

Glossary

New words can yield new sensitivity, for vocabulary filters experience, shapes perception, and guides understanding.

– William R. Catton, Jr.
OVERSHOOT: The Ecological Basis of Revolutionary Change, page 8

Acidification: a reduction in pH

Ocean water is becoming less basic and more acidic, primarily as a result of absorbing carbon dioxide from the atmosphere, which makes it more difficult for shellfish, coral, and calcareous plankton to grow calcium carbonate shells.

Ambient air: air at its natural temperature, not actively heated or cooled

Anthropogenic climate change: changes to long-term weather patterns due to human activity

Bioaccumulate: to pervade the environment and be found in greater concentrations in biological tissues over time and at higher trophic levels in the food web

Biodegradable: materials that naturally decompose to safe and inert substances

Carbon dioxide: a *greenhouse gas* that is accumulating in our atmosphere primarily as a result of burning fossil fuel

Besides warming our planet, more carbon dioxide in our atmosphere causes *acidification* of rivers, lakes, and oceans.

Carbon footprint: the amount of *greenhouse gasses* emitted as a result of activities over a period of time, expressed in units of *global warming potential* with carbon dioxide as the base unit

GHG Protocol defines three scopes: 1) direct emissions, 2) indirect emissions from electricity, and 3) indirect “upstream” and “downstream” emissions as a result of all other activities.

Carbon pollution: carbon pollution is carbon monoxide and carbon dioxide emitted into the atmosphere by burning carbohydrates (such as wood) or hydrocarbons (fossil fuel)

Burning carbohydrates or hydrocarbons produces both carbon monoxide, which is immediately dangerous to human life or health at 1,200 parts per million, and carbon dioxide, which is immediately dangerous to human life or health at 40,000 parts per million and contributes to both global warming and ocean acidification. Carbon monoxide is oxidized to carbon dioxide within a few years; carbon dioxide persists in air for centuries.

Carcinogenic: causing cancer

Composting: using oxygen-breathing microbes, fungi, and other organisms to decompose organic waste into a nutrient-rich soil amendment

Conservation: a reduction in the consumption of a resource; may lower living standards

Decomposition: breaking down organic matter into simpler substances by microorganisms, fungi, and other decomposers

Digesting: using anaerobic microbes in air-tight vessels sealed off from atmospheric oxygen to decompose organic waste into biogas (mostly methane, carbon dioxide, and water)

Biogas can be directly burned for electricity or scrubbed of carbon dioxide and other impurities to produce methane that meets standards for distribution in natural gas pipelines.

Diminishing (non-renewable) resource: a resource, such as petroleum, that does not replenish naturally; as this type of resource is consumed, the amount remaining diminishes

Downcycling: taking a waste material and recycling it in a way that produces a less valuable material than the virgin material

Recycled plastic waste is most often downcycled rather than recycled.

Ecological footprint: a measure of the biologically productive surface area of the Earth required to produce resources and absorb waste

Efficiency: reducing consumption of a resource without lowering living standards

Egregiously unsustainable: practices that have much worse environmental impacts than close substitutes, such as eating domesticated beef compared to wild-caught venison

Energy: the ability to change temperature, accelerate mass, compute calculations, and convert one form of energy to another

The scientific unit of energy is the *joule*, but a common unit is the *kilowatt hour*: the energy of one thousand *watts* of *power* expended for one hour.

Environmental impacts: changes to natural processes as a result of human activities

Energy productivity: a measure of how effectively energy resources are being used to create value

The closely related term, energy efficiency, emphasizes the technical aspects of reducing energy input for the same amount of work output. Reducing energy waste through technological improvements and system optimization can increase both energy efficiency and energy productivity.

Enzymes: biodegradable proteins that remove stains and odors by catalyzing reactions to break down molecules to pieces that are more easily removed by surfactants and detergents

Eutrophication: an increase in the concentration of plant nutrients in water

If excessive, this can lead to algae blooms and die-offs that deplete oxygen and kill aquatic animals.

