



System dynamics and LCA: Current implementation in openLCA

openLCA.conf 2026, Berlin

23.04.2026

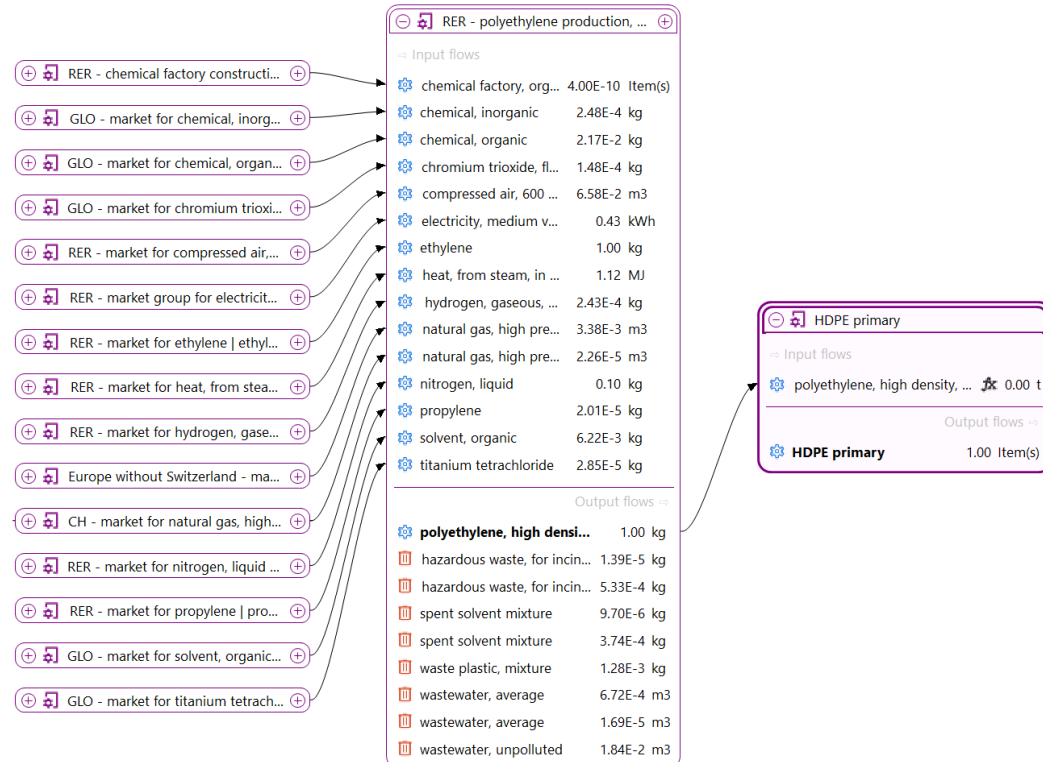
Alexander Koch

