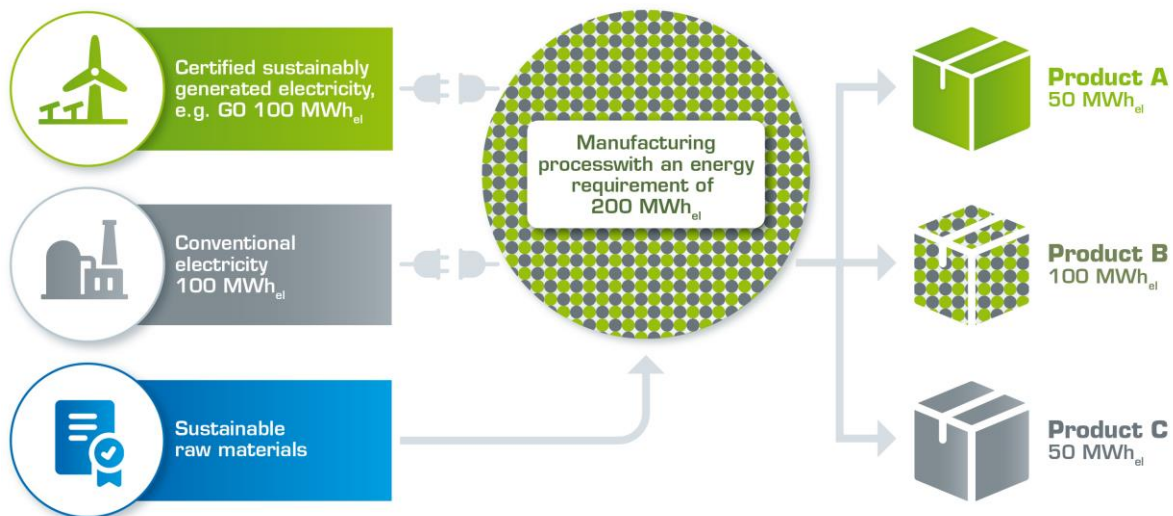


Figure 10: Example of how the mass balance approach is applied for the attribution of renewable energy.

In the above example, certified product A with an attributed share of 100% green electricity receives an additional advertising claim for the use of green electricity. Product B, on the other hand, only uses 50% sustainably generated electricity and is not granted an additional advertising claim. Finally, product C is produced entirely using conventional electricity. That certification option is only available for products which already fulfil the general sustainability requirements, i.e. were produced using materials

certified as sustainable. There is no provision for certifying conventional products purely on the basis of their use of renewable electricity.

### Electrolysis using renewable electricity

One exception to the above rule are products whose chemical value and thus sustainability characteristics only emerge through the use of renewable electricity, e.g. in the case of direct electrolysis of water into oxygen and green hydrogen or the chlor-alkali process, which produces chlorine gas and sodium hydroxide.

As these processes result in two or more products with significantly different chemical properties, theatres of application and economic value, and the ratios between them are fixed by the stoichiometry of the reactions, the attribution rules set out in section 8 are suspended in such cases. In those scenarios, sustainability characteristics cannot be transferred between the different co-products. Instead, the sustainability characteristics of the input materials and of the renewable electricity used are applied to each product on a proportional basis.

### Criteria for taking renewable electricity into account

This section describes the four central criteria of green electricity certificates that are taken into account under REDcert<sup>2</sup>: renewability, regionality, time correlation and additionality.

#### 1. Acceptable sources of renewable electricity (renewability)

The electricity used for the processes associated with a given product must be fully certified with renewable energy attribute certificates (EACs) such as GOs, Renewable Energy Certificates (RECs) or International Renewable Energy Certificates (I-RECs). Within the EU, renewable electricity is defined in Article 2 of Renewable Energy Directive 2018/2001 (RED II). It includes wind, solar (solar thermal and solar photovoltaic), geothermal and ambient energy, tidal, wave and other ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogas. The use of independent certification schemes (ICS) that offer equivalent certification following the EAC guidelines can be recognised by REDcert on a case-by-case basis.

To avoid double counting of renewable electricity, EACs from power plants that are subsidised through local feed-in tariffs are not taken into account.

## 2. Regionality

To avoid shortages in the electricity distribution grids, it is important to source renewable electricity as close as possible to the production site. The prerequisite is a physical connection via an end-to-end electricity grid between renewable electricity generation and the consumer. Accordingly, for example, renewable electricity produced in Iceland cannot be counted towards electricity use in continental Europe. In addition, to meet this criterion, the renewable electricity source must not be located outside a radius of 2,000 km around the production site where it is used.

## 3. Time correlation

Synchronicity between energy generation and use is very important to drive the development of renewable energy and grid expansion and to limit the electricity storage capacities required. As established in Article 19 of RED II, GOs can be applied for a maximum of 12 months after they are issued. Ideally, they should be attributed within the balance period of 3 months defined in section 8.2 of "Scheme principles for mass balancing".

## 4. Additionality

To meet the challenges of climate change, there must be a vigorous effort to build new renewable energy plants. It must therefore be ensured that, in addition to government subsidies, further indirect support is given to promote the construction of new renewable plants. At least 30% of the EACs issued by the certified company – excluding renewable energy generated using its own infrastructure – must include certificates from renewable power plants that are not older than five years.

## Documentation requirements

To meet the optional criteria for the use of renewable electricity, the certified company must comply with the guidelines for the attribution of renewable electricity in respect of the production of a particular product.

The EAC in question (e.g. GO, REC or I-REC) must be registered in a national registry that rules out double counting. Where guarantees of origin or other valid EACs have been issued from the national register, the technical and legal requirements have already been checked by an independent expert in the context of registering the installation and can be recognised accordingly. To avoid double counting, only guarantees of origin that display the label "Without support" in their factory data are permitted.

In countries where there is no EAC registry, appropriate proof must be provided by an independent certifier (e.g. an auditor or independent certification body). Alternatively, the international registry may also be considered (<https://evident.app/>).

Proof of renewable electricity status by EAC must include its expiry date, the company name or certificate, information on the energy source, the date of installation of the system under Germany's Renewable Energy Sources Act (*Erneuerbare-Energien-Gesetz*) and the location of the power plant.

The bill of material of a particular product must indicate the amount of electricity required for its production, followed by the certificate number or renewable energy attribute code. In addition, information on the EAC must be provided during the audit, particularly in relation to the termination date of the EAC (GO, REC or I-REC), accompanied by the basic information requirements of an EAC as defined by RED II or local laws (outside the EU).

### **Additional advertising claims for the use of renewable electricity**

Meeting the REDcert<sup>2</sup> criteria related to renewable electricity entitles the operator to an additional claim in respect of the certified products. For all products that meet the optional criteria for renewable electricity and have been produced entirely with renewable electricity in accordance with the principle illustrated by figure 9, the claim "100% renewable electricity used for production in our facilities" can be included.

Other requirements for the use of the REDcert<sup>2</sup> logo as well as specific product claims are described in "Guidelines governing the use of the REDcert<sup>2</sup> logo and the representation of claims for bio-based and biomass-balanced products".

## **5.13 Specific requirements for recycling processes**

In view of the diverse properties of waste materials, particularly inorganic waste and residues, REDcert reserves the right to issue process-specific rules in individual cases. These are published in the REDcert<sup>2</sup> document "Specific requirements for recycling processes in the chemical industry" on the REDcert website. Unless explicitly excluded or specifically formulated for this additional certification option, the basic definitions and requirements of the REDcert<sup>2</sup> scheme for the chemical industry apply. The rules for recycled organic compounds in section 5 can be applied analogously to inorganic compounds.

### **Optional: Recycling in line with the requirements of EN:15343**

Not all national legislatures can be taken into account in a generalised, globally applicable certification system. Nevertheless, the REDcert<sup>2</sup> system provides the option of demonstrating compliance with the specifications of EN:15343:2008 specific to mechanical recycling processes. Those specifications are among those set out in the document "Specific requirements for recycling processes in the chemical industry". They are optional and apply in addition to the general requirements for materials certified under the REDcert<sup>2</sup> system for the chemical industry.

In summary, over and above the multi-stage recycling process, the strict physical traceability of recycled material to its producer (in the case of industrial waste) or a waste-disposal company (in the case of domestic waste). Where materials produced in this way are subsequently used in a chemical process, however, the recyclates can be included in mass balancing if the materials are clearly attributed to a product.

## **6 Measures for transparency and prevention of misuse and fraud**

See the REDcert-EU document "Scope and basic scheme requirements".

### **6.1 Transparency in scheme representation**

See the REDcert-EU document "Scope and basic scheme requirements".

### **6.2 Transparency in scheme membership**

See the REDcert-EU document "Scope and basic scheme requirements".

### **6.3 Transparency in scheme management**

See the REDcert-EU document "Scope and basic scheme requirements".

### **6.4 Transparency in certification**

See the REDcert-EU document "Scope and basic scheme requirements".



## 6.5 Assuring scheme integrity and preventing misuse and fraud

See the REDcert-EU document "Scope and basic scheme requirements".

## 7 Fee schedule for scheme participants

See the current versions of the REDcert-EU documents "Scope and basic scheme requirements" or "Fee schedule for scheme participants (in the chemical industry)" on REDcert's website ([www.redcert.org](http://www.redcert.org)).

