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AMRC
Advanced Manufacturing
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Jargon buster: sustainability



CATAPULT
High Value Manufacturing

Net zero

The neutralisation of greenhouse gas emissions through offsetting by removing an equivalent amount of greenhouse gases from the atmosphere (this definition is developed from the IPCC net-zero definition ^[1]).

Absolute zero

Zero greenhouse gas emissions emitted without the use of offsetting. This includes scope 1, 2 and 3 emissions such as those caused by purchasing, imported goods, flights, and shipping ^[2].

Product/process net zero

The neutralisation of greenhouse gases emitted from the life cycle of a product or process through offsetting by removing an equivalent amount of greenhouse gases from the atmosphere (this definition is developed from the IPCC net-zero definition ^[1]).

Sustainability

The state of the global system, including environmental, social, and economic aspects, in which the needs of the present are met without compromising the ability of future generations to meet their own needs ^[3].

Sustainable development

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs and balances social, economic, and environmental concerns ^[1].

Sustainable development goals

The 17 global goals for development for all countries established by the United Nations through a participatory process and elaborated in the 2030 Agenda for Sustainable Development ^[1].

Sustainable manufacturing

Manufacturing that does not infringe on the persistence of natural and human systems in an equitable manner, balancing social, economic, and environmental concerns (this definition is developed from the IPCC definition of sustainability/sustainable development ^[1]).

Sustainable design

Design that does not infringe on the persistence of natural and human systems in an equitable manner, balancing social, economic, and environmental concerns (this definition is developed from the IPCC definition of sustainability/sustainable development ^[1]).

Design for environment (DfE)/ecodesign

Design that aims to reduce the negative impacts of a product on the environment and society in the product design process without compromising other criteria and specifications such as product performance, mode of use or appearance ^[4].

Circularity

The circular economy (CE) is a sustainable economic system where economic growth is decoupled from resources use, through the reduction and recirculation of natural resources. The circularity of a product is the degree to which it contributes to the CE ^[5].

Recycling

Any reprocessing of waste material in a production process that diverts it from the waste stream, except reuse as fuel. Both reprocessing as the same type of product, and for different purposes should be included. Recycling within industrial plants i.e., at the place of generation, should be excluded ^[1].

Downcycling

During the process of downcycling, the material or product loses value after being recycled ^[6].

Upcycling

During the process of upcycling, the material or product gains value after being recycled ^[6].

Scope 1 emissions

Direct emissions from owned or controlled sources ^[7].

Scope 2 emissions

Indirect emissions from the generation of purchased electricity, steam, heating, and cooling consumed by the reporting company ^[7].

Scope 3 emissions

All other indirect emissions that occur in a company's value chain not covered by scope 1 or scope 2 ^[7].

Embodied energy

The amount of primary energy and renewable energy used in the manufacturing, construction and maintenance of products, processes, and services ^[8].

Embodied carbon/embodied GWP

The amount of greenhouse gas emissions created in the manufacturing, construction and maintenance of products, processes and services ^[8].

Life cycle assessment (LCA)

Compilation and environmental impact assessment of the inputs, outputs of a product or service throughout its life cycle. This definition builds on ISO documentation ^[8].

Industrial symbiosis

Industrial symbiosis is the use by one company or sector of underutilised resources broadly defined (including waste, by-products, residues, energy, water, logistics, capacity, expertise, equipment and materials) from another, with the result of keeping resources in productive use for longer ^[9].

Cradle to grave/gate

Cradle-to-grave assessment considers the environmental impact at each stage of a product's life cycle, from the time natural resources are extracted from the ground and processed through each subsequent stage of manufacturing, transportation, product use, and ultimately, disposal. Cradle-to-gate assessment considers the environmental impact at each stage of a product's life cycle, from the time natural resources are extracted from the ground and processed until the manufacturing stage ^[10].

Sources

- [1] IPCC, 2018: Annex I: Glossary [Matthews, J.B.R. (ed.)]. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)].

- [2] Ward, M., Allwood, J.M., Azevedo, J., Cleaver, C., Cullen, J., Dunant, C., Fellin, T., Hawkins W., Horrocks, I., Horton, P. and Ibell, T., 2019. Absolute Zero: Delivering the UK's climate change commitment with incremental changes to today's technologies.

- [3] Brundtland, G. (1987). Report of the World Commission on Environment and Development: Our Common Future. United Nations General Assembly document A/42/427.

- [4] Li, J. and Sarkis, J., 2021. Product eco-design practice in green supply chain management: A China-global examination of research. *Nankai Business Review International*.

- [5] Corona, B., Shen, L., Reike, D., Carreón, J.R. and Worrell, E., 2019. Towards sustainable development through the circular economy—A review and critical assessment on current circularity metrics. *Resources, Conservation and Recycling*, 151, p.104498.

- [6] Paras, M.K. and Curteza, A., 2018. Revisiting upcycling phenomena: a concept in clothing industry. *Research Journal of Textile and Apparel*

- [7] Carbon Trust, 2017. Briefing: What are Scope 3 Emissions?

- [8] Loveday, J., Morrison, G.M. and Martin, D.A., 2022. Identifying Knowledge and Process Gaps from a Systematic Literature Review of Net-Zero Definitions. *Sustainability*, 14(5), p.3057.

- [9] European Committee for Standardisation (CEN), 2018. CEN Workshop Agreement 17354.

- [10] European Environmental Agency (EEA), 2022. Glossary: List of environmental terms used by EEA.



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