



TREASoURcE

A Toolset for Making Urban and Regional Systems More Sustainable

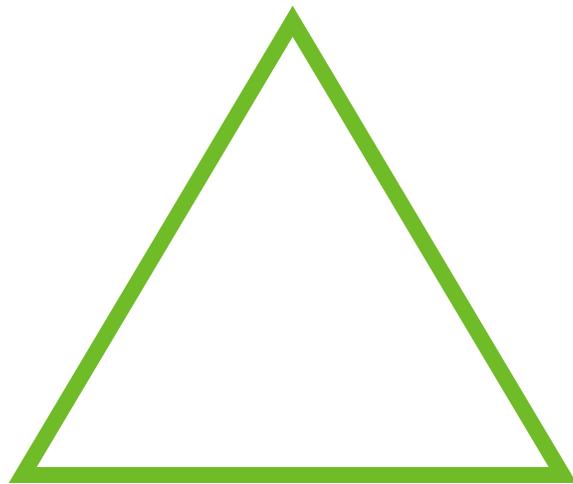
Alexander Koch, GreenDelta



Who we are

GreenDELTA

Sustainability consulting &
research



Databases

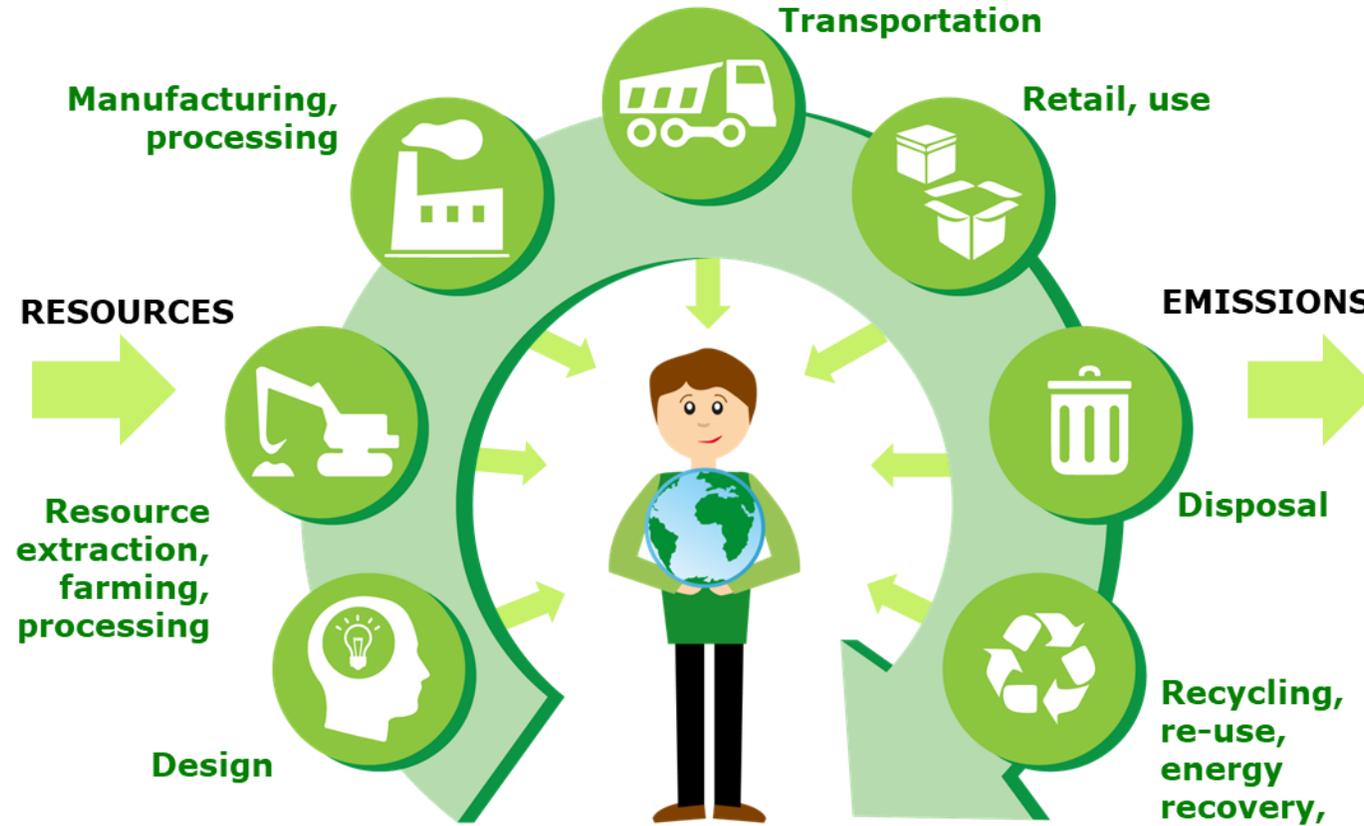
Software

- Founded in 2004 by Dr. Andreas Ciroth
- Based in Berlin
- 26 employees with diverse expertise
- Developers of openLCA and LCA databases