## 8 Principles of the mass balance system

The balance system used by participants in the REDcert<sup>2</sup> scheme for the certification of sustainable material flows in the chemical industry must guarantee that, after the balancing period has ended, the sum of all products and intermediates sold as having sustainability certification which are delivered from within the spatial boundaries are covered, with conversion factors applied, by corresponding amounts of materials (feedstock, intermediates) that are certified as sustainable (Input  $\geq$  Output).

The boundaries selected for the balancing system can be process-specific (*process-specific mass balancing*) or process-non-specific (*process-non-specific mass balancing*). For process-specific mass balancing, the requirements described in the REDcert-EU scheme document "Scheme principles for mass balancing" must be followed. The requirements for process-non-specific mass balancing are described in detail below.

### 8.1 Balancing method

The certified scheme participant uses a reliable procedure for continuous monitoring and ensuring adequate availability of MBUs (sourcing, storage, delivery). The sourced quantities are clearly identified and confirmed by both parties (supplier and producer).

- For a dedicated production process or the use of mechanically recycled materials, a process-specific mass balance calculation is required.

In process-non-specific mass balancing, the conversion of fossil-based and certified sustainable feedstock into MBUs is based on lower heating values standardised for a clearly defined substance (e.g. methane) (see figure 10 on page 42).

- The conversion of intermediates into MBUs is based on the quantities of (fossil-based) feedstock theoretically required for the production of the intermediate in question on the basis of a chemical process established for its production. It is not

necessary for that technology to actually be used within the production facility. If it is not, the quantity of feedstock required can be conservatively estimated on the basis of processes described in the literature and implemented technologically (see figure 3 on page 15).

- The conversion of certified sustainable feedstock not listed in [Annex 2a](#) is carried out with the same conversion factor as the fossil-based equivalent after conversion of intermediates to MBUs (for example, bioethylene is to be regarded as the sustainable equivalent of fossil ethylene; it can be assumed that both have the same conversion factors).
- For certified sustainable organic feedstock for which no fossil-based equivalent exists (e.g. wood), the conversion is carried out on the basis of its lower heating value, which is standardised for a clearly defined substance (e.g. methane).

### Balance period

The balance period, at the end of which the quantities must balance out, can be no longer than 3 months. Where an exception is justified, REDcert can, at the request of a scheme participant, approve an extension of the balance period to no more than 12 months. The relevant certification body must also be informed. That approval applies only to the balance period outlined in the application and has no effect on other balance periods or the basic requirements for mass balancing.

No negative balance is allowed after the end of the balance period. Positive balances up to a maximum of the amount of physically existing stocks may be carried over as long as their [expiry date](#) is not exceeded.

### Balance management

Mass balancing can be sales based or production based. The choice must be coordinated and established prior to the certification process.

In production-based balance management, the determined quantity of materials certified as sustainable is already available at the time the product is manufactured.

In sales-based balance management, the required quantity of materials certified as sustainable is removed from the accounting system at the time of sale. As a result, it is not necessary for the required quantities to already be available in the system during production.

## 8.2 Attribution principles in multiple-output processes

The *mass balance approach* makes it possible not only to attribute the sustainable characteristics of inputs to the products of a process but also to attribute sustainable characteristics among the co-products of a multi-output process. Consequently, sustainability characteristics can accumulate within individual co-products.

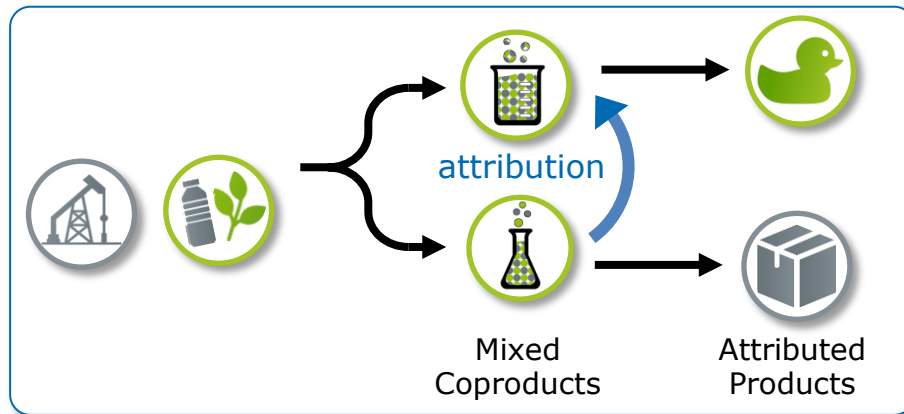


Figure 11: Sustainability characteristics can be attributed to various products of the same multiple-product process.

The attribution of sustainability characteristics among co-products of the same process follows the rules of the free attribution model.

### Free attribution model

#### Free attribution-Modell

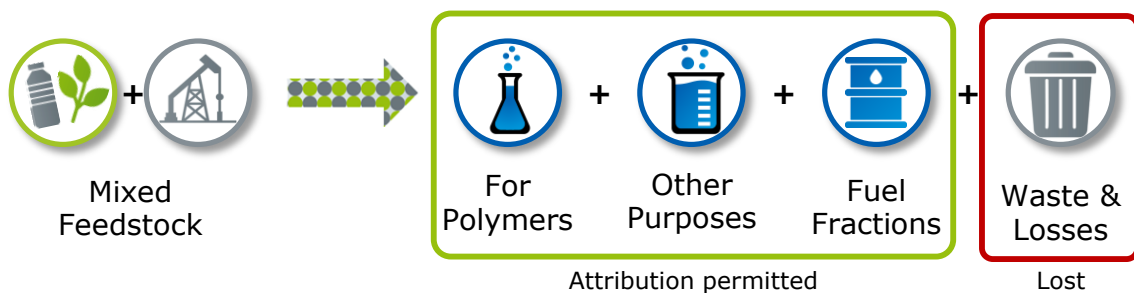


Figure 12: The free attribution model: Mass balancing encompasses all types of co-product; only conversion losses are exempt.

In the free attribution model, the sustainable share of the feedstock or intermediates used can be attributed within the accounting system to the different co-products. The various by-products of a reaction are always considered of equal value in terms of the resources they require. The only exceptions are conversion losses, waste and residues: these always

bind a share of the sustainability characteristics in proportion to the overall conversion rate, which is lost.

### Fuels-excluded model

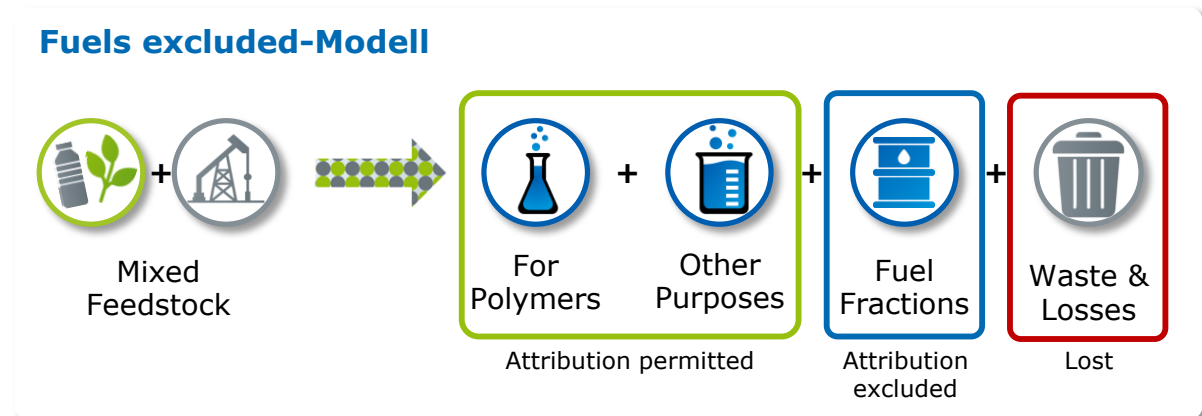


Figure 13: The fuels-excluded model: Products are further divided into the categories "fuels" and "chemicals"; each category accounts for a share of the sustainability characteristics of the starting materials.

To do justice to the diverse characteristics and intended uses of materials, the REDcert<sup>2</sup> scheme allows for certification in line with the fuels-excluded model. In that model, co-products that are used for the production of fuels, are themselves fuels or are otherwise used for energy constitute their own category. They are granted a share of the sustainability characteristics in proportion to their share in the overall total which cannot, however, be transferred to other categories. With reference to the exploitation of co-products suitable for material applications (figure 6, shown in green), co-products used or marketed as fuels are treated as conversion losses under this model. The sustainability characteristics can still be freely attributed among the co-products suitable for material applications.

## 8.3 Ensuring adequate availability of MBUs

The certificate holder has a process in place which ensures that the corresponding certified sustainable feedstock can be sourced in sufficient quantities at the right time in line with the forecast sale of certified products. This process also takes account of possible deviations in the actual values from the bills of material and ensures that actual values exceeding the bills of material does not result in a shortfall in the balance (negative balance) at the end of the balance period.

## 8.4 Accounting system

The *mass balance units* entered and removed must be managed in an accounting system. Companies may operate several separate accounting systems in order to make different product-specific claims. If both biomass-balanced and recycled materials or products are produced in *integrated sites*, multiple accounts must be maintained (in the ERP system) in so far as the claims about the product relate to the origin of the feedstock in question (*biogenic* and/or *recycled*). Each MBU can only be administered in a single accounting system. The accounting system selected for a certification cycle is binding for the product in question.

