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RSB Standard for certification of biofuels based on end-of-life-products, by-products and residues

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Contact Details: RSB - Roundtable on Sustainable Biomaterials
International Environment House 2
7-9 Chemin de Balexert
CH- 1196 Chatelaine (Geneva)
Switzerland
web: <http://www.rsb.org>
email: info@rsb.org

Introduction

End-of-life-products are a specific type of feedstock generated at the end of the life of products that were not primarily produced and intended for the production of biofuel or biomaterial. In this way they have reached the end of their intended supply chain, as they have been consumed, used, are spoiled etc. These end-of-life materials are thus intended to be disposed of and would potentially create environmental and social impacts. *End-of-life-products* include *Municipal Solid Waste (MSW)*, *Used Cooking Oil (UCO)* and *Wastewater*.

By-products and residues are secondary products derived from agricultural, forestry, food or industrial production and processing chains, among others. These products are not purposefully generated for their potential use as biofuel or biomaterial feedstock. These *by-products and residues* can be discarded or disposed of, but they can also be sold to specific markets (e.g. animal fats are often sold to the oleo-chemical industry), in order to increase the revenue of the production process.

The main benefit of using *end-of-life-products, by-products and residues* as biofuel or biomaterial feedstock is to reduce the pressure on lands and resources compared to feedstocks (e.g. agricultural crops) that are purposefully grown to produce biofuels. In addition, using *by-products and residues* to produce biofuels increases the overall system efficiency (e.g. water, energy) by reducing processes and costs related to treatment and disposal. However, this standard does not intend to systematically divert end-of-life products, by-products and residues towards biofuel or biomaterial production if other recycling, re-use or disposal options with a higher energy-efficiency or social/environmental benefits exist.

This standard describes the requirements for biofuels and biomaterials supply chains to use *End-of-life products, by-products and residues* as a feedstock, including requirements for sustainability and traceability.

It is important to note, however, that operators intending to produce Biofuels eligible under the Renewable Energy Directive (2009/28/EC) need to be certified against the RSB EU RED Standard for certification of biofuels based on waste and residues.

Main changes from the previous version (RSB-STD-01-020 version 1.6 and RSB-POL-01-001 version 1.0)

- a. This standard is the result of a merging of RSB Policy for certification of biofuels based on end-of-life-products and wastewater (RSB-POL-01-001) and RSB Standard for certification of biofuels based on by-products and residues (RSB-STD-01-020).
- b. The added section C highlights the fact that EU Member States may set additional requirements regarding the origin of certain feedstock (e.g. Used Cooking Oil). RSB will provide specific guidance to participating operators for each Member State. Flowcharts in annexes are updated accordingly. It also states that in case of contradiction between this standard and regulation, the latter shall prevail.
- c. The term “main product” is replaced by “primary product”, which is the official term in use in the European Union. The definition of primary product is based on the EU definition.
- d. Minor language revisions for consistency and updated table of contents, numbering and other references.

Main changes from the previous version (RSB-STD-01-010 version 1.6)

- a. Significant restructuring of the whole document with new sections Terms and Definitions - General Requirements – Feedstock-specific requirements
- b. Definitions for the terms *Point of Origin* and *First Collector* were added
- c. RSB Standards to be applicable from the first collector onwards (before: after the last collector), including RSB Standards for Traceability, Participating Operators, and Communication and Claims
- d. Specific requirements for Traceability were added
- e. GHG calculation to start with the collection of the material at the point of origin (before: GHG calculation started at the transportation of the material from the first collector)
- f. Requirement to source PFAD and Palm Stearin sustainably was extended to all waste and residues derived from palm oil
- g. Auditing requirements as set out in *RSB Procedure for Certification Bodies and Auditors* (RSB-PRO-70-001) are applicable

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A. Intent of this standard

The intent of this standard is to ensure that the use of *end-of-life-products, by-products and residues* for biofuel or biomaterial production is appropriately addressed within the *RSB certification system*, by ensuring that negative environmental, social and economic impacts related to their use are minimized and that the requirements upon *participating operators* are appropriate.