openLCA online LCA openLCA CS
openLCA nexus PSILCA soca
en 15804



Sustainability assessments today



Life Cycle Thinking



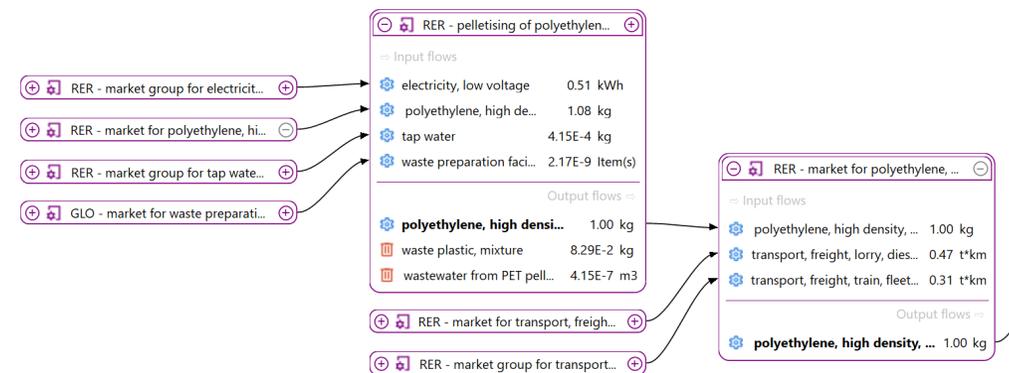
Sustainability assessments today

Virgin plastics



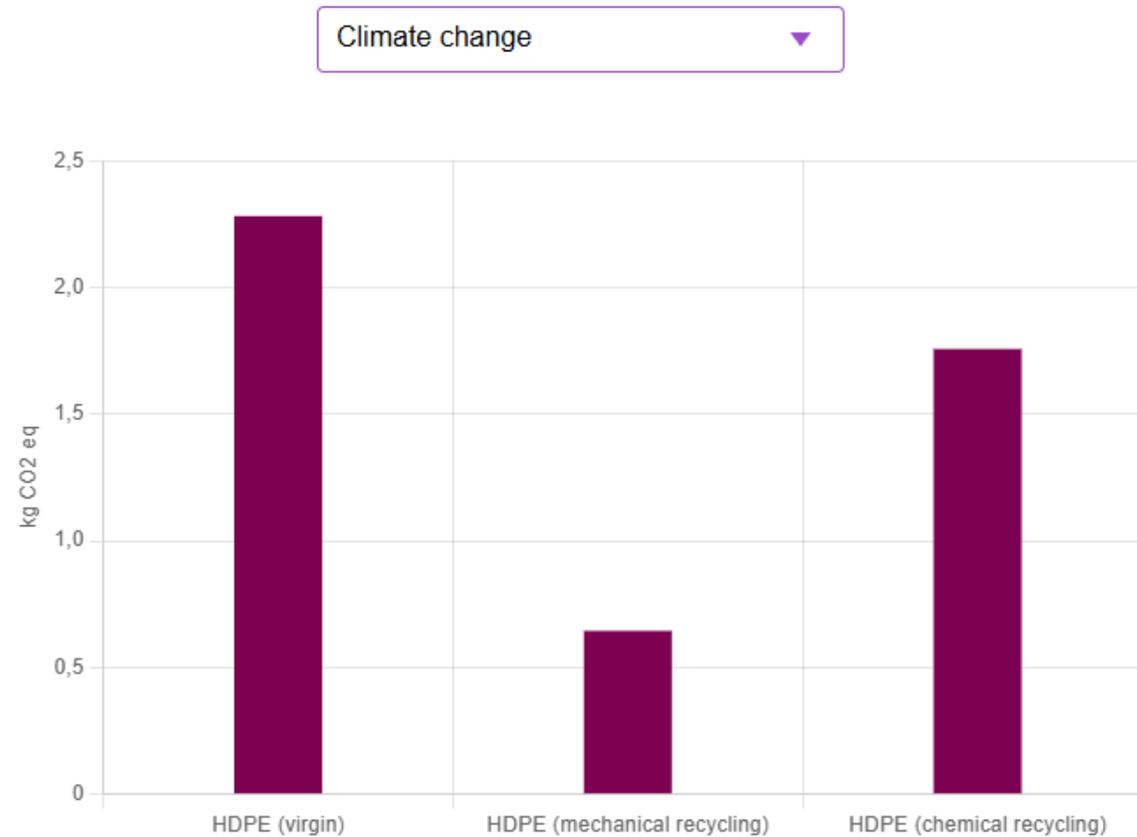
vs.