For the production or sale of *certified products*, the relevant percentage of certified sustainable materials must be removed from the accounting system. The attribution of certified MBUs to intermediates or products is generally only permitted if there is a technical possibility that those intermediates or products might actually contain physically sustainable substances. The only exception to this rule applies if the *extended mass balance* (EMB) described in *Annex 1* is applicable.

### Entries

Entries of *MBUs* in the accounting system are made, as explained in section 8.1, after considering the relevant production pathway, taking into account verified conversion rates. The MBUs entered into the accounting system do not have to be differentiated by type of feedstock and are therefore interchangeable. MBUs can only be entered after the feedstock has been physically transferred to within the spatial boundaries for mass balancing and if it is ensured that the feedstock will be used for material purposes. Certified sustainable materials that are used to generate energy cannot be entered into the accounting system. The last possible measurement is decisive for the quantity entered. If the feedstock is attributed to energy-generation or material use only after its physical transfer to within the spatial boundaries for mass balancing, they can be entered into the accounting system if evidence can be provided that the possibility of double counting has been ruled out.

### Removals

Entries are removed depending on the selected *balance management* system. If the sales-based balance period is used, the quantity is removed when the product is sold. If the production-based balance period is used, the quantity is removed when the product is manufactured. Removals must be documented for each product specifically, and the corresponding quantity of MBUs is deducted from the books with reference to the bill of

material (see section 5.7). Once a year, the entries made on the basis of the *bills of material* must be corrected using actual values. If the actual values are less than the bills of material used, they do not need to be corrected. For corrections, a negligibility limit applies: if the deviation is <0.5% or <200 kg MBUs, it is not necessary to correct the values.

## 8.5 Additionality

For *certified products*, the scheme participant may only use additional certified sustainable substances, which replace conventional fossil-based or mineral resources as of the date of certification.

Moreover, biogenic feedstock certified as sustainable can be used instead of biogenic feedstock not certified as sustainable (such as renewable feedstock from non-sustainable sources).

## 8.6 Double counting not permitted

The accounting system must be suitable for preventing double counting, especially if different accounting systems are in use.

### **Double counting of products sold as bio-based or consisting purely of recovered materials**

Quantities of sustainable materials used for the *dedicated production* of products sold as *bio-based* or consisting purely of *recovered materials* must not be included in the accounting system, i.e. credited twice. It is also possible, for example, to sell the product as bio-based or consisting purely of recovered materials if the certified sustainable materials are included in the list of contents or it is confirmed to the customer upon enquiry that they are contained in the product. If a feedstock material is used both for the manufacture of products sold as bio-based or as consisting purely of recovered materials and for the manufacture of mass-balanced products, an overall balance for that feedstock must be provided. The overall balance must list the quantities of the feedstock used for dedicated and mass-balanced production. A product-specific list of the quantities of the manufactured products must also be available.

### Other double counting

The total quantity of certified sustainable feedstock used (for dedicated and certified products) may only be communicated if this does not create the impression that every product sold contains a corresponding percentage of certified sustainable materials.

## 8.7 Principles of traceability

### Documentation of material flows

The scheme participant is required to fully document the material flows, from the certified sustainable materials used to the certified end product. The scheme used is part of the quality management system.

### Handling waste and exhaust gas flows

Waste and exhaust gas flows arising in the production process must be accounted for in the balance. The loss due to the conversion rate is transferred proportionately to the sustainable properties, i.e. the sequestered quantities of MBUs must be removed from the accounting system using the relevant balancing method. The waste and exhaust gas flows must be measured for that data to be available. Otherwise, the provisions apply based on the principle of *accuracy*.

### Handling by-products

By-products can relinquish their sustainable property if the possibility of double counting can be ruled out. The sustainable property does not have to be tied to specific feedstock or intermediates. This means that their identity as sustainable products is no longer given. The relinquishment of the sustainable property can be credited to the bill of material. When determining the amount to be credited, waste and exhaust gas flows in the further processing chain of the by-product must be accounted for.

### Validity of entered MBUs

Entered MBUs are generally valid for a period of 12 months.

If the quantity of sustainable materials in the balance exceeds the physical quantity of sustainable materials in the company, only the physically existing quantities can be carried forward to the next *balance period*. This means, for example, that *mass balance units* (MBUs) expire if there is no longer adequate inventory in storage. In that event, credit

balances of sustainable materials must not be carried over to the next balance period. This kind of situation can occur, for example, if sustainable bionaphtha is included in the mass balance but during the balance period a large quantity of it is sold for a use other than for the production of *biomass-balanced products* (e.g. for energy generation).

Deviations from this rule can be accepted if it can be shown that adequate storage capacity for the feedstock or its derivatives is available on the site.

### Rules for the process-non-specific trade in certified sustainable material flows

Suppliers of certified sustainable materials generally have to give their customers information on the quantity of material replacing fossil-based resources that was used in the production process of the material supplied. This information can be provided in one of two ways. One option is to indicate the quantity of MBUs contained in the product, with an indication of which standardised material the MBUs are based on (preferably methane). Alternatively, information can likewise be provided on the relative quantity of fossil fuel-saving materials used in the production of the material. In that case, customers are then required to determine the MBUs contained in the material using that information. This is done by calculating the quantity of feedstock required for the production of the material in question. This is a conservative calculation based on the processes described in the literature and implemented in technological processes.

All other documentation requirements are set out in the REDcert-EU document "Scheme principles for mass balancing".

## 8.8 Requirements for downstream companies

For downstream companies that use biomass-balanced products or recovered or recycled materials certified as sustainable, special requirements apply in respect of mass balancing and communication. Alongside certified products, downstream companies can use certified sustainable biomass with certificates from REDcert-EU, REDcert<sup>2</sup>, FSC or PEFC or from another scheme that has a positive assessment from the Sustainable Agriculture Initiative (SAI). In addition, downstream companies can also use directly recovered or recycled materials, provided that they can furnish proof of sustainability certification in accordance with the present document or of their origin in a certification scheme recognised by REDcert as "equivalent" (see Annex 2c).

The downstream company must prove that the use of certified products in production and with the same bill of material requires only marginally more energy and thus reduces the use of fossil-based resources overall.



### 8.8.1 Balancing requirements

Downstream companies carry out either process-specific or process-non-specific balancing. The advertising claim allowed for the product determines which method is selected.

#### Process-specific mass balancing

In process-specific mass balancing, the balance does not cover all the processes relevant to the value chain; the mass balancing is focused on one specific process. This requires the scheme participant to balance the input and output materials relevant to the process in accordance with the requirements described in the REDcert-EU scheme principles for mass balancing.

It is not necessary to convert the quantities of input and output materials to MBUs; input and output materials are compared in terms of weight.

As process-specific mass balancing takes the feedstock out of the equation, unlike process-non-specific mass balancing, it can only inform process-related statements. Statements about the substitution of fossil-based materials in relation to the value chain as a whole therefore cannot be made.

#### Process-non-specific mass balancing on the basis of mass balance units

Process-non-specific mass balancing determines what percentage of fossil-based raw material is replaced by certified sustainable feedstock along the entire value chain. As a result, balancing as outlined in section 8.1 can be carried out across more than one area of operations. In contrast to process-specific mass balancing, the balance here is based on *MBUs*. All input materials are converted to MBUs by converting their intermediates on the basis of the quantities of fossil-based raw material required for the production of the input material in question (figure 10). If no certified value for this is available from the upstream supplier, the required feedstock quantity can be conservatively estimated on the basis of processes described in the literature which have been technologically implemented (see section 5.2). Balancing is based either on the production-based or the sales-based *balance management*.

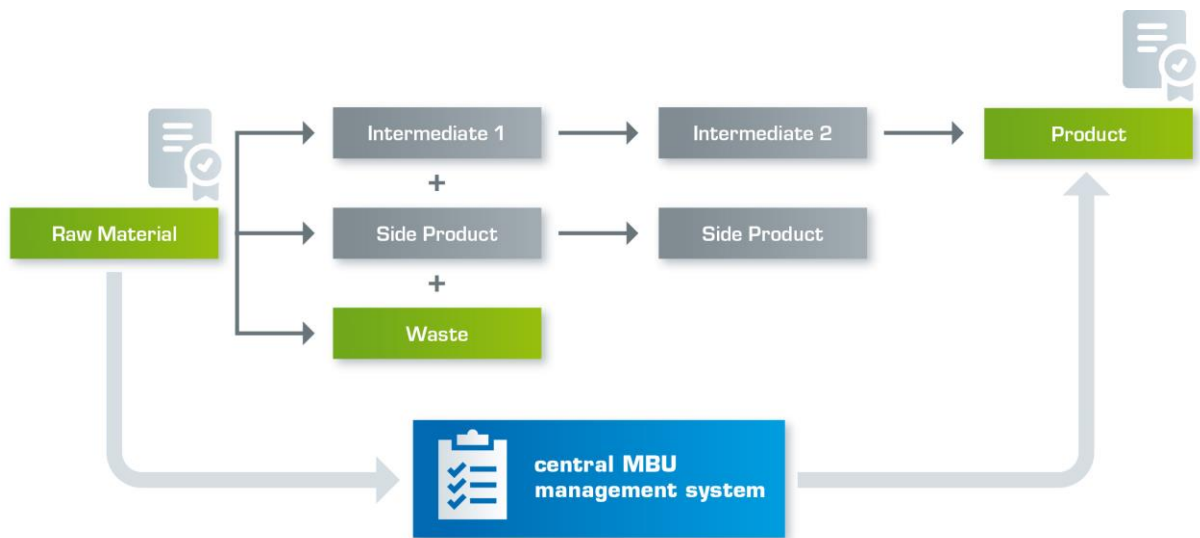


Figure 14: Attribution of sustainable properties by MBUs. MBUs are based on the lower heating value of the feedstock used; for example:  $LHV(\text{naphtha})/LHV(\text{methane}) = 44 \text{ MJ}\cdot\text{kg}^{-1}/50 \text{ MJ}\cdot\text{kg}^{-1} = 0.88$ . One kilogram of naphtha is equivalent to 0.88 MBUs (ISO 22095).

