Unlocking the Potential of Life Cycle Assessment (LCA) in Aviation

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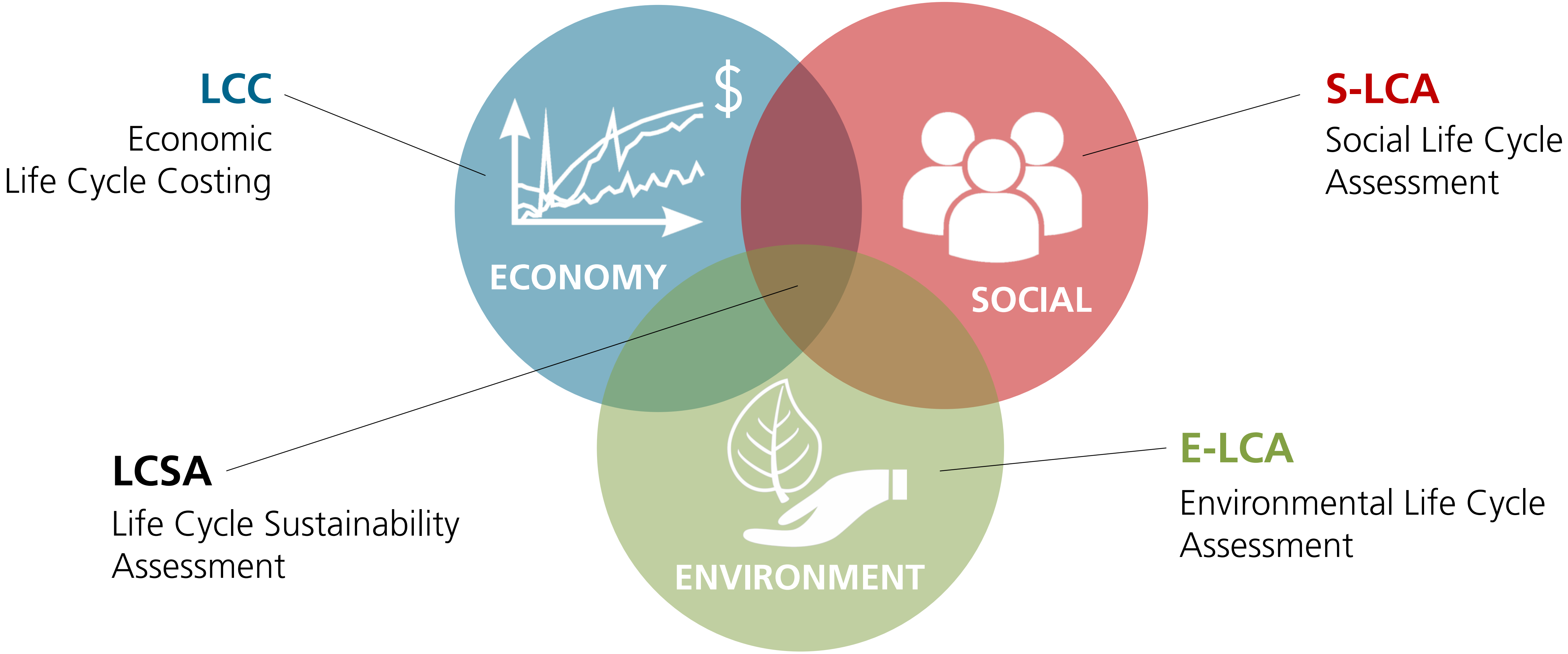
DLR

WHAT IS LIFE CYCLE ASSESSMENT?

Sustainability

Economic, Environmental, and Social Dimension

- Sustainability involves three dimensions:



