Carbon footprint labelling
– how to have high data quality and to maximize utilization

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Presentation

- Carbon footprints today – status and problems
- Hybrid LCA as a short-cut to carbon footprints
  - IO-data as starting point
  - Process-data for increasing accuracy
  - Trade-off between high costs&accuracy and low costs&accuracy
- Uses of carbon footprints

Carbon footprint today – status and problems

Status

- Significant demand driven by NGOs, industry, and consumers
- Several ongoing initiatives: PAS2050, WRI/WBCSD GHG-protocol, ISO14067
- Partly derived from this, life cycle assessment (LCA) and LCA-data also face increased attendance
- Typical approach: bottom-up (process based LCA)

Problems

- Often referred to as mission impossible or very time consuming
- Process based LCAs are typically not complete:
  - Capital goods: buildings, machinery, equipment etc.
  - Service inputs: business travelling, legal and accounting services etc.
  - Overhead: office equipment, paper, lighting etc.
- Impacts from these missing inputs are unknown
- Standards and guidelines do not provide a solution (ISO 14044 and PAS2050)
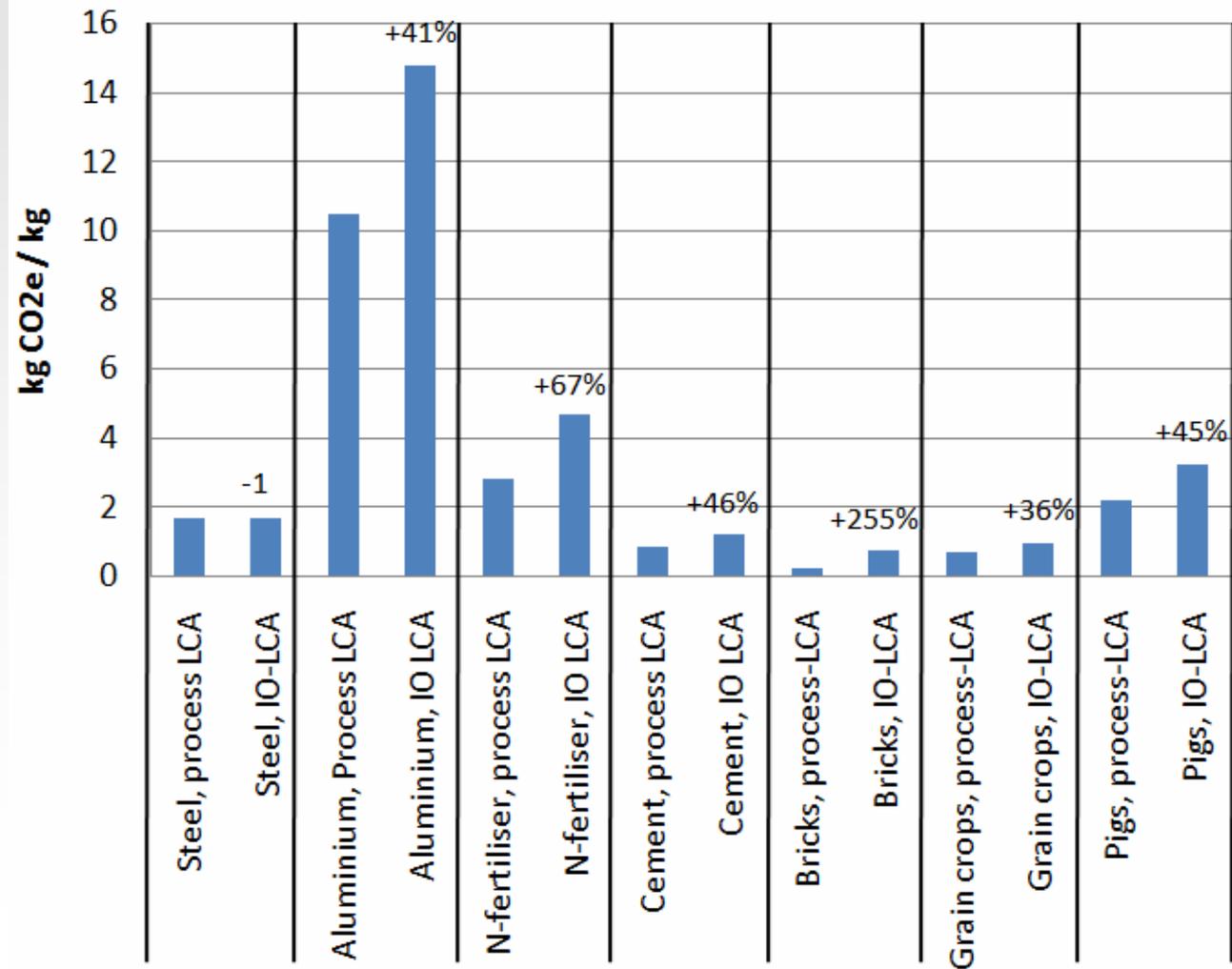
IO-LCA versus process-LCA