B. Scope of this standard

This standard and the *RSB standards* mentioned in this document apply to any operation and operator using *end-of-life-products, by-products and residues* from agriculture, forestry, livestock, fishery or industrial production and/or processing and/or any product generated from the processing, transformation or treatment of *end-of-life-products, by-products and residues* for the purpose of producing biofuel.

C. Status and effective date

The Version 2.0 of this *RSB Standard for certification of biofuels based on end-of-life-products, by-products and residues* shall be effective on **ddmmyyyy**.

Any party can make comments on this document by writing to the RSB Secretariat. The Secretariat will undertake a regular review of this document every five years, or earlier if deemed necessary by the Secretariat or RSB Board of Directors. The review shall follow the Procedure for the Development and Modification of RSB Standards (RSB-PRO-15-001).

D. Note on use of this standard

All aspects of this standard are considered to be normative, including the intent, scope, effective date, note on the use of this standard, references, terms and definitions, and requirements, unless otherwise stated. Users implementing this standard shall ensure that the intent of this standard is met. To ensure that the intent of this standard is met, users shall implement all of the requirements specified in this standard, and all additional measures necessary to achieve the intent of this standard.

E. RSB List of documents and corresponding references

Please see RSB-DOC-10-001 RSB List of documents and references

F. Terms and definitions

For the purposes of this standard, the terms and definitions given in *RSB-STD-01-002 RSB Glossary of Terms* shall apply. Relevant terms as defined in *RSB-STD-01-002* are:

F. 1. First Collector of waste and residues

Operator that receives waste or residual materials from points of origin

F. 2. Point of Origin

Companies or private households where waste and residues occur

The following additional specific definitions apply:

F. 3. Animal Fats, Oils and other animal processing by-products

Secondary products derived from livestock (e.g. cattle, swine, sheep) and poultry (e.g. chicken, turkey, goose) processing, e.g. tallow, lard, poultry fat. These are usually collected out of the slaughtering and/or rendering processes. These fats can be used to produce biofuels. Other by-products from animal processing are e.g. bone meal or offal.

F. 4. Biodegradable Municipal Waste (BMW)

The biogenic fraction of Municipal Solid Waste, i.e. materials derived from renewable biomass resources, including but not limited to crop residues, food residues, wood residues, grasses, and aquatic plants. The Biogenic Fraction of MSW does not include materials derived from petrochemical resources (e.g. plastics).

F. 5. By-products and residues

Secondary products from agriculture / forestry / livestock / meat / poultry/fish/food production and processing, as well as certain industrial processes. Eligible by-products and residues for the purpose of this standard are defined in Section G.2.3

F. 6. Fish residues

Secondary products derived from the aquaculture, fishing and processing of fish. Oil can be extracted from the fish residues and it can be used to produce biodiesel among other uses

F. 7. Municipal Solid Waste (MSW)

Municipal waste, collected by or on behalf of municipalities, by public or private enterprises (Source: United Nations Organization¹)

For the purpose of this standard, Municipal Solid Waste includes:

- Waste originating from households and waste that is similar in nature and composition, originating from commerce and trade, small businesses, office buildings and institutions. In general, the following components contribute to Municipal Solid Waste: Paper; food scraps; yard trimmings; plastics; metals; rubber, leather, and textiles; wood; and glass.
- Waste from selected municipal services, e.g., waste from park and garden maintenance, waste from street cleaning services (street sweepings, the content of litter containers, market cleansing waste), if managed as waste.
- Construction and demolition waste (concrete, wood (from buildings), asphalt (from roads and roofing shingles), gypsum (the main component of drywall), metals, bricks, glass, plastics, salvaged building components (doors, windows, and plumbing fixtures), and trees, stumps, earth, and rock from clearing sites.)

For the purpose of this standard, Municipal Solid Waste excludes:

- Waste from sewage network and treatment
- Industrial waste
- Special waste requiring separate disposal by law
- Hazardous waste requiring separate disposal by law

F. 8. Recyclable Material

Recyclable Material is constituted by every type of glass, paper, metal, plastics, textiles and electronics for which recycling chains exist in the country of operation. Materials derived from biomass, which can be composted, are not considered recyclable

F. 9. Used Cooking Oil

Any type of vegetable and animal oils and fats used for cooking purposes and collected from food processing activities, including but not limited to restaurants, food manufacturers, and industrial deep fryers, etc

F. 10. Wastewater

Includes Domestic wastewater, industrial wastewater and sludge.