GreenDelta

Background

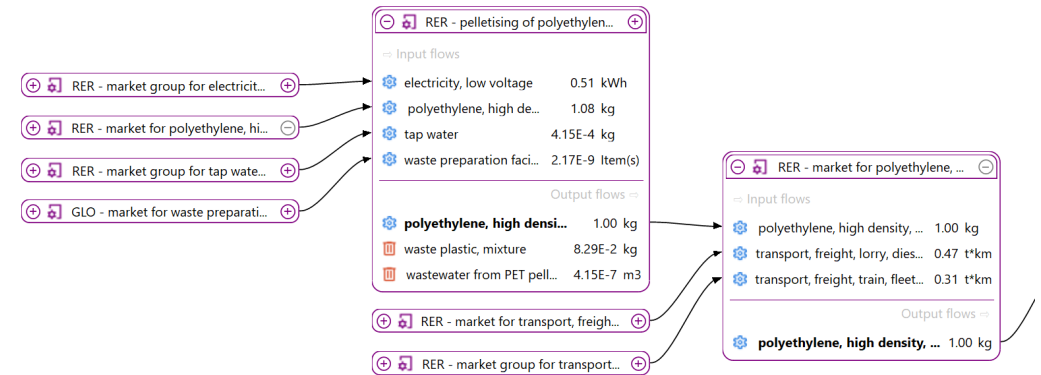
Sustainability assessments today

Virgin plastics

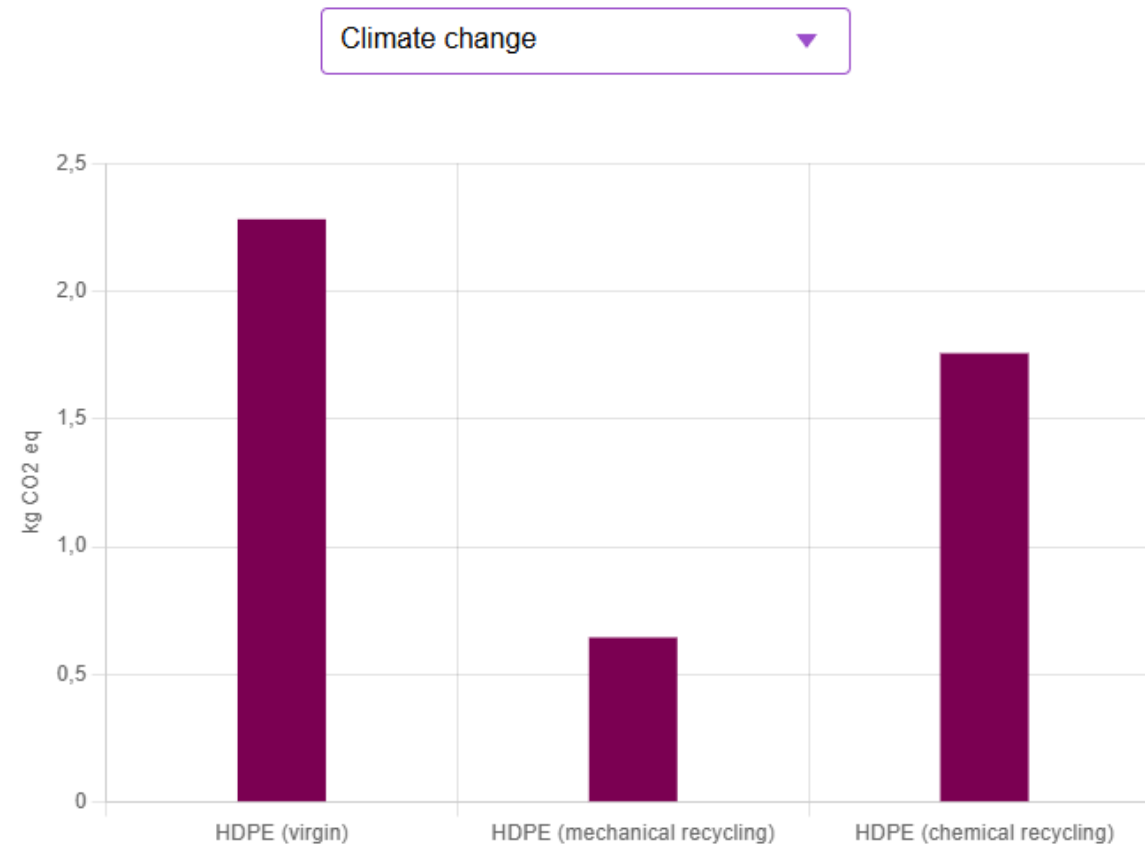


vs.

