ESA Green Agenda:
Strategy and actions for overcoming climate and sustainability challenges

[UN/Austria Symposium] Panel 2 – September 13 2023
Greening space systems engineering

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Two lines of action in the ESA Agenda 2025

1

Increase the ESA handprint i.e., the contribution of space projects to the sustainable development of society

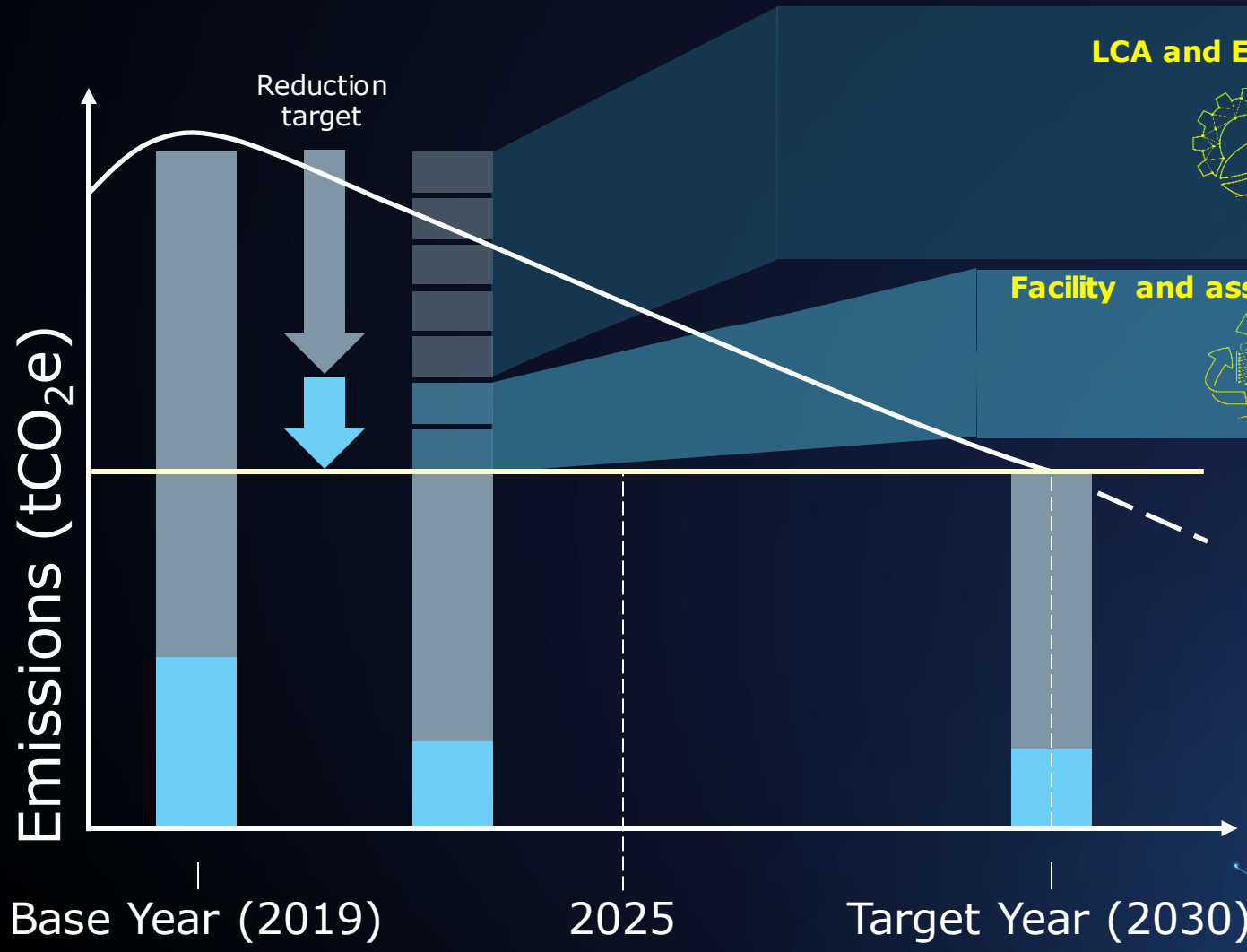
"(…) ensure that ESA and European space programmes can support the ***implementation*** *of the* ***Paris Agreement and the European Green Deal*** *to the fullest extent."*

2

Decrease the ESA footprint, i.e., improve the socially & environmentally responsible management of space sector activities

"The Agency will improve its own environmental responsibility, to contribute to the climate neutrality of Europe. ***By 2030, ESA's GHG emissions will be decreased by 46.2%*** *compared to 2019."*

