

Sustainability and Astronomy: Current Estimate on the Environmental Impact of ELT's MOSAIC

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MOSAIC is a multi-object and multi-integral field spectrograph for the Extremely Large Telescope, which is currently in its preliminary design phase (Phase B2). A first estimation of its carbon footprint had been done in 2024, presenting the order of magnitude of the CO₂eq emission. However, the scope of the analysis excludes some of the important parts of the project, such as the AITV phase, cooling system, and electronics. We perform further environmental impact estimation using Life Cycle Analysis (LCA) in accordance with the ESA LCA guideline, covering all project phases from the preliminary design to the instrument's end-of-life and ensuring inclusion of other environmental impact categories, in addition to carbon emissions. This follow-up study aims to provide the astrophysics community with reliable environmental impact figures of our project, identify "hotspots", build strategies on reducing the environmental footprint, and pave the way for an applicable methodology for future astronomical instruments.