EV: an electric vehicle, either a battery electric vehicle (BEV) or a plug-in hybrid electric vehicle (PHEV)

Forever chemicals: synthetic substances that do not decompose naturally and therefore tend to persist and bioaccumulate

Global warming potential: how much heat a type of gas traps in our atmosphere, expressed in relation to the global warming potential of carbon dioxide

Green building: designing and constructing buildings in ways that minimize negative environmental impacts while maximizing resource efficiency

Green building uses sustainable materials and methods, reduces energy and water consumption, and creates healthy indoor environments. Common green building standards include LEED (Leadership in Energy and Environmental Design), Living Building Challenge, and Passivhaus.

Greenhouse gasses: gasses that trap heat in our atmosphere, warming Earth's surface

Habitable land: Earth's solid surface area that is not covered by water, glaciers, deserts and other barren land; land that humans can inhabit

Incandescent lighting: lighting that produces light by heating a metal filament until it glows, converting only about 5% of input energy to visible light while the rest becomes heat

Integrated pest management: monitoring for, identifying, observing, and controlling pests using interventions that have the least environmental harm

Hazardous: activities or substances that can cause harm, especially hazardous waste

Jevons paradox (or Jevons effect): increasing the efficiency of resource use can lead to greater consumption rather than conservation of the resource due to induced demand
For example, improving energy efficiency lowers energy costs which induces demand for energy. Taking efficiency measures may counter-intuitively result in more energy being consumed.

Joule: a unit of energy equal to the work done when a force of one newton moves an object one meter, or when one watt of power is applied for one second

kWh: kilowatt hour, the energy of a thousand watts of power for one hour

Life-cycle analysis: a systematic assessment of the “cradle-to-cradle” environmental impacts associated with a product, service, or system, including extracting raw materials, manufacturing, distributing, using, and disposing of or recycling finished goods and supplies

Microplastics: small pieces of plastic debris less than 5,000 microns in size (the size of a pencil eraser or smaller)

Mutagenic: causing genetic mutations

MWh: megawatt hour, the energy of a million watts of power for one hour

Natural: processes that occur without human intervention

Nominal dollars: prices *not* adjusted for inflation

Organic matter: material that comes from living organisms, containing carbon

Parsimony: the inverse of the rate of resource consumption; expressed as time per unit
The units of parsimony depend on the resource. *Energy parsimony* is measured in seconds per joule (or minutes per kWh). It is the inverse of *power* (which is measured in joules per second).

Pescatarian diet: a diet that includes vegetables, fruits, grains, legumes, nuts, seeds, and aquatic animals including fish and shellfish, but excludes other animals
A pescatarian diet may or may not include eggs and dairy products. The prefix “pesca-” derives from “piscis,” the Latin word for fish. See also, *vegan diet*, *vegetarian diet*

Permeable surfaces: ground coverings that allow water to pass through to underlying soil

PFAS: per- and polyfluoroalkyl substances that are *forever chemicals* of concern

Planetary boundaries: “safe limits for human pressure on the nine critical processes which together maintain a stable and resilient Earth,” as defined by the Stockholm Resilience Centre
Environmental scientists in 2009 at the Stockholm Resilience Centre and Australian National University developed a science-based framework to quantify how far human activities can push Earth systems before triggering catastrophic changes.

Power: energy per time
The unit of power is the watt, one joule per second.

Pumped hydropower: an energy storage system that uses two water reservoirs at different elevations, pumping water to the higher reservoir when excess electricity is available and releasing it through turbines to the lower reservoir to generate electricity when needed

Photovoltaic (PV): producing electricity from light

Real dollars: *nominal dollars* adjusted for inflation

Pricing in real dollars allows meaningful comparisons of consumption between time periods.

