

Oiconomy Standard, version 1.7.1

Model standard for the life cycle sustainability assessment of products. The goal of this standard is to provide a normalized way of measuring and communication of (un)sustainability. In this standard (un)sustainability is expressed in a virtual monetary unit, the “ESCU” (Eco Social Cost Units). As closely as possible, the ESCU score of a product equals the hidden costs, or externalities, related to a product, the costs that should have been spent to avoid any of the damage that the product causes during its entire lifecycle. Added to the standard economic price of the product the ESCU score represents the total costs of a fully sustainable alternative for the product. The ESCU also provides a normalized means of transfer of (un)sustainability through the supply chain enabling all supply chain actors to build on each other’s data.

Table of contents

Oiconomy Standard, version 1.7.1.....	1
Table of contents	1
1. Introduction.....	2
2. Scope	2
3. Aspects and Categories.	3
4. Relation to other standards.....	3
5. Abbreviations, terms and definitions.	4
6. Goals of this standard.....	6
7. Principles of this standard.	6
8. Oiconomy Foundation.	8
9. Verification.	8
10. Presentation and communication in the market place.....	8
11. Requirements for organizations with certified products.	8
12. Criteria for ESCU calculations.	11
12.1 Definition and types of products.....	11
12.2 General rules.	12
12.3 Supplier’s contribution.....	16
12.4 Organization’s “Gate to Gate” contribution.....	19
12.5 Use phase.	46
12.6 End of life.....	52
12.7 Bonus ESCU’s.	54
12.8 Total ESCU score.....	56
13. Appendices.	57
13.1 Choices and Positions.....	57
14. Literature	57
15. Company Assessment.....	58

Chapters 1 - 11 describe the system, principles and definitions.
Chapter 12 describes the criteria on the measurement and communication of sustainability.

1. Introduction.

The economy is based on the mechanisms of the free market and especially the law of supply and demand. Product's prices and costs of use and disposal are supposed to represent all costs arising in the complete life cycle of the product. However, the free market fails where costs are not or insufficiently included in the price of products. Hidden product costs or externalities exist where costs or damage exists which are not paid by their cause and especially as:

- The costs of social irresponsibility and the consequent poverty, inequality and poor health-, living- or working conditions (People).
- The costs of damage to the environment and the depletion of resources endangering the future well-being of mankind (Planet).
- Profits obtained by irresponsible financial behavior, criminal activities or corruption (Prosperity).
- Product related costs paid by the community.

Without these hidden costs, current prices of products do not represent their true costs, with the result that damaging and unsustainable production is favored over sustainable production.

This standard provides a verifiable and normalized method to collect all relevant data on (un)sustainability, to objectively weigh these data according to the costs that should have been spent on damage preventative measures and express the result in a monetary unit, the Eco Social Cost Unit (ESCU).

This standard includes a method to verifiably transfer these sustainability data through the supply chain by means of the ESCU, enabling a specific assessment of specific products and their specific supply chains.

All ESCU scores are the product of a quantitative- and a price factor. The measurement of the magnitude or quantity factor for each aspect (Q_{Aspect}) is standardized by the criteria of this standard. The price factor (P_{Aspect}) represent the preventative costs for the aspect. Default values for these are presented in the "Oiconomy Foundation database" (O.F. database) and represent the marginal preventative costs, the highest costs of all major preventative measures that are necessary to globally reach the standard or target that has been set for the relevant aspect. Applicants shall use these default values unless, at certain conditions, they can demonstrate a lower actual value.

This "Oiconomy system" is designed to be self-learning. Where the default price factors are initially scientifically determined for the fundamental aspect categories and a series of subcategories, supply chain actors may provide data for more specific subcategories, this way demonstrating their own lower ESCU's and updating the system for all. Suppliers of sustainability improving technology or methodologies may this way demonstrate their contributions.

2. Scope

This standard enables determination and effective communication of the (un)sustainability of any product. The product may be a consumption product, a utensil, a personal service or an impersonal service.

The entire product lifecycle is assessed, from cradle to grave. A great variation of aspects of

sustainability (including ecological, social and economic responsibility) is considered in order to provide a balanced and comprehensive assessment of product sustainability.

This standard requires transparency of all data relevant to sustainability, prescribes the method of determination and communication and requires the organization to execute a full assessment in order to enable external stakeholders to make their own value choices between the aspects and make their own composite indicator. This standard makes no requirements to any specific aspects of sustainability, but only presents a standardized way of calculation of the (un)sustainability of a product.

This standard is applicable to any product or service, of which the supplier wishes to measure and communicate its sustainability in a standardized, trustworthy and comparable way, independent on the level of sustainability of the organization or product.

This standard aims to provide a measure for all possible types of aspects, presented in one comprehensive monetary ESCU score, but based on aggregation of a matrix of aspect specific scores which can also be presented separately.

3. Aspects and Categories.

This standard tries to be as objective as possible. The use of preventative costs instead of a damage related indicator makes it possible to objectively weigh the different aspects by their preventative costs.

However, like any standard, this standard has to make some choices, e.g. on the choice of the aspects and the positions it takes for each aspect. The positions taken by this standard on most discussed or controversial aspects are described in appendix 13.1.

This standard categorizes all types of eco-social-economic aspects in the following fundamental categories:

- A. Pollution of air, water or soil.
- B. Depletion of scarce resources.
- C. Use of scarce land.
- D. Damage to biodiversity or scarce nature.
- E. Public health risks.
- F. Waste.
- G. Poverty and Economic irresponsibility.
- H. Poor Labor conditions.
- I. Corruption and violence.
- J. Various social responsibilities.

Various categories are subcategorized and composed of several aspects. The calculation of the (un)sustainability based on these fundamental aspect categories is described in the sections 12.4, 12.5 and 12.6.

4. Relation to other standards.

The biggest difference of this standard with other standards is that this standard requires little else than that the responsible organization transparently, honestly and verifiably determines and communicates the (un)sustainability related to the entire lifecycle of a product, exactly following the criteria of this standard. This standard therefore replaces no other standard, is applicable to all types of products and has no specific requirements on any aspect of sustainability but transparency.

This standard is no quality mark for ecology or human rights or of any other kind, but aims to make all aspects of sustainability measurable and transparent. Because this standard aims to present

a comprehensive overview of the sustainability of a product, it may be less detailed on individual aspects of sustainability than specific standards on the relevant aspect. However, for some criteria this standard uses certificates of various more specific and detailed standards.

In this standard accredited quality certificates are used as means of evidence and in some aspects an organization can only reach the best score with a certain certificate. Therefore, to earn the best scores, an organization or its products may need several certificates. Because most organizations are specialized, the number of required certificates will usually be limited.

In various sections this standard requires verifiable tests by accredited testing institutions.

5. Abbreviations, terms and definitions.

- **Added value:** last year financial turnover – last year purchased value (before interest and tax).
- **Bulk gasses:** Gasses and fine dust that is only harmful to the health of man or environment in larger quantities.
- **CB:** Certification Body.
- **Certification:** certification to this standard, unless otherwise indicated in the text.
- **Consumer:** buyer of the end product. The buyer may be a private person or an organization.
- **Consumer products:** products in their final packaging or sold in bulk, destined for the consumer or for organizations. Products sold to organizations that are worked into other products, are not considered consumer products.
- **Consumption parts:** parts, to the consumption of which the use of a utensil leads, including all parts that need to be replaced within the life time of the utensil.
- **Consumption item:** product intended for one-time use.
- **Demonstrate:** show to the auditor/verifier with solid evidence. The word “demonstrate” does not indicate public transparency.
- **Downstream supply chain:** Direct customers and further down to end of product life stage.
- **End-producer:** depends on the situation:
 - If the end product is marketed under a brand name, traceable for the user, the owner of the brand name.
 - If there is no brand name, traceable for the user, the organization that makes the decision for the end-product to be produced (usually the company that markets the product), excluding retail organizations without own production facilities.
- **End-product:** the product, as it is presented to the consumer.
- **Impersonal service:** a service that is delivered to large groups of customers.
- **Fair minimum wage:** gross hourly income presented in (Croes & Vermeulen, 2016b)
- **Fair inequality:** gross income differences within the organization higher than the maximum ratio presented in (Croes & Vermeulen, 2016a)
- **Gasses:** includes fine dust (although in various sections fine dust is also mentioned separately).
- **Km.** = kilometer; **Kg.** = kilogram; **Kj.** = Kilojoule; **Kwh.** = Kilowatt hour
- **Low developed supplier (LDS):** a not certified supplier, without a clear management structure, without the knowledge to understand this standard, without relevant contacts reaching beyond its direct activities, or heavily instructed by the organization. (e.g. private person or family, a workshop, a farmer, a small cooperative).
- **Non tangible energy products:** electricity, heat and cooling.
- **Normal use:** see section 11.2
- **O.F.:** Oiconomy Foundation, the standard owner.
- **Organization:** any unit that produces, organizes or trades something and is paid for its product or service with money or a returned good or service.

- **Origin:** any step in the supply chain where both the purchased value ratio and the purchased weight ratio is below 20%.
- **Origin resource, origin commodity, or origin material:** resource produced at origin (usually mining, agriculture forestry or fishing).
- **O.S.:** Oiconomy Standard.
- **Personal service:** a service that is delivered to one single or a specific small group of customers.
- **Personnel:** all persons working for the organization for more than 30 days per year, either as employee or contracted.
- **POP:** persistent organic pollutant.
- **Primary resources:** An origin material or a material directly derived from an origin material, traded and used as a commodity. (e.g. iron ore is an origin material and primary resource; iron is a primary resource).
- **Product:** is to be understood in the widest possible sense, including services and energy.
- **Purchased value ratio:** purchased value divided by product turnover.
- **Purchased weight ratio;** purchased dry weight divided by product dry weight.
- **Quality:** delivery of a product according to customer's expectations and without negative consequences for his/her well-being.
- **Quantity:** unless otherwise stated, the yearly amount in kg., measured over the past year.
- **Raw material:** a material that is worked into a product or an essential component of a composite material.
- **Related to the product:** If an organization produces only one product, all its activities are related to the product. In an organization that produces several products, the term relates to all facilities, equipment, materials, people and activities that are used for the product, disregarding the importance or quantity of that use. Where ESCU allocations need to be distributed over different products, the same ratios shall be applied as are used in the organization's standard financial cost allocations.
- **Remuneration:** the sum of the value of all gross payments of money or goods to an employee, including the value of payments which can only be made real in the future, all calculated by their last full year's average value.
- **Risk DNA:** genetically modified DNA without solid and published and peer reviewed evidence of its safety for people and that this DNA, set loose in nature, may supersede or damage other organisms, or without effective control by an international body of supervision, or may endanger available DNA variety of the species.
- **ESCU: Eco Social Cost Unit** = the (un)sustainability score allocated by this standard.
- **SCID:** Supply Chain Impact Diagram.
- **Sustainability:** the responsibility to act meeting the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland Report). This standard includes both environmental, social and economic aspects in sustainability, but limits itself to the aspects listed in section 3.12.
- **T.C.R.'s:** Tasks, Competences and Responsibilities
- **Default ESCU score:** ESCU determined by O.F., by applicants, or by others, approved by O.F.
- **Unsustainability:** the lack responsibility to meet the needs of the present and the risk that the needs of future generations are being compromised.
- **Upstream supply chain:** the chain of first, second and further tier suppliers, back to origin.
- **Utensil:** product that can be used more than one time, either an item intended for business use or for consumer use.
- **Waste:** the sum of all solid, liquid and gaseous materials that during the production or use and at the end of the lifecycle of the product end up somewhere in the environment or are incinerated.
- **Year:** used in calculations may be a calendar year, a fiscal year or a year to date, provided that the chosen system is maintained.

6. Goals of this standard.

1. Transparency.

Clear, open, uniform, complete and honest reporting of (un)sustainability.

2. Fair and Objective Assessment.

To enable consumers, entrepreneurs and governments to make their purchases based on a fair consideration of all sustainability aspects and therefore contribute to a sustainable economy.

3. Communication.

To simplify sustainability measurement for businesses by means of a normalized way of measurement and communication of sustainability data in the supply chain.

4. Consciousness.

To accomplish that at high pace organizations increasingly become conscious of the damage their products may cause and of the costs to prevent damage and that sustainability is the focus of competition.

5. Preventative thinking.

To continuously confront organizations with the need of preventative thinking.

6. Responsible Economy.

The final goal is to change the focus of global competition on sustainability and create a sustainable economy, based on the free market, but based on real prices without externalities.

7. Gradual development to total sustainability.

Achieve sustainability in every action of mankind without destabilizing shocks effects, rebound and backfiring effects.

7. Principles of this standard.

7.1 Risk and Sustainability assessment.

The organization makes a self-assessment of the (un)sustainability and the risks related to a product's life cycle from raw material extraction to waste disposal.

7.2 Eco Social Cost Units.

Every product or service is allocated a score depending on the level of sustainability, expressed in **ESCU's (= Eco Social Cost Units)**. The score on every sustainability aspect contributes to the total score of ESCU's according to the additional preventative costs which would have been necessary to produce a product with zero damage on any aspect. However, since all category scores are made available, the practitioner will always have available a category matrix and stakeholders may require their own composite indicator.

7.3 Fundamental aspect categories.

ESCU's are determined by reducing types of aspects back to the 10 fundamental aspect categories. If a product has impact in different fundamental aspect categories, different categories of ESCU's will be allocated. If the organization can demonstrate a case of double counting, e.g. in the case that one preventative measure is effective in more than one categories, by means of a concrete and costs calculated plan of improvement, the score may be corrected by taking the highest only.

7.4 Supply chain.

Sustainability cannot be demonstrated without knowledge and communication about the complete supply chain. The method of calculation of this standard requires organizations to investigate backwards (upstream) in the supply chain by requiring ESCU's from suppliers.

The method also requires end-producers to investigate the potential unsustainability related to the product forwards (downstream) in the supply chain.

The (un)sustainability at any stage in the supply chain is transferred to the next stage by the ESCU's in the same way as costs are transferred by a normal price in a monetary unit. The comprehensive ESCU consists of several category-ESCU's, which can be transferred through the supply chain separately if the stakeholders require so.

7.5 Systematic approach.

This standard systematically leads the practitioner to determine the hidden costs of the life cycle of his product: the purchased products, all stages and types of transport, his own Gate to Gate operation, the use phase, the disposal and of his positive contributions (negative ESCU's). It also systematically leads the applicant along all 10 fundamental aspect categories and the sustainability aspects in each category.

7.6 Standards per sector.

Where necessary, a specific sector version of this standard may be written. Sector organizations for groups of companies that are relatively simple and of similar nature (e.g. for a certain type of farms) may even write their own standards or code of practice and submit these for approval with an accreditation body. However, all these standards must answer to the umbrella Oiconomy Standard and the participating organizations may not produce products other than the products covered by the sector standard.

7.7 ESCU scores and marginal preventative costs.

The default ESCU scores represent marginal preventative costs. They are determined by the most expensive of preventative measures that need to be deployed to globally reach the relevant target.

When several product scores are available O.F. will present averages for product categories, which averages may be used to determine the relative ESCU score indicating the sustainability performance of the product compared to other products in the category. Both product scores and averages may differ per location (for instance due to differences in transport distances and methods of collective disposal methodologies).

7.8 Measurability en verifiability.

All criteria of this standard require the measurement of the quantity of an aspect (Q_{Aspect}) which is multiplied with a price for that aspect (P_{Aspect}), for which a default value is available in the **[O.F. Database]**, based on the marginal preventative costs for the relevant (sub) category. For an organization or a product not all aspects may be relevant, mostly depending of the country of the activities. The organization may use its actual specific costs of prevention if it can demonstrate that **[O.F.-04 Country Statements]** contains a list indicating the relevance of some aspects per country (e.g. indicating "in the Netherlands child labor may be assumed irrelevant"). These statements may be used without any further evidence.

Where concrete data are hard to get, this standard takes the level of governance on the relevant sustainability aspect as verifiable criterion for the determination of ESCU's, measuring the compliance to common management system criteria.

7.9 Self-learning database.

The **[O.F. Database]** contains the price component (P_{Aspect}) of the ESCU's to be allocated, to be multiplied with the quantitative component (Q_{Aspect}), determined according to the criteria of this standards. P_{Aspect} is determined by the marginal preventative costs per impact category. Initially default values for P_{Aspect} are predetermined by science and shall be used if no different value can be

demonstrated. Because both market and science will continuously develop and provide new data, which are fed into the system (anonymously), the database becomes self-learning.

8. Oiconomy Foundation.

An organization (preliminarily called “The Oiconomy Foundation” (O.F.) will have to serve as standard owner and provide:

1. Consultation of stakeholders by means of a Central Committee of Standards.
2. Prepared calculation methods enabling determination of ESCU’s by the filling in of prepared forms.
3. Maintained databases with default values and adapt default values using market data.
4. Tools for organizations to automate their ESCU calculations.
5. Visibility and transparency on the internet of the sustainability of certified products and of the worst case scores which non certified products may have.
6. Automated alarming of strongly aberrant ESCU scores, in support of the auditors.
7. Clearly published information on the internet of typical types of unsustainability related to product categories.
8. Training of auditors and tuning between certification bodies and auditors.
9. Tools for the consumers/users or warehouses to facilitate product comparison.

9. Verification.

The goal of verification is to verify the trustworthiness and transparency of the calculations and the information concerning the sustainability of the product.

Verification methods are under development, which will probably be risk a based certification, a type of certification based on risk of damage such as hotspot databases. In such system, frequency, scope and costs of verifications depend on risks. Risks depend on the country/region of activities, sector, size and complexity of the product and the organization, other certificates, history of reliability and transparency.

The criteria will be described in the Oiconomy Certification/ Verification Requirements.

10. Presentation and communication in the market place

This standard primarily leads to one comprehensive ESCU score, which is the aggregation of category scores. The organization shall keep a bookkeeping of the category scores and be able to present these if required by its stakeholders.

Presentation of logo and scores in the market may be developed. Preliminarily this will be left to the market. Criteria will be described for the presentational use the ESCU in the Oiconomy Certification/ Verification Requirements.

11. Requirements for organizations with certified products.

11.1 The organization and its products.

All requirements apply to the products of the juridical unit, but additionally some data are required of sister company’s products of the same category.

Products of an organization that is part of another organization cannot be certified if the mother organization is not included in the conception of the criteria and in the verification.

11.2 The product and its normal use.

The organization that is the end-producer and any producer of a product with one major function that is practiced by more than 80% of the users, shall define and disclose what is the function and what is “normal use” of the product. If a product has large (collective turnover >\$ 1 billion) and very different categories of use (e.g. coal for private homes and coal for large electricity generation), different categories of “normal use” may be defined, provided that it can be demonstrated that the exact category of use is communicated to the downstream supply chain. The organization shall also investigate practices of use in the market and average or most common use. Deviations of its definition of normal use from average use shall be justified. The organization shall determine, in practice, the expected lifetime of the product at normal use (does not need to be equal to the warranty period). For the lifetime a maximum of 100 years may be taken. For this definition the organization shall investigate the life time of similar products in the market. Reasons for differences between the definition of the products’ expected lifetime and practice of similar products shall be based on substantial and demonstrable product differences. For services, including the use of tangible products defined as the product (e.d. “ an hour of light”), no definition of the product life time is necessary.

If the definition of the product and its normal use involves the risk of disputes on the responsibility for aspects of the product, these responsibilities shall be in agreement with all involved parties and the definition of normal use based on the agreement.

11.3 Organization schedule.

The organization shall publish on the internet a transparent organization schedule of the complete network of organizations which it is part of, including trusts and foundations, describing all product categories and locations that the relevant organizations are active in. In addition the organization shall keep a list with all shareholders owning 5% of the shares or more. If the organization is owned by the state, the requirements of this paragraph apply from the biggest juridical unit down that is owned by the state. The language(s) of the schedules must be easily understood by consumers in all countries of use of the product.

11.4 SCID and cutting off point.

11.4.1 Contribution ratios.

The organization shall demonstrate, based on last full years data:

- The %G2G (percentage Gate to Gate Contribution) of the added value to the product (before tax, profit and interest, but including depreciations) of organization’s own operations.
- The %SC (percentage Supplier Contribution) of the value of the product (= 100%- %G2G).

