Conducting
Life Cycle Sustainability Assessment for Bio Refineries

ifu Hamburg GmbH

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material flows and software.

We enable sustainable Production!
That is our passion!

SEVENTH FRAMEWORK PROGRAMME

This project is co-funded by the European Union within the 7th Frame Programme. Grant Agreement n°613771.

Sustainability for bio refineries

Renewables aren’t sustainable by default

Compare the impacts of the life cycle

Required for some founded projects

Life Cycle Sustainability Assessment also can guide process development in the right direction

Sustainability

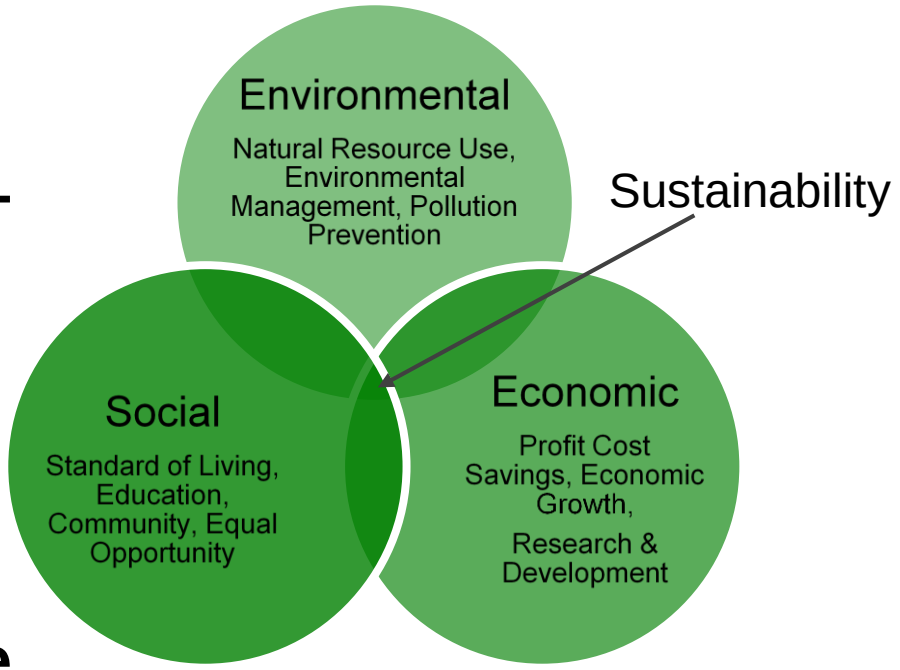
Sustainability

“Meeting current needs without compromising the needs of future generations”

Environmental impacts
EDIP2003 / ecoinvent 3.1

Economical indicators
Life Cycle Costing

Social Hotspots
Social Hotspot Database



Economic indicators

- Return of Investment
- Total Life Cycle Cost
- Production Cost
- Operating Costs
- Capital Costs
- Net Present Value (NPV)
- Labor costs