Recycled plastics



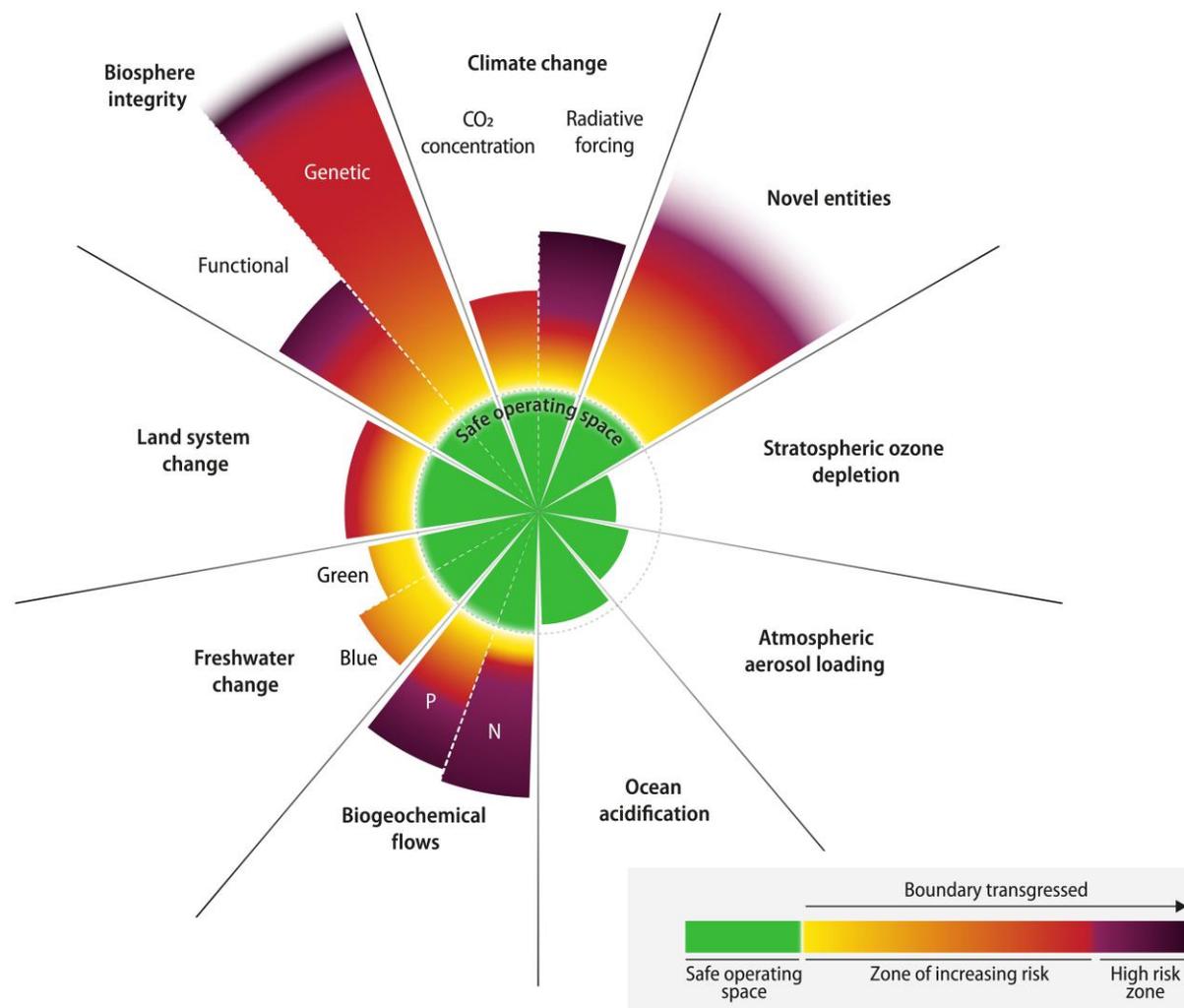


Comparing alternatives for establishing preferences





