

Accounting Negative emissions

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When are negative emissions negative emissions?†

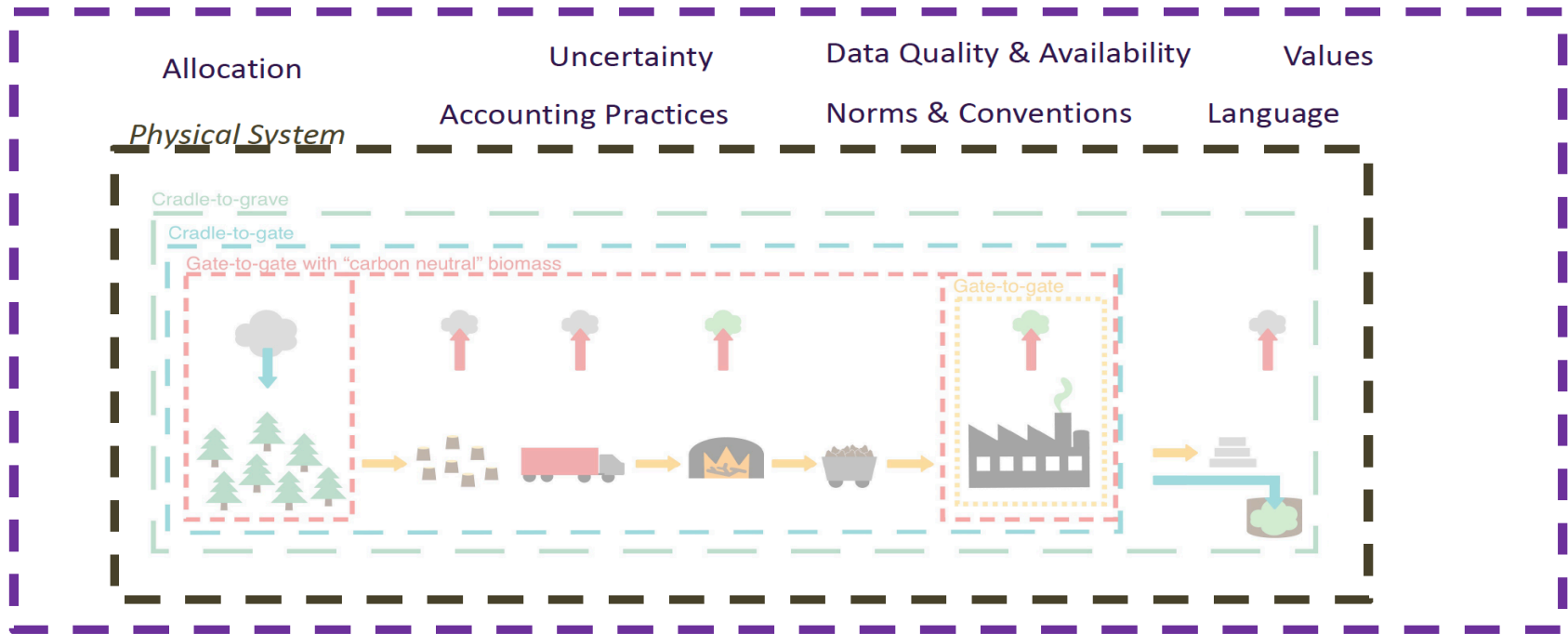
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- Physical greenhouse gases are removed from the atmosphere.
- The removed gases are stored out of the atmosphere in a manner intended to be permanent.
- Upstream and downstream greenhouse gas emissions are comprehensively estimated and included in the emission balance.
- The total quantity of atmospheric greenhouse gases removed and permanently stored is greater than the total quantity of greenhouse gases emitted to the atmosphere.

System boundaries we tend to work with:

System of Assumptions



Permanent vs Temporal storage

- There is no correlation between THs and the atmospheric lifetime of CO₂ (according to IPCC while more than 50% of CO₂ is removed within a century about 20% stays for many millenia)
- After which TH is carbon stored considered permanent?
 - UNFCC and PAS2050: >100 years
 - Product Environmental Footprint (PEF) guidelines: >300 years
 - International Reference Life Cycle Data (ILCD):>10000 years
 - LCAs: 50, 100, 500 years (100 is most common)

Permanent vs Temporal storage

- Selecting time horizon: implicit discounting long term impacts
 - *The shorter the time horizon:* the more value temporal storage has
 - *The longer the time horizon:* the less value temporal storage has

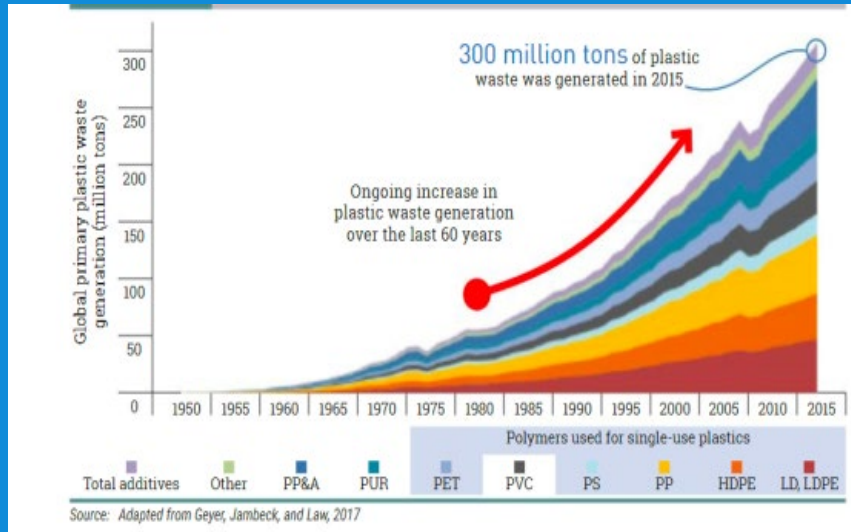


This not an LCA/accounting problem.

This is a *value* choice of how we look at impacts in the future

Recycling for permanence

Using Recycling as a way to achieve permanence requires that we keep **custody** of the carbon and of other (carbon) flows are added to the system (transport, recovering, reprocessing). System can shift from carbon sink to carbon source.



Historically 600 Mt has been recycled (9% of all plastic produced between 1950 and 2015). Only 10% of this has been recycled more than once!!
(source: Geyer , Jambeck et al., 2017)

THANK YOU FOR YOUR ATTENTION!

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