Glossary

Allocation: finding a total and uniform measure for all the services to which the joint processes contribute, and on the basis of this partition the joint exchanges to each of the services to which they contribute

Background load: the contribution to a resource consumption or impact category from the reference area, expressed per person in the area. Used for normalization

Bioconcentration: tendency of a substance to accumulate in living organisms

Biodegradability: degradability by microorganisms in the environment. Assessed from standardized tests

CAS number: Chemical Abstracts Service Registry Number is a numeric designation assigned by the American Chemical Society's Chemical Abstract Service uniquely identifying a specific chemical compound regardless of name or naming system

Co-products: two or more products leading to a service for a user and deriving from or entering into a range of processes

Data format: a template for the three categories of information: a description of the process, an inventory of the process's exchanges with the environment, and a characterization of the information

Elements: defined tasks or "steps" in the LCA method. Each of the method's phases consists of one or more elements

Environmental latitude: the environmental impact acceptable on average for each person in a sustainable society

Environmental diagnosis: designating environmental points of focus in the product: designating which impact potentials are problematic, identifying improvement potentials and localizing where in the product they reside

Environmental exchanges: an exchange with the environment is defined as an input to a process, an output from the process or an internal interaction with an operator of the process

Environmental impacts: impacts on the external environment including human health

Environmental specification: retainment of the weighting of environmental considerations in the product's total commercial basis and determination of the specific requirements for the product's properties imposed by environmental considerations

Environmental assessment of a product: to define and quantify the service provided by the product, to identify and to quantify the environmental exchanges caused by the way in which the service is provided, and to ascribe these exchanges and their potential impacts to the service

Exposure: the degree to which a substance reaches parts of the environment where the impact can be exerted, e.g. the degree to which a toxic substance reaches an organism

Functional unit: the defined and quantified service provided by the product. The functional unit is the object of the environmental assessment

Goal definition: clarifies what the LCA shall and shall not be used for, including the decisions which it must support and the environmental consequences to which these decisions can lead. A phase of the LCA method

Inventory: collection of environmentally relevant information from processes identified during scope definition and included in the product system. A phase of the LCA method

Joint environmental exchanges: environmental exchanges from a joint process which can be ascribed to more than one service

Joint processes: processes which contribute to more than one service for a final user

Key figures: the environmentally most important data of the LCA, including both data on environmental exchanges from the processes and on the composition of the product system, i.e. data for the product life time, use patterns, disposal routes and other product system parameters

Life cycle assessment: see environmental assessment of products

Manufacturing: the processing of materials into the final product. Designates a stage in the product's life

Material grade: the utility value residing in the material expressed as a fraction of the initial utility value of the material. The material grade thus lies between 0 and 1

MECO principle: a method to structure and systematize the work of the LCA. M, E, C and O designate Materials, Energy, Chemicals and Others

Non-renewable resources: resources which cannot be regenerated or regenerated only within a time horizon beyond current interest, e.g. oil, coal, metals

Normalization: Relative scaling of the product's impact potentials and resource consumptions through comparison of each of them with a reference, which is the background contribution to the same impact potentials and resource consumption. In the EDIP method the average contribution from one person in 1990 is used as reference

NO_x: Nitrogen oxides, i.e. NO and NO_2

Parts list: (~ list of components) a hierarchic list of the product's composition from top level, which is the product itself, to bottom level, which is materials and components purchased externally

PCBs: Polychlorinated biphenyls - a group of highly persistent organic compounds

Phases: here used to subdivide the LCA-method into four: the goal definition phase, the scope definition phase, the inventory phase and the impact assessment phase

Product service: the service provided by the product; a definition of a product is that it is of benefit to the user: it provides a service

Product system: all processes into which the product enters are collectively termed its product system

Projection: assessing the future magnitude of key figures for the LCA

Reference product: the product selected to represent provision of the service

Renewable resources: resources which can be regenerated, e.g. wood, water, grain

Resource consumption: consumption of both renewable and non-renewable resources

Resources: the primary raw materials from which the materials, the ancillary substances and the energy in the product system derive

Scope definition: designates a phase of the LCA method and comprises the following elements: definition of the object of the study including specification of the functional unit, identification of the assessment criteria, definition of the scope of the product system, definition of the time boundaries of the study, definition of the technological level of the processes in the product system, and definition of allocation procedures