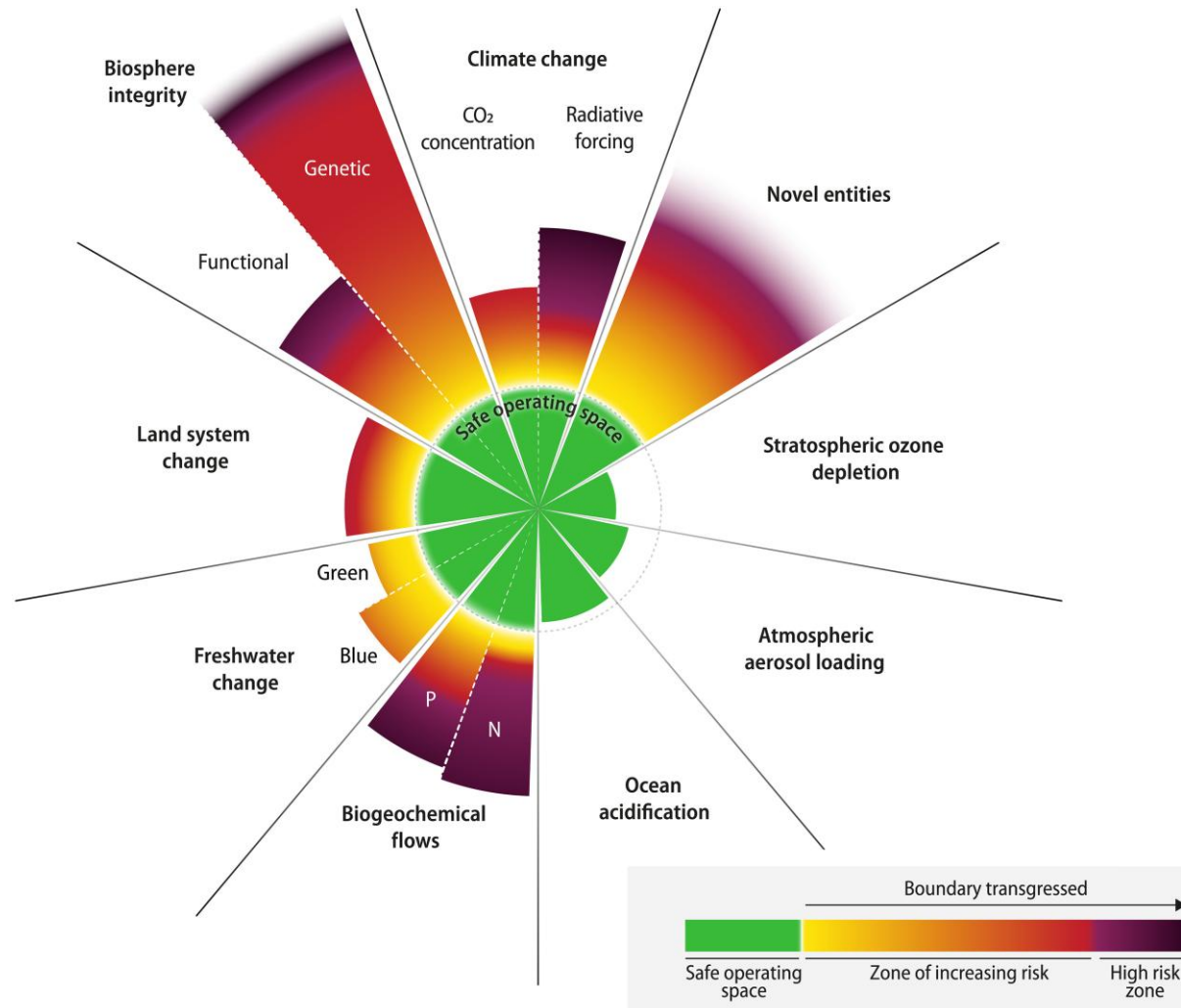
Recycled plastics



Comparing alternatives for establishing preferences

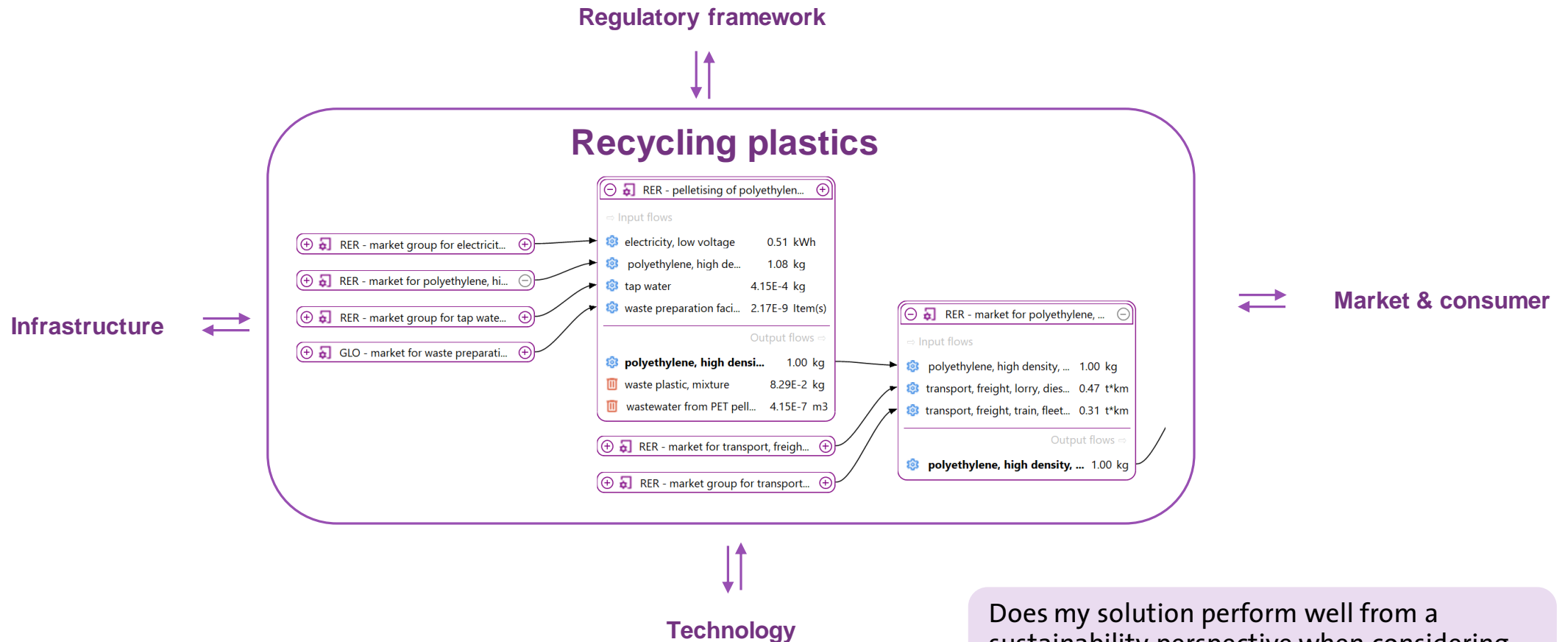


Sustainability assessments: *Thresholds?*



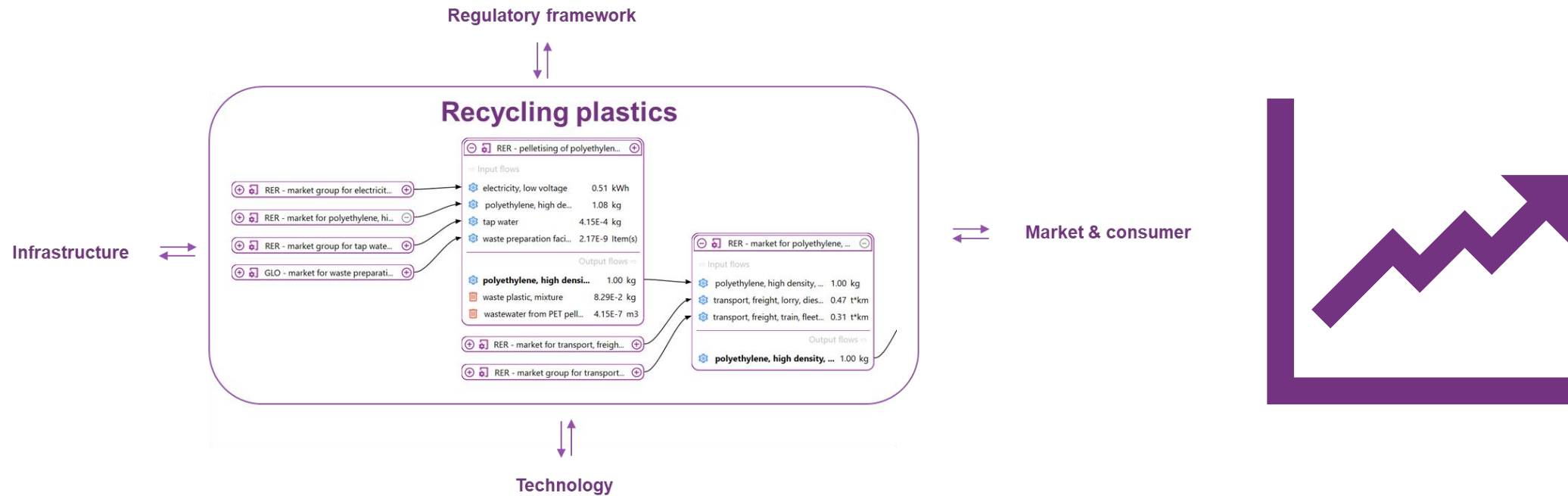