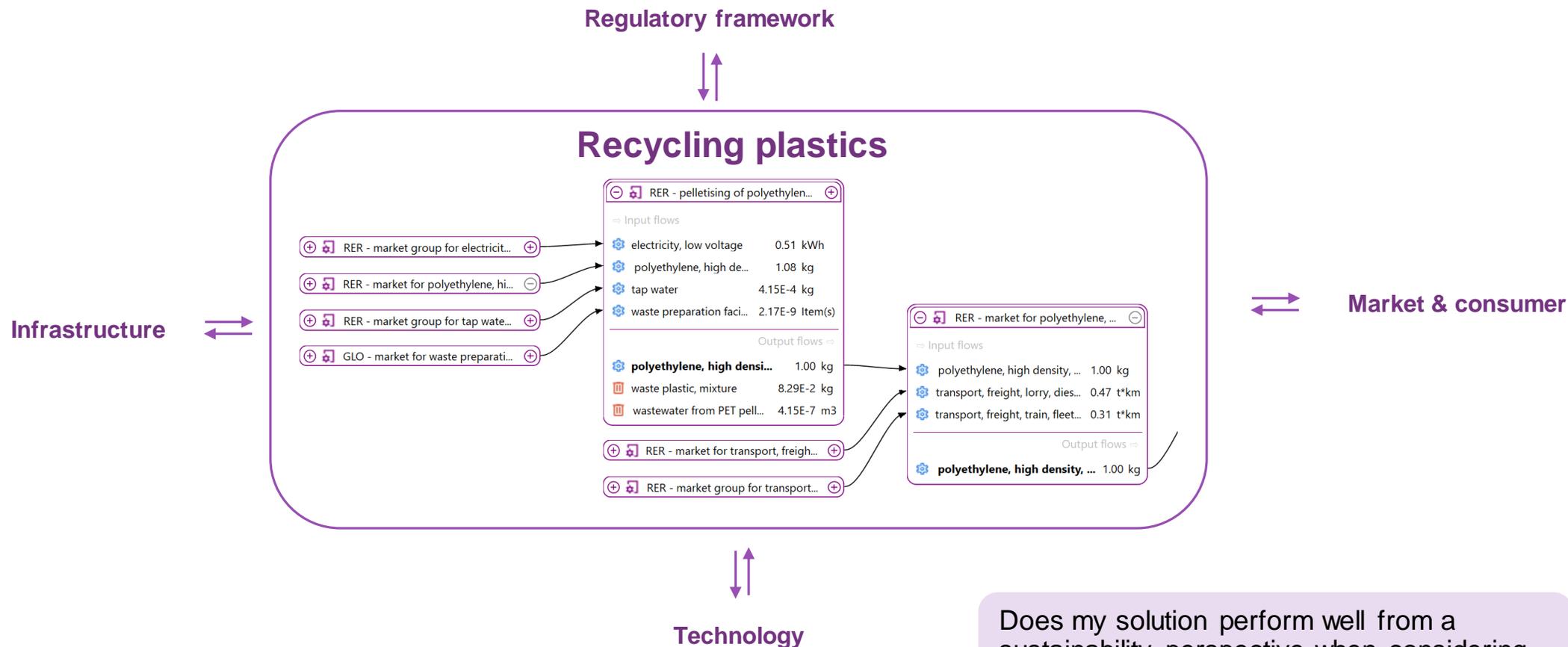
Sustainability assessments: *Thresholds?*



Does my solution operate within planetary boundaries?