ESA Green Agenda – Pathway to Net Zero



LCA and Eco Design

Facility and asset management

Sustainability Strategy for ESA Projects

Culture & Ways of Working

Procurement and supply chain

ESA GREEN AGENDA

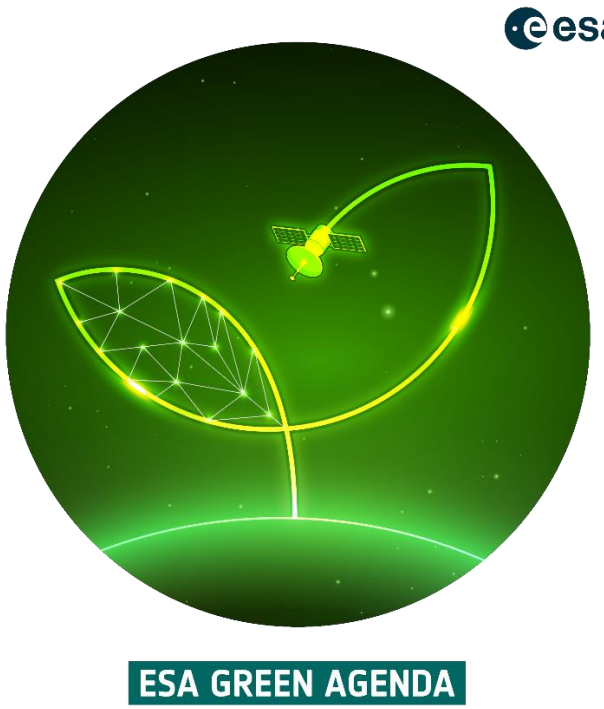
Science-based GHG reduction targets

46% for Scope 1,2

28% for Scope 3

- ESA core business
- ESA cross-cutting

ESA Green Agenda – from strategy to action



- Set **sustainability objectives for ESA projects**
- Reduce **environmental impact of ESA assets**
- Reduce the **environmental impact of space systems** along their entire life cycle
- Enforce ESA **responsible procurement**
- Promote **awareness and cultural change**

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Environmental impact of Space Systems

LCA & Eco-design roadmap (@CleanSpace) – Upstream & Operations

LCA

LCA Launch segment

LCA Space segment

LCA Ground segment

LCA Launch segment - update

LCA implementation in ESA projects

Ariane 6
Earth Explorer 9 & 10
Copernicus Expansion Missions
Galileo 2nd generation
...

Framework

Framework definition
- LCA Handbook
- LCA DataBase

Framework update
- LCA Handbook
- LCA DataBase

Framework consolidation

Eco-Design

GreenSat
First Eco-design implementation

Green technologies roadmap

First **Green Technologies** development

Eco-design implementation in ESA projects

2012 2015 2018 2021 2025 2030

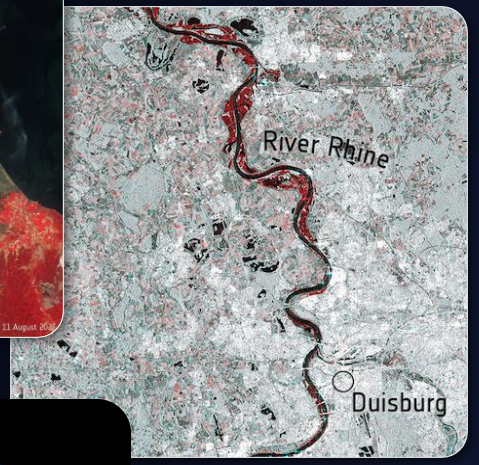
Thank you!