Scope definition of the product system: identifying and including the most significant processes from an environmental perspective, thus excluding the insignificant ones

Screening: an introductory rough environmental assessment used to plan the data collection for the actual environmental assessment. See also scope definition of the product system

Sensitivity analysis: idenfication of the key figures of the LCA and analysis of the overall variability of results and conclusions as a consequence of uncertainties in these figures

Service: see product service

Sustainable development: development that meets the needs of the present generation without compromising the ability of future generations to meet their needs with focus on material resources, biological diversity and the health of the environment

Technological scope: the technological level which must be met by the processes which comprise the product system

Uncertainty analysis: assessment of the uncertainty of the total results and conclusions due to uncertainties in the data used (in the scope definition, the inventory and the impact assessment)

Unit process: data for a process expressed per unit of process in a generalized form; for materials a unit will typically be weight, for a painting process typically surface area

Working environment, impacts on: negative influence on safety and health to which the operator is exposed during work. All impacts on the working environment are expressed as duration of exposure in hours or millihours except for accidents, which are expressed in numbers

Use stage: a stage of the product life comprising all processes related to use and maintenance of the product

Utility value: a measure of the total potential for use of the material, substance or component in question

Weighting: a quantitative comparison of the seriousness of the different resource consumptions or impact potentials of the product

Variables and parameters

B_b	Meat transfer factor
BCF	Bioconcentration factor
BIO	Biodegradability factor
B_m	Milk transfer factor
EF(ac)	Equivalency factor for acidification potential
EF(et)	Equivalency factor for potential for ecotoxicity
EF(etp)	Equivalency factor for potential for ecotoxicity in waste water treatment plant
EF(etsc)	Equivalency factor for potential for chronic ecotoxicity in soil
EF(etwa)	Equivalency factor for potential for acute ecotoxicity in water
EF(etwc)	Equivalency factor for potential for chronic ecotoxicity in water
EF(gw)	Equivalency factor for global warming potential
EF(ht)	Equivalency factor for potential for human toxicity
EF(hta)	Equivalency factor for potential for human toxicity on exposure via air
EF(htg)	Equivalency factor for potential for human toxicity on exposure via groundwater
EF(hts)	Equivalency factor for potential for human toxicity on exposure via soil
EF(htw)	Equivalency factor for potential for human toxicity on exposure via surface water
$EF(j)_i$	Equivalency factor for potential contribution from substance (i) to environmental impact category (j)
EF(N)	Equivalency factor for potential for nutrient enrichment (N only)
EF(ne)	Equivalency factor for potential for nutrient enrichment (N and P together)
EF(od)	Equivalency factor for ozone depletion potential
EF(P)	Equivalency factor for potential for nutrient enrichment (P only)
EF(po)	Equivalency factor for photochemical ozone formation potential
EP(ac)	Environmental impact potential for acidification
EP(et)	Environmental impact potential for ecotoxicity
EP(etp)	Environmental impact potential for ecotoxicity in waste water treatment plant
EP(etsc)	Environmental impact potential for chronic ecotoxicity in soil
EP(etwa)	Environmental impact potential for acute ecotoxicity in water
EP(etwc)	Environmental impact potential for chronic ecotoxicity in water
EP(gw)	Environmental impact potential for global warming
EP(ht)	Environmental impact potential for human toxicity
EP(hta)	Environmental impact potential for human toxicity on exposure via air
EP(htg)	Environmental impact potential for human toxicity on exposure via groundwater
EP(hts)	Environmental impact potential for human toxicity on exposure via soil
EP(htw)	Environmental impact potential for human toxicity on exposure via water
EP(j)	Environmental impact potential for impact category (j)
$EP(j)_i$	Environmental impact potential for impact category (j) from substance (i)
EP(N)	Environmental impact potential for nutrient enrichment (N only)
EP(ne)	Environmental impact potential for nutrient enrichment (N and P together)
EP(od)	Environmental impact potential for ozone depletion
EP(P)	Environmental impact potential for nutrient enrichment (P only)
EP(po)	Environmental impact potential for photochemical ozone formation
EP(pt)	Environmental impact potential for persistent toxicity
$ER(j)_{90}$	Normalization reference for environmental impact category (j) based on emissions in 1990
$ER(j)_{T2000}$	Society's target contribution in the year 2000 for environmental impact category (j) based on political reduction targets
ETF_p	Ecotoxicity factor for effects in waste water treatment plant
ETF_{sc}	Ecotoxicity factor for chronic effects in soil
ETF_{wa}	Ecotoxicity factor for acute effects in water
ETF_{wc}	Ecotoxicity factor for chronic effects in water
f(loss)	Loss of material grade
f(new)	Material grade of new material
f(scrap)	Material grade of scrap
f_a	That portion of the emission which contributes to toxicity via air
f_g	That portion of the emission which contributes to toxicity via groundwater
f_s	That portion of the emission which contributes to toxicity via soil
f_{sc}	That portion of the emission which contributes to chronic toxicity in soil
f_w	That portion of the emission which contributes to toxicity via surface water
f_{wa}	That portion of the emission which contributes to acute ecotoxicity in water
f_{wc}	That portion of the emission which contributes to chronic ecotoxicity in water
H	Henry's law constant
HRC	Human reference concentration
HRD	Human reference dose
HTF_a	Human toxicity factor for exposure via air
HTF_g	Human toxicity factor for exposure via groundwater
HTF_s	Human toxicity factor for exposure via soil
HTF_w	Human toxicity factor for exposure via surface water
I_a	Intake factor for air
I_g	Intake factor for groundwater
I_s	Intake factor for soil
$I_{s,b}$	Intake factor for soil via meat