Life Cycle Assessment

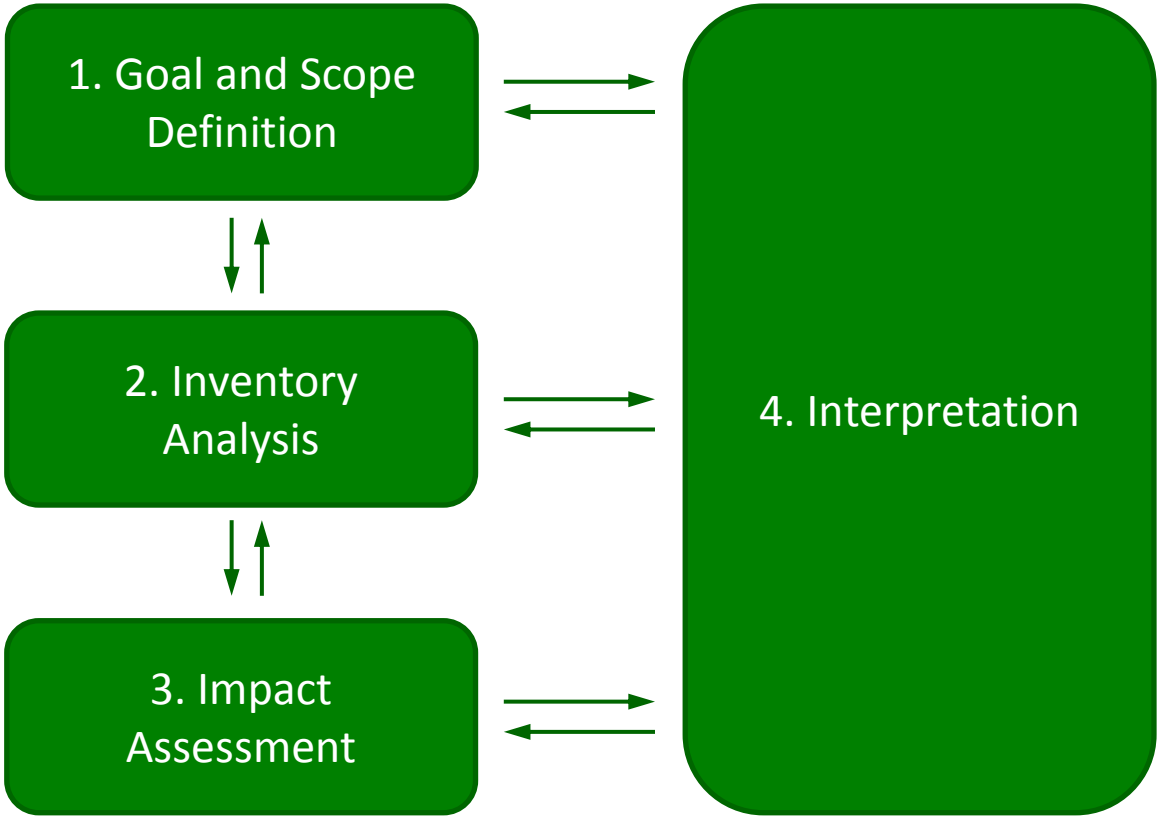


Illustration of Life Cycle Assessment phases, according to ISO 14044

Environmental impacts

- Global warming
- Acidification (terrestrial/aquatic)
- Depletion of fossil resources
- Ozone depletion
- Ozone formation
- Human toxicity
- Eco toxicity
- Eutrophication
- Water scarcity

(based on ecoinvent 3 / EDIP2003)

Specifics for bio refineries

+ Depletion of fossil resources
+ direct Global warming potential
- Land use change of crops
- Water scarcity
- Eutrophication and aquatic toxicity