## Communication requirements

The requirements for certified downstream companies when using the REDcert<sup>2</sup> logo as well as certain product statements (both with process-specific and process-non-specific mass balancing) are described in the "Guidelines governing the use of the REDcert<sup>2</sup> logo and the representation of claims for bio-based and biomass-balanced products".

## 9 Requirements for neutral inspections

The requirements outlined in the REDcert-EU document "Scheme principles for neutral inspections" also apply to the scheme principles for the certification of sustainable material flows in the chemical industry. When this document mentions the REDcert scheme, this always includes the REDcert<sup>2</sup> scheme. The same applies to other terms such as checklists, integrity and quality assurance measures, etc. In addition, the following provisions apply.

The documented stipulations for neutral inspections relate both to the implementation of the requirements of Directive (EU) 2018/2001 of "bioliquids/biofuels/biomass fuels" and, where applicable, to the supplementary criteria of the REDcert<sup>2</sup> scheme.

Inspection certificates are not issued in the REDcert<sup>2</sup> scheme. "Certificates" are only issued to verify compliance. Companies in the chemical industry that want to be certified in line with the REDcert<sup>2</sup> scheme requirements must register online on the REDcert website ([www.REDcert.org](http://www.REDcert.org)).

For the sake of clarity, the table below shows how the essential elements of the REDcert-EU scheme document "Scheme principles for neutral inspections" correlate to the REDcert<sup>2</sup>

scheme requirements for the certification of sustainable material flows in the chemical industry.

<b>REDcert-EU</b>	<b>REDcert<sup>2</sup></b>
<b>“Scheme principles for neutral inspections”, Version 05; section...</b>	“Scheme principles for the certification of sustainable material flows in the chemical industry”, Version 1.2
☒	9 Requirements for neutral inspections
1 Inspection system	✓ 9.1 Reference
1.1 Types of inspections	✓ 9.2 Reference; see also the following provisions in this section
1.2 Process and duration of inspections	✓ 9.3
1.3 Inspection intervals	✓ 9.4 Reference
1.4 Evaluation of the inspection results	✓ 9.5 Reference
1.5 Reporting	✓ 9.6 Reference
1.6 Issuing and revoking certificates	✓ 9.7 Reference; see also the following provisions in this section
1.7 Scope of the inspections	✓ 9.8 Reference; see also the following provisions in this document
1.8 Risk management	✓ 9.9 Reference; see also the following provisions in this document
2 Definition of the scope of sample inspections for upstream operations	✓ 10 Reference; with restriction to non-recovered materials
2.1 Group inspections and certification of farms	☒ (not applicable)
2.2 Inspections and certification of waste producers	☒ (not applicable)
2.3 Inspections and certification of storage sites	☒ (not applicable)
3 Requirements and responsibilities of certification bodies	✓ 11 Reference

3.1 Requirements for certification bodies	✓ 11.1 Reference; see also the following provisions in this document
3.2 Revoking approval	✓ 11.2 Reference
3.3 Responsibilities of certification bodies	✓ 11.3 Reference; see also the following provisions in this document;

**NB: Inspection certificates are not issued in the REDcert<sup>2</sup> scheme!**

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4 Requirements of REDcert inspectors	✓ 12 Reference
4.1 Training and qualification	✓ 12.1 Reference
4.2 Knowledge and professional and practical experience required of inspectors	✓ 12.2 Reference; for derogations, see the following provisions in this document
4.2.1 Further education and training	✓ 12.2.1 Reference; for derogations, see the following provisions in this document

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5 Registration process	✓ 13 Reference
5.1.1 Registering as a scheme partner	✓ 13.1 Reference
5.1.2 Registering a certification body	✓ 13.2 Reference
5.1.3 Registering an inspector	✓ 13.3 Reference

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6 REDcert integrity and quality assurance measures	✓ 14 Reference
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## 9.1 Audit system

See the REDcert-EU document "Scheme principles for neutral inspections".

## 9.2 Types of audits

### 9.2.1 Scheme audits

Initial certification audits and the subsequent recertification audits review the *mass balance* and all relevant information such as *bills of material*, material flows, processes, tools, feedstock and *products* sold.

If new sustainable products are to be included in the scope of the certificate during the course of the year, the certificate holder must notify the certification body in advance. The

need to verify the sustainability characteristics of these products depends on the (calculated) quantity of them sold. Where justified, products which are sold in quantities of <1 t can be classed by the certification body as trial quantities and are not subject to audits during the year. Products that are (expected to be) sold in quantities >1 t are generally subject to audits. In this case, the audit can be carried out as a document check (desk audit) if the audit criteria in the abridged desk audit checklist can be assessed with the same degree of reliability as an on-site audit. This requires certification bodies to assess the risk level/potential and decide which type of proof needs to be provided.

In each of the possible audit frameworks, detailed documented information, for example, must be checked by means of ERP systems, databases, etc. in respect of traceability, mass balancing and product declaration. The proof used as a basis for an abridged desk audit must be accessible, transparent, traceable, tamper-proof, credible and trustworthy. If the desk audit shows that the REDcert<sup>2</sup> requirements are not satisfied or not sufficiently satisfied, the certification body must take further appropriate steps to check compliance (e.g. an on-site audit).

Subcontractors (except *suppliers*) of a certified company that do not make a chemical, physical or biological change to the product, e.g. packagers or warehouses, do not necessarily have to be inspected on site. The certification body responsible is in charge of assessing which companies need to be audited and in which form (on-site or desk audit). The number of sample audits should be determined on the basis of a meaningful grouping of all subcontractors (e.g. by activity, trade volume, other relevant parameters). The members of those groupings are subject to sample auditing using a risk-based approach.

The risk assessment should include the following risk criteria:

- quantity of the processed product
- product type
- registered office of the company in question
- company size
- operational management (certificate holder vs independent management)

### 9.2.2 Special audits

See the REDcert-EU document "Scheme principles for neutral inspections".

### 9.3 Process and duration of audits

Audits must be carried out in accordance with the requirements of ISO 19011.

The duration of the audit is determined by the relevant certification body and contractually agreed with the relevant business prior to beginning the audit.

REDcert, however, has the right to define a minimum duration for the various steps in the future (particularly on the basis of the audit results) in the interest of quality assurance.

### 9.4 Audit intervals

See the REDcert-EU document "Scheme principles for neutral inspections".

### 9.5 Evaluation of the audit results

See the REDcert-EU document "Scheme principles for neutral inspections".

### 9.6 Reporting

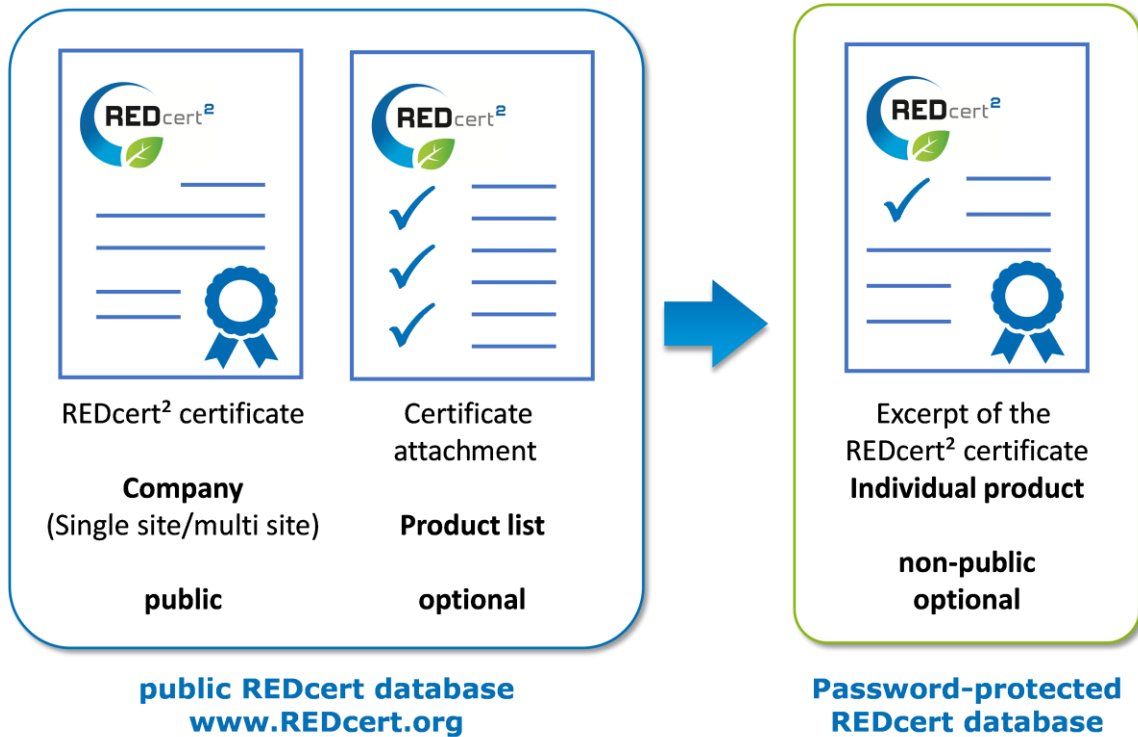
See the REDcert-EU document "Scheme principles for neutral inspections".