11.4.2 List of materials and services.

If in the following materials or services are used for several products, organization’s own financial allocation methods shall be used for allocation of quantities to the product.

A list shall be demonstrated, consisting of:

- All major purchased materials with the total volume (in kg.) required for the product. Such purchased materials may be ingredients/components of the product, processing aids, packaging materials, cleaning materials, analytical materials, administrative or any other materials. For moisture containing ingredients/components of products sold by weight, the dry weight volume is taken, for other materials the weight as purchased. Water is considered a service and added later. For materials used for several products, use organization’s own financial allocation methods.
- The obtained list shall be sorted by dry weight volume. Starting from the highest dry weight volume down, keeping all (major) materials until at least 80% of the total purchased weight

volume is reached. The remaining (minor) materials, but only with lower single purchased weight volume than 1%, are removed from the list. (If in advance, without any doubt a material will be a minor, it does not need to be listed in the first place).

The total percentage of the material that brings the total purchased weight to over 80% shall be included. (e.g. for a coffee product, if coffee beans account for 90% of the total purchased volume, 90% is the volume to be taken into account instead of 80%). If purchased products are very similar, such as various types or origins of coffee beans, they may be combined considering this detail truncation.

- Added to the list, if not already on, shall be all energy resources and energy carriers, disposal services, and the materials, purchased in smaller amounts, but occurring in the list [**O.F.-11 High impact Products and Activities**].
- Added to the list shall be any categories of yearly purchased non tangible services with higher individual financial contribution than 1% to the cost of the product (including water, financial products, consults transport, cleaning, transport, research, engineering, rented and leased materials, and other services).

Percentage allocations of services provided for more than one product shall be equal to the organizations' standard financial allocation methods.

Also services separately paid for by customers for services (e.g. transport) shall be included if the service is arranged by the organization.

- Every item in the list is described with its contribution percentage which is calculated as follows:
 - a. For materials: $100 \times \text{purchased dry weight} / \text{products' dry weight}$.
 - b. For services: $100 \times \text{purchased value} / \text{products' value (before profit, tax, interest)}$
- Add all obtained contribution percentages together (note that the total percentage may be higher than 100%) and proportionally reduce the SCID contribution percentages for supplied materials and services back to the total of the %SC. (see above)
- The obtained list is the "**SCID list**" for supplied materials and services that shall be included in the assessment, listing for each item:
 - a. The item and unique number.
 - b. The determined SCID contribution percentage (SCID %).
 - c. The "purchased value ratio": the value of the purchased materials/services divided by the product turnover (average over 5 years).
 - d. The "purchased weight ratio": the dry weight of the purchased materials used for the product, divided by the dry weight of the product.

11.4.3 SCID (Supply Chain Impact Diagram).

The organization shall demonstrate a diagram (e.g. fishbone) of the supply chain including every item on the SCID list, back to certified suppliers, or else to the origin of the materials (or services).

This diagram shall describe in generic terms for all items:

- a. All upstream steps in the supply chain, their major function(s) and involved countries of the relevant operations. End-producers shall also include downstream steps in the supply chain, the phases of use and end of life.
- b. All known and all potential sustainability aspects of every step in the supply chain. All potential aspects as described in this Oiconomy Standard shall be considered.

Because of competition and potential sensitivity of the data it is not required to include the names of all actors in the upstream supply chain.

The cutting off point for the upstream assessment (origin) is at that stage in the supply chain where both purchased value ratio and purchased weight ratio are lower than 20%. Usually this will be a stage of extraction (mining; agriculture; fishing), unless for extraction large percentages of other materials or services are used, or materials or services are used listed in [**O.F.-11 High impact Products and Activities**].

In case of several suppliers or supply chain character difference for one material, all supply chains shall be described. This diagram is called the "SCID" (Supply Chain Impact Diagram).

A version of the SCID shall be available for all customers with enough data to enable the customer to make his SCID.

11.4.4 Outgoing materials

The organization shall demonstrate a procedure and bookkeeping of all solid and liquid outgoing materials related to the product, including product and waste and including time and reason of existence, and time and destination of leaving the organization. The materials shall be categorized by type of material.

11.5 Governance level.

The organization shall measure its sustainability governance level using the **[O.F.-23 Governance Level Scoring Model]**. Organizations with a verified general organization governance level score > 0,7 may contribute to the creation of new subcategories, database and formation of collectives (see sector 12.2.11).

11.6 Communication.

The organization shall not use any public communication contradicting the calculated ESCU's. If a specific industry sector carries a special responsibility for any aspect of sustainability, the ESCU scores on that specific aspect shall be communicated in the market together with any other communication on sustainability. (E.g. the economic responsibility for financial products or food safety responsibility for foods). **[O.F.-24 Special Responsibilities]** lists these special responsibilities.

12. Criteria for ESCU calculations.

12.1 Definition and types of products

For a general definition see section 5: abbreviations, terms and definitions.

The ESCU score of a product may depend on the location of sales. Especially transport ESCU's may differ considerably. Therefore, the organization shall consider products in different countries, and even regions, as separate products if the ESCU score of one and the same product differs more than 5% depending on the location of sales.

This standard distinguishes the following types of products:

- **Consumption items:** Tangible products, of which the essential part can only be used one time.
- **Utensils:** Tangible products which can be used several times at similar quality level.
- **Personal services:** Products which are not tangible, provide a solution for a specific customer and are delivered to a relatively small number of customers.
- **Impersonal services:** Products that are not tangible and of which equal versions are delivered to large quantities of customers.
- **Capital Goods (utensils):** products that are used for the production of other products.
- **Non tangible energy products:** Electricity, heat and cold.

For each product, ESCU's are allocated for the following five life cycle contributions:

1. **Supplies:** The ESCU's of all previous steps in the supply chain.
2. **Organization own contribution:** The ESCU's for all steps belonging to organizations' own responsibility, including transport and waste that exists as a result of processes.

3. **Use or Consumption:** The ESCU's caused by the shared responsibility for the damage that exists at the user's end during the use of the product.
4. **Disposal:** The ESCU's that are the result of the waste and its handling that exists at the end of the life cycle of the product.
5. **Negative ESCU's:** The negative (or bonus) ESCU's that are allocated due to a defined series of activities favorable for the environment and/or social or economic conditions.

12.2 General rules.

12.2.1 Sum and subtotals of ESCU's.

By following the sections of this standard, the **[O.F.-ESCU Matrix]** of ESCU scores is created. The calculations for the 5 life cycle contributions listed in section 12.1 result in the 5 life cycle subtotals for ESCU's: **[ESCU-purchase], [ESCU-operation], [ESCU-use], [ESCU-disposal] and [ESCU-bonus]**. The sum of these 5 values makes **[ESCU-product]**, the final product score.

The calculations for the 10 aspect categories result in the 10 category-subtotals for ESCU's: **[Total-Pollution], [Total-Depletion], [Total-Land], [Total-Biodiversity], [Total-Waste], [Total-Public Health], [Total-Economic], [Total-Labor], [Total-Corruption], [Total-Various Social]**.

Both aggregating the 5 life cycle subtotals, and aggregating the category-subtotals result into the ESCU- Total for the product.

All Totals shall be registered and demonstrable for verification.

The ESCU – Total and the category-subtotals shall be communicated through the supply chain.

12.2.2 Price factors

For every aspect an ESCU allocation is determined by multiplication of a quantity factor (Q_{Aspect}) and a price factor (P_{Aspect}). The quantity factor is obtained by following the criteria of this standard. The default price factor represents the globally marginal preventative costs for the relative impact category (not the same as the categories used in this standard) and is listed in the **[O.F. database]**. The default value shall be used if no more specific value can be demonstrated.

The organization is challenged to use its own more specific value by demonstration of a detailed cost/investment calculation for the measures, the expected reduction and the expected remaining quantity of the aspect. If the expected prevention is below 100%, for the remaining quantity the O.F. default P_{Aspect} shall be used.

Specific self-determined values must be based on and feasible for reduction of the organization's own specific impact and may not be based on compensation by activities elsewhere, unless specified in the relevant criteria,. (compensation is covered in section 12.7: Bonus ESCU's).

Industry is challenged to contribute to the creation and updating of O.F. default price factors in one of the following ways:

- Updating of O.F. default price factors by providing new information on preventative costs.
- Providing O.F. default price factors for more specific impact categories e.g. by aspect, industry sector, product group, conditions, processes or other aspects.

New values for O.F. default price factors shall answer to the following criteria:

- The method described in (Croes & Vermeulen, 2014)*¹ shall be followed.
- O.F. default price factors shall be generically applicable for a large number of products. No price factors may be introduced for the purpose of one or few products or organizations.
- Data and methods shall be verified by O.F. or an accreditation body.
- Provided data on preventative costs need to be assessed on if the measures provide a potential solution of at least 5% of global impact and if they change the marginal preventative costs for the impact category.

However, a new subcategory may be created, e.g. for the industry sector, limiting the 5% to the impact within that industry sector.

12.2.3 Actual or last year based calculations.

Where possible and for all criteria, ESCU calculations must be actual per kg. product or per piece. (For non-tangible energy products the unit of Kj. or Kwh. shall be used). Only if an actual calculation is not possible or very complex, for instance because at the moment of production the destination is yet unknown or if a blend is continuously changing, last year's average ESCU score on the relevant aspect may be used. For applying this method, the following extra criteria apply.

- Where products for different countries or groups of countries have different packaging or if for any reason a different product number is used, or if the product undergoes an extra treatment in the country of destination, an actual calculation of ESCU's to the product shall be applied.
- For all products that are not destined for the consumer, or are not packed in their final packaging, an actual allocation of ESCU's to the product shall be applied.
- Importers that are separate juridical units are considered separate organizations and shall make an ESCU calculation for their imported product or answer to the criteria of section 12.3.7.

12.2.4 Responsibility.

The primary responsibility for the end-product is at the end-producer as the finally responsible organization for the design, choice of raw materials and suppliers, production methods and the purpose of use of the product.

The suppliers of components of a product (upstream supply chain actors) are responsible for the complete and correct information regarding the sustainability of their products and may take over the responsibility for the practical disposal from the end-producer, providing this responsibility transfer is covered by contract. (For instance the supplier of car batteries may take responsibility for the disposal and recycling of the batteries). Upstream suppliers also share responsibility regarding the disposal and recycling of their products. The end-producer remains responsible for the information required by this standard.

Upstream suppliers may also take over responsibility of data transfer and present their product as end-product if end-producers mainly follow their instructions and the product is traceable to that supplier by the user. A typical example is the installation at consumers by small installers of equipment with a brand name, that is traceable by the user. Advantages to a supplier in such case may be the ability to self-present ESCU's to the user. Even double end-producers may exist, if both prevent double counting.

12.2.5 Units of calculation.

The calculation method of this standard includes transfer of ESCU's for every step in the supply chain to the next, from extraction to end-product, in the same way as costs are transferred and finally end up in the price of the end-product.

The ESCU contribution of ingredients and parts is directly allocated per kg. or per piece.

The ESCU contribution of non-tangible energy products is allocated per kj. or Kwh.

The ESCU contribution of transport of incoming materials is allocated per km. from supplier to point of use and of transport of end-products per km. from location of production to the point of final sales.

The ESCU contribution of auxiliary materials, machines and other capital goods, personnel, administrative materials and the like, is calculated as an allocation to the products of the total ESCU's in a ratio of the yearly weight or piece numbers of the different products that these materials are used for. For all primary- and bulk resources the ESCU's are allocated per kg.

If for a product category, sales per unit of weight is common practice, the ESCU's shall be allocated per kg. for all products in the product category.

If the weight of a product changes between production and customer or between steps in the supply chain, for instance by evaporation, the ex-factory weight counts.

If sales per unit of weight is no common practice, ESCU's are allocated per piece.

If within an organization, materials which were purchased per unit of weight are worked into a product that is sold per piece, the ESCU's shall be converted per piece in the ratio of the used weights of the different materials. Utensils and impersonal services are allocated per piece.

Personal services are allocated per hour of labor.

If no calculation per unit of weight or per piece or per energy unit is possible, no certificate can be granted. The last stage of all calculations is always the conversion to ESCU scores per kg. or per piece (depending on the way of presentation).

12.2.6 Allocation of services.

The ESCU contribution of services, such as financial products, is calculated as an allocation of the total ESCU's per year to an in the industry sector common unit. Actual values from the complete last year shall be used.

12.2.7 New or changed products.

For new products actual values shall be used. For substantially changed products or production methods, actual values shall be used as soon as more than about 50% of the products in the market place have been replaced by the new version.

12.2.8 Allocation of indirect ESCU's.

If an organization sells more than one product, all directly to the product belonging ESCU's shall be allocated directly to the product. The allocations of indirect ESCU's shall be executed in the same ratio as financial costs of the relevant material or activity are allocated in the organization.

12.2.9 Burden of proof.

If an organization cannot demonstrate that the product has no impact on a sustainability aspect, it must be assumed that it does have the impact.

12.2.10 Frequency of updating of information.

ESCU's for a product can be updated on a yearly base only, unless new or substantially changed products are concerned. The information on the packaging shall describe the moment of production but may be one year behind (for reasons of finishing packaging stock only).

12.2.11 Industry sector cooperation and collectives.

Where this standard requires analyses by an accredited certification body (CB), cooperating organizations within an industry sector may execute such analyses and share the data together. However, for the benefit of such cooperation, the CB shall be notified about the exact relevant circumstances and process conditions which the analysis is based on and each organization sharing the data shall demonstrate that the product meets these circumstances and process conditions.

If a collective of organizations can demonstrate that on a certain criterion of this standard, considering a product that all members sell, there is very little difference in the sourcing of raw materials and the used processes, it may take the responsibility to determine a "default ESCU score" on the relevant aspect valid for all group members. This can be done for individual aspect categories, but also for the total ESCU value. Participants of such collective may not produce or sell products not covered by the collective certificate, unless they can demonstrate a bookkeeping for the shared product information completely separate from other products with no chance of affected ESCU allocations.

12.2.12 Use of the O.F. database.

The most recent version of the O.F. database shall be used as it is presented on the website: <http://http://oiconomy.sites.uu.nl/>.

12.2.13 Double counting exemptions.

By this standard the applicant is guided along all different aspects, for all of which ESCU's are allocated equal to the marginal preventative costs of the relative aspect category. Where one measure can prevent impact in different categories, a case of double counting exists (e.g. the use of mineral oil for energy gets ESCU's for GHG emission and for depletion of resources and in some cases also for safety or labor conditions).

If the organization can demonstrate a measure that prevents impact in more than one category, only the highest of all ESCU allocations that can be prevented by this measure, is allocated. Evidence for such double prevention may be provided by a scientific publication, by being listed in **[OF-45 Cases of double counting]**, or by a concretely tested and elaborated calculation by the organization itself (e.g. for an investment proposal).

12.2.14 Spatial exemptions.

The impact of an aspect may depend on the location. Where it is (scientifically or by a therefore accredited body) demonstrated that, out of clear location dependent reasons, an impact, assumed by this standard, is totally absent, no ESCU allocation is required.

12.2.15 Case specific price factors information sharing.

This standard uses the **[O.F. Database]**, providing default price factors based on the marginal preventative costs per impact category, which are allocated per quantity unit.

At most (but not all) criteria this standard allows and even challenges the organization to demonstrate product's own specific "cost-distance to sustainability". The following criteria apply for the use of a case specific price factor:

1. Cost calculation methods, used for new price factors, may not differ from standard operational methods (e.g. concerning allocations, interest and depreciation).
2. However, depreciations of capital investments shall be based on realistic expectations of the life time of used equipment, transport means and buildings.
3. Mitigating on one aspect, considered shall be the potential changes to other aspects. Preliminarily only significant changes shall be considered here. If implemented all aspects will be calculated.
4. The calculations must be based on realistic measures and investments feasible to be practiced by the company.
5. The data shall be verified by a certification body, using person(s) qualified both on the relevant aspect and on financial cost calculations.
6. The data shall be shared with the O.F., which can use these data to continuously improve the data in the database (anonymized) and the organization shall provide specific information on O.F. request, considering research on marginal preventative costs.

Demonstrated shall be what level of impact reduction can be achieved. The ESCU allocation shall be calculated as the sum of ESCU's, obtained using the costs of the proposed measures, and the not prevented ESCU's using the default price factors from the database.

12.2.16 Grouping of products.

Organizations often produce series of very similar products. If similarity on sustainability aspects can be demonstrated, ESCU calculations may be made for groups of products with one product (group) name and -number. The exact composition of such group shall be notified with the CB.

12.3 Supplier's contribution.

12.3.1 Gradual institution and minor contribution exemption.

In a fully grown and operational system according to this standard, organizations will require and get ESCU's and information from most of their direct suppliers and hardly need to investigate upstream supply chains themselves.

During the startup stage of this standard most products will not have been certified. In order to facilitate implementation, the analysis of the unsustainability related to purchased materials is initiated in stages:

1. Generally, the contribution to sustainability aspects by purchased materials will obey to the rule that a small number of materials accounts for the major quantity of impact. The SCID method, discussed in section 11.4, limits the life cycle analysis to only really relevant upstream supply chains.
2. Capital goods only need calculation of ESCU's after further development of this standard. Until further notice the ESCU score of list **[Supply-Capital Goods]** may be considered zero and section 12.3.6 may be neglected. However, this exception does not apply for capital goods for production, transport or storing of renewable energy, water-, air- or soil- cleaning installations or other equipment specifically designed for environmental reasons, and it does not apply in cases where the economic depreciation of the capital goods accounts for more 20% of the total costs of the product. For products for which ESCU calculation of capital goods is required, this may be limited to the 80% of the involved capital goods (sorted by depreciation with highest on top). If involved capital goods are used for more than one product, ESCU allocations shall proportional to the ratios as used for standard economic costs.
3. For materials and services purchased from not-certified suppliers, the environmental data must be determined by a conventional LCA and ESCU's calculated in the same way as described in section 12.4 for the gate to gate phase. If a default ESCU value is available in **[O.F. 02 Default Product ESCU Values]**, it must be used. For social and economic aspects however the data need to be obtained from the actual upstream supply chain.
In a running system new "Default ESCU scores" will be created from the industry data, also for social and economic aspects. Such default ESCU scores are based on generic category marginal preventative costs.
4. Other rules for obtaining ESCU scores for not certified purchased materials are described in section 12.3.4.

12.3.2 Registration of supplies and ESCU's.

On the ESCU's determined with the methods prescribed in section 12.3, the following surveys shall be maintained (only for materials listed in the SCID list (see section 11.4):

- **[Supply-Components]:** Ingredients and packaging materials, their weight contribution to the end-product and their ESCU contribution.
- **[Supply-Auxiliary Materials]:** Auxiliary materials, lubrication materials, water, energy resources and other materials that will not end up in the end-product, and their ESCU contribution.
- **[Supply-Capital Goods]:** Capital goods, means of production and of consumption items used for the production and their ESCU contribution.
- **[Supply-Services]:** Purchased services and their ESCU contribution, including contractors, financial institutions, consultants, detachment offices and suppliers of other services, and their ESCU contribution.
- **[Supply-Personnel]:** Personnel and their ESCU contribution (total only).
- **[Supply-Distribution]:** Distribution: all intermediate organizations that are used to get the product to the consumer or end user, and their ESCU contribution.

12.3.3 Use of O.F. Country statements.

[O.F.-04 Country Statements] contains generic data on countries and an inventory of countries which may be assumed free of impacts on the different sustainability aspects on the product or raw material. These statements may be used without further evidence. If a supplied material, product or service consists of a composition of deliveries from several countries for which the statements differ, the organization shall separate the relevant data accurately. If the practical or juridical ownership of a material makes a detour over more than only the country of origin and the country of destination, all concerning countries must be taken into account. If the organization cannot demonstrate exact recording of the origins and ownership flow of its supplied materials, the worst ESCU outcome of possibly involved countries shall be assumed.