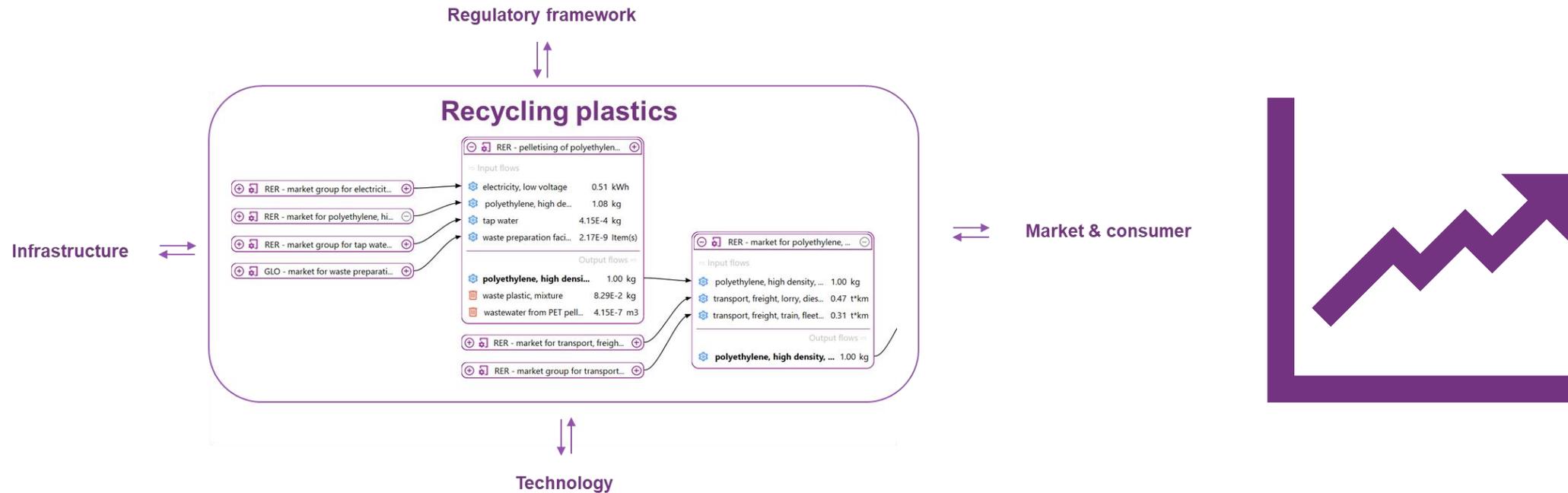
Sustainability assessments: *Extended system view?*



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?



TREASoURcE

Systemic Circular Economy Solutions

Key Value Chain Demonstrations



Circular plastics



Circular batteries



Circular biobased
side and waste
streams



Stakeholder
Engagement
Demonstrations