Does my solution operate within planetary boundaries?

Sustainability assessments: *Extended system view?*



Does my solution perform well from a sustainability perspective when considering the context? Is it suitable?

Sustainability assessments: *Prospective view?*



Does my solution perform well over time?

Opportunities

Sustainability assessments require:

- Consideration of planetary boundaries
- Prospective view
- Life cycle as part of wider systems

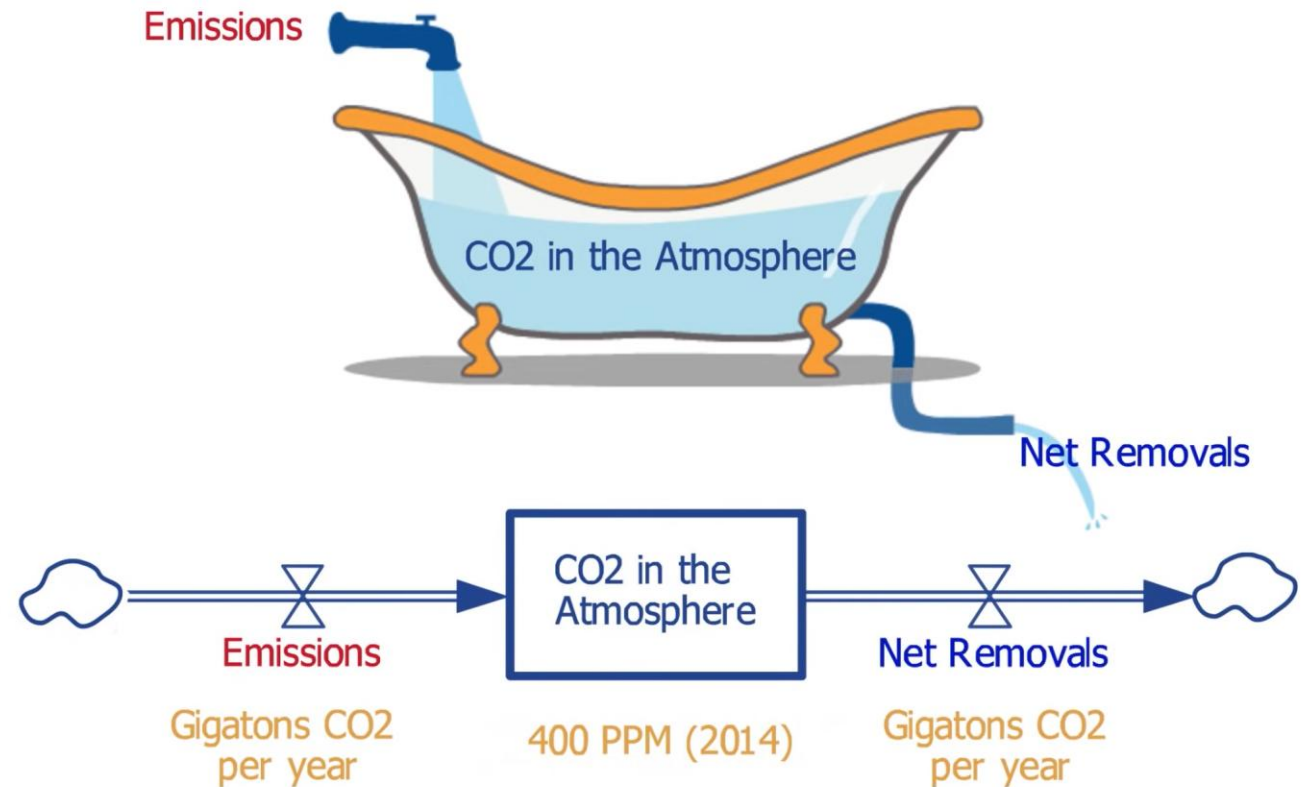
This will allow:

- For localized and dynamic decision-making! Considering the trade-offs
- More inclusive, effective, and feasible strategies

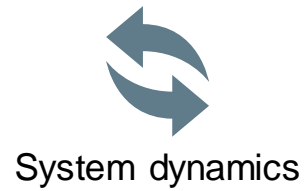
System dynamics in openLCA

System dynamics

- Idea: modeling a system as a combination of stocks and flow rates
- Simulate results over time
- Any system
- Scope and level of detail totally up to the modeler



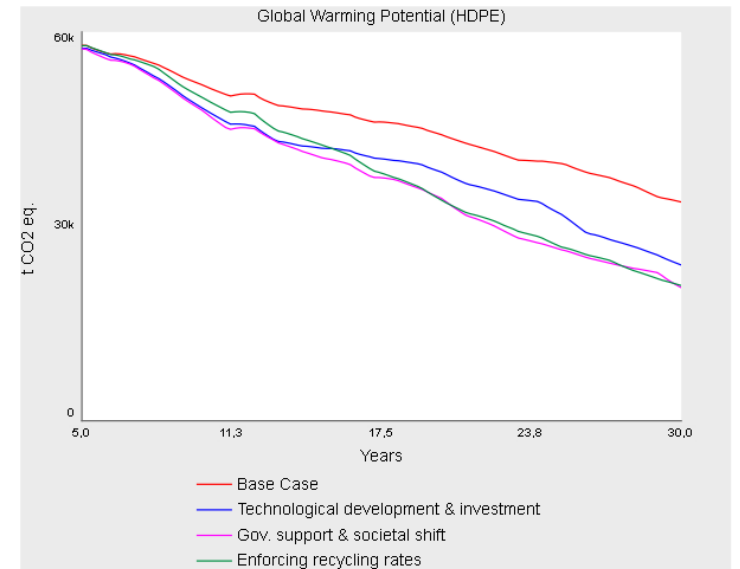
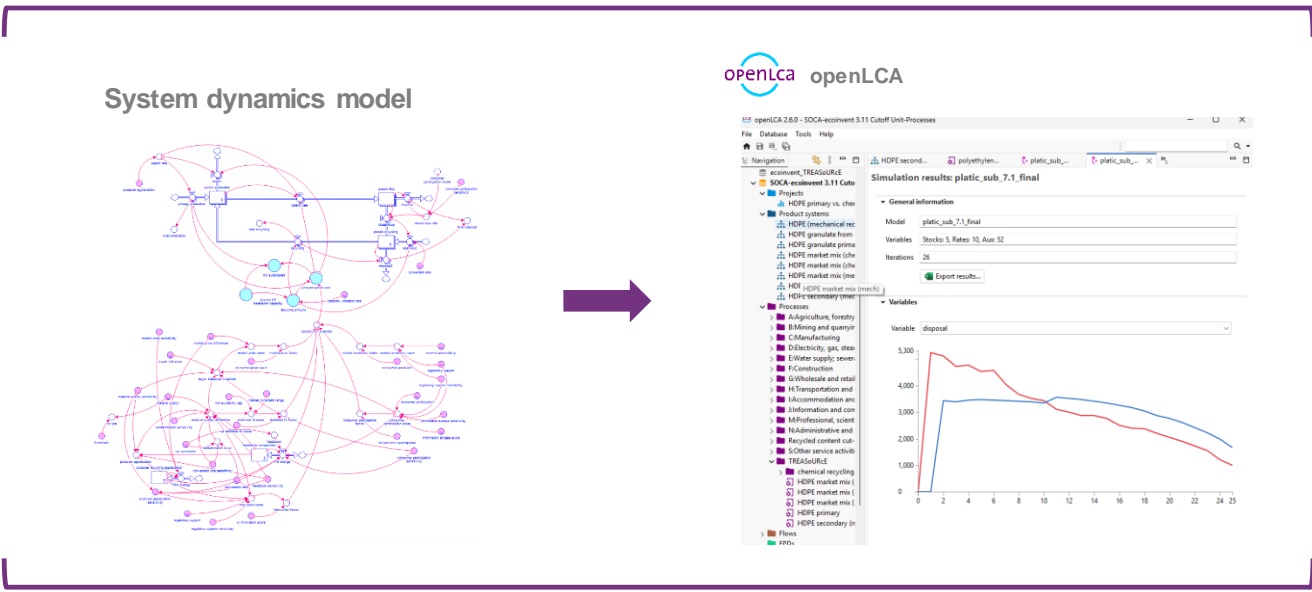
Approach