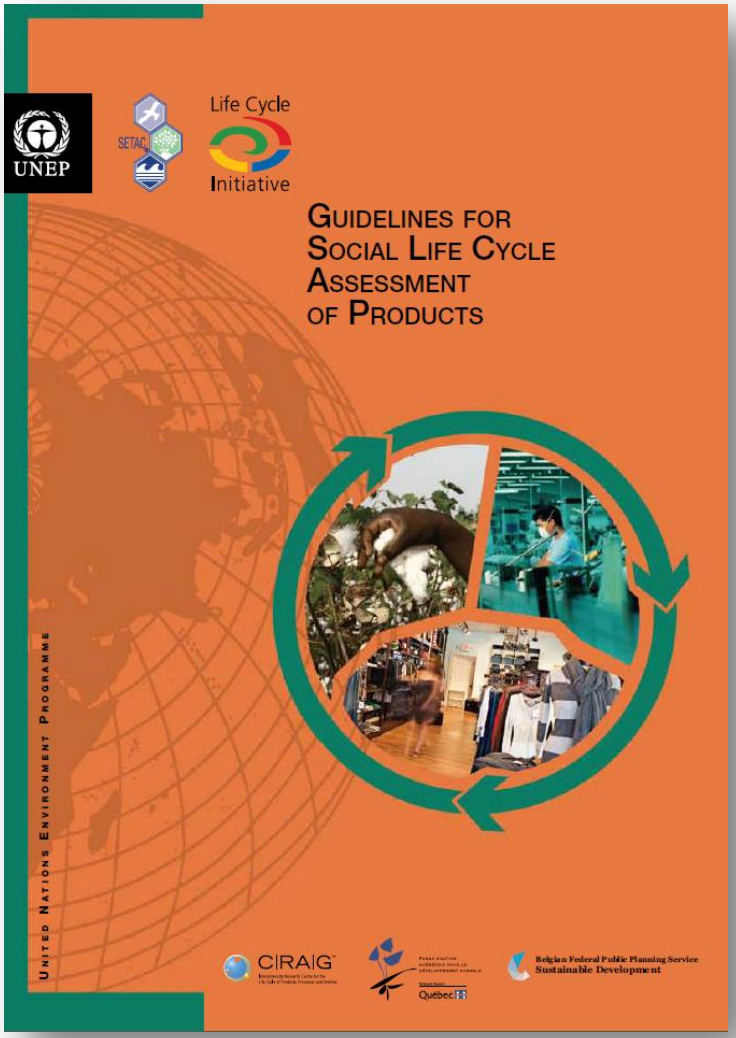
Social Life Cycle Assessment

Not standardized yet but according to the guidelines of UNEP/SETAC following the standards of ISO 14040/44

Often only quantifiable

Research on available tools and reasonable integration into existing lca-solutions

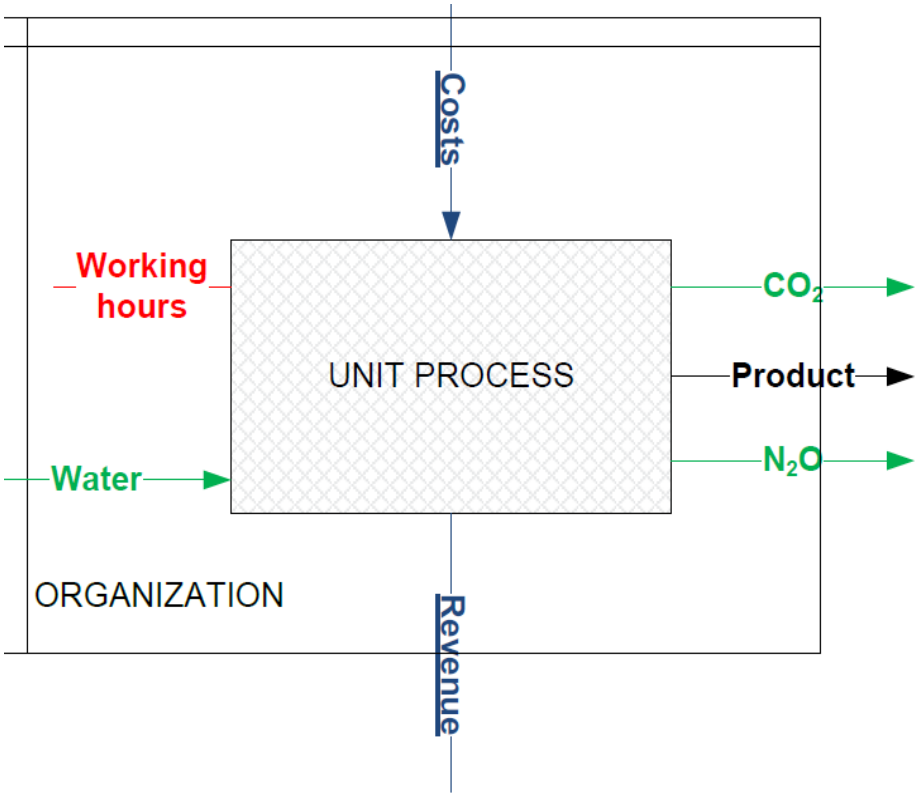
Guidelines for S-LCA of products



„The Guidelines for S-LCA of products provides a map, a skeleton and a flashlight for stakeholders engaging in the assessment of social and socio-economic impacts of product life cycle.“ **(Benoit et al. 2009)**

