

Paris Session 2022



Integration of circularity into eco-design

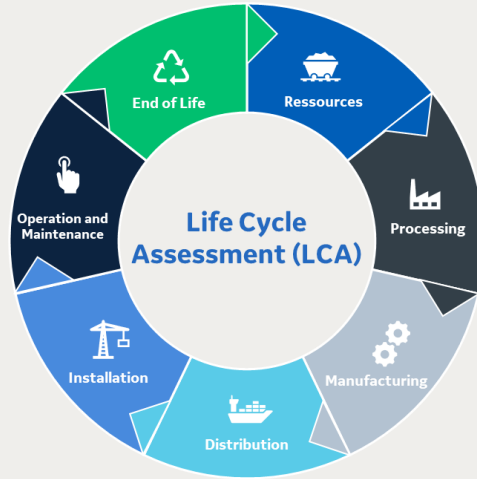
SC C3 Substations and electrical installations
PS1 Question PS1.15

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Question 1.15. To reach a carbon-neutral value chain in the entire process of network operators, there is need to embed circularity in their core business processes. An innovative approach needs to be adopted about the circularity of materials and the eco-design, applying extensively the concepts of resources management, recycling, refurbish, life extension and the LCA methodologies. What experience can be reported about the decision processes for asset management based on circularity? What results can we report?