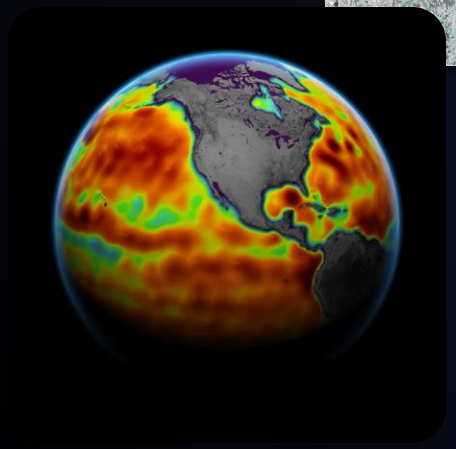
csr@esa.int

Back Up

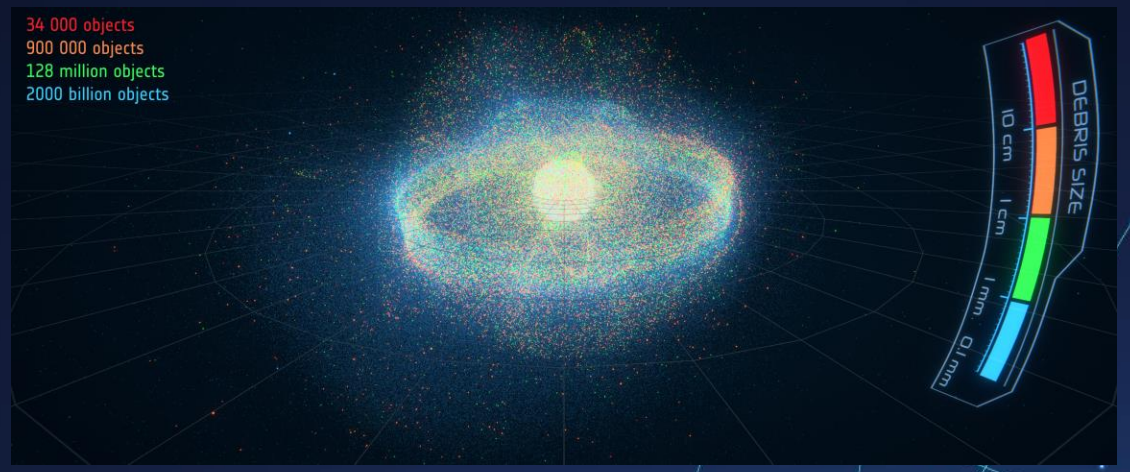
ESA for a Cleaner and Sustainable Planet