12.3.4 Supply chain.

If the product is not an “origin material” (see definition), ESCU’s for certified materials shall be required from the suppliers, including their certificate. The data shall be verified with the use of **[O.F.-01 Certified Products]** and thereafter registered in the relevant **Supply-lists (section 12.3.2)**. For not certified materials the ESCU’s shall be obtained in one of the following ways:

- Require certification of the relevant purchased product.
- If **[O.F.-02 Default Product ESCU Values]** or **[O.F.-03 Default Agricultural Product ESCU Values]** lists a “Default ESCU score” (see definition and section 12.3.1), for either an aspect category or for the total of all aspects, it may be used. For lower scores and for lacking data on categories evidence shall be demonstrated. Such evidence may be obtained by having a therefore accredited CB determine the ESCU score at supplier’s site, per aspect and presuming worst case situations where no evidence of a better situation is demonstrated.
- If a large primary resource is concerned and **[O.F.-02 Default Product ESCU Values]** or **[O.F.-03 Default Agricultural Product ESCU Values]** lists no default ESCU score, or data are lacking for aspect categories, O.F. may be requested to determine such default ESCU score on paid base.
- If no primary resource is concerned and the requirement of certification was neglected by the supplier, the search for a more willing supplier shall be started. Intermediately however, the following two step method may be used:
 - Determination of the quantities of the primary resources (see definition) which were used for the production of the material. The determination of the ESCU scores for such materials is described above.
 - By investigation of literature, suppliers, knowledge institutions, NGO’s, LCA databases, hot spot databases and the internet, it must be determined if between the relevant material of origin and the purchased material steps occur which might have major (>10%) influence on the ESCU score of the purchased material. If so, no other possibility than finding a certified supplier is available. If however, thorough investigation demonstrates that only minor impact may be expected, these influences preliminarily may be neglected.

Under no circumstances, the ESCU score of a not certified purchased product may be lower than any similar product listed in **[O.F.-01 Certified Products]**.

All obtained ESCU scores shall be listed in the relevant **Supply-list (section 12.3.2)**.

12.3.5 Grouping of small suppliers.

The organization **may** take over the task of ESCU calculation from groups of suppliers provided that:

- The relevant products of the suppliers were not certified before.
- The supplier has no more than 10 employees.
- The organization has more than 10 suppliers for the relevant material and these suppliers are verifiably of similar character and company management.

- The organization can demonstrate to be knowledgeable about all aspects of the management of the small suppliers, has clear and communicated guidelines about the management of sustainability aspects for these suppliers and verifies at least sample wise, following sound statistical techniques and therefore qualified people.
- The CB has given permission for the take-over of the calculations and samples the relevant group of suppliers during its audit.

This possibility of take-over is intended for example for large groups of small farmers and workshops of small businesses, or home workers.

Organizations with a turnover over € 50.000.000, - (for all its outsourced activities for the product) **shall** investigate the possibility to take over the calculations for groups of similar small suppliers before using other methods (see section 12.3.4) to obtain ESCU scores.

If an organization is supplied by several small businesses through one or more third parties (usually trade, transporter, intermediary, warehouse), which do not have certificates for their services, the organization may also take over the calculations for these third parties under the same conditions as described above (except for the requirement that at least 10 of these parties are required) and providing that de ESCU's include the contributions of the activities of the third party itself.

Also sector organizations or other collectives may take over the calculations from small businesses (<10 employees) under conditions as described above, provided that the relevant collective itself is a juridical unit.

12.3.6 Capital Goods.

The use of capital goods such as buildings, machines and furniture are automatically included in the calculations required by this standard. But all capital goods ever have been produced and will be disposed of, causing damage. For new capital goods, the (un)sustainability related to their production and disposal shall be calculated and ESCU's allocated to products in exactly the same ratios as the capital goods are depreciated and costs are allocated. Often however, calculation of the contribution of capital goods will not be necessary because they might fall under de exemptions described in the sections 12.3.1. In cases that the contribution of capital goods does need ESCU allocation, the following rules apply:

In principle the ESCU scores that exist at production and disposal shall be requested from the supplier of the specific capital good. At first certification the organization usually owns existing capital goods. Suppliers may not have been certified at the moment of their supply or may even not exist anymore. For these cases for categories of (not exempted) capital goods, **[O.F.-13 Capital Goods]** lists the ESCU's to be allocated, expressed in %'s of the depreciation.

12.3.7 Trade and intermediaries in the downstream supply chain.

All organizations in transport, service and trade that are used by the end-producer to get the product (unchanged) to the consumer or end user are considered suppliers of services (warehouses, retail, trade, exporters, importers, intermediaries, etc.), in spite of the fact that in reality such organizations are often customers. This type of suppliers shall calculate and communicate their own contribution per kg. product or per piece, but may do so for groups of products with similar impact magnitude (e.g. for supermarket deepfreeze; cooled, fresh, etc.). This contribution shall consist of:

- Suppliers contribution (section 12.3), but not include the involved traded goods.
- Gate to Gate contribution (section 12.4).
- Bonus (section 12.6).

The average of these ESCU (of all such supplier's/customer's contributions shall be listed in the relevant **Supply-list (section 12.3.2)**.

12.3.8 Allocation of ESCU's.

ESCU's of purchased materials are allocated to products the same way the organization allocates costs of these materials to the cost price of the end-product.

As with standard costs there are direct and indirect ESCU allocations. Direct ESCU's, for materials or activities that are 100% related to the product, shall always be allocated to the product per kg. or per piece.

For indirect ESCU's, generic rules may be used to evenly spread ESCU's over products provided that can be demonstrated that all relevant products have an even (less than 5% variation) contribution to the relevant sustainability aspect. If there is no even contribution of the different products of an organization, the following rules apply:

- Materials from list **[Supply-Components]** per number of pieces or unit of weight. If water or other ingredients may evaporate, "ex-factory" quantities are applied. Water and purchased gasses are also considered materials with ESCU's.
- Materials from **[Supply-Auxiliary Materials]** (auxiliary materials, gasses, lubrication means, energy resources and all other materials that are used or consumed during production, the ESCU's are allocated to products based on number of pieces or unit of weight in the ratio they are used for the relevant product, decreased with the recovered quantity. If an unambiguous allocation is not possible or too complex and if all products of the organization are certified and if none of the relevant materials has a relatively high contribution to the total ESCU score, a similar ESCU allocation may be used as the organizations uses for cost allocation. In other cases, it shall be demonstrated that no ESCU's are `allocated away` to not certified products.
- For materials from **[Supply-Capital Goods]** the allocation of ESCU's is executed the same way as costs are allocated (based on the real expected depreciation period and replacement value).
- The allocation of ESCU's of services of the list **[Supply-Services]** is direct where possible and where not possible in the same way as cost allocation is applied.
- For out-placed internal and external transport of goods the ESCU's per km. as listed for the different transport means in **[O.F.-08 Transport Means]** apply.
- Services products (internet, telephone, pest control, catering, security, banking, accountancy, etc.). In support of the administrative feasibility this standard permits to keep a group `various` of maximum 20% of the total services and various items out of the calculations, provided that this group consist of the items with smallest cost contribution to the organization and which are no end-products of the organization itself.

12.3.9 Total ESCU score for purchased products.

The subtotal **[ESCU-Purchase]** is obtained by aggregation of all ESCU's for purchased goods and services for a product.

12.4 Organization's "Gate to Gate" contribution.

For all damage to the current or future generations of man and environment, ESCU's are allocated to products, based on the 10 fundamental aspect categories listed in section 3.12.

(Good knowledge of the previous sections is required, especially of section 5: abbreviations, terms and definitions).

12.4.1 Pollution.

This standard distinguishes 5 measurement method-related pollution subcategories:

- A. Air Pollution by the emission of bulk gasses.
- B. Pollution of land or water by agricultural practices, not easily measurable, which are best prevented by best practices, and best measured by the level of governance.
- C. Pollution of air, land or water, with measurable quantities of emission.
- D. Heat pollution.
- E. Potential pollution by incident caused emissions of any type.

All direct and indirect emissions shall be considered, including harmful chemicals that enter the environment via defecation of humans and animals.

The organization shall assess, using therefore qualified persons, if its activities or materials related to the product, cause pollution. If an organization may reasonably expect that, related to the relevant product or for general purposes, it causes pollution of air, soil or water, it shall determine, initially and at relevant process changes, using a therefore accredited testing body, which type and which quantities of harmful chemicals or substances are emitted and how to sample and measure the yearly emitted quantities, using validated methods only. If however, the organization can demonstrate to only perform standard activities, common to a certain industry sector of which the emissions are known and published, or if the emissions can be calculated and demonstrated accurately from other variables, or if an O.F. default ESCU score on emissions exists for the product, listed in **[O.F.-02 Default Product ESCU Values]**, or **[O.F.-03 Default Agricultural Product ESCU Values]**, that known or calculated score may be used.

If any threshold concentration of harmful chemicals is achieved by dilution, other than by unavoidable and process required activities, the point of maximum achievable concentrations and related quantities of the chemicals shall be taken as base for ESCU allocations.

If it can be demonstrated (by a therefore accredited body) that pollution (other than type A) is, at all times, at the point of highest concentration outside the organization's premises reduced to below the toughest standards of all countries involved in the downstream product life cycle, by either own, municipal or other treatment facilities. "Downstream product life cycle countries" is here defined as all countries of destination of the product and its variations.

If it can be demonstrated (by a therefore accredited body) that pollution is mitigated by external bodies (e.g. by municipal waste water facilities) without intermediate pollution of the environment, and that mitigation is controlled by contract, mitigation measurement and regular communication on the average achieved mitigations, the emission data may be based on the externally mitigated emissions.

12.4.1.1 Type A pollution (Air pollution by the emission of bulk gasses)

The definition of "gasses" includes fine dust. Considering all gasses for any purpose, **[O.F.-05 Energy Resources]** and **[O.F.-14 Pollution Substances]** list the ESCU's which shall be allocated, including:

- GHG emissions caused by combustion of fossil energy resources. From energy suppliers, the ESCU's for certified energy resources are requested per unit of supplied energy or energy resource. Suppliers of energy or energy resources shall, considering losses, production activities, transport, etc., make their "well to gate" calculations according to the criteria of this standard. In addition certified suppliers of energy resources shall provide the exact quantity of emitted gasses and dust particles at normal use of the energy resource (e.g. combustion), if necessary for the different categories of use, and the ESCU's listed for gasses in **[O.F.-06 Harmful Gasses]**. The organization shall yearly verify, using validated measuring methods, if its own gas emissions for energy generation are in accordance with suppliers' definition of normal use, and if necessary correct the ESCU's. If own data are lower than supplier's data, a causal explanation shall be demonstrated showing that the difference is systematic.
Emissions covered by tradable certificates may not be subtracted here, but according to the criteria in section 12.7. If the energy resource is a blend and/or from different sources, the energy supply calculations shall be based on the yearly average composition and the supplier shall be able to demonstrate his balances of sources (see also section 12.2.3).
- Direct gas emissions from products or production processes related to the product, or the consequences thereof (e.g. CFK's, fine dust, evaporated solvents, methane from cattle).
- Gas emissions caused indirectly by the activities of the organization related to the product (e.g. ammonia from fertilizers or methane from barrier lakes).

Not included here are the emissions caused by the use of utensils which are covered in section 12.5 of this standard.

12.4.1.1.1 Use of non-tangible energy resources.

The ESCU's per Kwh. for certified electrical energy, heat or cold shall be requested from the supplier, that has measured or calculated these from the use of his specific choice of energy resources and processes. For not-certified electrical energy, **[O.F.-05 Energy Resources]** lists the ESCU's which shall be allocated by the suppliers per Kwh. For electricity of nuclear origin, the supplier shall use the ESCU's listed for the relevant country in **[O.F.-05 Energy Resources]** (based average carbon intensity).

If the energy resource a blend and/or from different sources, but paid for its components or properties separately (e.g. renewable electricity from the common grid), the supplier shall be able to demonstrate his balances of sources and destinations (see also section 12.2.3).

For electricity from the grid without more specific data on its sources, **[O.F.-05 Energy Resources]** lists the ESCU's/Kwh to be allocated by country and the ESCU's/Kwh if the country of power generation is unknown.

12.4.1.1.2 Emissions by employee commuting.

For transport to and from the work location, **[O.F.-08 Transport Means]** lists the ESCU's per km. per person for the different transport means. The organization shall make an inventory of the commuting distance for all its employees related to the product and their yearly working days, and calculate ESCU's based on driver-only driving an average large family petrol car.

However, if the organization can demonstrate a lower emission than listed in **[O.F.-08 Transport Means]** as a clear result of its policy or calculations based on the specific used transport means, the lower ESCU score may be used. For employees related to several products, ESCU allocation methods shall be equal to the organizations' financial allocation methods.

12.4.1.1.3 Emissions of combustion gasses by transport.

[O.F.-08 Transport Means] lists the standard ESCU's for transport means, which shall be allocated for any transport under responsibility of the organization related to the product (except for the transport covered in section 12.4.1.1.2). The organization shall make a yearly calculation of the ESCU's for each transport volume unit that it uses under its own responsibility (e.g. a pallet size) per km., using the ESCU's listed per ton.km. in **[O.F.-08 Transport Means]**, and last year's average payload occupancy rates of the relevant transport means. Return trips shall be included.

If the organization can demonstrate a lower emission than listed in **[O.F.-08 Transport Means]** as a clear result of its policy, the lower ESCU score may be used. For this purpose, calculations shall be made for transport using exact data on fuel use, emissions and maintenance as for any other process.

For outsourced transport the ESCU's shall be requested from the transport company (note that transport may be excluded as minor outsourced activity in section 11.4, but is always included as own activity).

12.4.1.1.4 Emissions as result of the activities of the organization.

Direct emissions can be measured and ESCU's shall be based the above criteria. Indirect emissions are not always easy to measure.

[O.F.-12 Examples of Indirect Emissions] lists a series of gas emitting activities with the ESCU's that shall be allocated, such as for changes to nature (e.g. forest fires), open methane producing fermentation processes and some types of drainage basins. The organization shall convert the listed ESCU's from the listed unit to ESCU's per kg. or per piece of product.

If the organization can demonstrate a lower emission, confirmed by a therefore accredited body, the

lower ESCU score may be used. For this purpose one-time emission causing actions (e.g. forest fires) shall be depreciated in 10 years.

12.4.1.1.5 Commercial gas.

For purchased gas the criteria of section 12.3 apply (not valid for origin materials). If however, the calculations of the supplier are based on the presupposition that the gasses will never be released into the air, because of installed technology to prevent such release, but proper governance to really prevent emission cannot be demonstrated, the ESCU's listed in **[O.F.-06 Harmful Gasses]** shall be allocated for the full quantity of purchased commercial gas, including the quantities that come as component of equipment.

For gasses that have been extracted from the atmosphere and for gasses that have been collected as a by-product of combustion processes for energy purposes and already obtained their ESCU's, no extra ESCU's need to be allocated, except for the activities required for the extraction, storing and transport processes.

12.4.1.1.6 Calculation of ESCU's for emission of Type A (gas) pollution.

By aggregation, the total ESCU score is obtained for the yearly direct or indirect emissions of gasses listed in **[O.F.-06 Harmful Gasses]**. However, more case specific price factors may be allocated instead following the criteria in section 12.2.15.

The total ESCU score is allocated per kg. product or per piece. If the organization sells more than one product, for emissions that are directly related to the product, the ESCU's are directly allocated to the product, but for emissions caused by more general purposes, ESCU's are allocated using the same proportional allocation as the organization uses for indirect cost allocations.

12.4.1.1.7 Registration of ESCU's for emitted Type A (gas) pollution.

The organization shall, where applicable, keep a list **[Gate to Gate - Pollution A]** with the quantities of gasses that are emitted or indirectly caused and the associated ESCU's per kg. of product or per piece.

12.4.1.2 Type B pollution: emissions of hazardous agri-chemicals.

This section only applies to agricultural organizations. Considered is pollution by nutrients or pesticides, of which the pollution quantity cannot be easily measured. Before considering emissions as type B pollution, the organization shall investigate if they are measurable and in that case consider the emissions as either type A pollution (see section 12.4.1.1), or C pollution, (see section 12.4.1.3). Purchased materials shall be assessed and ESCU allocated like normal purchased materials for their upstream life cycle ESCU's. Nutrients are an inherent requirement for agriculture, but shall be managed properly in order to prevent leaking into water and air systems, land degradation and eutrophication. (Land degradation is covered in section 12.4.4). If the possibility exists that nutrients leak into open water, ground water systems or into the open air, the yearly quantity of leaking nutrients shall be determined/estimated by a therefore accredited body and the quantity considered as type C pollution.

Harmful pesticides need to be avoided, but a farmer also has the responsibility to prevent large scale pests endangering food supply, which sometimes justifies the use of pesticides. The responsible organization complies with the principles of IPM (integrated pest management) as described in standards listed in **[O.F.-19 Approved Standards]**.

12.4.1.2.1 Calculation of ESCU's for type B pollution.

For type B pollution the ESCU's for total purchased quantities of all categories of hazardous agrochemicals listed in **[O.F.-14 Pollution Substances]** shall be allocated per kg. of product, reduced by a reducing calculation factor, determined in one of the following ways.

1. If the organization has certificates, listed in **[O.F.-19 Approved Standards]**, that cover the complete operation relating to the product, no ESCU's are allocated.
2. If the organization has no such relevant accredited certificate that covers the complete operation relating to the product, the organization's governance level shall be assessed using **[O.F.-23 Governance Level Scoring Model]** for the aspect of type B pollution risks, resulting in a reducing calculation factor. ESCU's shall be allocated for the full purchased quantity of hazardous chemicals, multiplied with the reducing calculation factor.
At least initially and thereafter every 4 years this governance assessment shall be executed by a therefore accredited certification body.

However, the organization may demonstrate its own "cost distance to perfect governance" on type B pollution risks instead, following the criteria of section 12.2.15, e.g. by means of a concrete investment proposal or calculations, made or verified by an independent qualified expert, and allocate these ESCU's per kg. of product or piece instead.

12.4.1.2.2 Registration of ESCU's for type B pollution.

The organization shall, where applicable, add its measurable quantities of polluting materials to the list of type C pollution (see section 12.4.1.3), and keep a list **[Gate to Gate - Pollution B]** of the purchased quantities of less concretely measurable polluting materials, and the associated ESCU's per kg. of product or per piece, determined according to the rules described for type B pollution.

12.4.1.3 Type C pollution: quantitatively measurable emissions of substances that should not be emitted to air-, land- or water systems:

- Pesticides other than IPM controlled, in agricultural processes.
- COD in water systems.
- Acidifying or alkalizing agents into soil or water systems.
- Organic solvents, mineral oils and other not accumulating eco- or human toxic substances.
- Risk DNA material': Use of organisms with genetically modified DNA without solid, published and independent evidence that this DNA, set loose in nature, may supersede or damage other organisms or without effective control by an international body of supervision. If more than 1% of the DNA of a material consists of risk DNA, the complete material and lot is considered 'risk DNA material'. Legally permitted risk modified DNA is excepted if it is clearly declared on all packaging or at all sales locations.
- Heavy metals, POP's and in plants or animals accumulating pollutants.
- Antibiotics, hormones, pharmaceutical products and other not previously mentioned human-toxic or eco-toxic substances. Included shall be residual hazardous chemicals present in sold product (e.g. meat), unless it can be demonstrated that these chemicals will never enter humans of the environment (e.g. be means of a very short half time under the relevant conditions).
- Unsterilized animal material (including manure) from a human or animal that has been treated with antibiotics until XX days after the last administration or until a therefore accredited testing body demonstrated absence of resistant microorganisms and antibiotics.
- Radioactive materials with radiation higher than the toughest legal standard of all downstream countries.
- Any dumping of solid materials (e.g. plastics, metals, excluding naturally occurring materials like sand and natural organic materials), including micro-particles in water or soil systems, other than in governmentally approved landfills (see section 12.4.5).

12.4.1.3.1 Calculation of ESCU's for type C pollution.

[O.F.-14 Pollution Substances] lists the ESCU's to be allocated per kg. pollutant for all categories of emitted hazardous chemicals.