### 9.7 Issuing and revoking certificates

See both REDcert-EU document "Scheme principles of neutral inspection" and the subsequent additions.

Only "certificates" in the form of "single or multi-site certificates" and "product certificates" are issued as proof of conformity. The "single or multi-site certificates" are listed in the scheme's proprietary and publicly accessible database. If required, all *certified products* covered by a certificate can be listed in the certificate's annex. The product certificates for the certified products covered by a certificate can be created by the certificate holders themselves in a protected area of the REDcert certificate database (see section 5.6 "Documentation requirements").

The figure below shows the different REDcert<sup>2</sup> certificates for the certification of sustainable material flows in the chemical industry.



The templates and forms provided by REDcert must be used to issue certificates. The format and/or language of them may be changed, but not the content. REDcert must be informed if the templates or forms are changed. The translated version of a certificate must indicate that it is a translation which is not legally valid.

## 9.8 Scope of the audits

See both REDcert-EU document "Scheme principles of neutral inspection" and the subsequent additions.

### 9.8.1 Group certification of operating sites

Compliance with the following conditions enables scheme participants to have their own *operating sites* inspected in the form of what is known as group certification. The individual operating sites must have comparable production processes with uniform *products*, which can be represented centrally and digitally. To this end, the group needs an internal management system to create confidence that the individual group members meet the

REDcert<sup>2</sup> scheme requirements. All operating sites in the group must be legally and/or contractually linked by a common administration or ERP system that is defined, implemented, monitored and subject to internal review by the main office.

The following requirements apply to operating sites:

- The main office of the company must keep a list of operating sites and can decide, after consulting the certification body, which operating sites may join the group.
- It must be clear between the individual operating sites and the main office that the operating sites are integrated into the company in an organisationally uniform manner and that the ownership structure is unambiguous.
- The group must have or set up a shared main office and appoint a representative of management or of the relevant area of operations to be responsible for implementing the scheme requirements.
- The main office is authorised to instruct the operating sites and take necessary corrective action and is responsible for group certification.

Fulfilment of the required criteria must be verified by the relevant certification body, which then decides whether group certification is applicable.

#### 9.8.1.1 Scope and process for sample audits of operating sites

The minimum number of *operating sites* for sample audits as part of the initial certification or the annual re-certification is one third of all operating sites belonging to the group. The sample audit must be organised in such a way that non-audited operating sites are included in the sample in the following year. This will ensure that all operating sites belonging to the group are audited in a three-year cycle. The main office is audited once a year on site.

The sample audit of the operating sites is carried out on site once a year and is determined by the certification body. Operating sites that are not subject to on-site sample audits must also be audited by verifying the shared ERP system.

#### 9.8.1.2 Threshold value for a failed audit

If one in three of the operating sites audited do not meet the scheme requirements, the scope of the audits must be doubled. In extreme cases, this can continue until all operating sites that belong to the company have been audited on site (inspection density of up to 100%). The main office will be informed of all major non-conformities. Only operating sites that meet the scheme requirements may supply *sustainable products* or *intermediates* certified under REDcert<sup>2</sup>.



Sample audits must be conducted on site. This means that the auditor visits each individual operating site; a mere document check is not permitted.

## 9.9 Risk management

As part of the risk assessments conducted by certification bodies, the following indicators must be taken into account at a minimum for the participants in the value chain:

- (a) existence and quality of an internal quality management system
- (b) scope and complexity of the organisation covered by the certification (number of processes and areas of operations included)
- (c) scope of the *products* to be evaluated (number, length of production chain)
- (d) scope of the input materials used (*aggregates*, intermediates)
- (e) non-conformities in previous conformity assessments
- (f) number of sub-contractors

The risk analysis must be used to determine the quantity and depth of the inspection to be conducted. This involves at a minimum:

- (a) checking measured data and original documents
- (b) checking business transactions (purchase/sale)
- (c) checking *bills of material*

In addition, the requirements of section 1.8 on risk management in relation to the inspection system and section 3.3.1 on risk management in relation to the certification bodies in the REDcert-EU document "Scheme principles for neutral inspections" apply.

## 10 Scope of sample audits for upstream operations

See the REDcert-EU document "Scheme principles for neutral inspections" if non-recovered materials are involved.

## 11 Requirements and responsibilities of certification bodies

See the REDcert-EU document "Scheme principles for neutral inspections".

## 11.1 Requirements for certification bodies

All certification bodies require accreditation in accordance with the principles laid down in Article 4 of Regulation (EC) No 765/2008, either by the competent authority of the relevant country or by a national accreditation body under ISO/IEC 17065:2013.

REDcert reserves the right to request further proof of accreditation for the approval of certification bodies in the REDcert scheme.

The certification bodies conduct their audits in accordance with the requirements of ISO 19011 (prerequisite for accreditation). Conformity evaluations are carried out in line with the specifications of ISO/ICE Guide 60.

The certification bodies must demonstrate experience of checking mass balance systems (certification of biofuels/liquid biofuels/biomass fuels under Article 30 of Directive (EU) 2018/2001).

Before starting certification activities, a designated representative appointed by a certification body must have taken part in a "train-the-trainer" course on the REDcert<sup>2</sup> scheme principles for the certification of sustainable material flows in the chemical industry. They must transfer the knowledge acquired to auditors and employees within the certification body who are involved in REDcert<sup>2</sup> certification. Additional training requirements for auditors (see section 12.2.1) remain unaffected.

## 11.2 Revoking approval

See the REDcert-EU document "Scheme principles for neutral inspections".

## 11.3 Responsibilities of certification bodies

See the REDcert-EU document "Scheme principles for neutral inspections".

### 11.3.1 Risk management

See the REDcert-EU document "Scheme principles for neutral inspections".

### 11.3.2 Performing audits and issuing certificates and inspection certificates

The certification bodies have to prove implementation of a documented process that governs the certification process and the issuance of certificates and inspection certificates

under the REDcert<sup>2</sup> certification scheme. The general requirements of the audit process are specified by the standard ISO 19011.

The requirements of the REDcert-EU document "Scheme principles of neutral inspection" also apply.

**No** inspection certificates are issued in the REDcert<sup>2</sup> scheme for the certification of sustainable material flows in the chemical industry and **no** surveillance audits are conducted in the area of waste and residues following initial certification.

### 11.3.3 Lists of interfaces

See the REDcert-EU document "Scheme principles for neutral inspections".

### 11.3.4 Storing and handling information

See the REDcert-EU document "Scheme principles for neutral inspections".

### 11.3.5 External and internal training for auditors

See the REDcert-EU document "Scheme principles for neutral inspections".

## 12 Requirements of REDcert auditors

See the REDcert-EU document "Scheme principles for neutral inspections".

### 12.1 Training and qualification

See the REDcert-EU document "Scheme principles for neutral inspections".

### 12.2 Knowledge and professional and practical experience required of auditors

Auditors conducting audits on the basis of the REDcert<sup>2</sup> scheme principles for the chemical industry must meet the following requirements:

Specialist skills	Auditing technique, communication skills, extensive knowledge of the legal requirements in the relevant area and of the REDcert <sup>2</sup> scheme requirements for the certification of sustainable material flows in the chemical industry
Required qualification as an auditor	Training (e.g. in accordance with EN ISO 19011) Duration: at least three days
Professional experience	At least five years of professional experience in a relevant position in the area to be audited
Practical experience as an auditor	At least five audits in the last two years in the area being audited (e.g. ISO 9001, ISO 14001, REDcert (conversion), environmental verification activities) as well as two years of auditing experience in a certification standard that certifies quantity-specific claims

### 12.2.1 Further education and training

In addition to furnishing proof of the requirements in section 12.2, auditors must have participated in basic training on the REDcert<sup>2</sup> scheme for the certification of sustainable material flows in the chemical industry which particularly addressed the special features of the *mass balance approach* before they start their activities in the REDcert<sup>2</sup> scheme.

## 13 Registration process

See the REDcert-EU document "Scheme principles for neutral inspections". *Appedices 3* and *4* contain the applications for registering a certification body or an auditor under the REDcert<sup>2</sup> certification scheme for the certification of sustainable material flows in the chemical industry.

### 13.1 Registering as a scheme partner

See the REDcert-EU document "Scheme principles for neutral inspections".



Figure 15: Diagram outlining the registration process.

### 13.2 Registering a certification body

See the REDcert-EU document "Scheme principles for neutral inspections".

### 13.3 Registering an auditor

See the REDcert-EU document "Scheme principles for neutral inspections".

