

The 16 impact categories of the Environmental Footprint

Climate change



This indicator refers to the increase in the average global temperatures as result of greenhouse gas (GHG) emissions. The greatest contributor is generally the combustion of fossil fuels such as coal, oil, and natural gas. The global warming potential of all GHG emissions is measured in kilogram of carbon dioxide equivalent (kg CO₂ eq), namely all GHG are compared to the amount of the global warming potential of 1 kg of CO₂.

Ozone depletion



The stratospheric ozone (O₃) layer protects us from hazardous ultraviolet radiation (UV-B). Its depletion increases skin cancer cases in humans and damage to plants. The potential impacts of all relevant substances for ozone depletion are converted to their equivalent of kilograms of trichlorofluoromethane (also called Freon-11 and R-11), hence the unit of measurement is in kilogram of CFC-11 equivalent (kg CFC-11 eq).

Particulate Matter



This indicator measures the adverse impacts on human health caused by emissions of Particulate Matter (PM) and its precursors (e.g. NO_x, SO₂). Usually, the smaller the particles, the more dangerous they are, as they can go deeper into the lungs. The potential impact of is measured as the change in mortality due to PM emissions, expressed as disease incidence per kg of PM_{2.5} emitted.

LCA and environmental impacts



With LCA, different environmental impacts may be assessed. The Environmental Footprint method allows assessing 16 impact categories.

Ionising radiation



The exposure to ionising radiation (radioactivity) can have impacts on human health. The Environmental Footprint only considers emissions under normal operating conditions (no accidents in nuclear plants are considered). The potential impact on human health of different ionising radiations is converted to the equivalent of kilobecquerels of Uranium 235 (kg U235 eq).

Photochemical ozone formation



Ozone (O₃) on the ground (in the troposphere) is harmful: it attacks organic compounds in animals and plants, it increases the frequency of respiratory problems when photochemical smog ("summer smog") is present in cities. The potential impact of substances contributing to photochemical ozone formation is converted into the equivalent of kilograms of Non-Methane Volatile Organic Compounds (e.g. alcohols, aromatics, etc.; kg NMVOC eq).

Acidification



Acidification has contributed to a decline of coniferous forests and an increase in fish mortality. Acidification can be caused by emissions getting into the air, water and soil. The most significant sources are combustion processes in electricity, heating production, and transport. The contribution to acidification is greatest when the fuels contain a high level of sulphur. The potential impact of substances contributing to acidification is converted to the equivalent of moles of hydron (general name for a cationic form of atomic hydrogen, mol H⁺ eq).

Eutrophication, terrestrial



Eutrophication impacts ecosystems due to substances containing nitrogen (N) or phosphorus (P). These nutrients cause a growth of algae or specific plants and limit growth in the original ecosystem. The potential impact of substances contributing to terrestrial eutrophication is converted to the equivalent of moles of nitrogen (mol N eq).

Eutrophication, freshwater



Eutrophication impacts ecosystems due to substances containing nitrogen (N) or phosphorus (P). If algae grows too rapidly, it can leave water without enough oxygen for fish to survive. Nitrogen emissions into the aquatic environment are caused largely by fertilizers used in agriculture, but also by combustion processes. The most significant sources of phosphorus emissions are sewage treatment plants for urban and industrial effluents and leaching from agricultural land. The potential impact of substances contributing to freshwater eutrophication is converted to the equivalent of kilograms of phosphorus (kg P eq).

Eutrophication, marine



Eutrophication impacts ecosystems due to substances containing nitrogen (N) or phosphorus (P). As a rule, the availability of one of these nutrients will be a limiting factor for growth in the ecosystem, and if this nutrient is added, the growth of algae or specific plants will be increased. For the marine environment this will be mainly due to an increase of nitrogen (N). Nitrogen emissions are caused largely by the agricultural use of fertilisers, but also by combustion processes. The potential impact of substances contributing to marine eutrophication is converted to the equivalent of kilograms of nitrogen (kg N eq).

Human toxicity, non-cancer



This indicator refers to potential impacts on human health caused by absorbing substances through the air, water, and soil. Direct effects of products on humans are currently not measured. The unit of measurement is Comparative Toxic Unit for humans (CTUh). This is based on a model called USEtox.

Water use



The withdrawal of water from lakes, rivers or groundwater can contribute to the 'depletion' of available water. The impact category considers the availability or scarcity of water in the regions where the activity takes place, if this information is known. The potential impact is expressed in cubic metres (m³) of water use related to the local scarcity of water.

Resource use, fossils



The earth contains a finite amount of non-renewable resources, such as fossil fuels like coal, oil and gas. The basic idea behind this impact category is that extracting resources today will force future generations to extract less or different resources. For example, the depletion of fossil fuels may lead to the non-availability of fossil fuels for future generations. The amount of materials contributing to resource use, fossils, are converted into MJ.

Ecotoxicity, freshwater



This indicator refers to potential toxic impacts on an ecosystem, which may damage individual species as well as the functioning of the ecosystem. Some substances have a tendency to accumulate in living organisms. The unit of measurement is Comparative Toxic Unit for ecosystems (CTUe). This is based on a model called USEtox.

Human toxicity, cancer



This indicator refers to potential impacts on human health caused by absorbing substances through the air, water and soil. Direct effects of products on humans are currently not measured. The unit of measurement is Comparative Toxic Unit for humans (CTUh). This is based on a model called USEtox.

Land Use



Use and transformation of land for agriculture, roads, housing, mining or other purposes. The impacts can vary and include loss of species, of the organic matter content of soil, or loss of the soil itself (erosion). This is a composite indicator measuring impacts on four soil properties (biotic production, erosion resistance, groundwater regeneration and mechanical filtration), expressed in points (Pts).

Resource use, minerals and metals



The basic idea behind this impact category is the same as the one behind the impact category resource use, fossils (namely, extracting a high concentration of resources today will force future generations to extract lower concentration or lower value resources). The amount of materials contributing to resource depletion are converted into equivalents of kilograms of antimony (kg Sb eq).



Impact affecting the environment on a global scale



Impact affecting the environment mainly at local/regional scale