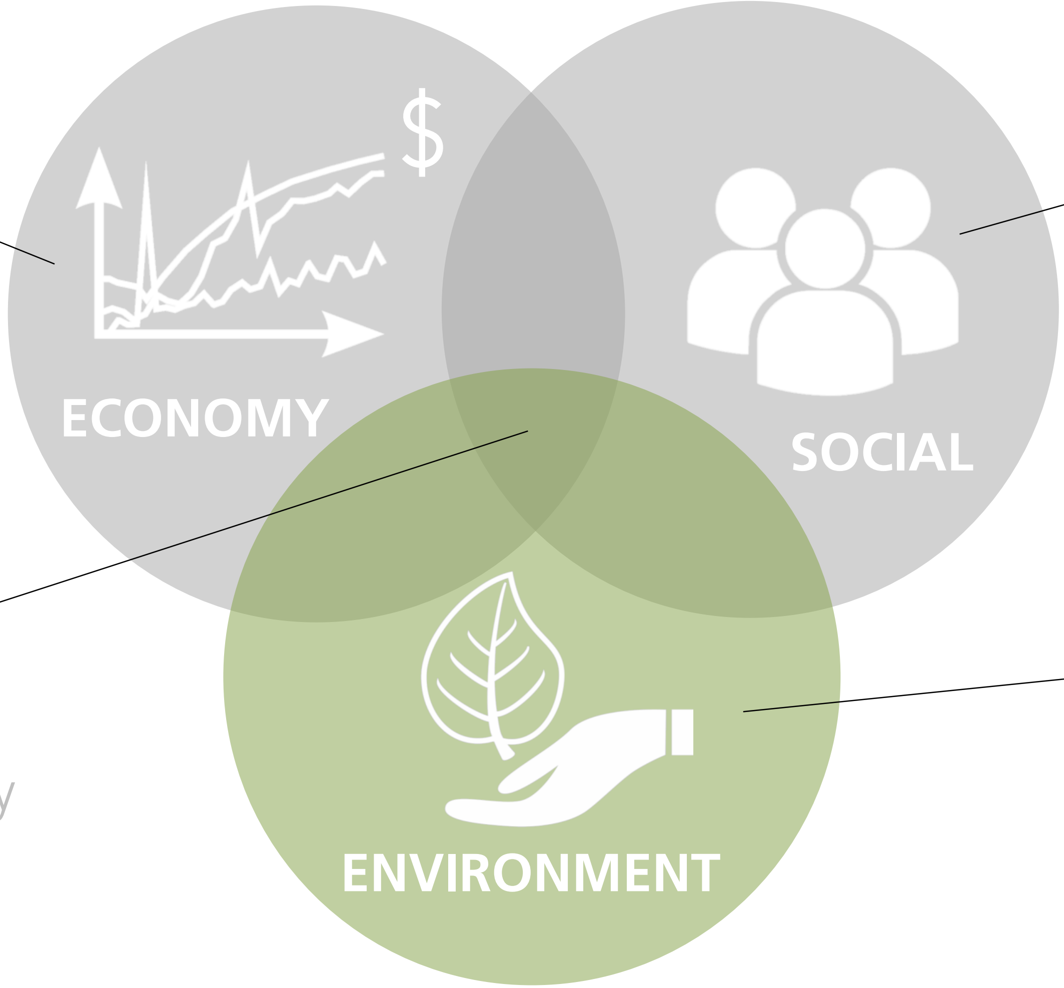
Joana Albano, German Aerospace Center (DLR)

Sustainability

Economic, Environmental, and Social Dimension

- Sustainability involves three dimensions:

LCC
Economic
Life Cycle Costing



S-LCA
Social Life Cycle
Assessment

LCSA
Life Cycle Sustainability
Assessment

E-LCA
Environmental Life Cycle
Assessment

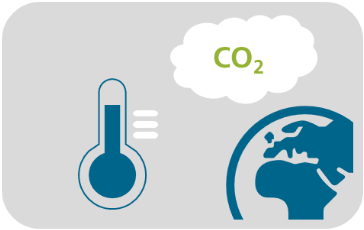
LIFE CYCLE CONSIDERATION

LIFE CYCLE CONSIDERATION

Which life cycle phase has the highest environmental impact?

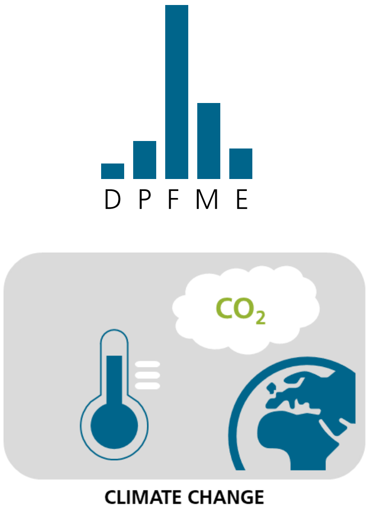
- [ ] Design
- [ ] Manufacturing
- [ ] Flight Operations
- [ ] Maintenance
- [ ] End-of-Life