F. 11. 1. Domestic wastewater

¹ <http://unstats.un.org/unsd/environment/wastetreatment.htm>

Wastewater from residential settlements and services, which originates predominantly from the human metabolism and from household activities (Source: European Union (91/271/ECC)²)

F. 11. 2. Industrial wastewater

Wastewater which is discharged from premises used for carrying on any trade or industry, other than Domestic wastewater and run-off rain water, and which does not contain any co-product, by-product or residue with market value (Source: European Union (91/271/ECC))

F. 11. 3. Sludge

Residual sludge, whether treated or untreated, from Wastewater treatment plants (Source: European Union (91/271/ECC))

G. Requirements

G. 1. General Requirements

G. 1. 1. Sustainability Requirements

- G. 1. 1. 1. With the exception of Principle 3, Principle 6 and Principle 8, the RSB Principles & Criteria (RSB-STD-01-001) and related documents (i.e. guidelines, glossary, guidance and indicators) shall apply to any operator involved in processing from *the First Collector* onwards.

Note: Operators only conducting mechanical processing of wastes or residues are not considered a processing facility.

- G. 1. 1. 2. Principle 3 (Greenhouse Gas calculation) applies to any operator starting with the collection at the *Point of Origin* onwards.

- G. 1. 1. 3. Principles 6 and 8 do not apply.

- G. 1. 1. 4. Feedstock specific requirements apply (see section “feedstock specific requirements”)

G. 1. 2. Traceability Requirements

- G. 1. 2. 1. The RSB Chain of Custody Standard (RSB-STD-20-001) applies to any operator in the supply chain from the *First Collector* onward.

- G. 1. 2. 2. RSB Participating Operators (POs) shall ensure that

² Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31991L0271:EN:HTML>

- (a) all of the collectors and aggregators in their supply chain maintain a mass balance system, for each individual material, including first collectors.
 - (b) all organizations in their supply chain are contractually obliged to provide the information as specified in clause G.1.2.4, for all waste and residues, which are part of the PO's certification scope.
- G. 1. 2. 3. *First Collectors* shall have supporting evidence back to the origin of the material, which shall be available for the auditors to verify. This could include, for example, evidence of collection from specific restaurants or renders. The name of the specific feedstock shall be on all documentation.
- G. 1. 2. 4. Organizations' in the supply chain aggregating and/or forwarding waste and residues, shall maintain both procurement management and mass balance systems, including the following:
 - A list of all waste suppliers with whom the organization is currently engaged. The list of suppliers shall be updated regularly and contain the following information:
 - Legal Name of Supplier;
 - Physical Address and Phone Number of Supplier;
 - Contact Name.
 - Acquisition data, on a physical volume or weight basis, associated with each individual listed supplier, by quarter. This may include both purchased and otherwise collected/acquired waste material.
 - A contractual requirement that all suppliers shall provide the necessary information on type of material, country of origin on a physical volume or weight basis for all consignments.
 - Sales data on a physical volume or weight basis for the waste material for the previous 12-month period.
 - A procedure for demonstrating that waste material acquired is in mass balance with waste material sold, or kept in stock, every quarter, over the course of the preceding year, for all categories of waste handled by the organization.
 - Where the organization aggregates or forwards waste material the nationally compliant documentation, stating the type of waste and the country of origin shall be passed on with each consignment sold.

It is assumed that waste collectors, waste aggregators, and rendering companies may have competing waste material collection business activities. Therefore all information provided with individual supplier or customer data shall be held in strict confidentiality.

G. 1. 3. Other Requirements

The following RSB Standards apply to any operator in the supply chain from the *First Collector* onward:

- G. 1. 3. 1. RSB Chain of Custody Standard (RSB-STD-20-001)
- G. 1. 3. 2. RSB Standard on communication and claims (RSB-STD-50-001)
- G. 1. 3. 3. RSB Standard for participating operators (RSB-STD-30-001)
- G. 1. 3. 4. RSB Standard for risk management (RSB-STD-60-001)
- G. 1. 3. 5. RSB GHG Calculation Methodology (RSB-STD-01-003-01)
- G. 1. 3. 6. RSB Fossil Fuel Baseline Calculation Methodology (RSB-STD-01-003-02)

Note on Auditing:

The requirements for auditing and certifying Participating Operators are set out in the *RSB Procedure for Certification Bodies and Auditors* (RSB-PRO-70-001).