## 14 REDcert integrity and quality assurance measures

See the REDcert-EU document "Scheme principles for integrity management".

## 15 Sanction system

In reference to the sanction system, the stipulations in the REDcert-EU scheme apply exclusively and in full.

<b>REDcert-EU</b> "Sanction system", section...	<b>REDcert<sup>2</sup></b> "Scheme principles for the use of biomass-balanced products in the chemical industry", Version 1.2
1 Introduction	✓
2 Procedure	✓
3 Special requirements	✓

## 16 Relevant documents

The document structure of the REDcert<sup>2</sup> scheme principles for the certification of sustainable material flows in the chemical industry includes the following documents:

No	Document	Published/revised
1	Specific requirements for recycling processes in the chemical industry	The current versions of the supplementary REDcert <sup>2</sup> scheme principles for the certification of sustainable material flows in the chemical industry are published on the website at <a href="http://www.redcert.org">www.redcert.org</a> .
2	REDcert-EU Scope and basic scheme requirements	
3	REDcert-EU Scheme principles for mass balancing	
4	REDcert-EU Scheme principles for neutral inspections	
5	REDcert-EU Sanction system	
6	Checklist for the inspection of interfaces, operating sites and suppliers of sustainable material flows in the chemical industry (REDcert <sup>2</sup> )	
7	Desk audit checklist for the inspection of interfaces, operating sites and suppliers of sustainable material flows in the chemical industry (REDcert <sup>2</sup> )	
8	Checklist for the inspection of waste producers/collection points that deliver waste and residues to the chemical industry (REDcert <sup>2</sup> )	

## 17 Revision information

Compared to version 1.2, valid until 31 December 2023, the present document "Scheme principles for the certification of sustainable material flows in the chemical industry (Version 1.3)" includes additions to the content as summarised in the table below.

Section	Change
Whole document	Editorial changes; the term "allocation" replaced by the term "attribution"
Section 3	Expansion of the scope to include downstream (mechanical) processing of chemical products (see also the new scheme document "Special requirements for mechanical conversion plants")
Section 5.3	Text rearranged and examples added (figure 5) (Decision tree under COM(2007) 59 added)
Section 5.4	Incorporation of recognised GHG balancing methods Additional reference to REDcert-EU scheme document "Scheme principles for GHG calculation"
Section 5.5	Minor revision of figure depicting recycling technologies
Section 5.7	Subsection on bills of material: Reference to "inputs" rather than "raw materials"
Section 5.12	Section renamed "Use of renewable electricity" Additional certification option added for process-non-specific use of green electricity ("cradle to gate")
Section 5.13	New option: Recycling in accordance with EN:15343
Section 8.0	Introductory text added; table with references to relevant REDcert-EU documents removed
Section 8.1	Text in subsection on balance period rearranged Subsection on balance management added
Section 8.2	New subsection on attribution principles in multiple-output processes added and subsequent subsections renumbered accordingly
Section 8.8.1	Subsection on process-specific mass balancing reworded
Annex 1	Definitions added or specified: <ul style="list-style-type: none"> <li>• waste and residues (new)</li> <li>• degree of substitution (new)</li> <li>• physical recycled content (supplemented)</li> <li>• certified product (supplemented)</li> </ul> Figure depicting extended mass balance replaced
Annex 2a, 2b	Introductory explanations added
Annex 2c	Text reworded RecyClass added as a recognised certification system

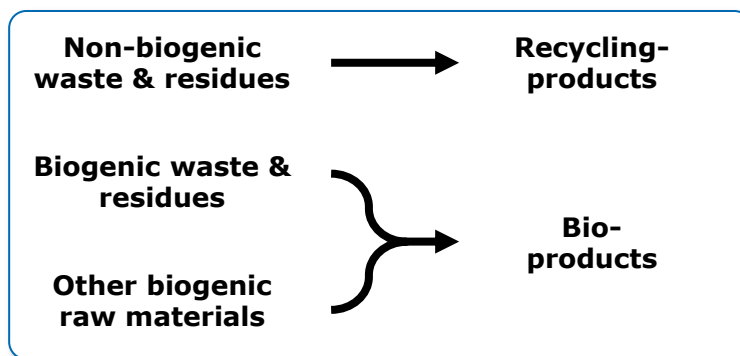
## Annex 1 – Definition of terms

### Waste and residues

Under Directive 2008/98/EC, the term “waste” means “means any substance or object which the holder discards or intends or is required to discard”. The definitions set out in ISO 14021:2016 continue to apply. The expression refers to any waste and residues, including process residues, which can have no other positive economic value or meaningful further use. To be classified as waste or residue, a material needs to have a valid waste code in accordance with the European Waste Catalogue (2014/955/EU); if no suitable waste code exists and the requirements of ISO 14021:2016 do not apply, the European Commission’s decision tree (COM(2007) 59) reproduced on page 18 can be used to demonstrate waste properties.

Waste should be used in accordance with the [waste hierarchy](#).

Bio-circular products and intermediates made from biogenic waste and residues (e.g. food waste and harvest residues) count as biogenic.



### Operating site

An operating site is defined as a dependent fixed business facility or plant operating on behalf of the company. See also [integrated manufacturing sites and plants](#).

### Bio-based product

A bio-based product from [dedicated production](#) consists partly or entirely (>99%) of certified sustainable biomass and is sold as such. The use of bio-based feedstock and intermediates can be verified, for example, by <sup>14</sup>C spectrometry.



## Biomass

The term biomass refers to the biodegradable fraction of products, waste and residues from agriculture (including vegetable and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and domestic waste. Biomass has a biogenic percentage of at least 99%. The non-biogenic portion is the result of unavoidable production processes. In addition, the term can also include hydrogen, for example, as long as it comes from electrolysis using electricity from renewable energy sources.

For information on the requirements for sustainably produced biomass in the REDcert<sup>2</sup> scheme for the chemical industry, see sections 5.1 and 5.2 on pages 14 to 15.

## Chemical and mechanical recycling

**Mechanical recycling** refers to the recovery of valuable materials using physical methods that do not change the chemical identity of the material being recycled. It includes, for example, granulation and compounding, distillation and sublimation. Materials recovered in this way may lose some of their physical properties and are therefore managed solely on a mass balance basis.

**Chemical recycling** involves temporarily or permanently changing the chemical identity of the recovered substance by means of chemical reactions. These include, for example, pyrolysis of used plastics and solvolysis of polymers. Chemical recycling usually results in virgin-quality intermediates or, for example in the case of pyrolysis, feedstock (pyrolysis oil). Chemically recycled intermediates can be booked in either a conventional mass balance system or an MBU accounting system; chemically recycled feedstock is converted to MBUs based on its lower heating value (LHV).

## Dedicated production

Dedicated production is a chemical, biological or physical manufacturing process which, by separating material flows, ensures that the certified sustainable source materials used are physically integrated into the product ("identity preservation", "segregation"). In this way, *dedicated products* made entirely or partly of *biomass* or *recycled materials* can be produced.



### Dedicated product

A dedicated product originates from a *dedicated production* process with clearly separated material flows and is produced partly or entirely from certified sustainable recycled materials, biomass or biomass-based intermediates and is sold as such. Products based entirely on biomass from dedicated production are also called *bio-based products*.

### Extended mass balance (EMB)

Extended mass balance is defined as a clearly defined domain within the limits of which a company is authorised to operate a single accounting system. This concept allows sustainability characteristics to be flexibly attributed (figure 12) and helps to reduce transport distances. No physical connection is required between the individual operating sites included in the balance. Mandatory requirements for the scheme-compliant compilation of an extended mass balance system are as follows:

- The operating sites within the scope of the mass balancing are under the operational management of the same company.
- The transfer of sustainability properties is only permitted for identical products with a valid product certificate.
- All operating sites are certified in accordance with the present document and have a valid certificate.
- The spatial boundaries of the balance system are at a maximum distance of 2,000 km.

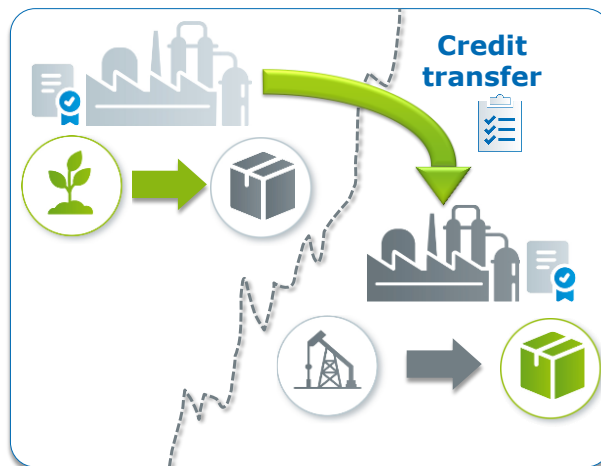


Figure 16: Operating principle of extended mass balance. Sustainability properties can only be attributed if the same product is produced at both sites; it is not possible to transfer attribution of sustainability properties between chemically identical raw materials. The transfer of MBUs between chemically non-identical products is also ruled out.

### Fossil-based raw materials

All substances listed in [Annex 2a](#) are considered fossil-based raw materials. Other fossil-based raw materials can be recognised by the REDcert scheme on a case-by-case basis.