Space for Sustainability - Climate Change



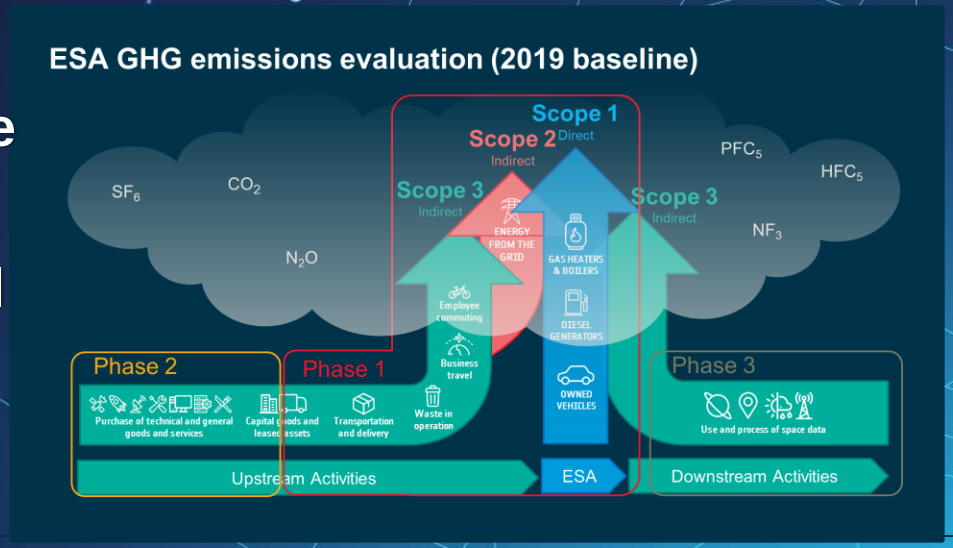


Sustainability of Outer Space

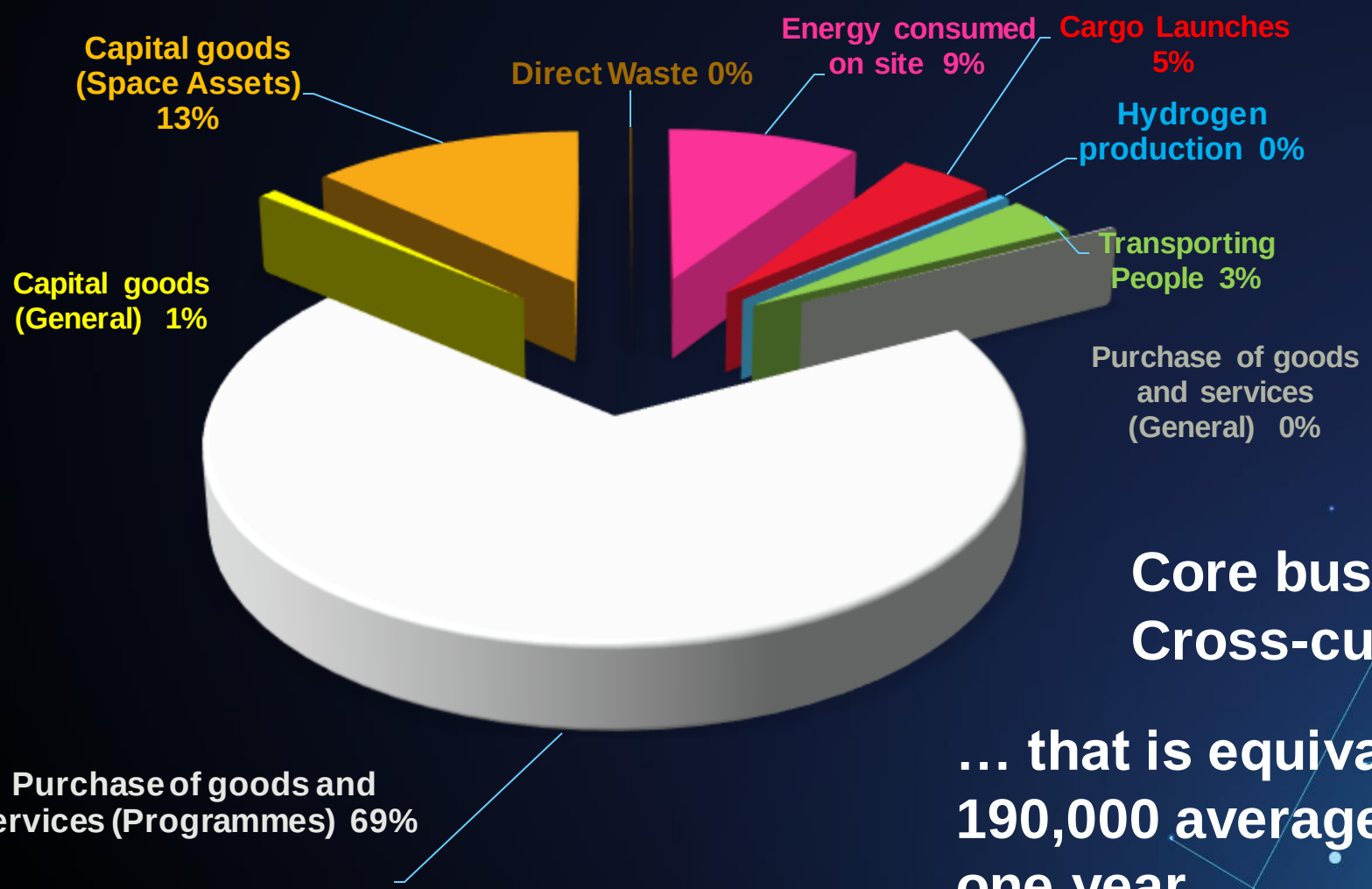


Sustainability of Space activities on Earth

Europe carbon neutral by 2050



ESA GHG footprint in 2019 – 1,3 $mtCO_2e$ …



Core business emissions 86%
Cross-cutting emissions 14%

… that is equivalent to GHG emitted by 190,000 average European citizens during one year

Environmental impact of Space Systems
ESA's Eco-design vision (@CleanSpace)

→ Setting up the framework

ESA LCA Handbook

1st publication in 2016
Foreseen updates in 2023

LCA Database

1st publication in 2016
2nd release in 2019
Foreseen update in 2023

EcoDesign CDF Tool

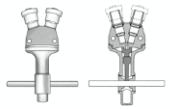
→ GREEN TECHNOLOGIES

Environmental Footprint

Ex: Efficient use of Germanium

Environmental Regulation

Ex: Replacement of pyrotechnic powders



→ ESA PROJECTS

- **Ariane 6**
- **Earth Explorer 9 (Forum - phase A/b1& B2/C/D and SKIM Phase A/B1) & EE10 (Harmony)**
- **Copernicus Std platform**
- **Copernicus Expansion Missions**
- **Galileo 2nd generation**
- …more to come from CM22 project

Scope 3 – the importance of collaboration

The largest part of an organisation's **GHG footprint lies in the supply chain** (70-95%) for upstream and downstream

A **shared responsibility** for reducing the Agency's Scope 3 GHG emission is fundamental to achieve the targeted reduction

Collaboration across the European value chain will allow to **exploit synergies** and identify **least-cost reduction pathways**

ESA, Large Systems Integrators, national space agencies and SMEs have repeatedly and publicly affirmed their **intention to collaborate**