

# Eco-Design Principles for the Sustainable Development of Nyx Earth



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ESA Clean Space Days

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We build *accessible, sustainable,*  
and *cooperative* space worlds.

Company Introduction

H2-2024.



Solution.

# The *Nyx* Family.



*Nyx Earth*

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Earth to Low Earth Orbit and back.



*Nyx Moon*

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Earth to Lunar Gateway and back.

Traction.



...and *growing*.

100+

Team Members

28+

Nationalities

10,000+

Applications

# Significance of Eco-Design.

- Increasing number of launches.
- Increasing number of objects in orbit.
- Evolving global environmental consciousness and awareness of environmental impact.

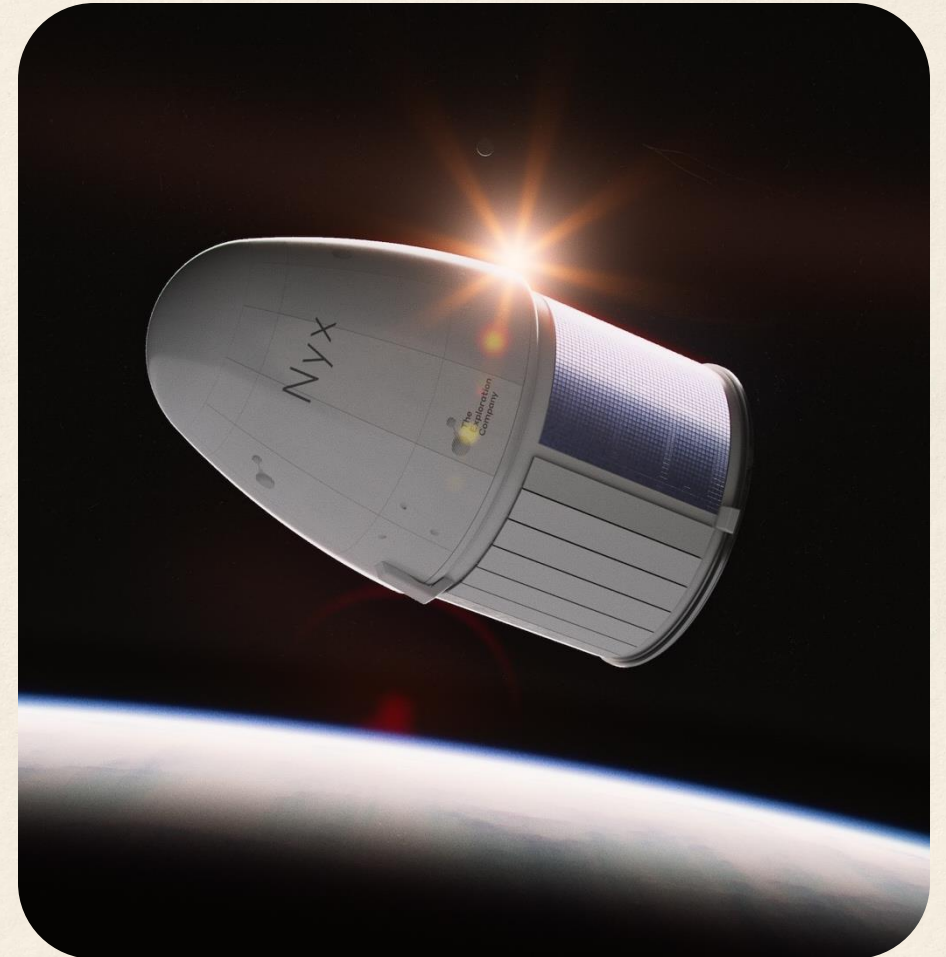
LCA as a proactive mitigation approach.

5.13 %

Of total emissions could be attributed to launches in the future.

80%

Of sustainability impacts are decided through early design choices.