G. 2. Feedstock specific Requirements

G. 2. 1. Municipal Solid Waste (MSW)

The operator shall demonstrate that the MSW

a) has a *Biogenic Carbon Content*, based on random sampling done at least once every year, of greater than 50% of the total carbon content; and

b) is sorted and pre-processed at a facility that has removed all but trace quantities of any *Recyclable Material*, hazardous material, infectious material or pollutants.

Guidance

It is not necessary for households, commerce and to any other operators generating *Municipal Solid Waste* to demonstrate compliance with the *RSB standards*. Compliance with the *RSB standards* must be demonstrated (through a 3rd-party audit process) from the *First Collector* onward.

Examples of *First Collectors* include, but are not limited to:

- A private or a municipal landfill

- A Mechanical Biological Treatment (MBT) plant where recyclable and organic elements (BMW), wastewater and refuses are separated from bulk MSW.
- A warehouse or equivalent site where MSW or BMW is aggregated, either formally by or on behalf of municipal authorities or informally by trash and refuse collectors, retailers or wholesalers.

Several techniques exist to measure the *Biogenic Carbon Content* of a product. One of the most widely used is the measurement of Carbon 14, which can be performed in public facilities or by some private laboratories, using the protocols described in norms ASTM 6866 or CEN 15440. However, the operator may use other techniques to measure the *Biogenic Carbon Content* or use the information published by a third party on the composition of the bulk *Municipal Solid Waste* used. The *Biogenic Carbon Content* may be measured in the *Municipal Solid Waste* or later in the production process (e.g. in the *Biofuel* produced).

G. 2. 2. Wastewater

The RSB Standard and related documents as referred to in G.1. apply to Wastewater from the processing, transformation or treatment of Wastewater onward.

Guidance

It is not necessary for households, commerce or for any other operators generating *Wastewater* to demonstrate compliance with the *RSB standards*. Compliance with the *RSB standards* must be demonstrated as soon as *Wastewater* and/or any product generated from the processing, transformation or treatment of *Wastewater* start being treated or processed for the purpose of producing biofuels.

Examples of *Wastewater* and product generated from the processing, transformation or treatment of *Wastewater* for the purpose of producing biofuels include, but are not limited to:

- Starchy *Wastewater*, e.g., from grain milling operations
- Effluents from industrial premises, which do not contain any co-product, by-product or residue with market value
- Primary or secondary *Sludge* collected out of a *Wastewater* treatment plant
- Greases or fats collected out of a *Wastewater* treatment plant

G. 2. 3. By-products and residues

G. 2. 3. 1. Eligibility

A by-product or a residue qualifies under this RSB standard if:

- It is listed in the positive list (Table 1) in section G.2.3.2. or

- It is determined as such by the RSB through the Economic Value Ratio (EVR) approach upon request by a participating operator. The EVR approach is described in Annex I.

G. 2. 3. 2. Positive list of by-products and residues

Table 1: Positive list of by-products and residues

Origin	Feedstock
Agriculture	Harvesting residues: Straw, husks, cobs, leaves and stems See section G.2.3.3.
	Processing residues: Bagasse, nutshells, bran, gums, soap stocks and pomace. Spoiled or contaminated grain or other commodities that no longer meet quality specification for food or other intended uses.
Forestry	Harvesting residues: tops, limbs (branches) and saplings (trees with a diameter at a breast height below 5 inches/12.7 cm ⁶). See section G.2.3.4
	Processing residues: Sawdust, shavings, bark, tall oil, tall oil pitch, and brown liquor (from pulp, cellulose & paper industry).
Animal excrement and run-offs from farms	Liquid manure
	Manure and manure streams (e.g. biomethane)
	Silage effluent and similar run-offs from farms with animal husbandry
Animal fats, oils and other animal processing by-products	See section G.2.3.5
Fish residues	Only <i>Fish residues</i> , which are not suitable for human or animal consumption (food and feed)

⁶ Based on US Dept of Agriculture and Energy.

