

Manufacturing for sustainability

In accordance with the definition from the United Nations' Commission on Environment and Development, CIRP understands a **sustainable development** as a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (UN WCED 1987). This definition has focus on fulfilment of human needs, which is essential for CIRP since the fundamental purpose of manufacturing is exactly that – to help meeting human needs today and in the future. The definition introduces the fundamental principle of sustainability - that the way in which we satisfy needs today must respect the tolerances of the natural systems that regulate the climate and the hydrological cycles and that are essential for the continued fertility of soils and regeneration of natural resources. If these systems are disrupted, this will strongly compromise the ability of future generations to meet their needs.

There exist **biophysical limits** that our impacts on the environment must respect. For impact on the climate, the Paris agreement (UNFCCC, 2016) that has been adopted by many nations stipulates that we must strive to keep the global average temperature increase of the atmosphere at a level that allows us to avoid accelerating climate change. This translates into a maximum concentration of greenhouse gases in the atmosphere and hence a cap on amount of greenhouse gas emissions that we can allow our activities to cause. There are also biophysical limits for our use of land or water, or our pollution of the ecosystems with chemicals. The exceedance of the tolerance of natural systems is reflected in the current climate crisis and also in the biodiversity crisis with a global rate of species extinction tens to hundreds times higher than it has been over the past 10 million years (IPBES, 2019).

The Planetary Boundaries were introduced as a way of presenting and managing our impacts relative to the limits for nine planetary environmental processes that are deemed essential for the stable environmental conditions that we have experienced since last glaciation (Steffen et al., 2015).

CIRP understands sustainability as: meeting the needs of present and future generations while staying within the planet's biophysical limits. They should be seen as **absolute constraints**. Sustainability trade-offs between environmental, social and economic objectives can only occur as long as we ensure that our activity does not impact the environment beyond its operating space within these limits.

Manufacturing has a central role in enabling a sustainable development. Consumption and production are covered by the same UN goal for sustainable development (SDG 12) because they are so closely interlinked. It is not meaningful to talk about sustainable manufacturing in isolation, but we can talk about sustainable consumption and production or **manufacturing for sustainability** as:

- Contributing to satisfying the needs of present and future generations within the central biophysical limits of our planet and natural ecosystems
- Only trading off between environmental, social and economic sustainability dimensions when we ensure that the environmental impacts respect the biophysical limits
- Always assessing the environmental sustainability impacts of manufacturing activities in a life cycle perspective.

References

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UNFCCC (2016) United Nations / Framework Convention on Climate Change. Adoption of the Paris Agreement, 21st Conference of the Parties, Paris.

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7 February 2022