$I_{s,d}$	Intake factor for soil on direct ingestion
$I_{s,m}$	Intake factor for soil via milk
$I_{s,p}$	Intake factor for soil via plants
I_w	Intake factor for water
K_d	Coefficient of adsorption in soil
L	Life span
NEP(j)	Normalized potential for environmental impact category (j)
NP(j)	Normalized impact potential or resource consumption (j)
NR(j)	Normalized resource consumption (j)
NWP(j)	Normalized potential for working environment impact category (j)
P(j)	Impact potential or resource consumption (j)
PNEC	Predicted no-effect concentration, the highest concentration assessed not to produce ecotoxic effects in the environment
$PNEC_{sc}$	The highest concentration assessed not to produce chronic ecotoxic effects in the soil compartment
$PNEC_{wa}$	The highest concentration assessed not to produce acute ecotoxic effects in the water compartment
$PNEC_{wc}$	The highest concentration assessed not to produce chronic ecotoxic effects in the water compartment
P_{ow}	Octanol-water partitioning coefficient
Product $\overline{NN}$	Average of products which draw on the material pool
Q_i	Environmental exchange of substance (i)
$Q_{i,p}$	Exchange of substance (i) from process (p)
$Q_{i,up}$	Environmental exchange of substance (i) from the use process and its non-terminal exchanges
Q_p	Quantity emitted to waste water treatment plant
R(j)	Normalization reference for impact potential or resource consumption for one year
R(j)	Consumption of resource (j)
$RR(j)_{90}$	Normalization reference for resource consumption (j) based on consumption in 1990
SCF	Stem concentration factor
$SF(j)_p$	Site factor for process (p) for use in computation of environmental impact potential for environmental impact category (j)
T	Duration of service as defined in the functional unit
T_a	Transfer factor from air
T_g	Transfer factor from groundwater
T_s	Transfer factor from soil
$T_{s,b}$	Transfer factor from soil via meat
$T_{s,d}$	Transfer factor from soil on direct intake
$T_{s,m}$	Transfer factor from soil via milk
$T_{s,p}$	Transfer factor from soil via plants
T_w	Transfer factor from water
WEP(j)	Weighted potential for environmental impact category (j)
WF(j)	Weighting factor for impact potential or resource consumption (j)
WP(j)	Weighted impact potential or resource consumption (j)
WP(j)	Potential for contribution to impact (j) on the working environment

WR(j)	Weighted consumption of resource (j)
$WR(j)_{90}$	Normalization reference for working environment impact category (j) for the years circa 1990
WWP(j)	Weighted potential for working environment impact category (j)
μ	Mean
σ	Standard deviation
σ/μ	Coefficient of variation (standard deviation divided by mean)