Residues from industrial processes (of biogenic origin)	Fatty acids from distillation (volatiles, bottoms, deodorized fraction and other fractions): See section G.2.3.6.
	Fatty alcohols from light ends, distillation residues or ester residues.
	Recovered fats and oils from pipeline flushing or fat trap/residues. Inedible oil from corn ethanol production Fats oils and grease (FOG) separated from wastewater treatment; or FOG diverted upstream of wastewater collection
	Vegetable acid oils from physical refining, chemical neutralization or other residues. Lipids from food wastes
	Crude glycerin
Crude glycerin	Crude glycerin from waste animal fats
	Crude glycerin from waste oils

G. 2. 3. 3. Feedstock specific requirements for harvesting residues from agriculture

The operator shall demonstrate that the use of harvesting residues, including lignocellulosic material, does not occur at the expense of long-term soil stability and organic matter content (i.e. operators shall provide evidence that Criterion 8.a of the RSB Principles and Criteria is met⁸)

G. 2. 3. 4. Feedstock specific requirements for forestry residues

Operators shall provide evidence that forestry harvesting residues derive from forests/wood that is certified by the Forest Stewardship Council (FSC⁹) or any verification/certification scheme with equivalent sustainability requirements as approved by the RSB.

Operators shall calculate the GHG emissions for the entire chain of production of the biofuel or biomaterial, including upstream production of the by-product or residue (land use change, forest management and harvesting), processing, storage and all transport steps through the lifecycle. Operators shall use the

⁸ Third minimum requirement of Criterion 8.a.1 of the Consolidated RSB EU RED Principles & Criteria: "The use of agrarian and forestry residual products for feedstock production, including lignocellulosic material, shall not be at the expense of long-term soil stability and organic matter content."

⁹ <http://www.fsc.org>

current RSB GHG Methodology or the UK's Ofgem Solid and Gaseous Biomass Calculator Tool¹⁰

G. 2. 3. 5. Feedstock specific requirements for Animal Fats, Oils and other animal processing by-products

Operators shall demonstrate that *animal fats, oils and other animal processing by-products* used as a feedstock to produce biofuels are produced in slaughterhouses and/or rendering units for which a regulation exists and is locally enforced, with regards to:

- Environmental impacts, in particular waste management practices, and
- Animal welfare

Whenever *animal fats, oils and other animal processing by-products* used as a feedstock to produce biofuels are produced in slaughterhouses and/or rendering units, for which no regulation exists or the existing regulation is not locally enforced, *Operators* shall demonstrate that environmental impacts, in particular waste management practices, are addressed through voluntary certification of their operations (e.g. ISO 14000, Eco-Management and Audit Scheme, etc.).

For *animal fats, oils and other animal processing by-products*, operators shall calculate the GHG emissions for the entire chain of production of the biofuel, including: upstream production of the *by-product or residue* (including GHG emissions from animal raising (incl. direct land use change for pasture clearing) and slaughtering, and all transport steps), transport to the processing of *by-product or residue* to produce biofuel, biofuel production, biofuel blending and storage, and all transport steps through the lifecycle. GHG emissions shall be calculated using the RSB GHG Calculation Methodology (RSB-STD-01-003-01).

Guidance:

Important impacts may occur across the supply chain before *animal fats* are being processed into biofuels. This standard addresses the impacts related to the processing of *animal fats, oils and other animal processing by-products* in biofuel production plants.

The impacts related to the production of *animal fats, oils and other animal processing by-products* in slaughterhouses and rendering units shall primarily be covered by the existing regulation in the country/region. The *Participating Operator* using *animal fats, oils and other animal processing by-products* as a feedstock to produce biofuels shall demonstrate that *animal fats, oils and other animal processing by-products* come from a

¹⁰ <https://www.ofgem.gov.uk/publications-and-updates/uk-solid-and-gaseous-biomass-carbon-calculator>

country/region where a regulation exists and is locally enforced on environmental impacts of slaughterhouses and rendering units and on animal welfare. Examples of regulations include:

United States of America:

