

Putting the metrics behind sustainability at ESA.



European Space Agency (ESA)

Environmental Aspects Of A Satellite Mission



The Challenge

The European Space Agency (ESA) is an organisation gathering knowledge about the earth, its immediate space environment, our solar system and the universe. It also develops satellite-based technologies and services and promotes European industries. ESA knows how important it is to understand how their activities impact the environment and to minimise these impacts, which is why they started the Clean Space Initiative. Under this initiative, ESA requested a consortium consisting of VITO (The Flemish Institute for Technological Research), PRé Consultants and QinetiQ Space to do an LCA of a satellite mission.

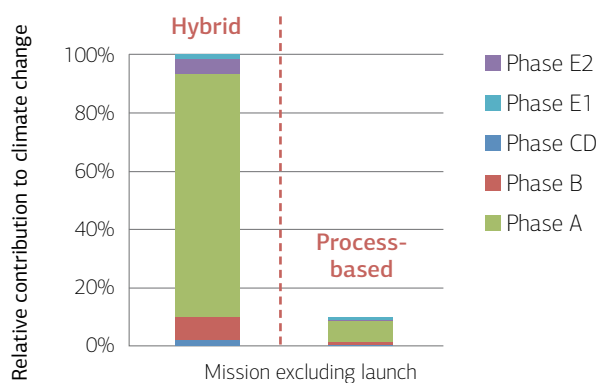
The objective of the study was:

- To develop a methodological framework for consistently modelling the life cycle of space missions and supporting decision-making at ESA
- To allow ESA to independently perform LCA studies of its space missions in the near future
- To identify the environmental hot spots of a space mission from a life cycle perspective

The solution

The assessment of the life cycle impacts of space missions can be very challenging. The sector uses many specialist materials and custom-made components with a low product output in relation to the overhead. LCA process databases such as Ecoinvent, commonly used in LCA studies, mainly contain data on standard mass-produced products with a high product output in relation to the overhead.

Therefore, VITO and PRé Consultants decided at the start of the project that the best option would be a hybrid LCA, using both physical and cost data. Physical data are derived from process databases, where the user can select products and processes on the basis of units such as mass or distance. Cost data can be retrieved from Environmentally Extended Input Output (EEIO



or IO) databases, describing the sale and purchase relationships between economic sectors (agriculture, industry, services) within an economy and linking them to the environmental flows resulting from these activities. Monetary units such as euros or dollars express the environmental flow per economic sector.

The next step was to use the expertise of QinetiQ Space to gather detailed information on space projects such as materials and man-hours. Then we created a model using the different phases of a space mission: design phases (A & B), production, verification and testing phase (C & D), launch and use phase (E), and disposal phase (F). Different models were created from the process data and IO data. The final product was a database with accompanying manual.

Business Value

- ESA now has insight into different modelling approaches and understands the different results from using process databases and IO databases
- ESA can use an LCA database specific to ESA's activities and projects, containing the different models created during the project. With the accompanying manual, ESA can adapt the models and create their own models for future space missions.



Creating Business Value Through Sustainability Metrics

Sustainability Metrics Consulting

Sustainability in business has become a core business concern and a driving factor in creating business value. PRé offers a range of consulting services, provided by a team of experts who will work with you to choose, create and deliver the right metrics for your sustainability goals.

PIONEERING Developing Innovative New Metrics For New Challenges

Societal and stakeholder expectations for implementing sustainability in business are becoming more demanding. Sometimes, off-the-shelf metrics cannot help you answer their questions. PRé has extensive experience in life-cycle-based metrics pioneering: implementing cutting-edge new product metrics and developing completely new, scientifically sound and robust metrics. PRé has been the driving force behind many ground-breaking initiatives like ReCiPe or the Handbook for Product Social Impact Assessment.

INTEGRATION Integrating Sustainability Metrics In Your Business

To create business value from sustainability, your business needs to integrate sustainability metrics across its business functions. You can't improve what you can't measure. PRé has the expertise required to help you choose the right metrics and to integrate sustainability into your day-to-day operations. PRé also supports you in increasing the efficiency of your LCA work and in empowering your LCA practitioners.

DELIVERY Expert LCA Knowledge To Measure Sustainability Performance

LCA has proven to be a robust and science-based way to measure and communicate your sustainability performance. PRé can review your LCA studies, deliver EPDs, footprints and other metrics, and provide you with completely new LCA studies to measure your impact. Our consultants are renowned for their expertise in specific topics, such as impact assessment, uncertainty, normalisation, toxicity, social sustainability and databases. PRé offers training courses and in-house training that build a solid knowledge base to help you conduct LCA studies yourself.

Get In Touch With PRé
We're always happy to discuss your sustainability challenges with you. If you have any questions, feel free to contact our offices in the Netherlands and the US.

The Netherlands
PRé Consultants bv
Stationsplein 121
3818 LE Amersfoort

Phone: +31 33 450 4010
consultancy@pre-sustainability.com

United States
PRé North America Inc.
2100 M St NW
Suite 170-352
Washington, DC 20037
USA

Phone: +1 202 728 5087
PRENA@pre-sustainability.com

We look forward to being your partner in putting the metrics behind sustainability.

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Those Who Have Gone Before – Market-leading Businesses That Are Creating Value From Sustainability Metrics

PRé has built a worldwide reputation as a leader on environmental and social impact assessment. We work with organisations and institutes such as the European Commission, European Space Agency, Heineken, BASF, Philips, L'Oréal and DSM.



L'ORÉAL



About PRé

PRé has been a leading voice in sustainability metrics and life cycle thinking, since 1990, pioneering the field of product and supply chain sustainability metrics. We've developed some of the world's most widely recognised and applied environmental impact assessment methods, as well as the world's leading LCA software, SimaPro. From the very first, we have not only focused on developing the science of LCA, but also its application – helping companies create value by using state-of-the-art measuring, monitoring and analysis methodologies to improve their sustainability performance.

Find out more about what we can do for your organisation at www.pre-sustainability.com