- The TREASoURcE project is demonstrating and replicating circular economy solutions for 3 key value chains (plastics, batteries, biomass) in selected regions and municipalities
- A context-based sustainability assessment approach is needed
- This will allow localized decision-making for sustainable solutions



Framework & Toolset

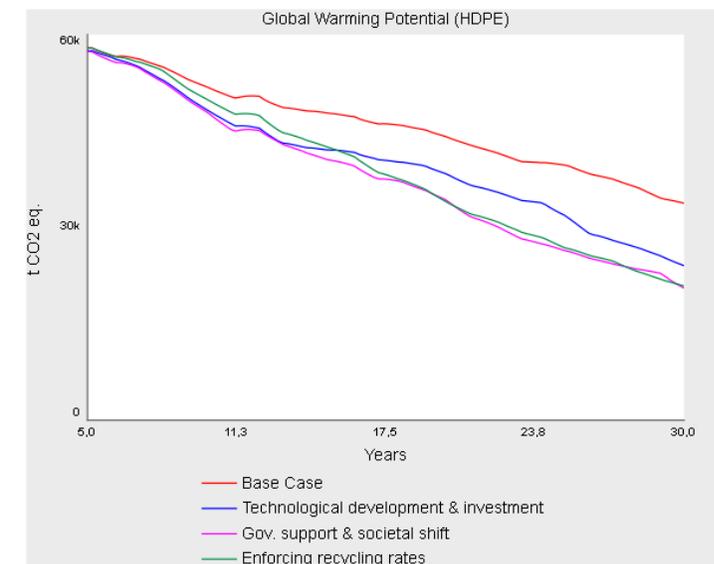
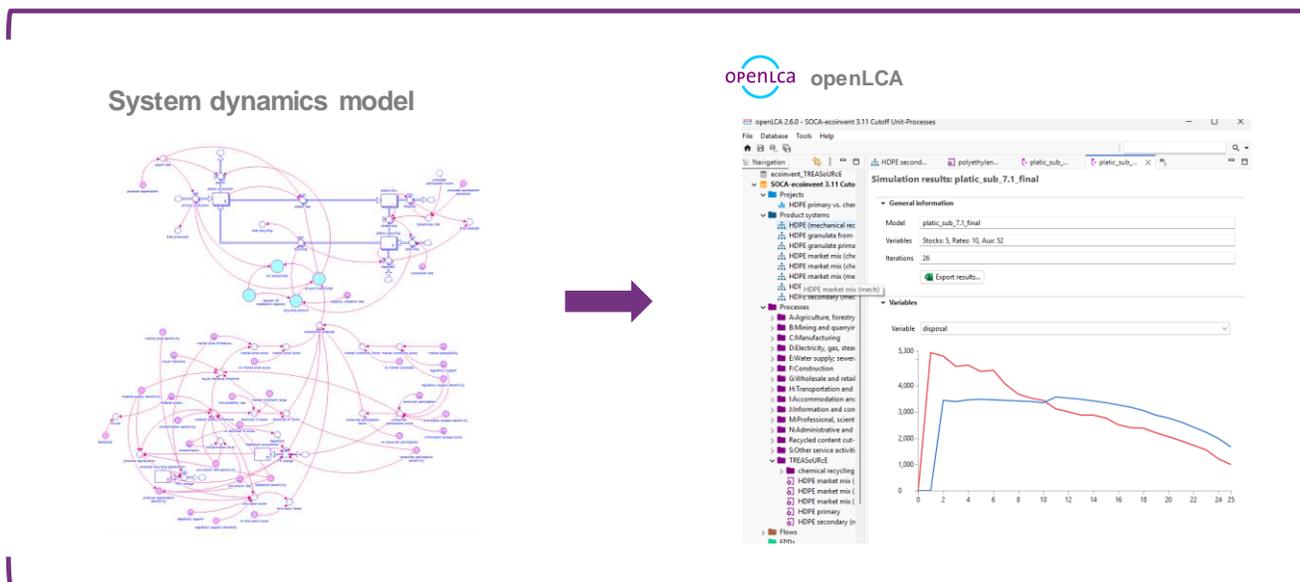