+



System dynamics sustainability assessments





Navigation

- > Agribalyse
- > BAFU
- > Carbon Minds
- > Consulting
- > ecoinvent
- > EF
- > FRED
- > HybridSwitch
- > Other
- > premise
- > premise_TREASoURcE
- > premise_TREASoURcE_1
- > premise_TREASoURcE_2
- > PRIMUS
- > ProBas
- > PSILCA
- > RecycleBot
- > Refinery
- > soca
- > Training
- ▼ TREASoURcE
 - biomassesTreasource0414
 - ecoinvent 3.12 Cutoff Unit 2025-12-19
 - ecoinvent_TREASoURcE
 - SOCA-ecoinvent 3.11 Cutoff Unit-Processes
 - TREASoURcE_ecoinvent v3.10 Cutoff Unit-Processes 2024-06-19
 - TREASoURcE_BAFU-2025_LCI DB
 - TREASoURcE_biomass_Thesis
 - TREASoURcE_ecoinvent v3.10.1 Cutoff Unit-Processes 2024-12-06
 - TREASOURCE_ecoinvent_391_cutoff_upr_n2
- > UVEK
- > worldsteel
- > Libraries
- > Scripts

Welcome

[Getting started](#)[What's new in openLCA 2](#)[Extensive documentation](#)[Community Q&A](#)[Databases, case studies, impact methods](#)[Certified trainings, support](#)[Tools to get more out of openLCA](#)[Working with the developers of openLCA](#)

With openLCA, you can model the life cycle of everything. Create or import existing databases with life cycle processes and import assessment methods; create your own processes, build your own life cycle models, calculate and analyse them. Click the other sections on the left to read more.