ESCU's shall be allocated for all purchased quantities of hazardous, extracted or generated chemicals, listed **[O.F.-14 Pollution Substances]**, for which no emission free destination can be demonstrated.

The quantities of process generated hazardous chemicals listed [**O.F.-14 Pollution Substances**] shall be calculated based on an analysis by a therefore accredited body. For all quantities for which no emission free destination can be demonstrated, ESCU's shall be allocated.

Chemicals may end up in the product and may become polluters at unsustainable disposal of the product. The actual practice of product disposal shall be measured per country of use and the product embedded quantity for which no emission free disposal can be demonstrated shall be considered polluting chemicals. The criteria on "sustainable disposal" are described and ESCU's allocated for this aspect in section 12.6.1.

However, more case specific price factors may be allocated instead following the criteria in section 12.2.15.

12.4.1.3.2 Registration of ESCU's for type C pollution.

The organization shall, where applicable, keep a list [**Gate to Gate - Pollution C**] of the quantities of polluting materials that it willingly or unwillingly releases into the environment, and the associated ESCU's per kg. of product or per piece.

12.4.1.4 Type D pollution: water heating systems.

The responsible organization that changes the temperature of water systems is able to demonstrate to have investigated the consequences of this temperature change, other than water evaporation, to the environment and the local population. If the organization cannot demonstrate absence of negative or persistent consequences of the temperature change to the environment or humans at or downstream the location, ESCU's shall be allocated. [**O.F.-14 Pollution Substances**] includes the ESCU's to be allocated per kg. water per degree centigrade. Water evaporation is covered in section 12.4.2.1.1. Temperature changes lower than 1° C at 1 km. from the heating activities are exempted.

12.4.1.4.1 Calculation of ESCU's for type D pollution.

[**O.F.-14 Pollution Substances**] lists the ESCU's to be allocated for harmful heating of a water system. The organization may demonstrate its own "cost distance to no temperature change, e.g. by means of a concrete investment proposal or cost calculation, made or verified by an independent qualified expert on the relative aspect and finance, and allocate these ESCU's per kg. of product or piece instead.

12.4.1.4.2 Registration of ESCU's for type D pollution.

The organization shall, where applicable, keep a list [**Gate to Gate - Pollution D**] of according to the rules of this section determined ESCU's for heating pollution per kg. of product or per piece.

12.4.1.5 Type E pollution: potential incident caused emissions.

The responsible organization can demonstrate an assessment, executed by qualified persons, by developing worst case scenarios, which polluting incidents could occur because of activities and materials related to the product. The organization shall determine the maximum quantities of harmful substances listed in [**O.F.-14 Pollution Substances**] that could potentially be emitted into the air, water or soil systems by such incidents. Maximum quantities shall be listed per category listed in [**O.F.-14 Pollution Substances**].

12.4.1.5.1 Calculation of ESCU's for type E pollution.

For type E pollution the ESCU's for total purchased and generated quantities of all categories of hazardous agrochemicals listed in [**O.F.-14 Pollution Substances**] shall be allocated per kg. of product, reduced by a reducing calculation factor, determined in one of the following ways.

If related to the product harmful chemicals are purchased or generated, the following applies:

1. If the organization has relevant accredited certificates that cover the complete operation relating to the product, no ESCU's are allocated.

2. If the organization has no relevant accredited certificate that covers the complete operation relating to the product, the organization's governance level shall be assessed using **[O.F.-23 Governance Level Scoring Model]** for the aspect of type E pollution risks, resulting in a reducing calculation factor. ESCU's shall be allocated equal to the maximum, reduced by the reducing calculation factor.

At least initially and thereafter every 4 years this governance assessment shall be executed by a therefore accredited certification body.

However, the organization may demonstrate its own "cost distance to perfect governance" on type E pollution risks instead, following the criteria of section 12.2.15, e.g. by means of a concrete investment proposal or calculations, made or verified by an independent qualified expert, and allocate these ESCU's per kg. of product or piece instead.

12.4.1.6 Registration of ESCU's for type E pollution.

The organization shall, where applicable keep a list **[Gate to Gate - Pollution E]** of maximum possible quantities of incidental emission of polluting materials, and the associated ESCU's per kg. of product or per piece, determined according to the rules described for type E pollution.

12.4.1.7 Calculation of ESCU's for pollution.

The organization shall keep a list **[Gate to Gate - Pollution]**, with sum of **[Gate to Gate - Pollution A]**, **[Gate to Gate - Pollution B]**, **[Gate to Gate - Pollution C]**, **[Gate to Gate - Pollution D]** and **[Gate to Gate - Pollution E]**.

12.4.2 Depletion of Scarce Resources.

If the ESCU's for scarcity of a purchased scarce resource are already included in the ESCU score of the certified purchased material and applied according to the criteria of section 12.3, the ESCU's of this section need not to be allocated again.

12.4.2.1 Scarce Resources.

The concept of scarcity is negotiable. Scarcity often depends on available technology and may therefore be temporary. **[O.F.-07 Scarce Resources]** lists the resources which currently shall be considered scarce.

Considered are naturally occurring materials like fresh water, fossil energy resources, scarce minerals and natural plant- and animal species at land or sea, that are newly extracted. If a material consists of a blend of newly extracted material and recycled material, the ESCU calculations shall be based on last years' average percentage of newly extracted material that is present in the article.

ESCU's shall be allocated for every extracted quantity of the scarce resource. The organization shall require from its suppliers or measure the exact amount of scarce materials listed in **[O.F.-07 Scarce Resources]** present in supplied materials or used for the production of the materials and thereafter not recycled. For certified materials these data shall be provided both in ESCU's and weight units, for not certified materials in weight units only.

12.4.2.2 Calculation of ESCU's for scarce resources.

For every kg. of scarce resources that are listed in **[O.F.-07 Scarce Resources]**, not already included in purchase ESCU's obtained from suppliers, the associated ESCU's that it uses as raw material directly are allocated, increased with the materials and associated ESCU's per kg. or per piece listed in **[O.F.-07 Scarce Resources]**, which come as a component in purchased composite materials. If the organization consumes scarce resources listed in **[O.F.-07 Scarce Resources]**, occurring on the SCID list (see section 11.4) for other reasons than as a component, ESCU's shall be allocated to the organization's products in the ratio of turnover in weight. However, more case specific price factors may be allocated instead following the criteria in section 12.2.15.

12.4.2.2.1 Fresh Water

If water is purchased from a supplier and represents more than 1% of the product's costs (see section 11.4.2), the ESCU's shall be requested from the supplier. For organization's processes involved in the water supply, such as pumping, transport, purification, desalinization and storage, the ESCU's shall be calculated according to the criteria of this standard.

The organization shall measure the quantity of scarce fresh water used in relation to the product, using validated methods only. If for any reason the evaporation of fresh water systems is increased by the processes related to the product (e.g. by water heating or by changing the surface or flow rate), the average evaporated amounts of water shall be included, determined, initially and at relevant process changes, by a therefore accredited body.

12.4.2.3 Calculation of ESCU's for scarce water.

The marginal preventative measure is desalination of seawater and transport to the location, both with renewable energy.

3 possible situations are considered:

1. The specific location of water use and specific data on regional freshwater availability and withdrawal quantities are available.

For the assessment of water scarcity, the organization shall demonstrate (either by own or collective measurement in the region, or by well recognized external data on the used water sources) the development of COD pollution and mineral content of the used water sources, groundwater- and basin levels, the regional water withdrawal (WW) and the regional rain or river discharge quantity (WQ). If the water intake is chemically contaminated, added to WW shall be the amount of water necessary to dilute to concentrations below the toughest of local, EU and USA standards for the relative application.

If the water is taken from the soil or a groundwater fed lake, WQ is calculated/estimated as the highest of the 10-year average regional loss of water in the aquifer or basin, and the 10-year average precipitation. If the water is taken from a river or river fed lake, WQ is calculated as the 10-year average river discharge (for agriculture measures as continuously having the discharge at the month of the year of highest water withdrawal).

Water is considered scarce if, measured over a 10-year period:

- The groundwater- or basin level is lowering.
- $WW/WQ > 0,2$ (Vorosmarty, Green, Salisbury, & Lammers, 2000).
- COD or mineral content of the water resources is rising over an average of 10 years.

However, if the water is taken from a river without any water related disputes with upstream or downstream regions, the water is not considered scarce. Water taken from a river or lake that is returned to the original source unpolluted is not considered scarce.

The ESCU's per m³ are calculated as: $ESCU's = WNR + CT + EE + WT$, where:

WNR is the costs for seawater desalination with non-renewable energy, listed in [O.F.-07 Scarce Resources].

CT is the costs of pumping the water from sea to the location, which can be calculated using the data for horizontal and vertical transport in [O.F.-07 Scarce Resources].

EE is the ESCU's for seawater desalination-energy which can be calculated as 4 x the ESCU's/Kwh for electricity listed in [O.F.-05 Energy Resources] for the relative country.

WT is the ESCU's for water transport-energy to the location. [O.F.-07 Scarce Resources] lists the extra ESCU's for water transport (renewable) per 100 meter vertical and per 100 km horizontal transport. WT can be calculated by taking the elevation as vertical distance and the shortage distance to sea as horizontal distance.

For WNR, CT, EE and WT, the organization may correct, e.g. for own specific use of renewable energy for desalination or transport of the water.

2. The location of water use is unknown but can be limited to a number of countries (e.g. by an LCI) or regions. In this case water scarcity shall be assumed. $ESCU's = WNR + CT + EE + WT$. (see above for the meaning of the variables)
The formula shall be used of each of the possible locations, using the ESCU's for electricity of the involved countries as listed in **[O.F.-05 Energy Resources]**, and the elevation (max 500 meters) and distance to sea (max 1000 km) of the locations. The highest ESCU's obtained for the possible locations shall be used.
3. The location of desalination is unknown → Use the ESCU's for country unknown in **[O.F.-05 Energy Resources]**, an elevation of 500 meters and a distance to sea of 1000 km.

ESCU's shall be calculated per kg. of product or per piece for the use of scarce water, as listed per m³ in **[O.F.-07 Scarce Resources]** for scarcity + the ESCU's, listed in **[O.F.-07 Scarce Resources]** for every 100 km distance from sea, and every 100 m elevation above sea level.

The obtained ESCU's shall be multiplied with a factor: **Max ((WW- 0,2 x WQ)/WW; 0)**.

12.4.2.4 Registration of ESCU's for use of scarce resources.

The organization shall, where applicable, keep a list **[Gate to Gate - Depletion]** of the quantities of the in **[O.F.-07 scarce resources]**, per kg. of product or piece.

12.4.3 Land Occupation.

Most of global land surface is covered by nature or occupied for agricultural use, both of which provide many vital services. Use for energy, urban development and infrastructure and industry increase pressure on natural ecosystems and food. No further valuable ecosystems should be lost. Sustainable land use is an equilibrium between maintaining optimal soil and biodiversity conditions and maximum land use efficiency. Therefore, ESCU's are allocated for both land occupation (section 12.4.3) and for land degradation (section 12.4.4).

12.4.3.1 Land occupation.

Because world's major land use is for agricultural purposes, marginal preventative cost calculations are based on agricultural considerations. Because not all land is as fertile, the maximum yield of food crop is location dependent. The ESCU score for crops depends on the efficiency that the relative land area is used. Organic and biological production is rewarded by other criteria in this standard for their prevention of pollution and land degradation, but in this section, ESCU's are allocated for potential inefficient land use.

12.4.3.2 Calculation of ESCU's for land occupation.

The ESCU score for land occupation shall be divided over the different products produced at the land proportionally to their turnover and converted to ESCU's per kg. of product or per piece. A "piece of land" is defined as all land, measured as horizontal projection, occupied by the organization and used for the product. Occupied but unused parts of land shall be divided over used parts of land, proportionally to the surfaces used for the different products.

12.4.3.2.1 for agricultural purposes.

1. **FAOSTAT** (<http://www.fao.org/faostat/en/#data/QC>) provides the average yield/ha by country (CY) for world's most common crops. In absence of FAOSTAT data, CY may be derived from other reliable databases. In absence of any reliable data, those on the best related crop listed in FAOSTAT shall be used (for fodder see below). Demonstrable reliable 5-year average yield data with higher granularity on the specific region, may be used. The ESCU score per hectare is calculated as follows:

The yield factor $YF = AY/CY$, where AY is the actual 5-year average yield/ha on the piece of land. If the yield or location is unknown, YF is assumed 0,5.

If during the 5 past years the crop was intermitted by green manure or fallow, all years shall be included. If cash-crops are grown on a piece of land in rotation with other cash-crops, the yield factor shall be determined for all involved products and the weight-turnover based average taken as AY for all involved crops.

If $0,9 < YF > 1,1$, no ESCU's are allocated. For yield factors outside this range both positive ESCU's (damage) or negative ESCU's (bonus) shall be allocated, using the formula: $ESCU = (1-YF) \times$ the Price Factor for land occupation, listed in **[O.F.-09 Land Use]**.

2. For non-food wood and other tree derived products, the same rules apply as above. However, with a certificate listed in **[O.F.-19 Approved Standards]** no ESCU's are allocated. If it can be demonstrated that the occupied land has at least 80% of the locally original biodiversity and is effectively protected for maintaining its biodiversity and it can be demonstrated that more than 80% of the product has a lifetime >50 years, the ESCU score for land use may be lowered with the yearly sequestered CO₂, estimated by a therefore accredited testing body, multiplied with the ESCU's for CO₂ as listed in **[O.F.-05 Energy Resources]**.
3. For livestock and -derived products the following applies:
 1. For the land occupied by livestock, grass and feedstuffs from the farm of livestock breeding. ESCU's shall be directly allocated with the ESCU's listed in **[O.F.-09 Land Use]**.
 2. Additionally, for purchased feedstuff ingredients, the ESCU's shall be required from the suppliers and back to farm level, where also ESCU's shall be allocated for the actual occupied land with the ESCU's listed in **[O.F.-09 Land Use]**.
4. For crops for other purposes (fiber, energy, pharmacy) the full ESCU's for land occupation listed in **[O.F.-09 Land Use]** shall be allocated.

12.4.3.2.2 For non-agricultural purposes.

For land occupation for other than agricultural purposes **[O.F.-09 Land Use]** lists the ESCU's to be allocated per hectare.

12.4.3.3 Registration of ESCU's for land occupation.

The organization shall, where applicable, keep a list **[Gate to Gate - Land]** of the land use in hectares, the crops it delivers, the space intensity per crop, the used space per crop in hectares and the allocated ESCU's per kg. product or per piece. For the aspect of land occupation no more specific price factors may be used.

12.4.4 Degradation of Land (or water ecosystem), Biodiversity and Nature.

12.4.4.1 Types of impact on land or sea, biodiversity and nature.

Considered are:

- Reduction of the area of natural forest, wetland, corals, kelp or seagrass, or other valuable ecosystems after 1-1-1990. Every type of degraded valuable ecosystem after 1-1-1990 (year of the Kyoto protocol) is considered degraded, unless it can be demonstrated that the area is recuperating and effectively protected as locally natural ecosystem. ESCU's for degradation of ecosystems shall be allocated for:
 - All kinds of wood culture without a certificate listed in **[O.F.-19 Approved Standards]** is considered harmful and for all produce grown in such area, ESCU's shall be allocated.
 - Agricultural or non-agricultural activities that decrease or risk future crop yields (e.g. erosion and soil depletion), other than already covered in section 12.4.1.
 - Activities in a forest, wetland, mountainous areas with erosion risk, on sea bottom or near corals, in polar regions, or other valuable ecosystems without demonstrable monitoring biodiversity and the impact of the activities of the organization, or without a governance program for effective preservation of the ecosystem.
 - Property, use or management of forest or other valuable ecosystems without effective protection against fire, foray and other damage by third parties.

- Fishing practices without a certification listed in **[O.F.-19 Approved Standards]**, or other marine activities damaging aquatic bottoms or -ecosystems.
- All types of mining, build areas, construction, roads, railways, industry, recreation. However manmade recreational areas are considered nature provided that they provide locally natural biodiversity and are effectively and long term protected.

12.4.4.2 Calculation of ESCU's for degradation of land, biodiversity or nature.

[O.F.-09 Land Use] list the ESCU's per hectare by Biotope (land or sea) that shall be allocated. However, more case specific price factors may be allocated instead following the criteria in section 12.2.15, but only by means of demonstration of one of following methods:

1. Determine the actual fraction of the number of vascular plants relative to the locally natural ecosystem (for the method see (Vogtländer, Lindeijer, Witte, & Hendriks, 2004)), resulting in the biodiversity factor, leading to ESCU's by multiplication of the factor by the ESCU's for 0% biodiversity, listed in **[O.F.-09 Land Use]**.
2. Actual costs of methods of (partly) restauration of the area back to the original ecosystem, followed by calculation of the expected new biodiversity factor and further calculation of ESCU's using the method described in **[O.F.-09 Land Use]**.

12.4.4.3 Registration of ESCU's for degradation of land, biodiversity or nature.

The organization shall, where applicable, keep a list **[Gate to Gate - Biodiversity]** of all areas and their surfaces in hectares on land or at sea which it owns, cultivates or where its activities are practiced. This list shall demonstrate if before 1-1-1990 the area was forest, wetland, coral or other valuable ecosystem, which harmful activities listed in **section 12.4.4.1** are being practiced. The associated ESCU's are allocated as surface x ESCU/hectare. The total of ESCU's score is thereafter converted into ESCU's per kg. product or per piece.

12.4.5 Waste and Disposal.

12.4.5.1 Waste and waste processors.

Considered are all materials that are disposed of from organizations' operations without functional reuse, as consequence of the processes or other activities related to the product. Included are materials that are used in relation to the product outside of organization's premises (e.g. cables for energy- or information transport). If the organization itself is not legally responsible for the waste, the legally responsible organization or person shall be considered a supplier, required to communicate its ESCU's. If the supplier is unknown or if disputes thereabout exist, the organization shall calculate disposal- ESCU's as if self-responsible. The ESCU's for disposal of capital goods shall be allocated proportionally to organization's financial cost allocations for using these materials.

Disposal due to the use of the product is considered in section 12.5.3, and the end-of-life disposal in section 12.6. In this section **"sustainable disposal" is defined as "disposal of materials resulting in functional reuse of the material or all its components"**. **Landfill of any type is not considered sustainable disposal; incineration with energy recovery is considered partly sustainable (for the recovered energy)**. No ESCU's are allocated for resource depletion because these were already allocated in section 12.4.2

The following rules and exceptions apply:

1. All disposed materials, purchased, extracted, generated or existing from processes as a by-product, in relation to the product, that do not become (part of) the product are considered waste (for incineration see below).
2. If waste exists related to several products in unknown quantities, their quantities shall be divided proportionally to the products' financial turnover.

3. Litter on land or into water systems and all quantities for which the organization cannot demonstrate sustainable disposal, is considered both pollution for all quantities of hazardous components occurring in **[O.F.-14 Pollution Substances]**, covered by section 12.4.1, and waste for the remainder.
4. Disposed materials transported over country borders to other locations belonging to the organization is considered waste at the location of existing of the waste, unless it can be demonstrated that the materials are returned to an upstream certified supply chain actor, or remain traceable until recycled into a marketable new material.

12.4.5.2 Calculation of ESCU's for waste.

Waste is considered a product with an either positive, zero, or negative price. All ESCU's allocated to the product, including internal waste/recycling processes and materials, shall be calculated according to the criteria of this standard and divided between product and waste-product proportionally to their financial turnovers (see section 12.2.8). If the waste-product is reused internally, its value shall be determined exactly according to organization's internal financial allocation methods.

Internal reuse or recycling.

The proportionally calculated ESCU's shall be allocated to the original and destination-products.

External recycling under internal responsibility.

ESCU's shall be calculated as for internal recycling and added shall be the ESCU's for the external waste/recycling processes and materials, obtained from the external recycling body.

Recycling under external responsibility.

If the waste is recycled into a certified product under responsibility of an external body, the proportionally determined waste-part of the allocated ESCU's can be transferred to the external body, remaining the reduced ESCU's for the original product. The ESCU's for the recycling processes and materials are allocated to the external bodies' destination-product.