Abbreviations

ABS	Acrylonitrile-butadiene-styrene copolymer
CEN	Comité Europeén de Normalisation
CFC	Chlorofluorocarbon
D	Statistical distribution
EAA	European Aluminium Association
EDIP	Environmental Design of Industrial Products, acronym for the LCA method presented in this book
GWP	Global warming potential
HCFC	Hydrochlorofluorocarbon
HDPE	High density polyethylene
HFC	Hydrofluorocarbon
HIPS	High impact polystyrene
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
LC_{50}	Lethal concentration 50%. Concentration lethal to 50% of test organisms
LCA	Life cycle assessment
LC_{Lo}	Lethal concentration low. The lowest concentration which causes death among test organisms
LD_{50}	Lethal dose 50%. Dose lethal to 50% of test organisms
LDPE	Low density polyethylene
LLDPE	Linear low density polyethylene
LOAEC	Lowest observed adverse effect concentration. The lowest concentration observed to result in injurious effects in test organisms
LOAEL	Lowest observed adverse effect level. The lowest dose observed to result in injurious effects in test organisms
LOEC	Lowest observed effect concentration. The lowest concentration observed to result in effects in test organisms
logN	Log(arithmic) normal distribution
NMHC	Non-methane hydrocarbons. Hydrocarbons except methane
NOAEC	No observed adverse effect concentration. The highest concentration observed to result in no injurious effects in test organisms
NOAEL	No observed adverse effect level. The highest dose observed to result in no injurious effects in test organisms
NOEC	No observed effect concentration. The highest concentration observed to result in no effects in test organisms
ODP	Ozone depletion potential
OECD	Organization for Economic Co-operation and Development
PCBs	Polychlorinated biphenyls
POCP	Photochemical ozone creation potential
PP	Polypropylene
PS	Polystyrene
PU	Polyurethane
PVC	Polyvinyl chloride
REPA	Resource and environmental profile analyses
SETAC	Society of Environmental Toxicology and Chemistry
TD_{Lo}	Toxic dose low. The lowest dose which results in injurious effects in test organisms
UNCED	United Nations Conference on Environment and Development
UNECE	United Nations Economic Commission for Europe
VOC	Volatile organic compound

Units

C_2H_4-eq	Ethylene equivalents. Unit for potential contribution to photochemical ozone formation
CFC11-eq	Unit for potential contribution to stratospheric ozone depletion
CO_2-eq	Carbon dioxide equivalents. Unit for potential contribution to global warming
dB(A)	Decibels: unit of sound pressure ('A' weighting)
m^3 air	Unit for potential contribution to human toxicity via inhalation
m^3 soil	Unit for potential contribution to chronic ecotoxicity in soil or human toxicity via soil
m^3 water	Unit for potential contribution to acute ecotoxicity in water or waste water treatment plant, chronic ecotoxicity in water or human toxicity via water
N-eq	Nitrogen equivalents. Unit for potential contribution to nutrient enrichment
NO_3^--eq	Nitrate equivalents. Unit for potential contribution to nutrient enrichment
P-eq	Phosphorus equivalents. Unit for potential contribution to nutrient enrichment
$PET_{WDK2000}$	Target person-equivalents. Unit for weighted environmental impact potentials expressed via weighting relative to society's target impacts for the year 2000. Given as PET_{W2000} or PET_{DK2000} depending on whether the weighting factors are based on global (W) or Danish (DK) emission targets in the year 2000
PE_{WDK90}	Person-equivalent computed as the average resource consumption or impact potential per person in the world (W) or in Denmark (DK) in 1990. Unit for normalized resource consumption or normalized potentials for environmental impacts or impacts on the working environment
ppbv	Parts per billion by volume. Unit for concentration in air
PR_{W90}	Person-reserve. Unit for weighted consumption of resources which is expressed via weighting as the fractions of the person-reserve computed in 1990. Given as PR_{W90} as the reserve is computed for the world (W) in 1990
RWI_{DK90}	Expected number of reported work injuries based on figures for Denmark in the years circa 1990. Unit for weighted impact potentials on the working environment
SO_2-eq	Sulphur dioxide equivalents. Unit for potential contribution to acidification

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