# A need for **Change.**

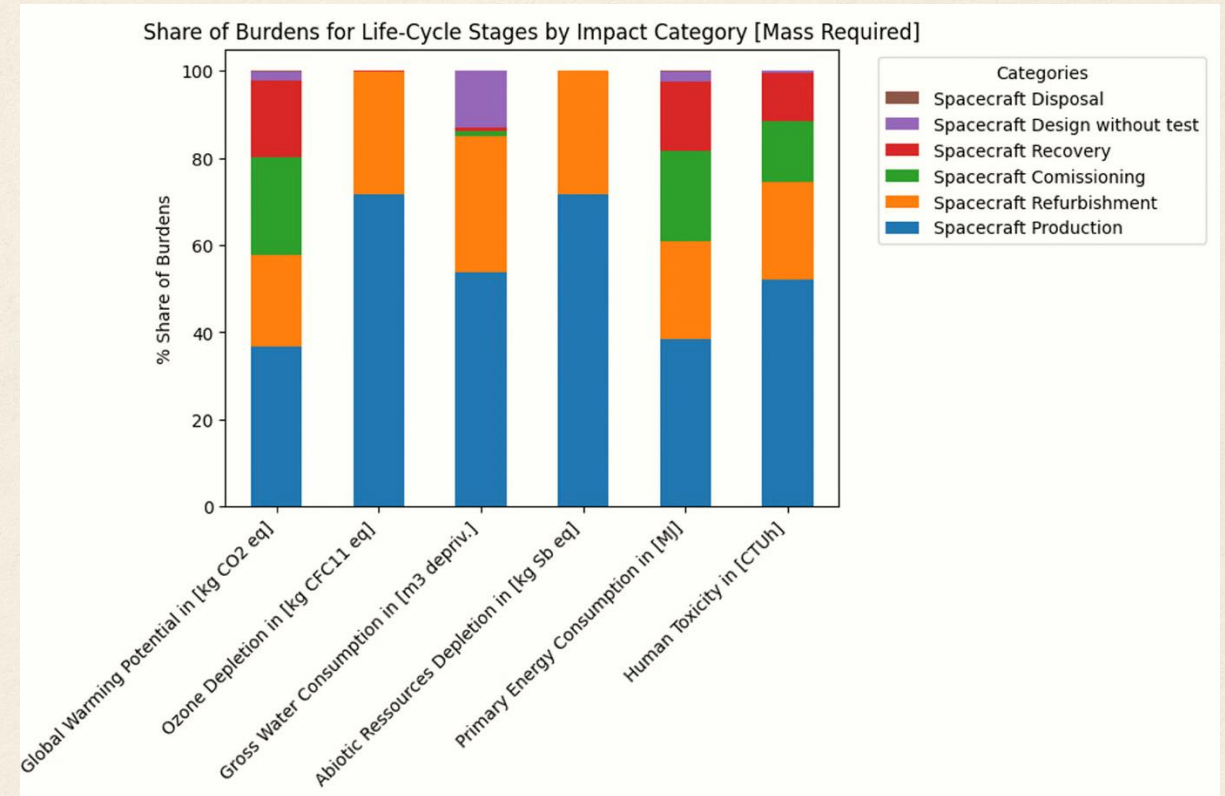
**Lack of Data**

**Industrial  
Reluctance**

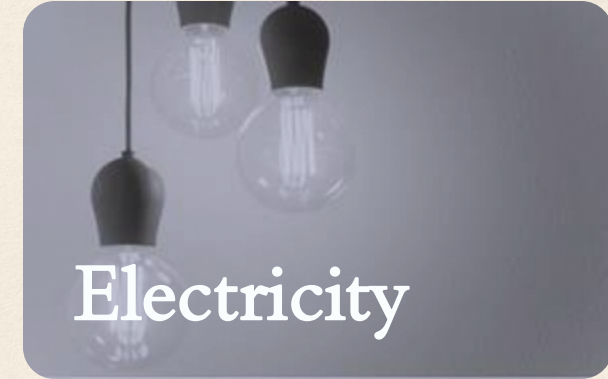
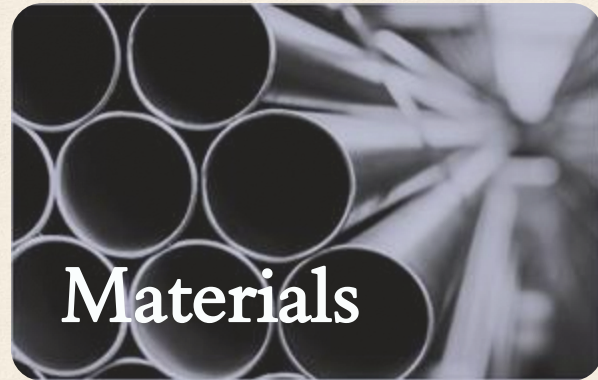
**Inconsistent  
Data**

# Life Cycle Assessment Findings.

Impact Category	Value	Units
Global Warming Potential	388'211.7	kg CO2 eq
Ozone Depletion	1.101	kg CFC11 eq
Gross Water Consumption	209'283.2	m3 depriv.
Abiotic Resources Depletion	15.484	kg Sb eq
Primary Energy Consumption	5'876'806	MJ
Human Toxicity	0.007	CTUh



# Areas of Opportunity.





# Derivation of Eco-Design Principles.

- PTFE shall be substituted with more sustainable plastics, such as PE or PI.
- Use of critical raw elements shall be avoided.
- Use of REACH targeted substances shall be avoided.
- AA7075 shall be preferred over AA7475, AA2024, AA2095, AA2195.
- Scrap materials shall be recycled.
- Recycled germanium shall be used in solar cells.
- Decentralized avionics architecture shall be implemented.
- Harness length shall be minimized.
- Friction stir welding shall be employed where possible.
- Additive layer manufacturing shall be utilized where possible.
- Quantity of gold wire bonding on PCBs shall be reduced.
- Chemicals with only the minimum required purity shall be used.

TEC - PUBLIC



TEC - PUBLIC