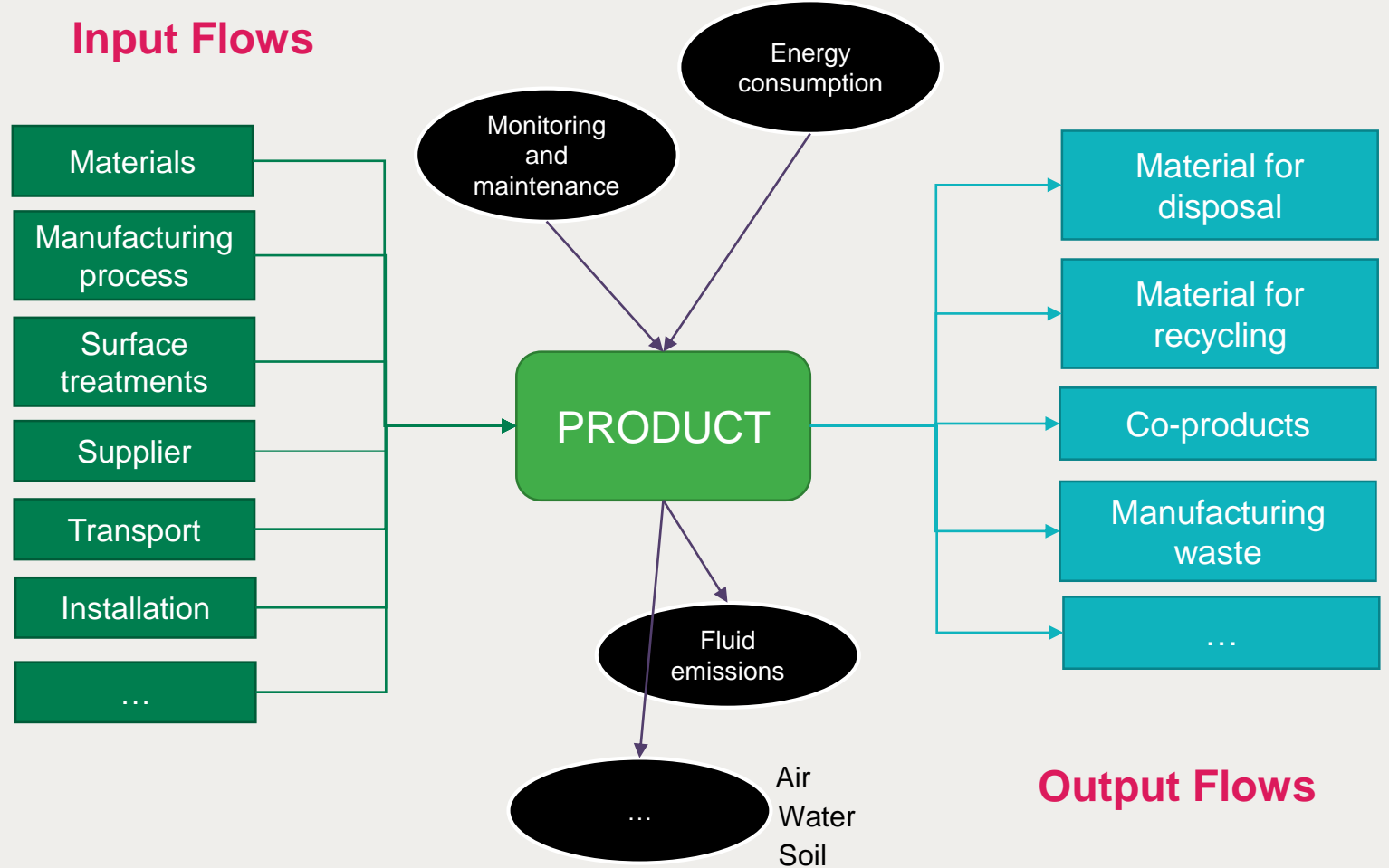
LCA – Assess environmental impact



A study involving the **entire value chain**.

Account for every material, energetic and chemical **flow** necessary to **complete product's function** and rated performance.


An **exhaustive, multi criteria** approach to identify the key impacts and contributors, during product's lifespan.



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5R's of circular economy



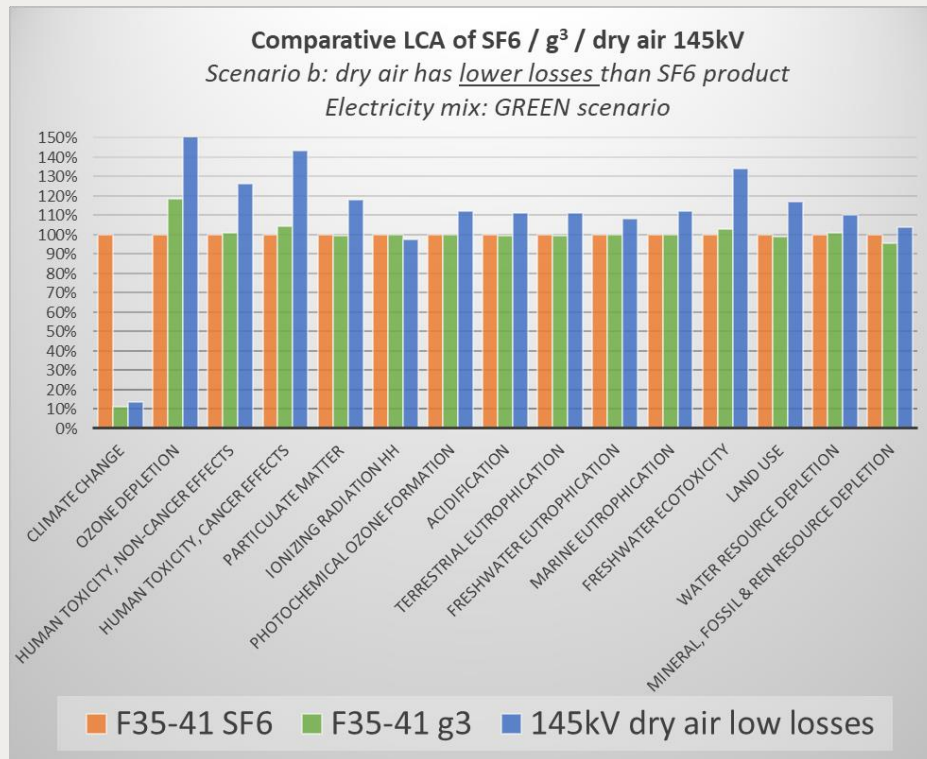
Circular economy model by  the PORTO PROTOCOL

- **Refuse:**
No use SVHC.
- **Reform:**
Technologies to allow a lower material intensity.
- **Reduce:**
Mass of materials by optimizing design.
- **Reuse:**
Reuse of SF₆, reuse of component by life extension (repair of circuit breaker).
- **Recycle:**
SF₆ to move from new SF₆ (acc. to IEC 60376) to recycled SF₆ (acc. to IEC 60480).

Results example on GIS 145 kV – with fluorinated alternative gas

- Addressing climate change impact source led to insulating gas changes.

Material efficiency and circularity is now the **principal enabler for environmental improvements**



- **Material efficiency :**

Alternative gas : **+3% vs SF₆** (2.5t finished materials)

Dry air : **+56% vs SF₆** (3.7t finished materials)

- **Green electricity scenario (prospective use in 2050):**
52 gCO₂e/kWh (McKinsey)

Properly performed material efficiency actions (**Reform and Reduce**) translates in a better environmental performance.