System dynamics

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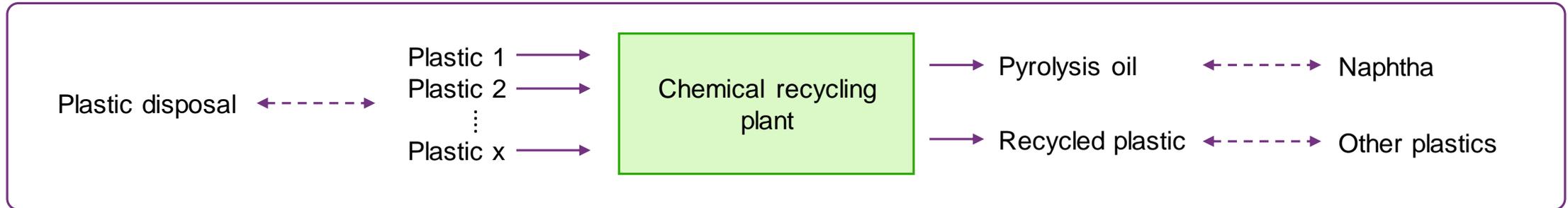
Context-specific sustainability assessment of different scenarios over time



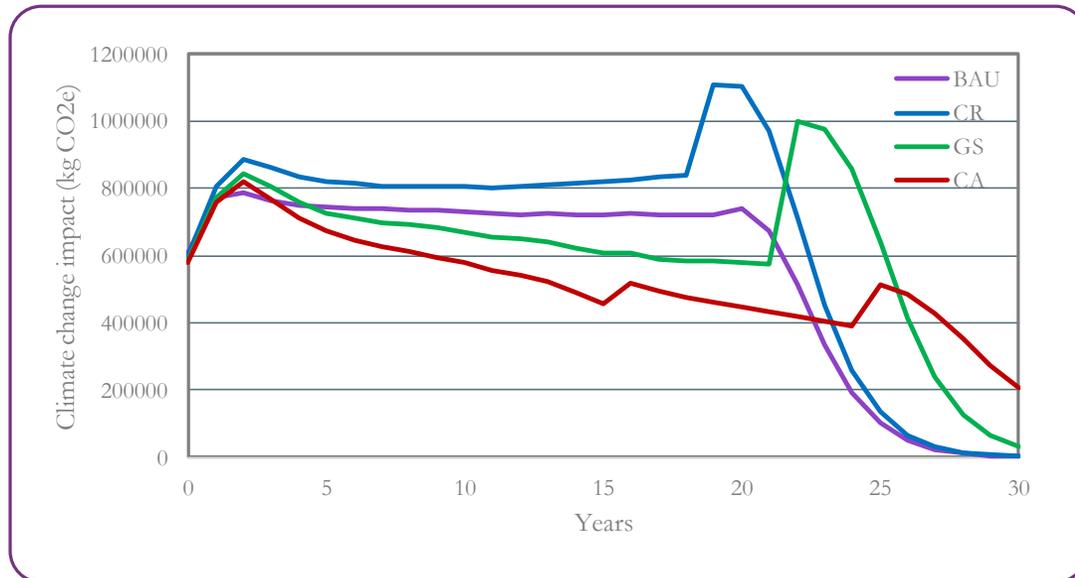


Case 1: Chemical recycling of plastics

System: Chemical recycling in Gothenburg, Sweden



Results



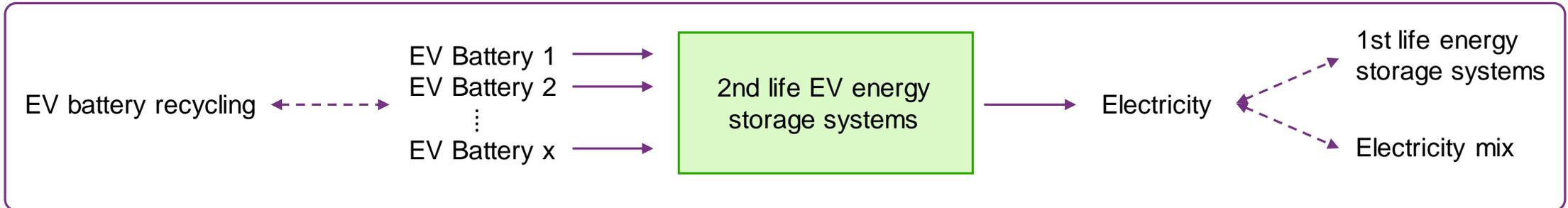
Insights

- Chemical recycling is not necessarily better when considering the wider system
- Competes with mechanical recycling, resulting in a rebound effect, as more virgin additives are needed
- Virgin plastic demand is predicted to increase steadily
- Prices and quality are main factors influencing substitutability
- Improvements only with additional strategies, such as technological development or raising consumer awareness

