Steps toward a sustainable circular economy
A new performance indicator for the circular economy
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Current quantitative «Circular Economy» performance indicators...

... are often waste disposal indicators
... rarely address longevity, value change and implications on the use phase
... are mostly mere mass-based indicators
... often do not allow for assessing all levels of value retention processes

“What gets measured gets managed”
(Peter Ducker)
To warrant that the circular economy is sustainable, indicators should capture environmental impacts of a circular solution with a systems view.

Retained environmental value (REV) indicator quantifies the share of the original environmental impact that can be retained through CE solution.

\[
REV = \frac{\sum_{j=1}^{n}(EI_{disp,j} - EI_{vrp,j})}{\sum_{i=1}^{n}(EI_{original,i})}
\]

Substitution of primary material/product \quad Impacts value-retention process

Original “invested” impact

Retained environmental value (REV) indicator quantifies the share of the original environmental impact that can be retained through CE solution

- \( \text{REV} = 100\% \rightarrow \text{full value retained (no losses)} \)
- \( 0\% < \text{REV} < 100\% \rightarrow \text{value partially retained} \)
- \( \text{REV} = 0\% \rightarrow \text{does not bring any benefit} \)
- \( \text{REV} < 0\% \rightarrow \text{should not be done} \)

Retained environmental value (REV) applied to circular solutions

- REVE<0: should not be done!
- Partial value retention (percentage shows degree of value retention)
- IPCC 2013
- CED

**Glass**
- Recycling to glass
- Recycling to insulation
- Recycling to glass sand

**Newsprint**
- Recycling to newsprint
- Recycling to cardboard
- Recycling to insulation

**Motor Block**
- Remanufacturing (replace Fe)
- Remanufacturing (replace Al)
- Recycling to metals

**Retained environmental value (REV)**
- REV = 1: full value retention
- Partial value retention (percentage shows degree of value retention)

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Conclusions

- REV indicator complies with the CE idea of value retention
- REV gives a relative ranking between different CE solutions and can hence support CE decisions
- Covers all value retention processes and also considers “side effects” (e.g. when the technology is not yet mature)
- REV can be implemented with any environmental impact category (using LCA methodology)
- Currently an economic REV indicator is developed within the TACLE project
Thank you!
Team **TACLE (Towards A sustainable CircuLar Economy)**

Group for Sustainability and Technology (SusTec), ETH Zurich

Sozio-ökonomische Perspektive

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Ressourcen-Perspektive