Recyclable: materials that can be recycled

Reasonable people disagree about what is recyclable, especially plastics. For waste plastic to achieve the same material properties as virgin plastic, the polymer must be completely broken down to the monomer, all contaminants must be removed, and the polymer must be reassembled from the monomer, which is not practical to do. Instead, plastic waste is *downcycled* or *wish-cycled*.

Recycling: collecting and processing waste material so that it can be reused for an equivalent purpose

Regenerative: farming methods that ensure land remains agriculturally productive in perpetuity

Renewable: a resource, especially energy, that replenishes naturally

Resource: a material, energy source, or natural system that can be used to meet human needs

Resources can be renewable (naturally replenishing within human timescales) or diminishing (non-renewable, with finite available quantities).

Restorative process: a process by which a natural environment returns to a healthy, self-sustaining state by rebuilding soil health, water quality, biodiversity, or other ecological functions

Restorative processes go beyond merely reducing negative impacts to actively improving environmental conditions, such as regenerative agriculture practices that build soil fertility.

Safe share: each person's share of consumption and pollution that stays within planetary boundaries; calculated by taking safe limits at a planetary scale and dividing by the number of people on Earth

Sequestered carbon: carbon that is chemically in a solid state, such as coal, rather than in a gaseous state, such as carbon dioxide

Burning fossil fuel releases carbon from a sequestered state. *Sequestration* is chemically reacting carbon dioxide or carbon monoxide gas with another substance to produce a solid product that becomes part of a living organism or part of the Earth's crust.

Solar year: approximately 365.25 days; Earth's annual orbit time around the sun

Leap years occur every fourth year because the Earth's annual orbit time is approximately 365 and one quarter days.

Suspra App: a web app for practical sustainability, published by Sustainable Practice

Suspra Certification Exam: a test of knowledge across a full range of practical sustainability topics

Suspra Score: a score that quantifies the sustainability of practices along seven pathways

A *negative* SusPra Score indicates that practices have impacts that exceed planetary boundaries, so they are *unsustainable*; a *positive* score indicates that practices are *sustainable*.

Sustainability: the ability to meet current needs in ways that allow our posterity to meet their needs

Sustainability indicators: measurements of the rate and type of resource use and pollution emissions in a system

These measurements for a home or organization indicate whether the environmental impacts of practices are within or exceed the ability of natural systems to regenerate and persist.

Teratogenic: causing birth defects

- Trophic level:** the functional distance from the primary energy source of an ecosystem
Sunlight is primary energy. Plants that use sunlight directly are at the first trophic level; herbivores are at a higher trophic level; and carnivores on up to apex predators are at the highest trophic level.
- Toxic:** substances that are especially hazardous to humans or other life
Toxins can be poisonous, radioactive, explosive, *carcinogenic* (causing cancer), *mutagenic* (causing genetic mutations), or *teratogenic* (causing birth defects).
- Upcycling:** taking a waste material and recycling or reusing it in a way that produces a more valuable product than the virgin material
An example is upcycling old sails into expensive bags.
- Vegan diet:** eating everything except animal-derived food products
Vegans avoid eating meat, fish, poultry, dairy, and eggs. *Entovegans* eat insects but no other animal food products. Some vegans avoid eating honey because bees produce it.
- Vegetarian diet:** eating everything except animals
Animals include mammals, reptiles, amphibians, birds, and fish. Some vegetarians also avoid eating multicellular invertebrates like insects, but eat substances that insects produce, such as honey. A *lacto-ovo vegetarian diet* is a plant-based diet that includes eggs and dairy and mushrooms, but excludes meat, fish, and poultry. See also, *vegan diet*, *pescatarian diet*
- Watt:** a unit of power equal to one joule of energy per second, used to measure the rate at which energy is transferred or work is done
- Wish-cycling:** putting items in a recycling bin even though they won't actually be recycled
Wish-cycling soothes the guilt of over-consumption or buying disposable products for convenience. Plastic waste is often wish-cycled.
- Xeriscape:** a landscaping approach that minimizes water usage
The term combines "xeros" (Greek for "dry") with "landscape."