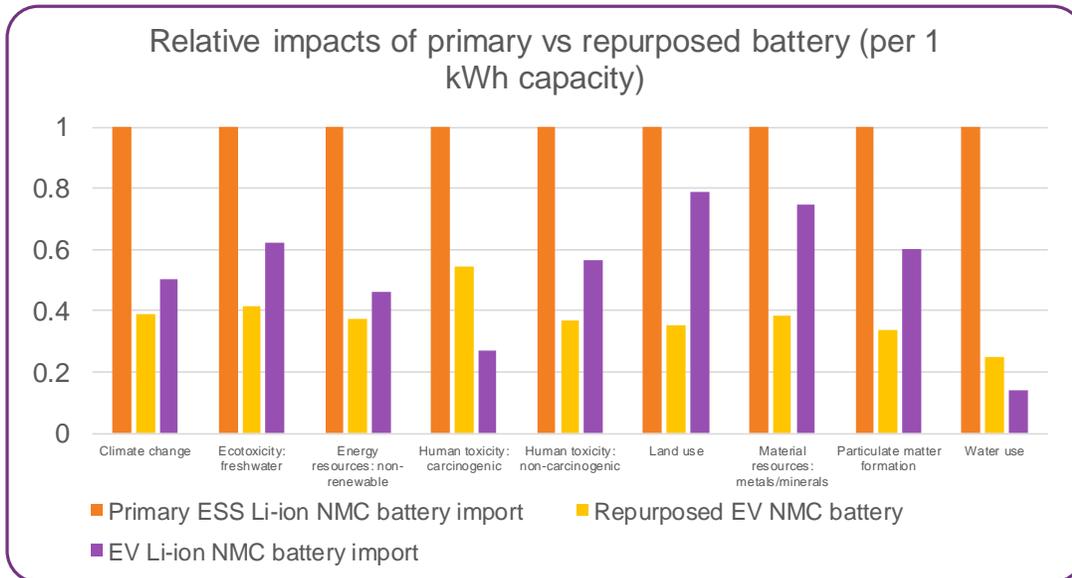


Case 2: 2nd life EV batteries

System: 2nd life EV batteries as energy storage systems in Oslo, Norway



Results



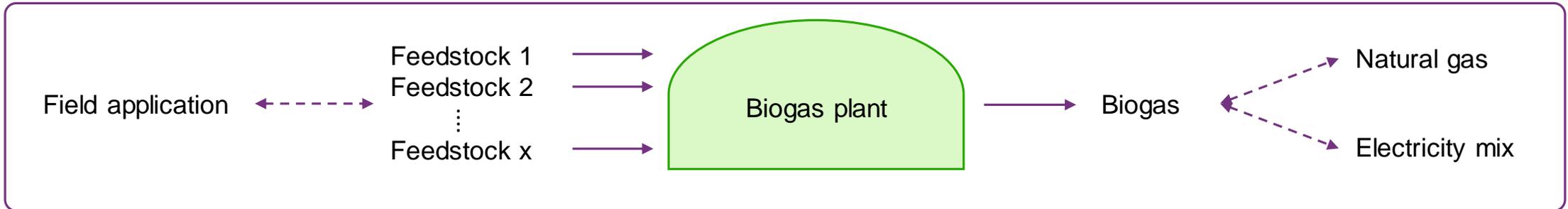
Insights

- The impacts associated with the battery value chain in the region were found to be driven primarily by 1st life BESS
- Repurposed batteries provide impact reduction
- The battery repurposing was found to be limited by the supply of EoL EV batteries in the first 12 years of simulation and then restricted by repurposing capacity
- Hydropower in Norway already provides low emission and flexible energy supply
- Energy storage systems mainly make sense for peak shaving activities

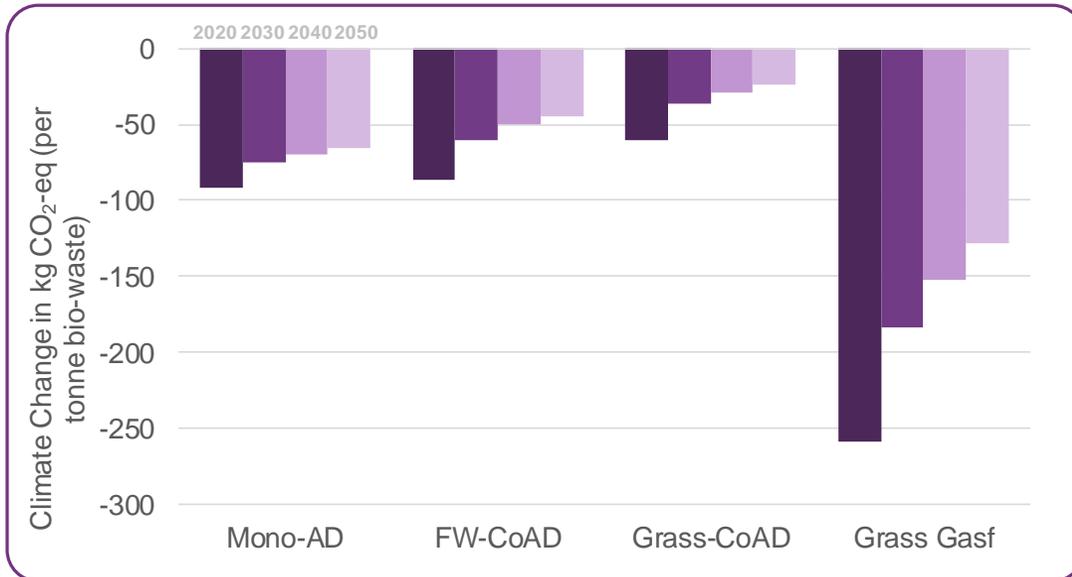


Case 3: Bio-based side and waste streams

System: Bio-based side and waste streams for biogas production in Hämeenkyrö, Finland



Results



Insights

- Avoided manure field applications lead to negative net impacts
- Benefits of biogas production decreases over time as the electricity mix becomes more renewable
- Region found to have high amounts of manure, which is a feedstock with high biogas potential
- Infrastructure and market price are decisive factors that influence the buyer-seller relationship for bio-based side and waste streams



Outlook: *Decision-making support*

- Extending sustainability assessments with system dynamics provides deeper insights into the behavior of a broader system linked to certain product systems.
- This further supports city and regional level decision-making.
- Including planetary boundaries helps understand how to stabilize local ecosystems.
- The prospective view shows how solutions perform under changing conditions over time.
- A wider system view reduces the risk of decisions that lead to unintended, indirect effects.
- Understanding system forces makes it possible to identify and explore conditions that leverage sustainable solutions.



TREASoURcE

Thank you!

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