

## **Particulate Matter Emissions of the aeronautics manufacturing sector based on global market data and its potential derivation**

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The aeronautics sector has been regarded as an important contributor to environmental problems, due to fuel consumption and combustion emissions. Additional emissions are coming from aircraft manufacturing, aircraft End-of-Life and Recycling.

The complexity of aircraft systems and the lack of public data have prevented analysis of aggregated contributions of the value chain to key environmental problems - analysis that could provide valuable insight to reduce environmental impacts. In European funded projects with partner organisations Fraunhofer developed new mapping method to quantify the environmental burden of industrial areas, such as the aeronautics manufacturing sector.

The mapping performed by partners usually builds on environmental databases and available market data representing high percentage rates of the sector's sales (e.g. Aviation: 84% in 2017). The mapping results for aircraft production (EDES Project) show that material resources and aircraft manufacturing consumed 69.5 TWh energy (site specific energy consumption aggregated), emitted therefore 18.1 MtCO<sub>2e</sub>, and withdrew 475 million m<sup>3</sup> water.

The largest contributions stemming from airframe manufacturers and aluminium alloy production. Carbon emissions predominantly occur in the manufacturing stage while water withdrawals mainly originate from the material production.

Based on the global manufacturing data collected by the partners, Fraunhofer ICT expand the System Boundaries for the Life Cycle Assessment (LCA) with the re-use and recycling quota developed in the ecoDESIGN transversal activity in Clean Sky 2. Applying the processes to the global amounts of materials in the system.

Due to the expected changes in the material mix in the aviation industry, there is as well a forecast derivative possible for future aircraft manufacturing scenarios, as well as different forecast scenarios for variation to the electricity and energy supply changes by using renewable energy. The poster will present the effect on the global particulate matter impact change.

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