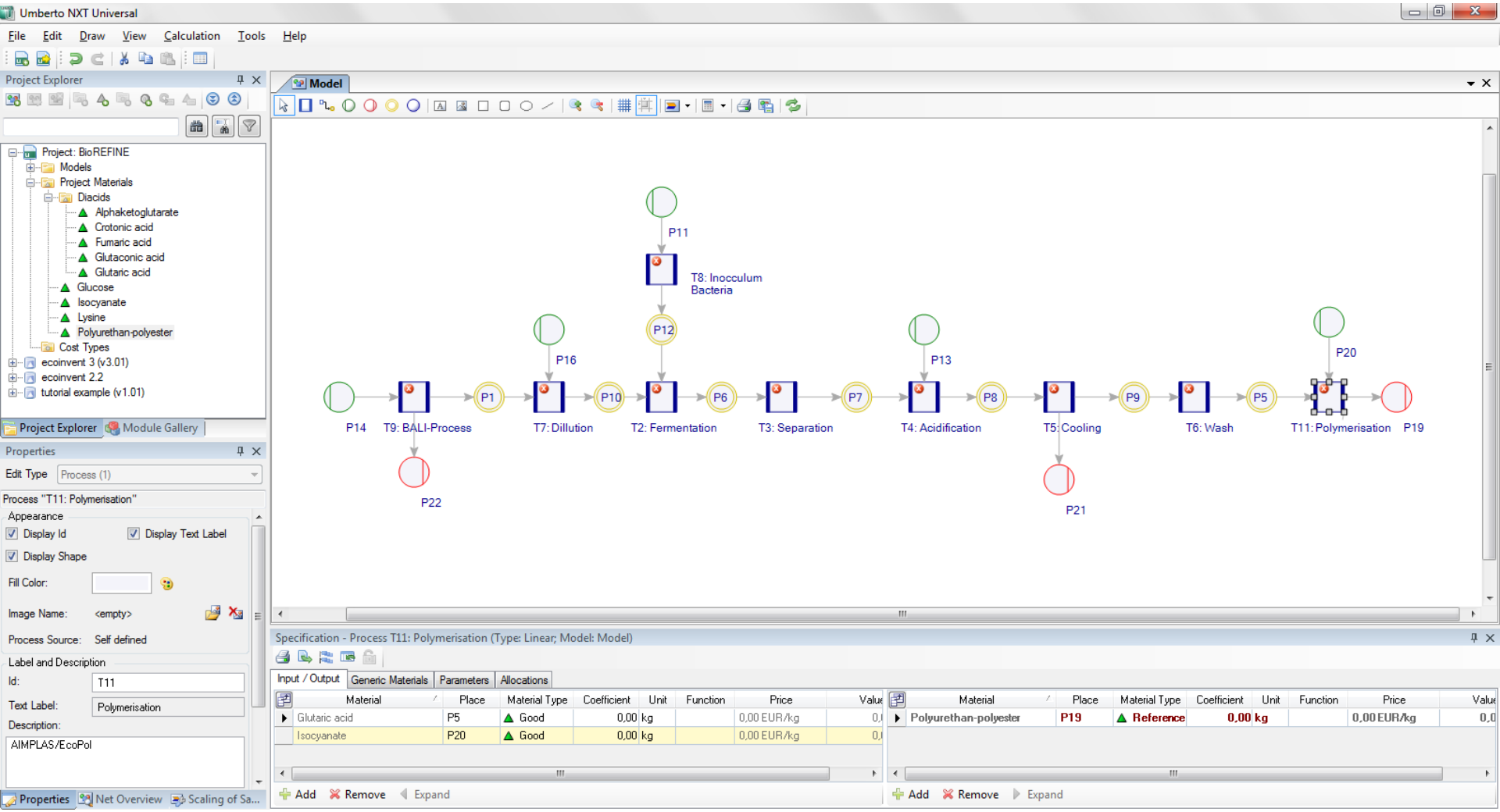
- Based on ISO 14040 & 14044 standards for LCA
- Presents key elements to consider and provides guidance for the goal & scope, inventory, impact assessment and interpretation phases of a S-LCA
- Basis for the development of databases
- Highlights areas were further research is needed