If no such certified external product(s) can be demonstrated, but the ESCU's for the recycling processes and materials are demonstrable (E.g. by means of reliable data on standardized processes and traceability of the waste), all known ESCU's for demonstrably recycled quantities, and for the remainder the default values listed in **[O.F.-15 Waste Categories]**, are allocated to the original product.

If no ESCU's for recycling processes are available the default ESCU's listed in **[O.F.-15 Waste Categories]** shall be allocated for the complete quantity of waste materials.

Waste that is incinerated with energy recovery.

If ESCU's are provided by a certified incineration body, they shall be allocated. Without demonstrable kWh's or ESCU's, the ESCU's listed in **[O.F.-15 Waste Categories]** shall be allocated (positive or negative).

Waste, incinerated without energy recovery, landfill, or destination unknown.

The full default ESCU's listed in **[O.F.-15 Waste Categories]** shall be allocated.

Pollution causing waste and mixed composition

The responsible organization can demonstrate the quantities of hazardous chemicals in its waste. For natural organic materials only quantities higher than naturally occurring are considered, measured at the highest on-site stage concentration. Considered must be that the concentration of hazardous substances in the waste-parts of materials may be higher than in used parts and therefore be hazardous waste.

For quantities of waste for which no sustainable disposal can be demonstrated and containing hazardous chemicals shall be considered pollution for the full quantity of embedded hazardous chemicals, listed in **[O.F.-14 Pollution Substances]** and allocated with extra ESCU's according to section 12.4.1.

For quantities of organic material for which no sustainable disposal or composting can be demonstrated are considered to be landfill without methane recovery and are allocated ESCU's for methane production, listed in **[O.F.-14 Pollution Substances]**.

For quantities of waste disposed of in unseparated state of different materials, the complete quantity shall be considered consisting of the ESCU requiring component, unless it can be demonstrated that either separation is not necessary, or separation is included in the price obtained or paid for the waste.

For the aspect of waste, more case specific price factors may be allocated instead following the criteria in section 12.2.15.

12.4.5.3 Registration of ESCU's for waste.

The organization shall, where applicable, keep a list **[Gate to Gate - Waste]** of the quantities of all waste materials that it produces, its first and final destination (a functional reuse destination is considered final) and the method of processing (the organization requires from its buyers of waste proof of the waste processing method) and the associated ESCU's per kg. of product or per piece.

12.4.6 Economic Responsibility.

The responsible organization aims for sustainability and avoids sudden changes that may damage the environment or people. It aims for transparency of the supply chain and money flows and considers itself co-responsible for the wellbeing of its stakeholders and especially its employees, customers and suppliers.

12.4.6.1 Fair trade.

The responsible organization does not misuse unequal bargaining power towards a low developed supplier (LDS) (see definition in section 5), and does not pay prices for purchased products that do not enable a LDS and its workers to gain a fair minimum wage. If the organization works through an intermediate, it shall demonstrate that also this intermediate complies with this principle, preferably by its certification.

The responsible organization has made an analysis of the "typical income" (income per worked hour as if the LDS would deliver the one product only). Special responsibility exists if the organization takes more than 30% of the yearly turnover of a LDS.

12.4.6.2 Calculations of ESCU's for unfair prices.

The following cases are distinguished:

1. If the organization can demonstrate an analyses made or verified by a therefore accredited body, of the typical income of the LDS, pays no less than a fair price, enabling fair minimum wage payment as listed in **[O.F.-04 country statements]**, and has at least 2- year purchasing contracts with an LDS of which it takes more than 30% of his total turnover, no ESCU's are allocated.
2. If the organization can demonstrate such analyses of the typical income of the LDS, but does not pay the fair price for all products to all suppliers, the price difference required to pay all workers of the supplier the minimum fair wage as same ESCU's listed in **[O.F.-04 country statements]** shall be allocated as ESCU's. If the organization does not have at least 2 year purchasing contracts with suppliers of which it takes more than 30% of his total turnover, extra ESCU's listed in **[O.F.-16 Labor Aspects]** are allocated.
3. If the organization cannot demonstrate an analyses of the typical income of a LDS, or purchases goods that typically have the risk of being underpaid, in a manner that it has no direct influence on the price paid to the supplier (e.g. via the stock market), the ESCU's, mentioned in **[O.F.-16 Labor Aspects]** for unknown underpayment shall be allocated.

12.4.6.3 Transparency.

The responsible organization fully communicates to the customer (consumer for the end-producer), before his purchase, and in an understandable and easily accessible and unambiguous way, the following aspects about the product and its delivery, where applicable and based on normal use (see section 11.2):

1. Directly and indirectly to the product related costs, such as the price, taxes, delivery costs, costs and terms of credits, installation costs, replacements to be expected due to wearing materials and of maintenance and energy use, and the costs of required or advised insurances or subscriptions, taxes and tied sales with other products, contract- and cancellation periods. All these are based on the defined normal use and the year/moment of sales. For case specific costs (e.g. installation costs), averages may be used.
2. All legal communication requirements and all other terms of delivery or conditions for use of the product.
3. The expected lifetime of the product at "normal use", which is the average lifetime at normal use, both as determined by the organization. The expected lifetime is not necessarily equal to the warranty period.
4. The negative effects of the use of the product to the user, the environment or other people, and the measures the customer may take to minimize such effects and the related costs of such measures. If not all such information can be displayed on the packaging or near the product's sales location, at least the customer shall be informed about a website that does contain this information, that must be easy to find and in all languages of countries where the product is sold.

[O.F.-17 Economic Risks] lists the percentage of the year-average sales prices of the product that shall be allocated as ESCU's depending on the completeness of the explanation of the expected yearly costs by the use of the product, in 4 levels:

1. All required communication can be demonstrated at more than 80% of the sales locations and of locations of price communications → No ESCU's are allocated.
2. All required communication can be demonstrated at more than 80% of the sales locations, but not elsewhere where prices are communicated → 33% of the % listed in **[O.F.-17 Economic Risks]** are allocated as ESCU's.
3. Most communication can be demonstrated, but incomplete, not clear or at less than 80% of the sales locations → 66% of the % listed in **[O.F.-17 Economic Risks]** are allocated as ESCU's.
4. The required communication cannot be demonstrated for most sales locations → 100% of the % listed in **[O.F.-17 Economic Risks]** are allocated as ESCU's.

Finance related criteria.

Considering the risk for the international community, investments with a too high speculative character are considered not sustainable. Special risks are considered financial products with a leverage, the speculative overvalue of investments, the structure of remuneration within the organization (covered by section 12.4.8 of this standard), corruption (covered by section 12.4.9) and the level that the financial organization invests on the stock markets for own risk. A company shares responsibility in stock market related risks by the decision to be financed on the stock market.

[O.F.-17 Economic Risks] lists the percentage of the year-average sales price of the product that shall be allocated as ESCU's. (All measured as year averages of end of month status).

Per % of the sales price of product.

1. For insufficient Debt to Equity ratio (valid for all products of the organization).
2. For investments in deposits or bonds of states with a too low credit status.
3. For speculative Price to Earnings ratio. The ESCU's for criteria 2 and 3 may be replaced with demonstrable interests of significant amounts of recently acquired capital.
4. For investments in companies involved in fossil energy unless it can be demonstrated that these are sufficiently changing to renewable energy.
5. For investment companies or states with no or low credit rating.
6. For speculative investment in agricultural or food resources.

7. For investment in derivatives with leverage, unless exclusively used for protecting the company against temporal price or currency fluctuations.
8. For investments in companies involved in weapons, bonds of countries with a corruption perception index > 40, or uncertified companies not being able to demonstrate fair payment and labor conditions by an unannounced audit on these aspects.
9. For banking with organizations not fulfilling to Basel III requirements.
10. For banking with banks with insufficiently focus on sustainability.

ESCU's expressed per % of the product sales price are calculated as yearly amount of product (by weight or pieces) divided by the yearly financial turnover, directly allocated to the product. ESCU's expressed as % of the invested money are calculated as $\text{equity} \times \frac{\sum_{12} [\text{end-of-month invested money/equity}]}{12}$, allocated to the companies' products proportionally to their financial turnover

12.4.6.4 Warranty periods and product life time.

Long life time warranties for utensils slow down the disposal-culture and stimulate long term responsibility of the producers. **[O.F.-17 Economic Risks]** lists the percentage of the year-average sales price of the product that shall be allocated as ESCU's, as follows:

1. Without proof of other possibilities for every year < 5 years.
2. At demonstrable assessment of the relevant market for each life time warranty year lower than the average of the top 20% life time warranties in the sector (full life time guarantee excepted).

At demonstrable investigation of the costs of prolonging the life time warranty, these costs may replace the default ESCU's.

12.4.6.5 Tax evasion.

Translocation of profits to allied companies or countries with tax friendly regimes or by other constructions is not considered fair and transparent management.

The perfectly responsible profit allocations between locations of an international corporation are, according to this standard, proportional to the number of workhours in the different countries related to the product.

The ESCU's that shall be allocated are equal to the difference between the perfectly responsible tax and the paid tax.

Contrary to most other aspects, for the aspect of tax evasion, the profit, investments and financial status and conduct of the corporate company is considered instead of that of the juridical unit.

[O.F.-17 Economic Risks] mentions the ESCU's to be allocated. If the organization produces more products the ESCU's are allocated proportionally to their turnover.

12.4.6.6 Various economic criteria.

[O.F.-17 Economic Risks] mentions the ESCU score per kg. product for all products of the organization that cannot demonstrate to comply to the following 6 criteria.

1. Active 5-year plan on sustainability.
2. Responsible and sustainable finance.
 1. No mergers for mainly shareholder's benefit and no extraction of money from companies within 5 years from their acquisition.
 2. No payout ratio >20% if the debt-to-equity ratio is lower 2.
 3. No loans between allied organizations against interest rates higher than Libor- or Euribor + 1%.
 4. No remunerations of people with shares or financial leverage products that can be cashed within 5 years.

3. Not any communication by the organization may contradict the data demonstrated by ESCU's.
4. If the organization gives loans, it has defined and transparently published standards, equal for all persons. For the credit risk it thoroughly investigates the solvency of the relevant persons and complies with its own standards. If the company gives loans to people or bodies likely not to be able to repay, a reservation for potential total loss is made.
5. No granting of loans or selling financial products other than according to determined principles in writing.

Separately ESCU's shall be allocated, as listed in **[O.F.-17 Economic Risks]**, for received subsidies. Subsidies obtained for several products together, are divided proportionally to their turnover. Likewise, in section 12.7 paid taxes may be allocated as negative (Bonus) ESCU's.

12.4.6.7 Calculation of ESCU's for economic responsibility.

All ESCU's as described above in the various aspects of economic responsibility are added and the total allocated to the product per kg. or per piece.

ESCU's in % of turnover or in % of investment or equity are converted into ESCU's per kg. or per piece proportionally to their turnover.

The total ESCU's to be allocated of economic responsibility are maximized to 20% of the product's sales price.

12.4.6.8 Registration of ESCU's for economic responsibility.

The organization shall keep a list **[Gate to Gate - Economic]** containing:

1. The average prices per year of all purchased products and services, (if available) the analyses per country of origin the typical income of the low developed producers of the materials and the belonging ESCU's per kg. of product.
 2. The financial coverage (for financial products only) and the associated ESCU's.
 3. The financial product and the number of enciphering levels between the financial product and the underlying share or tangible product, and the associated ESCU's.
 4. The ESCU's for the air bubble part of the price/earnings ratio and price/equity ratio (for companies on the stock exchange market only).
 5. Warrant periods for the product and the associated ESCU's.
 6. Whether (yes or no) profits are translocated in the definition of this section and the associated ESCU's.
 7. Investments in high risk financial products and the associated ESCU's.
 8. The either or not fully meeting the 8 criteria of section 12.4.6.6.
 9. Insufficient transparency on indirect costs, expected lifetime and adverse sustainability effects
- All statements shall include the relevant ESCU's per kg. Product or per piece.

12.4.7 Third Parties' Health Risks.

12.4.7.1 Risks.

Considered are risks of production and transport to third parties (other than by pollution, other than internal occupational risks and other than due to the use of the product) of waste flows and risks of limiting access to clean and fresh water or other vital necessities. (Pollution related risks are considered in section 12.4.1, occupational health and safety risks are considered in section 12.4.8.: health and safety and risks due to the use of the product in section 12.5.2). Considered here are all health and safety impacts, not covered by these sections.

The responsible organization can demonstrate a risk assessment, executed by qualified persons, including worst case scenarios, and an estimate of how many external stakeholders (facility surroundings, customers, transporters, cleaners, waste handlers or other third parties) may be harmed or diseased by organization's activities, related to the product. Included shall be (not

exclusively) potential indirect and future impacts such as the creation of antibiotic resistant organisms by the use of antibiotics and the potential transfer of pathogens from animals to humans, impacts from incidents, traffic and transport of dangerous goods, criminal misuse of information technology and software, and databases. Included shall be the risk to third parties of accidental release of quantities of chemicals listed on the List of Regulated Substances under the Risk Management Plan (RMP) Program (<https://www.epa.gov/rmp/list-regulated-substances-under-risk-management-plan-rmp-program>).

The responsible organization applies good governance on external public health and safety aspects and actual risks depends on organization's governance level.

12.4.7.2 Calculation of ESCU's for risks for third parties' health risks.

For health risks to third parties, ESCU's are calculated based on the marginal preventative costs per industry sector multiplied with a reducing risk factor, depending on organization's governance level. **[O.F.-10 Health Risks]** lists the marginal preventative costs for the different industry sectors. One of the following rules apply:

1. If the organization has relevant accredited certificates on external health and safety risks that cover the complete operation relating to the product, or if the organization can demonstrate not to present health risks to third parties, greater than normal households, no ESCU's are allocated.
2. If the organization has no such relevant accredited certificate that covers the complete operation relating to the product, the organization's governance level shall be assessed using **[O.F.-23 Governance Level Scoring Model]** for the aspect of external public health risks, resulting in a reducing calculation factor. ESCU's shall be allocated equal to the maximum, reduced by the reducing calculation factor. In high (external) risk industry sectors, as indicated in **[O.F.-10 Health Risks]**, at least initially and thereafter every 4 years this governance assessment shall be executed by a therefore accredited certification body.

ESCU allocations shall be made per kg. product or per piece.

However, the organization may demonstrate its own "cost distance to perfect governance" on external public health aspects instead, following the criteria of section 12.2.15, e.g. by means of a concrete investment proposal or calculations, made or verified by an independent qualified expert, and allocate these ESCU's per kg. of product or piece instead.

If the activities of the organization do not cause any external public health risk, this shall be demonstrated by the risk analyses.

The ESCU scores for the different public health risks are added together and allocated per kg. product or per piece.

Public health risks caused by contamination of water, air or soil are covered in section 12.4.1 of standard and only need attention under this section if incidents in the direct surroundings of the premises, equipment or transport means related to the product are concerned.

12.4.7.3 Registration of ESCU's for third parties' health risks.

The organization shall keep a list **[Gate to Gate – Third Parties' Health]** demonstrating:

- 1 All identified risks.
- 2 The number of people that may be harmed in worst case situations per risk.
- 3 Maximum ESCU's calculated as in **[O.F.-10 Health Risks]** indicated percentage of the total wage sum.
- 4 The governance level depending reducing risk factor and the ESCU score per kg. or per piece.

12.4.8 Labor.

12.4.8.1 Wages.

This standard distinguishes three types of unfair remunerations: underpayment for labor (unfair wages), underpayment for purchased products (unfair pay), and unfair remuneration inequality. Unfair pay for purchased products is covered in section 12.4.6.

This section applies to both wages paid to own personnel, wages for outsourced work and to all services that are purchased from small companies or private persons that do not pay wages to their employees themselves.

12.4.8.2 Calculations of ESCU's for Wages.

Payment lower than a fair minimum wage (see definition in section 5).

Most countries have democratically set legal minimum wages, but some have not. Not all legal minimum wages are also fair wages.

If an organization produces several products, the organization has no sound own cost allocation method, and exact data on separate products are unknown, allocations shall be calculated proportionally to the turnover of the products (turnover – purchased value).

In addition to the described, **[O.F.-16 Labor Aspects]** lists the ESCU's to be allocated for:

1. Fair Wages.

[O.F.-04 Country Statements] lists the gross fair minimum wages (**FMW**) per country per year and per hour, to be gained in normal work hours (NWH), defined as: a maximum of 40 hours per week, and a maximum of 1864 days per year. For people under 23 years old the FMW may be set at a percentage of the adult FMW as listed in **[O.F.-20 Child Labor]**.

The ESCU's to be allocated are determined with the formula: $ESCU = \sum (FMW_p - LW_p)$, where p is a person over 23 years old, paid under the fair wage, FMW_p is the fair minimum wage and LW_p is the actual paid (lower) wage per person doing work related to the product.

For foreign migrants, ESCU's equal to the difference between paid unemployment and health insurances or other common fees in the country of their work, and the required taxes and insurance fees of the country of origin may be subtracted if the size of these can be reliably demonstrated and are based on the highest quality level of insurances common in the involved countries of work and origin, and on the actual remuneration (minimum fair minimum wage).

Also **[O.F.-16 Labor Aspects]** lists the ESCU's to be allocated.

2. Fair Inequality.

[O.F.-16 Labor Aspects] lists the Maximum Acceptable Inequality Ratio (MAIR) within the organization. The ESCU score to be allocated is the total costs required to raise all gross remunerations (based on a 40-hour work week) paid by the organization to the level of 1/MAIR of the highest gross remuneration. For expatriates the income-difference factor may be multiplied with a factor [PPP correction x GNI country of location/ GNI country of nationality].

[O.F.-04 Country Statements] lists the GNI's and PPP conversion rates per country.

Also **[O.F.-16 Labor Aspects]** lists the ESCU's to be allocated.

3. Overwork Wages.

For overwork (based on last year) that is not paid at least 30% over normal pay, **[O.F.-16 Labor Aspects]** lists the ESCU's to be allocated.

4. Pension Plans.

Lack of provision to all personnel of shared paid (at least 50% for the organization) pension plans for a pension of at least 60% (including governmental pension schemes) of previous pay (average pay during the last 10 work years). The ESCU score to be allocated is the costs of an insurance to provide such pension to all personnel minus the costs of the current pension plan. However, because pensions were included in the FMW calculations as listed in **[O.F.-04 Country Statements]**, they may be subtracted from the FMW.

5. Health Insurance.

Lack of provision of shared paid (at least 50% for the organization) health insurance and disability insurance to all personnel, including temporary personnel and subcontractors that do not have such insurance. The ESCU score to be allocated is the costs of such insurance to all personnel minus the costs of the current health insurance plan.

6. Personal Development.

For lack of provision of opportunities (financial and time) for personal professional development,

to all personnel, **[O.F.-16 Labor Aspects]** lists the ESCU's to be allocated.

For lack of demonstrably effective and active training plans in quality, safety and sustainability.

7. **Temporary Work.**

For use of temporary workers longer than for 2 months, **[O.F.-16 Labor Aspects]** lists the ESCU's to be allocated. Excepted are jobs that are clearly of temporary nature (< 1 year), work that is clearly for training purposes, and replacement for performance reasons.

8. **Minimum employment time.**

This standard assumes that people that are hired for short terms need one-month time to find a new job after leaving the organization. This month shall be fully paid by the organization. (exception for seasonal work and incidental emergencies; subcontractors shall apply the same rule if they don't provide a time joining new job). **[O.F.-16 Labor Aspects]** lists the ESCU's to be allocated.

9. **Various wage related aspects.**

The responsible organization complies with the following criteria:

- Contracts are communicated at least one week in advance.
- Wages are paid with regular intervals.
- No money deposits or hiring fees are taken for or from any worker, neither by the organization, nor by intermediate agencies.
- Nothing of the remuneration is refrained than is permitted by law or by individual or collective contract.
- A system has been established guaranteeing equal pay for equal work (differences based on age, experience, career planning, and performance are permitted, if objective, transparently documented and equally applied).