### Accuracy

The requirements for a measuring and weighing system and compliance with it are represented in the quality management system (QMS) of the certified company (selection of measuring and weighing systems, regular calibration, etc.) and include feasibility checks and measures which must be initiated in the event of non-conformities. The measuring and weighing system concentrates on the measurement of main and by-products, waste and exhaust gas flows. If data are lacking in light of the accuracy requirements, it is possible to make conservative estimates in order to limit the work of performing measurements. Per bill of material, a maximum of 10% (by mass) of the necessary data can be based on conservative estimates.

### Integrated manufacturing sites and plants

The term “integrated manufacturing sites and plants” refers to a physically connected arrangement of operating sites at the same location or describes the physical connection of [operating sites](#) across different locations by dedicated transport routes (e.g. pipelines, but also regular consignments by ship, train or HGV) without any supply to or from external parties. Third parties are also part of the integrated manufacturing sites and plants, provided that they are physically connected to the integrated operating sites and are under the operational management of the company.

## Integrated production

Integrated production is a chemical, biological or physical manufacturing process that uses partially certified sustainable *biomass* and/or *recovered materials*. Material flows of sustainable materials and fossil-based raw material are not separated from one other and can go through several process steps. It is defined as a physically connected arrangement of *operating sites* at the same location or physically connected across different locations, e.g. by interconnected pipelines. The products resulting from integrated production can be certified on the basis of mass balancing. Recovered materials therefore become “circular mass-balanced products” and *biomass* becomes “biomass-balanced products”.

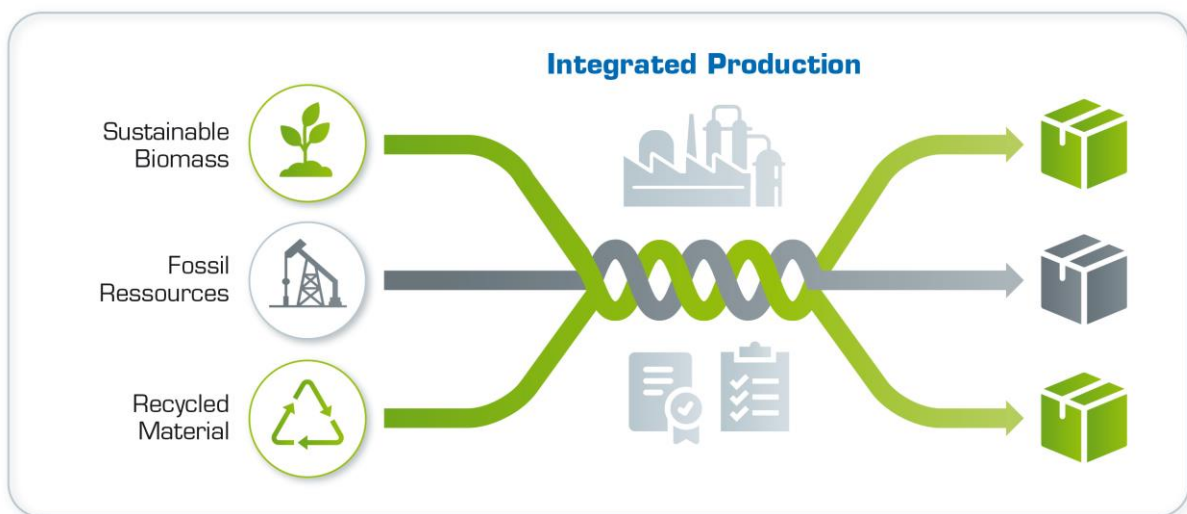


Figure 17: Diagram representing an integrated production process. Incoming materials are not physically separated from each other within the operating site but can be stored together. Sustainable properties are attributed on a mass balance basis using an accounting system.

## Mass balance unit

The mass balance unit (MBU) is the standard unit for the mass balance system. The conversion of chemical substances to MBUs is based on the mass balance. In order to calculate equivalents for different types of chemical feedstock so that they can be compared, the technical process of synthesis gas generation, including the water-gas shift reaction, is used as a basis. For fossil-based raw materials and sustainable materials, the conversion rate is determined in MBUs on the basis of the synthesis gas process. This involves determining the quantity required for the production of synthesis gas. This is standardised to a clearly defined product, e.g. methane. For fossil-based raw materials and sustainable materials, the conversion rate to MBUs can be determined using the lower heating value for the sake of simplicity. The possible biomass is listed in [Annex 2a](#). Other feedstock can be recognised by the REDcert scheme on a case-by-case basis.

See also figure 3 on page 15 and figure 10 on page 42.

### Mineral resources

Mineral resources are generally inorganic salts and solids such as carbonates and silicates. In the event of doubt, recycling processes intended to save mineral resources are recognised by the REDcert<sup>2</sup> scheme on a case-by-case basis; individual specifications are published separately in the document "Specific requirements for recycling processes in the chemical industry".

### Recycled material

Substances that have been processed from recovered (reclaimed) material. They include, for example, mechanically recycled plastic granulate, pyrolysis oils and synthesis gases.

### Recycled product

A recycled product resulting from a *dedicated production* process consists partly or entirely (>99%) of certified sustainable recycled materials and is sold as such.

### Physical recycled content

The physical recycled content ( $X$ ) corresponds to the percentage by weight of *recycled material* physically present in a product or intermediate. It is therefore not to be confused with the degree of substitution of fossil-based or mineral materials with certified sustainable materials, which is determined in the course of the certification process.

Where necessary, physical recycled content can be expressed as  $X_i$  for the proportions of particular types of waste (domestic, industrial, etc.). It always refers to absolute mass and therefore always takes into account the presence of non-fossil-based materials, particularly inorganic fillers and moisture.

$$X = \sum_i X_i \text{ (in \%)}$$

$$X_i = \frac{\text{mass of recycled content}}{\text{total mass of product}} \times 100 \%$$

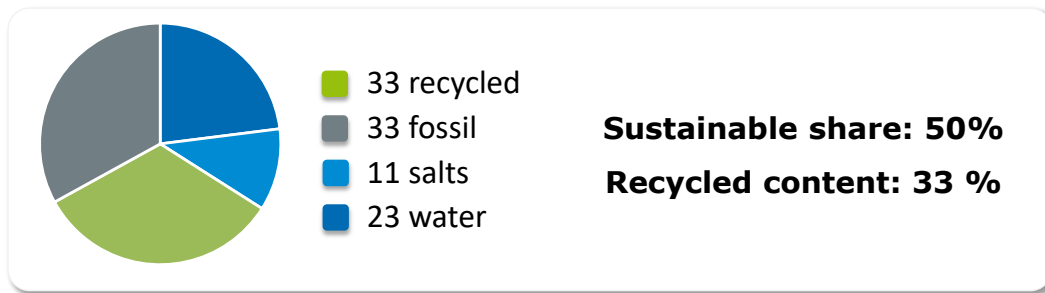


Figure 18: The sustainable portion identified refers to the balance-based or dedicated degree of substitution of fossil-based materials. The physical recycled content refers to the physical share by weight of recycled materials in the product and so takes into account the presence of other non-fossil-based materials.

Only pre-consumer and post-consumer waste may be considered as physical recycled content, consistent with the following use of the terms.

1. Pre-consumer waste

Material diverted from the waste stream during a manufacturing process. This excludes the re-use of materials from reworking, regrinding or scrap generated in a technical process and capable of being reclaimed within the same process.

2. Post-consumer waste

Material generated by households, or by commercial or industrial facilities in their role as end-users of the product, which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.

### Bill of material

A bill of material is a plant-specific quantity specification recording all input materials required for production as well as the quantities of the by-products and main products. If GHG emissions are to be calculated or the use of renewable electricity is to be certified, the bills of material must include information on the quantities of energy used (see also [section 5.4](#) and [section 5.12](#)).

### Degree of substitution

The degree of substitution (also called the sustainable portion) of a product or intermediate certified as sustainable refers to the proportion of fossil-based or mineral materials saved by the use of feedstock certified as sustainable. Depending on the value chain model selected, the substitution can be made by means of either dedicated production with guaranteed, physical content in the product or, alternatively, integrated production with sustainability properties established by mass balancing. The minimum required is 20%,

but the exact degree of substitution is derived from the bill of material and recorded on the product certificate.

Degree of substitution is not to be confused with *physical recycled content*.

### Company

In the present document, the term “company” describes an economically and legally independent organisational unit that produces and trades in biomass-balanced chemical products and/or recovered or recycled waste materials.

### Materiality

Regarding the threshold for the materiality of data, a piece of information is considered material if omitting, misstating or incorrectly reporting it could affect the result of an assessment. The threshold for materiality is defined as 5% in total in relation to the balance-based proportion of sustainable materials in the certified product.

### Certified product

To produce certified sustainable products, certified sustainable materials are substituted for fossil-based feedstock within the value chain, and the average proportion of each within the product is recorded in the individually issued product certificate.

That substitution can occur in one of two ways:

1. as part of a *dedicated production* process, guaranteeing the physical presence of sustainable components within the finished product
2. as part of an *integrated production* process, with sustainable materials content attested to by mass balancing but, because of attribution options and fluctuations, not necessary physically present in each product

### Recovered (reclaimed) material

This refers to material that would otherwise have been disposed of as waste or used for energy recovery but has instead been collected and recovered (reclaimed) as a material input, in lieu of new primary material, for a recycling and manufacturing process.