Unit process

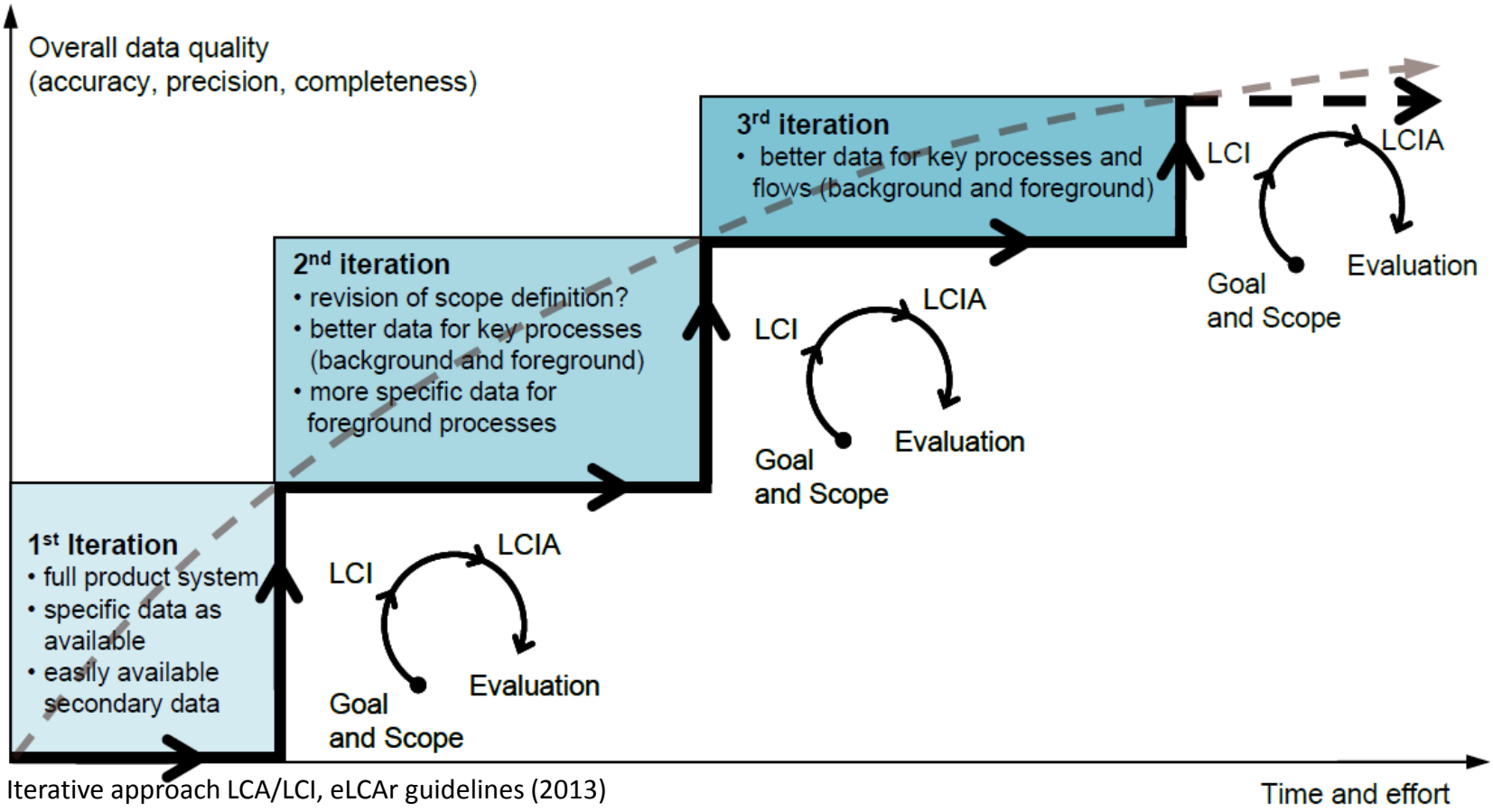


Unit process with required information for all sustainability dimensions

Modelling step by step



Iterative Approach



Iterative approach LCA/LCI, eLCAr guidelines (2013)

Our goal is to facilitate your Life Cycle Sustainability Assessments

Please stay in touch…

- **if your interested in LCC / LCA for your production**
- **if you want to track efficiency and environmental hotspots of your processes via holistic models**
- **if you can provide LCI-Data on typical bio-based supply-chains**
- **If you want to follow the ongoing development on LCC / LCA / S-LCA**

Thank you for your attention !!

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