All ESCU's shall be converted to be allocated per kg. product or per piece.

12.4.8.3 Registration of ESCU's for Wages.

The organization shall keep a list **[Gate to Gate - Wages]** showing the ESCU's for wage aspects per kg. product or per piece.

12.4.8.4 Occupational Health and Safety.

The responsible organization feels responsible for Occupational Health and Safety (OHS) of all that work for the organization. It can demonstrate that:

1. Everything is done to prevent that workers (everybody doing work relating to the product) are harmed by standard operations or by incidents, accidents, or by physical or mental violence. Also future impacts on the health of workers shall be considered.
2. The organization is knowledgeable on OHS and potential preventative measures itself, or uses an outside qualified person.
3. The organization takes all necessary measures to prevent damage or illness to any worker.
4. The organization complies with all legal requirements on OHS.
5. The organization has a continuously improving system (Plan-Do-Check-Act) on OHS.
6. The company continuously documents, investigates accidents and near accidents back to the root-cause and takes preventative measures.

12.4.8.5 Calculation of the ESCU score for Occupational Health and Safety.

For occupational health and safety (OHS) risks, ESCU's are calculated based on the marginal preventative costs per industry sector multiplied with a reducing risk factor, depending on the organization's governance level on OHS. **[O.F.-10 Health Risks]** lists the marginal preventative costs for the different industry sectors. One of the following rules apply:

1. If the organization has relevant accredited certificates on OHS, listed in **[O.F.-19 Approved Standards]** that cover the complete operation relating to the product, no ESCU's are allocated.

2. If the organization has no relevant accredited certificate on OHS that covers the complete operation relating to the product, the organization's governance level shall be assessed using **[O.F.-23 Governance Level Scoring Model]** for the aspect of OHS risks, resulting in a reducing calculation factor. For ESCU allocation, the ESCU's listed for OHS in **[O.F.-16 Labor Standards]** are reduced by the reducing calculation factor.

At least initially, thereafter every 4 years, and within 1 year after every major OHS incident, this governance assessment shall be executed by a therefore accredited certification body.

ESCU allocations shall be made per kg. product or per piece.

However, the organization may demonstrate its own "cost distance to perfect governance" on labor conditions instead, following the criteria of section 12.2.15, e.g. by means of a concrete investment proposal or calculations, made or verified by an independent qualified expert, and allocate these ESCU's per kg. of product or piece instead. If the activities of the organization do not cause any OHS risk, this shall be demonstrated by the risk analyses.

The ESCU scores for the different OHS risks are added together and allocated per kg. product or per piece.

12.4.8.6 Registration of ESCU's for Occupational Health and Safety.

The organization shall keep a list **[Gate to Gate - OHS]** showing the ESCU's per kg. product or per piece for Occupational Health and Safety.

12.4.8.7 Labor Conditions.

The responsible organization feels responsible for the wellbeing of all that work for the organization and their families. The responsible organization can demonstrate compliance with the following criteria (mostly from Dreyer, Hauschild, & Schierbeck, 2010), and derived from ILO conventions (Extra criteria for child labor are covered in the separate category 12.4.8.10):

1. Nobody within or outside of the organization is confronted with discrimination of any type.
2. Employees are completely free to form unions.
3. A least 60% of the workers are of local origin, sufficiently present in management positions and of sufficient level of education, in order to be aware of all aspects that could harm the local population or environment and of labor conditions that could harm the workers. If necessary education and training is provided.
4. No workers are forced or tending to work more than 48 hours per week.
5. The standard workweek is no longer than 40 hours. Overtime hours and payment are kept on file.
6. All workers are free in their work and the nature of the work is not compulsory to an extent that it could physically or mentally harm a worker. No physical enforcement is used to any worker or external person.
7. All workers have freedom of speech, but may be required to respect secrecy about companies' intellectual- and financial assets.
8. Immediate and proper action is taken against violence afflicted by or to employees in the performance of their duties.
9. The work periods of employees give enough room for rest and time for privacy and sufficient paid vacation (minimum 15 working days per year) is permitted for this purpose.
10. Official personal documents, such as birth certificates and passports are consulted and all their data kept on file.
11. Employment- and apprenticeship contracts, internal and external education, trainings and apprentice programs for all employees are kept on file.
12. Employment contracts, in understandable language for both employee and employer, systematically include wage, working time, annual holidays and length of personal holiday and terms of resignation, which ensure employees voluntary leave of employment, and are kept on file.

13. All workers are free to file complaints without repercussions and are ensured a fair response and uniform and confidential treatment. Complaints and responses are kept on file.
14. At end of employment a letter of resignation is handed to the employee. The organization sees to it that intermediates do the same.
15. If housing or transport is provided, that must be voluntary for the worker, of good standard quality, reasonably priced compared to the wage and with respect to the worker's freedom and privacy.
16. Food provided by the organization is of high quality and reasonably priced.
17. Loans, credits and other financial schemes, are all by contract, transparent, reasonably priced, not strangling at resignation, and kept on file.
18. Known whistleblowers are taken seriously and their points thoroughly investigated by an independent and qualified person; The identity of unknown whistleblowers is not investigated.

12.4.8.8 Calculation of ESCU's for Labor conditions.

[O.F.-16 Labor Aspects] mentions the maximum ESCU % relative to the total labor costs related to the product for perfect labor conditions, which shall be calculated to ESCU's per kg. product or per piece. A reducing calculation factor may be applied depending on organization's governance level on Labor Conditions. One of the following rules apply:

1. If the organization has an accredited certificate, on labor conditions, covering all aspects listed in section 12.4.8.7, no ESCU's are allocated.
2. If the organization has no relevant accredited certificate on Labor Conditions that covers the complete operation relating to the product, the organization's governance level shall be assessed using **[O.F.-23 Governance Level Scoring Model]** for the aspect of above labor conditions, resulting in a reducing calculation factor. For ESCU allocation, the marginal preventative costs are reduced by the reducing calculation factor.

However, more case specific price factors may be allocated instead following the criteria in section 12.2.15.

12.4.8.9 Registration of ESCU's for Labor conditions.

The organization shall keep a list **[Gate to Gate – Labor Conditions]** showing the level of governance on labor conditions and the associated ESCU's per kg of product or per piece.

12.4.8.10 Child Labor.

According to this standard harmful labor child labor refers to children's work for which any of the following apply:

- Deprives children of proper education and attend school (more than 2 hours work on schooldays).
- Deprives children of sleeping or play time at home.
- Involves the risk of causing mental, moral, social or physical harm to children.
- Is excessively heavy, too far from home, without proper daylight, or at night.
- Involves payments for children too far lower than the fair minimum wage.
- Is more than 5 days per week or with too long working hours.
- (For children under 16 years) includes work with chemicals, weapons, dangerous goods, knives or other sharp objects, hot objects or liquids (>60 °C) or open fire.
- For children under 16 years old, includes work without the attention of a responsible adult.
- Involves any type of organized recruitment, organized transport or trafficking.

All conditions outside of the limits listed in **[O.F.-20 Child Labor]** are considered harmful child labor. Light work during vacations and with a lower total duration than 2 months per year or light labor in the business of the parents or neighbors at the own living location that does not deprive the children of education, and during less than 4 hours per day and 5 days per week, is not considered harmful child labor. Work at home does not need payment. However, the other criteria of table 1 and of this section remain valid.

12.4.8.11 Calculation of ESCU's for child labor.

Considering child labor in or by the organization itself.

The ESCU score for child labor per kg. product or per piece depends on 2 possible situations:

1. Absence of child labor is demonstrated by the use of **[O.F.-04 country statements]** or by means of verification by a therefore accredited certification body by means of unannounced audits → No ESCU's are allocated.
2. **[O.F.-04 country statements]** indicates the risk of child labor, and independently verified absence of child labor cannot be demonstrated → The organization shall demonstrate in practice (by at least 5 auditor chosen workers) to a therefore accredited certification body the amount of workhours necessary for the product and average the demonstrated workhours.

The Expected Labor Costs are calculated as the **[Adult Fair Minimum Wage x Average Amount of Workhours]**. The ESCU's are calculated as the **[Expected Labor Costs - demonstrable, well registered labor payment, in accordance with product cost calculations]** for the relevant work.

At any doubt about the labor payment, it shall be considered zero.

The ESCU's shall be calculated separately for labor acceptable according to **[O.F.-20 Child Labor]** except for their payment, and for other child labor, and added together.

If an organization uses a group of not certified small suppliers in a country with child labor risk, according to **[O.F.-04 country statements]**, such as workshops and home based workers, absence of child labor shall be demonstrated by at least following measures:

- The organization shall at least monthly verify absence of child labor by an unannounced onsite inspection; present children shall be interviewed and findings documented.
- The independent Certification Body shall pay a 2 yearly unannounced visit to 3% of the involved sites, and check completeness of the supplier list by sampling the source of several lots of finished products.

All ESCU's are thereafter allocated per kg. product or per piece.

12.4.8.12 Registration of ESCU's for child labor.

The organization shall keep a list **[Gate to Gate - Child Labor]** with its products, the relevant levels of governance of child labor, the associated ESCU's per kg. or product or per piece, and references to documents of proof.

12.4.8.13 Registration of ESCU's for aggregated labor ESCU's.

The organization shall keep a list **[Gate to Gate - Labor]** of ESCU's per kg. or per piece, which is the sum of **[Gate to Gate - Wages]**, **[Gate to Gate - OSH]**, **[Gate to Gate – Labor Conditions]** and **[Gate to Gate - Child Labor]**.

12.4.9 Corruption and Conflict Situations.

12.4.9.1 Corruption and fair competition.

Corruption is one of the greatest obstructions to the development of a country and for certification. The responsible organization does not participate in any type of corruption and takes preventative measures where it may expect corruption, if necessary by doing no business in a country or region at all. Corruption is illicit by nature and therefore is hardly measurable. Nevertheless, this standard introduces a certain level of measurability by measuring the quality level of governance. For this

purpose, we distinguish 2 categories of criteria/managerial measures: 1. General governance criteria (GGC) and 2. Subject specific managerial measures (SSM). The GGC include criteria to assess the risks and define the SSM's. For this purpose, the responsible organization consults experts and anti-corruption guidelines, such as (OECD, 2011; Transparency International, 2009; United Nations Global Compact, 2010; World Bank, 2008).

In areas with a large governmental corruption or violence accompanied extortion, the organization usually has little own influence on corruption. However, this standard adheres the opinion that economic pressure can eventually persuade authorities to act against corruption.

The responsible organization can demonstrate a risk analyses on corruption. Evidence must be provided in the following way:

12.4.9.2 Organization and actions.

The responsible organization can demonstrate a chart of its relations with other organizations, including trusts and foundations, and all potential sources of corruption, supposing bad will, and including shareholders with a share > 5%, that actively interfere with the companies' policy or finance, listing the ultimate beneficial owners. The responsible organization can demonstrate effective preventative measures against all potential sources of corruption, both internally and externally. It can demonstrate that the organization is not used for the purpose of unjust decisions, e.g. by related organizations, or owners.

Considering business in countries with a score in the Transparency International Corruption Perception Index < 60, the responsible organization takes collective action against corruption, together with as many as possible other organizations in the country. In addition, it clearly communicates its policy publicly and to all involved parties, repeating this at any business. Policy and consequential managerial measures should at least include its position on bribery, engaging suppliers, customers and governmental institutions and -officers, legal compliance (including differences between countries), disciplinary actions, negotiations, traveling, gifts, meals, donations, complaints and whistle-blowers, notification-, communication-, registration- and consult in difficult situations, and exceptions (e.g. if employees are in danger).

Even if the organization has little influence on sources of corruption, for instance because it is of governmental origin, the relevant sources of corruption must be described generically. If the relevant authority forbids such description or that is feared, maximum ESCU's must be allocated (see section 12.4.9.11).

12.4.9.3 Employees.

The responsible organization can demonstrate an assessment of the risks and potential methods of corruption by "risk employees", which are those employees that have the theoretical power to give or receive unjust favors. For not certified outsourced work from organizations bigger than 10 persons, such assessment is required from the supplier. Not certified outsourced work from organizations smaller than 10 persons, must be considered work by own employees (considering the corruption aspect).

12.4.9.4 Surveillance.

The responsible organization can demonstrate a yearly surveillance of its bookkeeping on unjust or suspect money flows, by an independent and at least every 4 years changing accredited accountant, without any other relations with the organization.

The responsible organization requires all "risk employees" to undergo a random check on signs of unjust income or favors by the same accountant. The organization accepts not any risk of corruption, further investigates and takes measures where necessary.

12.4.9.5 Situations of conflict.

Situations of conflict are very harmful to the development and well-being of people and countries. The responsible organization has no activities related to situations of conflict, no business with a risk of financing conflict situations and no connections to known perpetrators of violence. If the organization uses other organizations to do business in countries in conflict, it shall either consider these as suppliers and require their certification and ESCU's, or (for small suppliers < 10 persons) control them and calculate ESCU's for their actions as for its own.

12.4.9.6 Weapons.

The responsible organization does not produce or trade weapons or military materials listed in the common military list of the EU (The Council of the European Union, 2015) to unsafe bodies (all organizations apart from governments of countries with corruption perception index <60, or of countries in armed conflict, as listed in **[O.F.-04 Country Statements]**).

12.4.9.7 Risk of future conflicts.

The responsible organization can demonstrate that it does not share responsibility for potential future conflict situations, for instance by depletion of water in water poor areas, diverting of rivers, land grabbing, displacement of people, destruction of income sources of indigenous people, publishing of discriminating documents, trading in drugs, white laundering of money, teaching violence to children.

12.4.9.8 Financing of conflict situations.

The responsible organization has no part in financing of conflicts or weapons of unsafe bodies. It must consider that in countries in conflict even regular flows of money tend to reach perpetrators of violence. Activities in a country in conflict present an extremely difficult situation. The presence of the company may help develop the country and prevent violence, but once the violence has started its presence or activities are usually used for financing violence. Therefore, this standard gives companies 4 year after the start of the violence without the requirement of solid proof for absence of unintended financing of it, but after those 4 years, solid proof (which is hardly possible) of not financing shall be demonstrated to avoid ESCU allocations. **[O.F.-04 Country Statements]** lists countries with such risk. For compensation, e.g. by financing schools and hospitals, see section 12.7.

12.4.9.9 Political involvement.

The responsible organization (with the exception of political organizations themselves) prohibits the use of undue influencing or undermining the political process. It does not contribute to political organizations or politicians; it is transparent in any lobbying activities influencing regulations and does not use any misleading information, threats or promises to policy makers and does not make any other unjust attempt to influence policy makers. It makes an assessment of the persons within the organization that have the power to influence politics and makes sure they are well informed and trained about organization's policy and behavior at conflicts of interest.

12.4.9.10 Opinion awareness.

The responsible organization is aware of society allegations towards the organization and can demonstrate investigation of the truth of such allegations.

12.4.9.11 Calculation of ESCU's for corruption and situations of conflict.

For corruption and violence risks, ESCU's are calculated based on the marginal preventative costs. The maximum ESCU allocation for involvement with corruption and situations of conflict is the 5-year^{*1} average net operational product margin, which shall be converted per kg. product or per piece

1. No ESCU's are allocated for corruption and violence if:

- 1.1 The corruption perception index of the country of establishment, listed in **[O.F.-04 Country Statements]** is ≥ 60 and no money transfers with any other organization or private person that it has ownership relations with, in a country with a corruption perception index < 60
- 1.2 The organization can demonstrate not to contribute to armed conflicts as defined in the sections 12.4.9.5/6/7/8.
2. In all other cases, the organization's governance level shall be assessed using **[O.F.-23 Governance Level Scoring Model]** for the aspect of corruption and conflict situations and considering the aspects discussed in this section, resulting in a reducing calculation factor. ESCU's shall be allocated equal to the maximum, reduced by the reducing calculation factor. At least initially and thereafter every 4 years this governance assessment shall be executed by a therefore accredited certification body.

*1 If the product exists shorter than 5 years, or if the product margin is unknown, the 5 years' organizational net operational margin is taken, and if even that is unknown, the 5-year average net operational profit margin of the industry sector in the S&P 500.

12.4.9.12 Registration of ESCU's of corruption and conflict situations.

The organization shall keep a list **[Gate to Gate - Corruption]** of the countries it is active in, its company governance score on corruption and involvement with conflict situations and the associated ESCU's.

12.4.10 Various Social Responsibilities.

12.4.10.1 Social irresponsibility aspects.

Starting point for the assessment of ethical damage, not covered before, is whether potential victims are confronted with one of the following types of irresponsibility or disturbance:

1. Discrimination in personnel policy, advertising or other communication in the field of sexes, health, handicap, belief, race, origin, age, political conviction, pregnancy or migrants.
2. Lack of efforts to stimulate labor participation of minorities, disabled and underprivileged. However, this standard does recognize the necessity of well qualified personnel.
3. Physical or mental violence and harassment to persons outside of the organization.
4. Publication of pornography, nude or other communications that could be taken offensive by more than 30% of the population of the country.
5. Advertising without respect for groups of the society, such as stereotyping groups of people.
6. Payment of suppliers or employees more than 30 days after delivery or after the agreed limit of the payment date.
7. Illegal use of a brand name, knowledge, domain, design or intellectual property of others.
8. Violation of property rights of both tangible goods and intellectual property.
9. The use of property rights based on DNA properties directly from nature (e.g. natural seeds).
10. The use of property rights for more than 5 years based on DNA properties of material derived from nature (e.g. by plant breeding or modified DNA), (only for products in the sectors of food and health).
11. The use of property rights on sustainability enhancing developments longer than 5 years.
12. Under-market compensation for acquired property.
13. Disrespect for not well defined traditional property (e.g. of indigenous people).
14. Advertising with potential wins, prizes or profits without publishing the chance, or advertising subscriptions with temporary reductions without mentioning the duration of the reduction and what cost may be expected after the reduction period. (exception: lotteries and other products that present this chance/risk ratio and the related uncertainty as the product itself).
15. Advertising smoke or other health damaging products, or pharmacological products, without presenting the potential damage as belonging to the clearest communications.

16. Use of claims without reference to published scientific evidence of their correctness.
17. Use of misinformation on the product or on the purpose/circumstances that affect its sales.
18. Communicating negative information on competing products and companies.
19. Not consequently communicate the sustainability as it is determined by the use of this standard together with advertising about or including aspects of sustainability.
20. Incomplete, ambiguous, or insufficient transparency of vital information on packaging, information leaflets, contracts, webpages, prospectus and other ways of communication about the product.
21. (Risk of) violation of privacy.
 5. Spam, uninvited telemarketing or other methods of violating the privacy of private persons.
 6. Keeping, disclosing or using personal data without a proper reason or without knowledge of the involved.
 7. Insufficient protection of personal data.
22. Noise (>50 decibels in living areas), vibration, smell, dust, traffic in living areas or other disturbances to people, where this matter is not covered by the section on public health.
23. Earthquake- or flood risks due to operations, in areas where it may damage others.
24. Damage of cultural heritage.
25. Lack of easy access for complaints and grievances.
If Services desks are used, waiting times shall be limited, customers shall be answered in the countries own language, complaints, incidents and problems shall be documented and effectively solved.

12.4.10.2 Calculation of ESCU's for lack of Social Responsibility.

For the category of various social responsibilities (VSR), ESCU's are calculated based on a maximum default value per industry sector multiplied with a reducing risk factor, depending on organization's governance level. **[O.F.-21 Responsibility Levels]** lists the marginal preventative costs for the different industry sectors. One of the following rules apply:

1. If the organization has relevant accredited certificates on VSR that cover the complete operation relating to the product, no ESCU's are allocated.
2. If the organization has no relevant accredited certificate on VSR that covers the complete operation relating to the product, the organization's governance level shall be assessed using **[O.F.-23 Governance Level Scoring Model]** for the aspect of VSR, resulting in a reducing calculation factor. ESCU's shall be allocated equal to the marginal preventative costs, reduced by the reducing calculation factor.

At least initially and thereafter every 4 years this governance assessment shall be executed by a therefore accredited certification body.

ESCU allocations shall be made per kg. product or per piece.