The substances in question have been obtained by processing waste with fossil-based raw material components (mainly plastic waste). These materials can, for example, be processed into oils or synthesis gases by means of chemical processes such as pyrolysis or gasification. Another means of extracting positive economic value from recovered

materials is by recycling them mechanically. In that case, the term “recovered material” applies both to the waste fractions collected separately or sourced from a sorting facility which are used to produce mechanically recycled products and to the products made from them.

### **Intermediates**

Intermediates are the result of any processing step except the last (which results in the end product) and serve in turn as input materials for other products (see [Annex 2b](#)).



## Annex 2a – Sustainable biomass and fossil-based raw materials

Sustainable feedstock comprises basic resources like recovered *waste and residues*, *biomass* or commodities directly produced from plants, e.g. vegetable oils and chemicals produced via biological fermentation, such as biomethane or bioethanol.

In process-non-specific mass balancing, only feedstock can be entered using its heating value.

### Certified sustainable biomass (selection):

- hydrogen (produced with renewable energy)
- biomethane
- bionaphtha
- biodiesel
- vegetable oil
- wood (air-dried)
- palm oil
- biobutanol
- bioethanol
- glycerine
- biomethanol
- biogenic production residues
- fresh wood

### Fossil-based raw materials (selection):

- natural gas
- methane
- butane mix
- *n*-butane
- naphtha
- crude oil
- asphalt (HVR)
- coal

### Recycled materials:

- pyrolysis oil
- synthesis gas
- mechanically processed waste fractions
- chemically recycled intermediates

See also the REDcert<sup>2</sup> document "Specific requirements for recycling processes in the chemical industry".

## Annex 2b – Intermediates

All materials produced from the feedstock listed in Annex 2a are described as intermediates or as products, depending on their position within the value chain. Intermediates are still to undergo further processing to become products, whereas products are sold to end users. Thus, a substance can be either an intermediate or a product, depending on the particular use to which it is intended.



## Annex 2c – Recognised certification schemes

Sustainable *biomass* that has been certified within the scope and relevant version of a voluntary certification scheme recognised by the European Commission in accordance with Directive (EU) 2018/2001 can be used without restriction within the REDcert<sup>2</sup> scheme for the chemical industry. The same applies to sustainable biomass that does not originate from a scheme recognised by the European Commission as a voluntary certification scheme but from one that has at least a positive benchmark result from the Sustainable Agriculture Initiative (SAI) or has been explicitly recognised by REDcert (e.g. FSC or PEFC; see table below). For sustainable biomass from other sources, the provisions in section 5.11 apply.

*Recovered (reclaimed) materials* can only be used if they have been certified in accordance with the present scheme document or a certification scheme recognised as “equivalent” by REDcert (see table).

*Certification schemes recognised by REDcert*

<b>Certification scheme</b>	<b>Biomass</b>	<b>Recyclates</b>	<b>Intermediates</b>
REDcert-EU	✓	✗	✓
REDcert <sup>2</sup> -food/feed	✓	✗	✓
REDII voluntary schemes <sup>1</sup>	✓	✗	✓
ISCC Plus	✓	✓	✓
RSB	✓	✓	✓
FSC	✓	✗	✗
PEFC	✓	✗	✗
SAI-benchmarked <sup>2</sup>	✓	✗	✗
EuCertPlast	✗	✓	✗
RecyClass	✗	✓	✗

<sup>1</sup> Online at [https://energy.ec.europa.eu/topics/renewable-energy/bioenergy/voluntary-schemes\\_en](https://energy.ec.europa.eu/topics/renewable-energy/bioenergy/voluntary-schemes_en)

<sup>2</sup> All schemes that have achieved an equivalence level of at least bronze under the Farm Sustainability Assessment (FSA) current at the time; see also <https://saipatform.org/resource-centre/fsa/>

Other schemes can also be accepted once REDcert has reviewed them.

## Appendix 1 Application for registration of a certification body under the REDcert<sup>2</sup> certification scheme for the certification of sustainable material flows in the chemical industry

(The certification body sends the application to REDcert electronically. The certification body is also responsible for the content of the application and for reviewing that information.)

(1) Master data of the organisation	
<input type="checkbox"/> See application for registration of a certification body under the REDcert-EU certification scheme	
<b>Name and legal form of the organisation</b>	
<b>Name of the person responsible</b> (The person responsible has to be authorised to legally represent the certification body.)	
<b>Name of the REDcert<sup>2</sup> contact</b> (The REDcert <sup>2</sup> contact person is responsible for communicating with REDcert and sharing information both externally and internally under the REDcert certification scheme.)	
<b>Address</b> (street address, PO box)	
<b>Postal code, city</b>	
<b>Country</b>	
<b>Mailing address</b> (if different)	
<b>Postal code, city</b> (if different)	
<b>Country</b> (if different)	
<b>Tel. no</b>	
<b>Fax no</b>	
<b>Email</b>	
(2) Status and scope of recognition by the competent authority	
<input type="checkbox"/> See application for registration of a certification body under the REDcert-EU certification scheme	
<b>Certification body approved by the competent authority</b>	<input type="checkbox"/> Yes / <input type="checkbox"/> No (Mark the applicable option with a cross.)

<b>The registration number is:</b>	
<b>Is approval limited to particular countries or states?</b>	<input type="checkbox"/> Yes / <input type="checkbox"/> No (Mark the applicable option with a cross; if <b>yes</b> , please explain.)
<b>Is approval limited to particular areas of application?</b>	<input type="checkbox"/> Yes / <input type="checkbox"/> No (Mark the applicable option with a cross; if <b>yes</b> , please explain.)
<b>Is approval limited to particular types of biomass?</b>	<input type="checkbox"/> Yes / <input type="checkbox"/> No (Mark the applicable option with a cross; if <b>yes</b> , please explain.)
(3) QM system and documentation of the certification body	
<input type="checkbox"/> See application for registration of a certification body under the REDcert-EU certification scheme	
<b>Description of the certification process</b> (schematic diagram of workflow)	(to be included as an appendix)
<b>Description of the process for issuing certificates</b>	(to be included as an appendix)
<b>List of auditors and of people in the certification body who decide on certification, including application for approval of an auditor (see relevant appendix)</b>	(to be included as an appendix)
<b>Measures for transparency and prevention of misuse</b>	(to be included as an appendix)
<b>Process for handling complaints and claims</b>	(to be included as an appendix)
<b>Process for revoking and reinstating certificates</b>	(to be included as an appendix)

Place and date:

Name and signature of the person responsible at the certification body:

## Appendix 2 Application for registration of an auditor under the REDcert<sup>2</sup> certification scheme for the certification of sustainable material flows in the chemical industry

(The REDcert contact person of the relevant certification body submits the application to REDcert electronically. The certification body is responsible for the content of the application and for reviewing that information.)

1. General information about the auditor			
<b>Surname</b>			
<b>First name</b>			
<b>Form of address/title</b>		<input type="checkbox"/> Mr <input type="checkbox"/> Mrs/Ms/Miss	
<b>Date of birth</b>			
<b>Scope of application:</b>			
<input type="checkbox"/> Conversion plant/integrated manufacturing sites and plants (upstream/downstream)			
<input type="checkbox"/> Trade in sustainable material flows			
2. Auditor's training and education			
<b>Type of education</b> (by school-leaving qualification, chronologically)	<b>Duration</b>	<b>Subject</b>	<b>Qualification</b> (degree, diploma, certificate)
	<b>from</b> <b>to</b>		
	<b>from</b> <b>to</b>		
	<b>from</b> <b>to</b>		
	<b>from</b> <b>to</b>		
	<b>from</b> <b>to</b>		
3. Auditor's professional experience			
<b>Company</b>	<b>Duration</b> (number of years)	<b>Industry/main field in which the company operates</b>	<b>Position in the company</b> (including description of role, as appropriate)

<b>4. Auditor's relevant training</b>					
<input type="checkbox"/> <i>Mandatory two-day basic training on the REDcert<sup>2</sup> scheme for the certification of sustainable material flows in the chemical industry (training certificate available)</i>					
Training and experience	When (date of the training course/ seminar, etc.)	Comments (brief description of the experience)			
<b>5. Auditor's practical experience</b>					
(Description of the inspections conducted)					
<p><b>All information is handled confidentially and will only be used to verify the applicant's experience as an auditor.</b> The auditor must furnish proof of at least two years of professional experience and five audits in the relevant field.</p>					
Type of audits (e.g. REDcert, ISO or EMAS inspections, environmental reports)	Date of the audits	Duration (days)	Name of the audited company	Scope of the audit	Position (Lead/co-auditor, observer)
<b>6. Confirmation by the certification body</b>					
<b>The certification body hereby confirms that the data provided here by the auditor has been checked.</b>			<input type="checkbox"/> Yes / <input type="checkbox"/> No (Mark the applicable option with a cross.)		
<b>The certification body confirms that a contract with the auditor exists and that all proof of the auditor's skills and expertise is kept in the office of the certification body.</b>			<input type="checkbox"/> Yes / <input type="checkbox"/> No (Mark the applicable option with a cross.)		
<p><b>NB:</b> Please use only this template to apply for approval of REDcert<sup>2</sup> auditors for the certification of sustainable material flows in the chemical industry. Other templates will not be accepted by REDcert.</p>					

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