Life Cycle Assessment



CLIMATE CHANGE

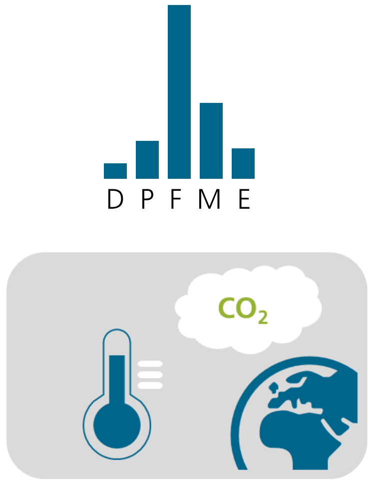
Life Cycle Assessment



Life Cycle
Assessment

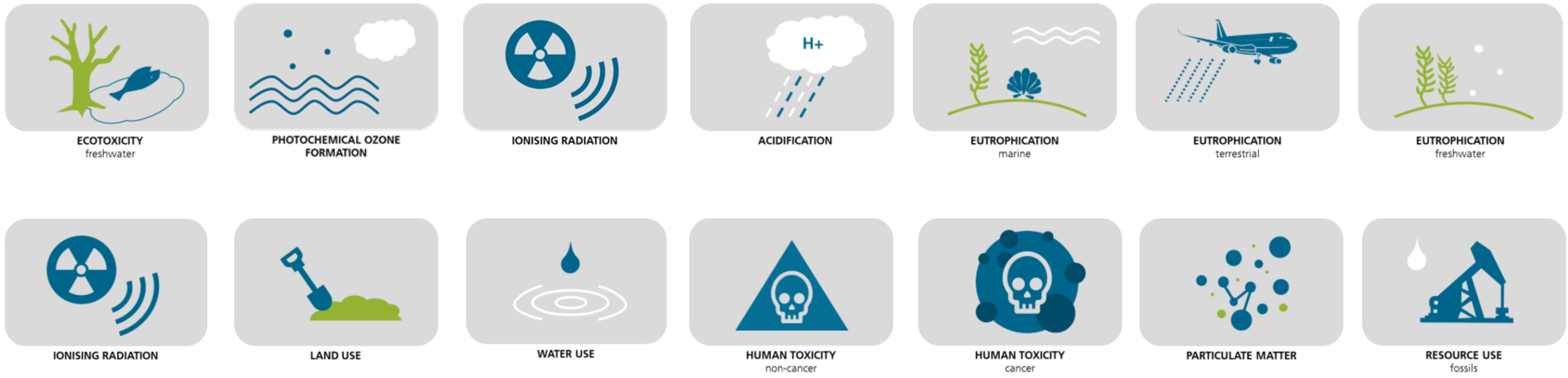
Life Cycle Assessment

RESOURCE USE
minerals & metals



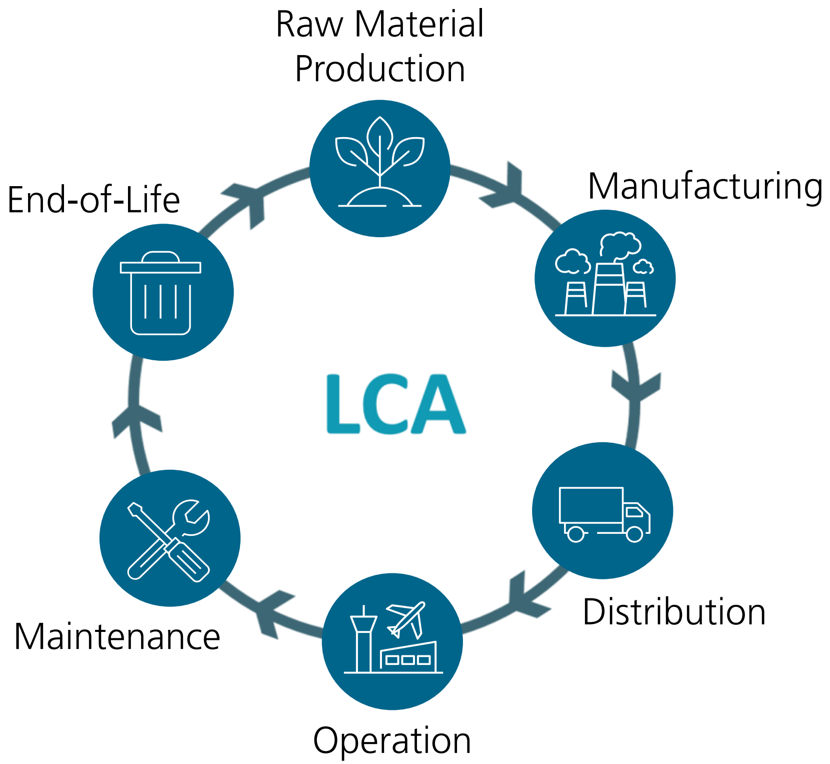
CLIMATE CHANGE

Life Cycle Assessment



Life Cycle Assessment
Purpose of Life Cycle Assessment

Life Cycle Consideration



Environmental Analysis

- Highlights critical environmental hotspots
- Provides valuable data for informed decision-making
- Measures and shares environmental impacts in a clear, standardized way
- Identifies potential for reducing impacts for sustainable development

LCA IN AVIATION

Contextualization

Why Life Cycle Assessment in Aviation?

aviation is **responsible for 3.6 %** of the human-induced greenhouse gas emissions

air transport is **expected to grow** at a faster pace than technology improvement

LCAs assess the **environmental impact** of an aircraft over **its whole lifetime**

LCAs highlight opportunities **to reduce emissions and resource use** while avoiding **burden-shifting**

LCAs support achieving **environmental targets and informed decision-making**

Life Cycle Assessment in Aviation

Research Areas

- ▶ Life Cycle Assessment of Aircraft Concepts
- ▶ Life Cycle Assessment of Aircraft Maintenance
- ▶ Life Cycle Assessment of Aircraft Engines
- ▶ Inventory Management
- ▶ Parametric Life Cycle Assessment
- ▶ Life Cycle Assessment in Space
- ▶ Uncertainty Analysis
- ▶ Circularity as Impact Category
- ▶ End-of-Life Analysis

Thank you for your attention!
Visit our website for more information:

German Aerospace Center (DLR)
Institute of Maintenance, Repair and Overhaul (MO)
Product Lifecycle Management Department (MO-PLM)