However, the organization may demonstrate its own "cost distance to perfect governance" on social responsibility aspects instead, following the criteria of section 12.2.15, e.g. by means of a concrete investment proposal or calculations, made or verified by an independent qualified expert, and allocate these ESCU's per kg. of product or piece instead. If the activities of the organization do not cause any nuisance to external stakeholders, this shall be demonstrated by the risk analyses.

All ESCU's shall thereafter be allocated per kg. product or per piece.

12.4.10.3 Registration of ESCU's for lack of social responsibility.

The organization shall keep a list **[Gate to Gate - Responsibility Humans]** with its level of governance of social responsibility and the associated ESCU's per kg. product and the references to proof.

12.4.10.4 Animal Welfare.

This section only applies if animals are involved in the processes related to the product.

Animal suffering may be caused in the operation of the organization itself, by its activities anywhere

in the world, or by its outsourcing of analyses or other businesses to suppliers. The responsible organization takes care that it does not directly or indirectly cause animal suffering activities, especially not of one of the following kinds.

General types of Animal Suffering ("the 5 freedoms of animals").

1. Deprivation of a continuous supply of water or deprivation of enough food for full development.
2. Deprivation of a, for the specific animal suitable, environment, shelter and resting area.
3. Pain, injury or disease that is not properly and quickly diagnosed and treated.
4. Deprivation of sufficient and proper space, facilities and company of its own kind that enables the animal to develop.
5. Fear en distress by causing or not preventing conditions of mental stress.

Specific types of Animal Suffering.

1. Tests on animals for medical reasons without transparency about this testing, without demonstrable minimizing it and without demonstrable research for alternatives.
2. Tests on animals for testing cosmetics.
3. Keeping animals with so little space that they become stressed and show species-abnormal behavior, such as in crates, battery cages or feeding cubicles.
4. Transport of animals more frequently or for longer durations than absolutely necessary, or with so little space that they become stressed and show species-abnormal behavior.
5. No emergency plans for evacuation or preventing other animal suffering at any type of disaster.
6. Keeping of animals that do not do well in captivity or do not reproduce in captivity.
7. Deprivation of outside light and open air or of air conditions that keep the animals in good health.
8. Feeding animal with food, drugs or medicines that make them more sensitive to disease.
9. Keeping animals under conditions that increase the risk of mass infestations with diseases which force owners, governments or others to mass killings in case of emergencies.
10. Capturing or keeping animals for their fur or other ornamental use as main purpose.
11. Manipulation of the genetic code of animals by other means than selection.
12. Any operative techniques without proper anesthesia.
13. Keeping animals for educational purposes or entertainment with wild animals (keeping in animal friendly zoo's excepted).

12.4.10.5 Calculation of ESCU's for Animal Welfare.

For animal welfare risks, ESCU's are calculated based on the marginal preventative costs per industry sector multiplied with a reducing risk factor, depending on organization's governance level. **[O.F.-18 Animal suffering]** lists the maximum ESCU allocations per industry sector, to be multiplied with a reducing factor calculated as follows:

1. If the organization can demonstrate not to be involved in the use of animals, or has relevant accredited certificates that cover the complete operation relating to the product, no ESCU's are allocated.
2. If the organization uses animals and has no relevant accredited certificate on animal welfare that covers the complete operation relating to the product, the organization's governance level shall be assessed using **[O.F.-23 Governance Level Scoring Model]** for the aspect of animal welfare risks, resulting in a reducing calculation factor. ESCU's shall be allocated equal to the maximum, reduced by the reducing calculation factor.

At least initially and thereafter every 4 years this governance assessment shall be executed by a therefore accredited certification body.

ESCU allocations shall be made per kg. product or per piece.

However, the organization may demonstrate its own "cost distance to perfect governance" on animal welfare instead, following the criteria of section 12.2.15, e.g. by means of a concrete

investment proposal or calculations, made or verified by an independent qualified expert on animal welfare, and allocate these ESCU's per kg. of product or piece instead.

12.4.10.6 Registration of ESCU's for Animal Suffering.

The organization shall keep a list [**Gate to Gate - Responsibility Animals**] with its level of governance on animal suffering and the associated ESCU's per kg. product and the references to proof.

12.4.10.7 Calculation and Registration of total ESCU's for Social responsibility.

The organization shall keep a list [**Gate to Gate - Various Social**] with the sum of [**Gate to Gate - Responsibility Humans**] and [**Gate to Gate - Responsibility Animals**].

12.4.11 Total ESCU score for organization's own Gate to Gate contribution

The subtotal [**ESCU-Gate to Gate**] is obtained by aggregation of all 10 ESCU scores of section 12.4.

12.5 Use phase.

A utensil may cause damage to the environment, consumer, user or third party as result of its use. The user of the utensil shares responsibility, but he may be forced into causing impact by the design of the utensil.

Also capital goods usually are utensils. For capital goods the ESCU's need to be calculated here for the sake of transparent communication to the user, but need no ESCU allocation, because the customer/manufacturer will calculate the ESCU's for his operations, including the effect of the use of these capital goods, himself. In addition, users of capital goods already allocate ESCU's for the fuels and other damaging replacements that are used for working with the capital good.

The end-producer is primarily responsible for the design of the utensil and the damage that is caused by its use and disposal, which shall be expressed in ESCU's which will provide the information to the user. This section only applies to products under the responsibility of the end-producer. Of the 10 fundamental aspect categories, the following shall be considered:

12.5.1 Emission of harmful gasses and other chemicals and depletion of scarce resources.

By the criteria of this section various emissions may result into ESCU allocations. However, if the organization can demonstrate that several emissions can be prevented by one preventative measure, only the highest of the involved ESCU allocations needs to be applied.

12.5.1.1 Energy resources.

Suppliers of energy resources of mineral origin shall determine the quantities of harmful gasses listed in [**O.F.-06 Harmful Gasses**] that are emitted by combustion of the product at normal use and allocate the associated ESCU's using [**O.F.-06 Harmful Gasses**] and the quantities of depleted scarce resources listed in [**O.F.-07 Scarce Resources**].

12.5.1.2 Use related energy consumption and emissions.

Many products cause energy related emissions during their use and some products cause non energy related emissions during their use (e.g. leaking cooling or heating fluids and lubrication oils from machines or soot from wood fire places). The product may be a utensil (e.g. a car) or a consumption item (e.g. a piece of meat that needs to be cooked). The use (or cause/increase) of energy and the gas emission (including fine dust) caused by the use of the product and the use of energy resources, shall be determined by a for this purpose accredited body, at normal use. If no accredited method exists or if disputes on the testing method exist, the organization shall, overviewed by a testing body, accredited for similar analyses, demonstrate a measurement of a statistically representative sample

of actual use in the market. The energy use is expressed in kj. per km. for transport means and in kj. per hour of use for other utensils and per kg. for consumption items.

Utensils may also cause or increase energy consumption of other utensils (e.g. a caravan that increases the energy use of the pulling car or game that needs a server to be downloaded to a computer to be played, both using energy).

12.5.1.3 Calculation and allocation of ESCU's for use related energy consumption.

The lifespan total (maximum 10 years), based on the defined "normal use", of ESCU's connected to the used energy sources shall be allocated to the product.

[O.F.-05 Energy Resources] both lists the ESCU score for scarcity of the energy resource that shall be allocated per kg. of energy resource, and the ESCU score for emission per kg. of the harmful gasses. The sum of both shall be converted to ESCU's per hour of use of the product, or per km. for transport means, or per kg. for consumption articles. However, if it can be demonstrated that, for the specific energy use, both GHG emissions and resource depletion can be prevented by one preventative measure, only the highest of both is allocated. **[O.F.-05 Energy Resources]** also lists the ESCU's to be allocated per kWh of electrical energy by country based on the carbon intensity of the countries' electricity generation (corrected for nuclear kWh's which are given equal ESCU's as for the world average carbon intensity).

If the utensil uses rechargeable batteries, the same ESCU's for electrical energy shall be used as above, augmented with the loss factor of recharging. The ESCU's for pollution and waste caused by these batteries are described in section 12.5.3.

If it is demonstrated that a product (e.g. in a country) is exclusively used with energy that is cleaner than average, the lower ESCU's may be allocated, provided that the relevant data have been determined by a therefore accredited body and no certificates or other rights for the cleaner energy have been traded with third parties. The ESCU's for the use of electrical energy are converted to ESCU's per piece of utensil.

However, more case specific price factors may be allocated instead following the criteria in section 12.2.15.

12.5.1.4 Calculations for emission by utensils of other gasses than combustion gasses.

Emissions from earlier produced gasses (e.g. in refrigerators) usually are obtained from suppliers, have their upstream ESCU's, and usually are not supposed to be emitted. The associated ESCU's per kg. gas are calculated according to rules of section 12.3. The organization shall calculate the total quantity of gasses that is emitted by the utensil by normal use during the normally expected lifetime and allocate the ESCU's for this total quantity to the utensil.

[O.F.-06 Harmful Gasses] lists the ESCU allocations required for the use related other harmful gasses (e.g. fine dust by mills and smoke from fire places), expressed by kg. of emitted gas.

However, more case specific price factors may be allocated instead following the criteria in section 12.2.15.

12.5.1.5 Registration of ESCU's for product-use related energy use.

The organization shall keep a list **[Use-Pollution-Energy]** per product with the energy use per km., per hour or per kg., the emissions per km., per hour or per kg. and the associated ESCU's for pollution and a list **[Use-Depletion-Energy]** with the ESCU's for the depletion aspect.

Suppliers of certified energy resources of mineral origin shall be asked to provide the ESCU score for combustion of the energy source. Utensils that are intended to be used as capital goods for the production of other products shall be sold with a separate specification of ESCU's for the use of the utensil, because the user only needs to calculate the ESCU's for the consequences of his use of the utensil one time.

12.5.1.6 Calculation and allocation of ESCU's for use related resource depletion.

The utensil may use scarce resources during its use, such as fresh water, consumption parts or lubrication oils. The use (or increased use) of scarce resources listed in **[O.F.-07 Scarce Resources]**, other than energy resources covered in section 12.5.1.3, shall be determined by a for this purpose accredited body, at normal use. If no accredited method exists or if disputes on the testing method exist, the organization shall, overviewed a testing body, accredited for similar analyses, demonstrate a measurement of a statistically representative sample of actual use in the market. However, more case specific price factors may be allocated instead following the criteria in section 12.2.15.

ESCU's shall be allocated for the lifespan total (maximum 10 years), based on the defined "normal use", of ESCU's connected to the used energy sources shall be allocated to the product.

The following situations are distinguished:

1. The use of the product leads to the use of other resources and the product is the functional cause. E.g. batteries and tires of a car. In this case the ESCU's shall be allocated as described in this section.
2. The product is just a means to use scarce resources, but is not the functional cause and the product has no influence on the quantity of resources used. (E.g. a water hose to water the garden). In this case no ESCU's shall be allocated.
3. The product is a means to the use of other resources, is not the functional cause to the use of that resources, but affects the quantity used (e.g. a shower head).
By this standard, only products directly using resources are allocated with ESCU's. Other products, such as the shower head do not get ESCU's for resource use.
If a product causes lower use than average and the organization wants to advertise this, it needs to be able to demonstrate lower ESCU's. This is covered by a bonus criterion in section 12.7.
4. For depletion of water the rules for scarcity described in section 12.4.2.3 shall be applied.

12.5.1.7 Registration of ESCU's for use related resources depletion.

The organization shall keep a list **[Use-Depletion-a]** per product per kg. or per piece with the total amount of scarce materials it uses during its expected life span at normal use and the associated ESCU's.

12.5.2 Product Health & Safety Risks.

The responsible organization can demonstrate an assessment on the harm that, at normal use, the consumption item or utensil may cause to the health of people or animals during its complete lifecycle and during the handling and disposal of its waste.

Apart from normal use, the responsible organization shall also identify potential misuses and groups of people that are likely to misuse the product and if necessary, redesign or design special products or measures for such groups to prevent harm.

The responsible organization develops measures to prevent products to become unsafe during transport, storage or use of the product.

The responsible organization can demonstrate an effective monitoring of complaints, incidents and health effects of the utensil in the market and that it continuously takes preventative and improvement measures based on this monitoring. This also applies to utensils that are intended for professional use and may provide a risk for labor conditions.

12.5.2.1 Calculation of ESCU's for Product Health & Safety risks.

For Product Health & Safety Risks, ESCU's are calculated based on the marginal preventative costs per industry sector multiplied with a reducing risk factor, depending on organization's governance level. **[O.F.-10 Health Risks]** lists the marginal preventative costs (in % of production costs) for the different industry sectors. One of the following rules apply:

1. If the organization has relevant accredited certificates that cover the complete operation relating to the product, no ESCU's are allocated.
2. If the organization has no relevant accredited certificate that covers the complete operation relating to the product, the organization's governance level shall be assessed using [**O.F.-23 Governance Level Scoring Model**] for the aspect of Product health & Safety Risks, resulting in a reducing calculation factor. ESCU's shall be allocated equal to the maximum, reduced by the reducing calculation factor. At least initially and thereafter every 4 years this governance assessment shall be executed by a therefore accredited certification body.

ESCU allocations shall be made per kg. product or per piece.

If the product does not cause any use related public health risk, this shall be demonstrated by the risk analyses.

ESCU allocations shall be made, expressed per kg. product or per piece, and be based on normal use as defined in section 11.2. The organization may demonstrate its own "cost distance to perfect governance" on public health risks, e.g. by means of a concrete investment proposal or calculations, made or verified by an independent qualified expert on public health risks and finance, and allocate these ESCU's per kg. product or per piece instead. For utensils and consumption items calculations ESCU's are always allocated as ESCU's per piece.

12.5.2.2 Registration of ESCU's for Product Health & Safety risks.

The organization shall keep a list [**Use-Public Health**] per kg. of product or piece of utensil describing:

- 1 All identified risks.
- 2 The number of people that in worst case may be harmed by one kg. of product or one piece of the utensil and the associated ESCU's per utensil as derived from [**O.F.-10 Health Risks**].
- 3 The ESCU score per kg. of product or per piece.

12.5.3 Pollution and waste.

Utensils may cause pollution or waste by its use, other than caused by the use of energy or by the components of the item itself. For pollution and waste as consequence of the disposal of the ingredients or components of the product itself, the criteria of section 12.6 apply.

Considered in this section are:

Wear: By its use the utensil may wear and materials parts in the environment (e.g. car tires and - brake linings).

Consumption parts disposal: By its use a utensil may cause creation of waste or pollution by their use of "consumption parts". Typical examples are consumption of lubrication oil, batteries, the use of liquids or gasses for heating or cooling and wearing parts (such as car tires and brake linings). The responsible organization can demonstrate utensil design intended to prevent any consumption parts and emissions to end up in the environment. It investigates the customs and possibilities for consumption parts' disposal and guarantees their proper disposal or recycling in every country of use of the utensil, already at the stage of design. For this purpose, it seeks cooperation with the suppliers of consumption parts, waste handlers, customers, colleagues and authorities.

The responsible organization does not sell waste producing products in a country (or area) where no proper, effective system is available for the sustainable disposal of the consumption parts of the utensil. Because in most countries products will be returned to the organization if the right price for the waste is offered, in principle returning and sustainable disposal is always possible.

12.5.3.1 Determination of waste and pollution due to utensils.

The organization determines the weight loss of wearing parts of the utensils, lost in the environment at normal use and considers these as polluting materials.

For all consumption parts and materials, the end-producer determines the average lifetime, in hours of use, at normal use (not necessarily equal to the warranty period). Based on this expected lifetime, the quantity of pollution and waste for the used consumption parts and materials shall be determined and verified by a therefore accredited testing body. If for this determination a known expected lifetime is required for a consumption part (e.g. a rechargeable battery), where possible, the warranty period of the relevant supplier must be used and if this is not available or realistic, the lifetime at the defined normal use shall be determined by the testing body. The responsible organization can demonstrate knowledge of the exact quantities of harmful substances and materials per waste category in consumption parts, and the potential emission it may become (e.g. fine dust from brake linings).

12.5.3.2 Calculation of ESCU's for waste and pollution.

[O.F.-14 Pollution Substances] lists the ESCU's per kg. polluting substance for pollution categories, and **[O.F.-15 Waste Categories]** the ESCU's per kg. waste, which shall be converted to ESCU's per hour of use of the utensil (or km. for transport means).

For wear the lost weight of the product is determined per km. or hour of use, at normal use. ESCU's shall be allocated per piece of utensil for the full life time of the product at normal use (maximum 10 years). However, more case specific price factors may be allocated instead following the criteria in section 12.2.15.

The ESCU's for pollution and disposal of consumption parts are allocated per utensil in the following 4 levels:

- If the organization, either or not in cooperation with others, can demonstrate an effective disposal in every country of use of more than 90% of waste from the utensils, exclusively based on reuse or recycling, no ESCU's are allocated. For waste that is incinerated with energy recovery the full ESCU's are allocated, but, if the net generated kWh's can be demonstrated, for each net generated kWh the ESCU's as listed in **[O.F.-05 Energy Resources]** per kWh of electrical energy may be subtracted.
- If the organization can demonstrate that 50% to 90% of the waste is disposed of by recycling or incineration with energy recovery, [100% - demonstrated %] of the ESCU's are allocated.
- In other cases, 100% of the ESCU's are allocated.

Demonstration shall include transparent communication to the user and statistically sound measurements of the practice of waste disposal in every country of use (either or not executed by the organization itself).

12.5.3.3 Registration of ESCU's for waste and pollution during the use of a utensil.

The organization shall, where applicable, keep a list **[Use-Waste]** and a list **[Use-Pollution-Waste]** containing:

- A description of the intended function and normal use of the product.
- The expected life time of the product at normal use in hours of use.
- All consumption parts, either or not components of the utensil, that may need replacement during the expected lifetime of the utensil (max. 10 years) 5 or more times and may cause pollution or become waste.
- All quantities of packaging materials that become source of pollution or waste after its use to transport the product to its final destination. The average practice must be reported, unless the organization can demonstrate realistic calculations on quantities that will result from recently taken measures that without any doubt will improve current practice.
- The recommended method of waste disposal, tailored to the country where the waste will exist and references to the used communication to the users.

- The product-use associated ESCU's, depending on the list, for waste or pollution.

12.5.4 Social responsibility.

The use of products may be disturbing to people either or not being harmful. Most common examples are:

12.5.4.1 Noise.

ESCU's are allocated for every decibel over 70 dB that the utensil produces during normal use, as tested by a therefore accredited testing body. **[O.F.-21 Responsibility Levels]** mentions the ESCU's per utensil per decibel > defined levels for short term use and for long term exposure at day- and night, measured at the closest location of exposure by people or animals.

12.5.4.2 Instructions for use.

ESCU's are allocated for erratic or unclear instructions for the use of a utensil, as tested by the therefore accredited testing body. **[O.F.-21 Responsibility Levels]** mentions the ESCU's per utensil for 4 quality levels of the instructions.

1. Working and maintenance are so easy that no instructions are required → Zero ESCU's.
2. Instructions are in the right and correct language, complete, nowhere confusing, completely conforming the use of the utensil, up to date and understandable for every user → Zero ESCU's.
3. 1 or 2 of the conditions mentioned in level 2 are to the opinion of the testing body not met → 50% of the ESCU's are allocated.
4. More than 2 of the conditions mentioned in level 2 (above) are to the opinion of the testing body not met, or the instructions for the utensil were not tested by such body → 100 % of the ESCU's are allocated.

12.5.4.3 Quality.

The responsible organization only sells high quality products that answer to customers' expectations. **[O.F.-21 Responsibility Levels]** lists the marginal preventative costs for the different industry sectors. One of the following rules apply:

3. If the organization has relevant accredited certificates on quality that cover the complete operation relating to the product, no ESCU's are allocated.
4. If the organization has no such relevant accredited certificate that covers the complete operation relating to the product, the organization's governance level shall be assessed using **[O.F.-23 Governance Level Scoring Model]** for the aspect quality, resulting in a reducing calculation factor. ESCU's shall be allocated equal to the maximum, reduced by the reducing calculation factor. At least initially and thereafter every 4 years this governance assessment shall be executed by a therefore accredited certification body.