- Federal Meat Inspection Act (1906)
- Code of Federal Regulations on Animals and Animal Products (9 CFR 313)
- Humane Methods of Livestock Slaughter Act (7 USC, 1901 - 1907)
- Clean Water Act (1972, 1977) and Water Quality Act (1987)
- EPA Factsheet (Final Rule) for wastewater discharge standard EPA 821-F-04-004

European Union

- Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control)
- Directive 93/119/EC on the protection of animals at the time of slaughter or killing
- Council Directive 98/58/EC on the protection of animals kept for farming purposes
- Regulation (EC) No 178/2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety
- Directive 2002/99/EC laying down the animal health rules governing the production, processing, distribution and introduction of products of animal origin for human consumption, 16 December 2002

Canada

- Meat Inspection Act (R.S.C., 1985, c. 25 (1st Supp.))
- Meat and Poultry Products Plant Liquid Effluent Regulations (C.R.C., c. 818)

Auditors evaluate on a case-by-case basis if regional/national regulations on environmental impacts of slaughterhouses and rendering units and on animal welfare exist and are enforced in the region(s) from which the animal fats used by a *participating operator* originate, e.g. demonstrated implementation.

G. 2. 3. 6. Feedstock specific requirements for residues from industrial processing

Whenever residues are derived from palm oil, the material shall be certified by SAN (only non EU market)¹¹, RSB or RSPO¹² (EU market and non EU market).

¹¹ Sustainable Agriculture Network (SAN): <http://sanstandards.org>

¹² Roundtable on Sustainable Palm Oil (RSPO): www.rsपो.org

Annex I: Determination of Economic Value Ratio for Determination of Residues and By-products

Upon request of operators, the RSB will evaluate if additional feedstocks could be considered eligible under this standard. The RSB will determine whether a product qualifies as a by-product or residue under this standard through the Economic Value Ratio (EVR). Operators are required to provide the data needed to perform the calculation of the EVR.

A by-product or residue qualifies under the EVR method of this standard if it meets the following applicability requirements:

- It is a secondary product that is derived from an agriculture/forestry/livestock/meat/poultry/fish/food/industrial supply chain AND
- It has an economic value ratio of $\leq 5\%$ with respect to the *primary product* (see below for the calculation of the economic value ratio).

The *economic value ratio of by-products and residues* are calculated as the relative value of the *by-product or residue* compared to the *primary product(s)*, co-products and other by-products generated from the same production process. The market value of a given *by-product or residue* and the *primary product* (as listed on a stock exchange), is used in combination with the quantity used for biofuel relative to how much of that same product is used for other purposes. This indicates the economic influence between biofuel production and feedstock production. The value U should be sought at the national/regional level or for each supplier of the by-product, whichever is the highest. Wherever possible, market value data shall be obtained from the same stock exchange and for the same calculation period. The calculation shall be performed as follows:

$$\text{economic value ratio} = \left(\frac{M_1}{M_2 + M_3 + \dots + M_n} \right) \times F_1 \times U_1$$

Where:

- M_1 = Market value of the by-product/residue (in USD¹⁸/metric ton)
- M_2, M_3, \dots, M_n = Market value of other product(s), incl. primary product, co-products and other by-products (in USD¹⁹/metric ton)
- F_1 = Fraction of the by-product on primary product, co-products and other byproducts out of the original raw material (in % by mass or volume)
- U_1 = Fraction of the by-product utilized for biofuel production on other non-biofuel usages (in % by mass or volume)
- n = total number of products, incl. primary product, co-products and by-products out of the original raw material.

Example:

The crop X produces 1 primary product (A) and 2 co-products (B)(C). For each ton of crop, 580kg of (A), 300kg of (B) and 100kg of (C) are obtained. Their respective market values are USD 15/MT, USD 8/MT and USD 2/MT. Out of the second by-product (C), 60% is sold to a feed producer and 40% to a biofuel producer.

The EVR is calculated as:

$$\text{economic value ratio} = \left(\frac{2}{15 + 8} \right) \times \left(\frac{100}{580 + 300} \right) \times 0.4 = 0.00395$$

The EVR is therefore of 0.39%. This by-product qualifies under this standard.

¹⁸ Or applicable currency. The same currency must be used consistently in all calculations.

¹⁹ Or applicable currency. The same currency must be used consistently in all calculations.