GreenDELTA

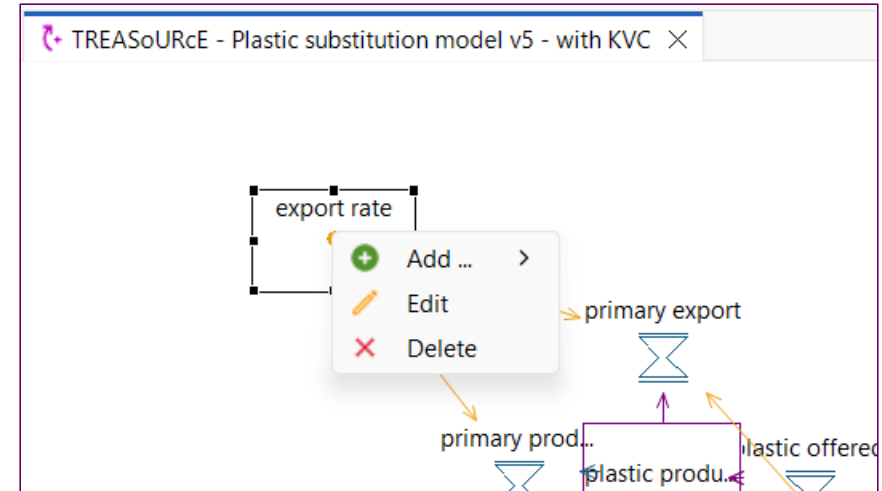
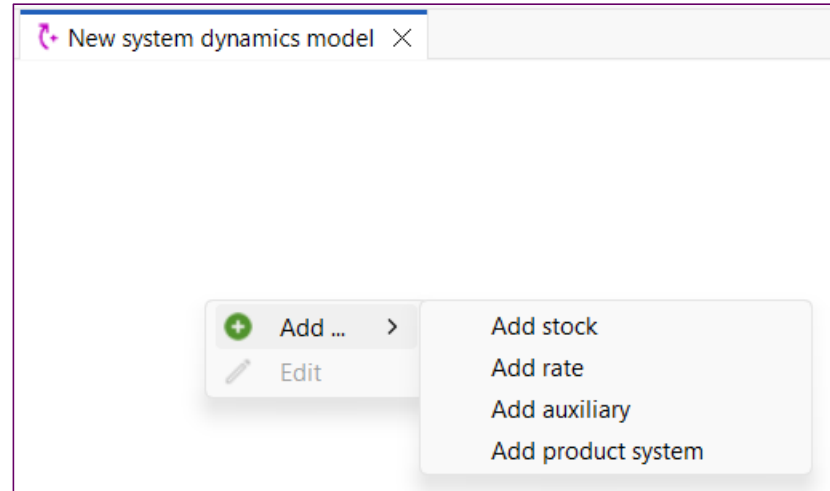
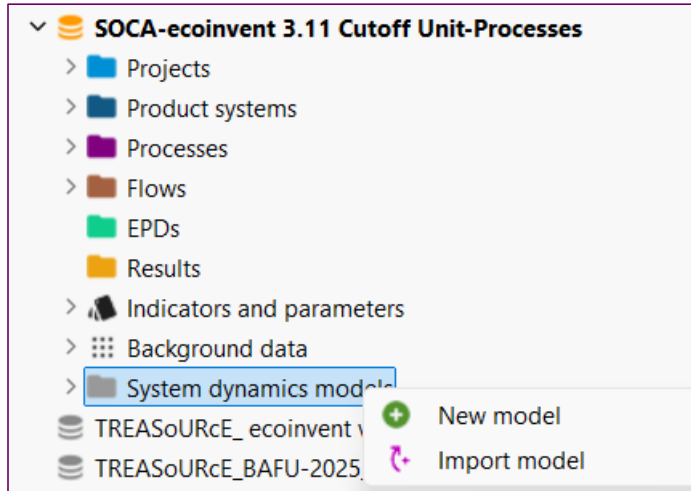
System dynamics in openLCA

Current development

- Manage and run SD models following the XMILE standard
- Basic functionalities (stocks, flows, auxiliaries) and arrays
- Graphical view of SD models
- Most important built-in functions
- Link product systems and bind parameters
- Run coupled simulations
- Result visualization of SD variables and LCIA results
- Excel export of results

Next steps

- Graphical editing and a better openLCA integration of SD models



- Faster calculations



Thank you!

Alexander Koch
koch@greendelta.com
GreenDelta