However, more case specific price factors may be allocated instead following the criteria in section 12.2.15.

12.5.4.4 Registration of ESCU's for lack of social responsibility.

The organization shall, where applicable, keep a list **[Use-Social Responsibility]** with the decibels that the utensil produces at use, the quality level of the instructions for use, the level of quality of the management or product, with the associated ESCU's.

12.5.4.5 Consumption items.

Also consumption items may use energy and/or resources and/or cause pollution as a result of its use, such as a kg. potatoes that needs to be cooked, using energy and water, or a shirt that needs washing with energy, water and soap.

The use of energy and resources as a result of the use of the consumption item shall be determined at normal use and shall be determined by a therefore accredited body. The energy source and resources, most commonly used for the purpose, shall be used. ESCU's for the use of the product are only calculated by the end-producer of a consumption item.

12.5.4.6 Utensil specific preventative measures

The use impact of utensils is measured in section 12.5 by the marginal preventative measures of the used energy or resources instead of the actual preventative measures for the product specific aspect. However, the organization may use its own specific preventative costs under the following conditions:

1. The organization can demonstrate actual preventative costs, e.g. by an investment proposal or a detailed study, verified by an independent accountant.
2. At more than 80% of all sales locations of the ESCU's per unit of use and the life span total (maximum 10 years) of ESCU's per piece are, presented together with the data described in section 12.5.4.4.

12.5.5 Total score for use and its consequences.

In all subsections of this section, if the use phase of utensils is considered, ESCU's shall be allocated for the lifespan total (maximum 10 years), based on the defined "normal use", of ESCU's connected to the used energy sources shall be allocated to the product. (For fair comparison of utensils, it is advised to also present ESCU's to the user per hour of use or per km. for transport means).

However, if the organization can demonstrate that in a country (part of) the ESCU's have been internalized, for instance by an environmental tax (see section 12.7.1.3 for the conditions), that part of ESCU's may be subtracted.

The ESCU's on pollution: **[Use-Pollution-Energy]** and **[Use-Pollution-Waste]** shall be aggregated and registered in a list **[Use-Pollution]**.

The ESCU's on depletion: **[Use-Depletion-Energy]** and **[Use-depletion-a]** shall be aggregated and registered in a list **[Use-Depletion]**

The subtotal **[ESCU-Use]** is obtained by aggregation of all ESCU's for the use of utensils (**[Use-Pollution]**, **[Use-Depletion]**, **[Use-Waste]** **[Use-Public Health]** and **[Use-Social Responsibility]**).

12.6 End-of-life.

12.6.1 Responsibility.

In this section "sustainable disposal (SD)" is defined as disposal resulting in (indefinite) functional reuse of the product of all its component or materials. Not sustainable is disposal involving pollution, landfill, litter, incineration without energy recovery, and disposal without knowledge about the end-of-life destination of the product.

Disposal of materials transported over country borders without a formal treaty thereabout between the involved countries is not considered waste, unless it can be demonstrated that the materials are returned to an upstream certified supply chain actor or remain traceable until recycled into a marketable new material.

Most tangible products consist of components that after use or consumption must be disposed of. Disposal of a product involves three activities to be considered by the organization and ESCU's allocated for: logistics (collection, storage and transport), dismantling, and the final disposal or processing. Two situations are considered: 1. The organization has full knowledge and control over

the end-of-life disposal, and 2. This is not the case.

The responsible organization can demonstrate:

1. A product design that enables sustainable disposal of all components.
2. A product design that enables replacement of relatively fast wearing or failing parts.
3. Available instructions for replacing parts and availability of the parts during the expected lifetime of the product at normal use, and communication of this possibility.
4. The necessary spare parts are kept available and accessible to optimize life time of the product and at prices with no higher margin than the average margin made on the original product.
5. Intended methods of sustainable disposal have been tested and concluded feasible by a therefore accredited testing body or can be demonstrated by actual application. A list of all components, subcomponents and chemical composition with the relevant qualification from **[O.F.-15 Waste Categories]** of all components after dismantling, and the designed method of disposal is available. Components with equal method of disposal may be grouped.
6. Assessment of the feasibility of the sustainable disposal methods in every country of use. Where the possibilities for sustainable disposal are insufficient (< 80% sustainable disposal), systems of disposal are created either or not in cooperation with other organizations or authorities, and will be available before the first products are expected to have reached end of life (at normal use).
7. Cooperation on sustainable disposal with other supply chain actors. Upstream suppliers of non-agricultural bulk products shall be able to recycle their products, if required by the organization. Upstream suppliers keep responsibility for the recycling of their components, if these are not changed by other means than by normal use and wear. The responsible organization does not purchase from suppliers with which no agreement of recycling responsibility can be made.
8. Cooperation with other producers of similar products and/or with authorities about the sustainable disposal. However this responsibility may be covered by a sector organization, if demonstrable.
9. Good and understandable communication about the sustainable disposal to the users, authorities, waste and recycling companies and workers, waste collectors, -transporters and other involved parties.
10. Analysis of the real practice of disposal in every country of use, if possible of the product itself and otherwise of similar products. Measurements per country of use of the percentage of waste that indeed is disposed of sustainably. Continuous improvement measures if less than 80% of the product is disposed of sustainably, either or not in cooperation with other parties.
11. All separable components of the product are marked or at least recognizable in such a way that they are identifiable (as waste category) until definite disposal. The described composition and methods of disposal are accessible and available until the moment of definite disposal.

12.6.2 Calculation of end-of-life disposal ESCU's.

Reliable data on country averages for disposal under municipal/ governmental responsibility may be used if it can be demonstrated that the product is likely to be disposed of through these channels.

For the percentage the organization can demonstrate full control over the sustainable end-of-life disposal of the product, ESCU allocations shall be according to the criteria described for its own ex-factory-waste in section 12.4.5. For the remainder the following applies:

The quantities of hazardous chemicals containing product going to landfill, or for which no sustainable disposal can be demonstrated, shall be allocated ESCU's both for disposal and for pollution (see section 12.4.1) for the full quantity of embedded chemicals, listed in **[O.F.-14 Pollution Substances]**.

For unsustainable disposal of not-hazardous materials, and for quantities for which no sustainable disposal can be demonstrated, **[O.F.-15 Waste Categories]** lists the ESCU's per kg. that shall be allocated per waste category per kg. (dry weight) of materials, related to the product.

For waste that is incinerated with energy recovery the full ESCU's are allocated, but if the net generated kWh's can be demonstrated, for each net generated kWh the ESCU's as listed in **[O.F.-05 Energy Resources]** for 1 kWh of electrical energy may be subtracted and otherwise the ESCU's listed in **[O.F.-15 Waste Categories]** for co-firing are allocated. The incineration shall be considered as an independent activity and supply to the organization for which all ESCU's must be calculated and allocated back to the product. ESCU's for CO₂ emissions are allocated according to section 12.4.1 based on the full dry weight of the waste subtracted with CO₂ emissions from the demonstrable non-mineral part of the waste.

End of life responsibilities

In addition, the following rules apply considering the above listed 11 responsibilities:

Responsibilities 1, 5,6, 10. If (a part of) the product design precludes sustainable disposal or the method of disposal is not feasible or not demonstrated to be practiced in a country, for (the part of) the product the full ESCU's shall be allocated.

Responsibilities 2,3,4. If the organization cannot demonstrate to have investigated all possibilities to prolong the product life time by a different design and/or by keeping spare parts available and accessible, the end-of-life-disposal ESCU score shall be multiplied with a factor: **[maximum possible average life time]/[current average life time]**, but the ESCU's for extra disposal of added spare parts and extra maintenance activities may be subtracted.

Extra ESCU's shall be added equal to the extra margin (higher than on the whole product) made on spare parts that prolong the product life time.

Responsibilities 7,8,9,11. If 2 or more of responsibilities 7,8,9,and 11 are not in good order, the complete product is considered waste and accordingly the full ESCU's are allocated.

The organization may demonstrate its own "cost distance to sustainable disposal" e.g. by means of a concrete investment proposal or cost calculation, made or verified by an independent qualified expert on waste management and finance, and allocate these ESCU's per kg. of product or piece instead.

12.6.3 Registration of ESCU's for end-of-life disposal.

The organization shall keep a list **[End-of-life Disposal]** per product listing for each criterion if and how it is met with the associated ESCU's.

12.6.4 Total ESCU score for End of Life.

The subtotal **[ESCU-Disposal]** is also the Total of ESCU's for the aspect of End-of-Life.

12.7 Bonus ESCU's.

12.7.1 Bonus activities and products.

Negative (bonus) ESCU's are ESCU's that may be subtracted from the ESCU's for certain activities. Because this standard reveals the hidden preventative costs (externalities), not included in the standard economy, only for hidden positive impacts, bonus ESCU's may be allocated.

Exactly like ESCU's represent costs of prevention (and not of the harmful impact), Bonus ESCU's are equal to the (extra) costs (and not to the beneficial impact).

The following types of bonus activities/products are distinguished:

- 1 Activity/production related benefits. Considered are benefits that are not (fully) paid for.
- 2 Legally paid sustainability taxes.

- 3 By-product related benefits.
- 4 High agricultural crop yields (see section 12.4.3).

For all below listed benefits applies that Bonus ESCU's may only be allocated if the benefit is not paid for and not used as public advertisement (one to one B2B communications within the supply chain are OK). In addition, subsidies received for beneficial products/activities must be allocated as ESCU's.

12.7.1.1 Bonus ESCU's for activity/production related benefits.

- 1 Provision of products with beneficial impact below cost price, e.g. for underprivileged people. ("Beneficial" defined as "mitigating ESCU's" in the sense of this standard)
- 2 Sustainable capturing of CO₂. It shall be demonstrated that this CO₂ is captured for millennia without major negative consequences. However, if the carbon is captured for product related mitigation purposes and for the captured carbon no ESCU's were allocated in section 12.4.1, no bonus ESCU's may be allocated. **[O.F.-05 Energy Resources]** lists the ESCU's per kg. captured CO₂. E.g. in the case of planting trees, this means that it shall be demonstrated that the involved area is protected and that long term funds have been reserved for effective protection, and that the concerned country has a corruption perception index < 40.
- 3 Recycling of at least 5 years old waste into useful products. Negative ESCU's are only allocated if the organization does not delay recycling of current waste and products for more than one year.
- 4 Recovery or restoration of previously caused damage which was caused either by the organization itself or by others. Negative ESCU's are only allocated if the organization currently and systematically does not cause the relative type of damage.
- 5 Development of products or technology aimed to serve as preventative measure (in the sense of this standard). Bonus ESCU's are only allocated if:
 - 5..1 The technology is especially designed for the impact mitigating purpose.
 - 5..2 The organization can demonstrate that the technology in development or (to be) developed technology belongs to the best 20% in the market in its mitigating effect.
 - 5..3 All ESCU's for used products and activities are calculated.
 - 5..4 5-year average profit margin of the corporate organization < 20%.
- 6 Construction or running of technology, exclusively designed for ESCU-mitigating effects, such as installations for cleaning soil, water or air.
- 7 Restauration and/or long term protection of natural ecosystems, or upgrading of soils in countries with a corruption perception index > 40.
- 8 Poverty reduction in a country marked as "Poorest Country" in **[O.F.-04 Country Statements]**. At a corruption perception index <60, only for expenses directly to the underprivileged Bonus ESCU's may be allocated.
- 9 Contributions to the local community (infrastructure, nature, education, sponsoring, cleaning, healthcare). No Bonus ESCU's are allocated for activities with any advertising purpose or for contributions necessary for the product or organization itself.
- 10 Provision of medical care (not the insurances), either to own personnel or to others (excluding for harm caused by work in or for the organization).
- 11 Emergency relief, fit for and at the disposal of the community (excluding for incidents caused by the organization itself).
- 12 Costs for activities like peace initiatives and community bonding. Excepted are activities with any advertising purpose or -effect.
- 13 Costs for protection of cultural heritage and indigenous peoples and stimulation of cultural activities that do not harm sustainability, other than for the organization's own purposes.
- 14 Losses caused by providing micro credits (calculated over the total of micro credits) provided that proper control can be demonstrated that the credits are used for development of small scale businesses.
- 15 Cancellation of micro debts to the underprivileged.

- 16 Donations to government recognized NGO's for nature protection, health care or aid. Excluded are political parties.
- 17 Education, other than for personnel or trainees working for the organization.
- 18 Extra costs for employing people with distance to the labor market (e.g. by a mental or physical handicap). Included may be costs for adaptations and costs of lower efficiency if demonstrable by comparison with an average worker.
- 19 Other extra costs for benefits for the community that are not paid for and not used as public advertising purposes.

12.7.1.2 Bonus ESCU's for paid sustainability taxes and -certificates

- 20 Paid taxes, specifically and fully concerning sustainability. These negative bonus ESCU's may only be allocated if it can be demonstrated that the relative tax is purely calculated based on sustainability aspects.
- 21 Paid certificates, specifically concerning the exchange of sustainability related rights.
- 22 Paid sums (including tax) for end-of-life disposal services by governmental- or other bodies.

12.7.1.3 Bonus ESCU's for beneficial by-products

- 23 If a company provides beneficial by-products (e.g. heat from a chemical company, used for municipal heating), that by-product is considered a product, resulting in ESCU – reduction of organization's other products.

12.7.2 Calculation of ESCU's for Bonus activities.

[O.F.-22 Bonus ESCU's] lists the total ESCU scores for each bonus - activity per quantity of compensated damage or action of aid.

However, the ESCU's for the activities used for execution of the bonus activities themselves shall be calculated. Negative ESCU's are allocated per kg. product or per piece and divided over the different products proportionally to their financial turnover.

One activity can only lead to one negative ESCU allocation.

All Bonus ESCU's shall be based on last year's average, unless otherwise specified.

Costs of beneficial activities of products as meant in this section are divided over the products of the organization proportionally to their turnover.

Cost of beneficial activities that are necessary for the product or organization itself shall be allocated as Bonus ESCU's proportionally, or as the market price for a service or product delivered.

Beneficial by-products are allocated with ESCU's proportionally to their financial turnover, this way reducing the ESCU's of the involved products that the by-product(s) exist from.

Organizations that B2B provide a fully paid mitigation product are paid for their mitigation service, raising the price of customer's products and mitigating their ESCU's. No bonus ESCU's are allocated.

12.7.3 Registration of ESCU's for Bonus activities.

The organization shall keep a list **[Bonus-1]** per product, listing for each criterion a description of the bonus activity and the associated ESCU's.

12.7.4 Total ESCU score of bonus ESCU's.

The subtotal **[ESCU-Bonus]** is obtained by aggregation of all Bonus - ESCU's as a negative amount.

12.8 Total ESCU score

The total ESCU score for the product is obtained by aggregation of **[ESCU-purchase], [ESCU-operation], [ESCU-use], [ESCU-disposal] and [ESCU-bonus]**.

If the end-producer so requires, also the category totals as shown in **[O.F.-ESCU Matrix]** shall be calculated and transferred to the next supply chain actor.

13. Appendices.

13.1 Choices and Positions.

To facilitate future stakeholder assessment, the more controversial positions are described here:

1. GHG emissions cause climate change.
2. Modification of DNA presents both opportunities and threats. The OS considers genetic modification harmful until an international body controls research and approves potential products. The OS will take a similar position to other new technologies with major threats.
3. Nuclear energy presents both opportunities and threats. Scientific assessment without emotions is virtually impossible. An international body controls the development and use of nuclear technology. The OS considers the use of nuclear energy equally harmful as GHG emission, also because most preventative measures are the same as for GHG emitting energy sources.
4. Animal welfare is an emotional aspect. Nature itself is extremely cruel, but nonviolence and care including for animals may well be considered a positive direction for humanity. Because growing numbers of people consider animal welfare as an aspect, the OS includes its measurement.
5. A long term vision provides a far better prospect for sustainable management than a short term vision. Therefore, the OS includes long term vision and responsibility considerations in its criteria, with consequences for aspects like remuneration and financial products.
6. Conflict, war, corruption and crime are great dangers to sustainability. Therefore the OS includes criteria on both situations where the activities of an organization may contribute to situations of conflict, violence or corruption, and situations where the transparency and reliability of the organization and its communication may be questioned by the presence of situations of conflict or corruption.
7. Crops rival for space with each other and with nature. The OS considers further loss or damage of natural ecosystems, such as forest, wetlands and corals, unacceptable. Because large parts of the old world were denuded long ago, it would not be fair to only impose ESCU's on relatively newly denuded space only. Inefficient use of land in one part of the world will lead to loss of nature in other parts. Therefore, the OS intends to allocate ESCU's to any use of land.
8. The OS strives to a sustainable economy by means of a free market, functioning within moral boundaries. Poverty is one of the major sustainability aspects but also the one most affecting other aspects. Global population growth, climate, conflict, health and safety conditions, erosion, forest clearing, pollution and many other conditions, all are strongly (positively or negatively) interrelated to poverty. Therefore, the OS includes criteria on fair pay of both fair wages and fair trade.
9. Remuneration differences are necessary because they belong to the free market, providing motivation and opportunities. Some rewards however, are harmful because they stimulate decision takers to prevalent their own interests over the interest of sustainability. Therefore, the OS includes criteria on inequality.

14. Literature

Croes, P. R., & Vermeulen, W. J. V. (2014). Life Cycle Assessment by Transfer of Preventive Costs in the Supply Chain of Products. A first draft of the Oiconomy system. *J. Cleaner Prod.*, 102, 178–187.
<http://doi.org/10.1016/j.jclepro.2015.04.040>

Croes, P. R., & Vermeulen, W. J. V. (2016a). In Search of Income Reference Points for SLCA using a Country Level Sustainability Benchmark (part 1): Fair Inequality . A Contribution to the Oiconomy Project. *Int. J. Life Cycle Assess.*,

21(3), 349–362. <http://doi.org/10.1007/s11367-015-1018-0>

- Croes, P. R., & Vermeulen, W. J. V. (2016b). In search of Income Reference Points for SLCA using a Country Level Sustainability Benchmark (part 2): Fair Minimum Wage. A Contribution to the Oicconomy project. *Int. J. Life Cycle Assess.*, 21(3), 363–377. <http://doi.org/10.1007/s11367-015-1017-1>
- Dreyer, L. C., Hauschild, M. Z., & Schierbeck, J. (2010). Characterisation of Social Impacts in LCA: Part 1: Development of Indicators for Labour Rights - Supplementary Material 1-4. *Int. J. Life Cycle Assess.*, 15(3), 247–259. <http://doi.org/10.1007/s11367-009-0148-7>
- IAEA, & PRIS. (2014). Nuclear Share of Electricity Generation in 2016. Retrieved May 6, 2017, from <http://www.iaea.org/pris/WorldStatistics/NuclearShareofElectricityGeneration.aspx>
- OECD. (2011). OECD Guidelines for Multinational Enterprises. *OECD Publishing*, 1–92.
- The Council of the European Union. (2015). *Common Military List of The European Union* (No. C:2015:129:TOC).
- Transparency International. (2009). *Business Principles for Countering Bribery. A Multi-Stakeholder Initiative led by Transparency International. Transparency International* (Vol. September). Berlin.
- United Nations Global Compact. (2010). *Fighting Corruption in the Supply Chain: A guide for Customers and Suppliers*. New York.
- Vogtländer, J. G., Lindeijer, E., Witte, J.-P. M., & Hendriks, C. F. (2004). Characterizing the change of land-use based on flora: application for EIA and LCA. *J. Cleaner Prod.*, 12(1), 47–57. [http://doi.org/10.1016/S0959-6526\(02\)00022-7](http://doi.org/10.1016/S0959-6526(02)00022-7)
- Vorosmarty, C. J., Green, P. A., Salisbury, J., & Lammers, R. B. (2000). Global Water Resources: Vulnerability from Climate Change and Population Growth. *Science Magazine*, 289(October 2016), 284–288. <http://doi.org/10.1126/science.289.5477.284>
- World Bank. (2008). *Fighting Corruption through Collective Action. Worldbank*. Washington D.C.

15. Company Assessment.

Section is in development