Process-data:

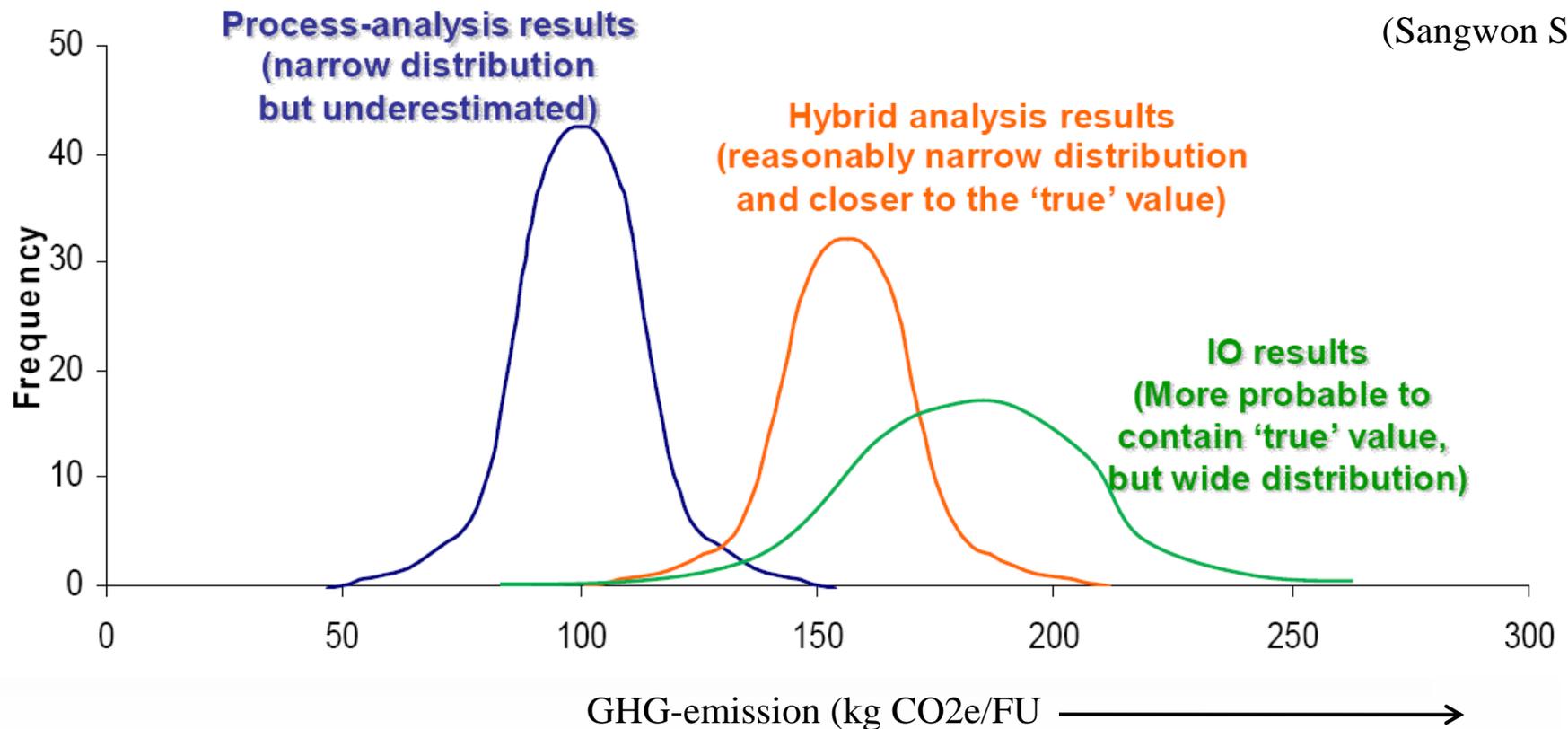Ecoinvent and LCAfood

IO-data:

Swedish IO-table
(FORWAST project)

*N.B. In Swedish IO-table
electricity is associated
with significantly lower
GHG emissions than in
process databases*

Underestimation versus loss of accuracy

- IO-LCA, process LCA and hybrid LCA

(Sangwon Suh)

Process-analysis results (narrow distribution but underestimated)

Hybrid analysis results (reasonably narrow distribution and closer to the 'true' value)

IO results (More probable to contain 'true' value, but wide distribution)

Frequency — 50, 40, 30, 20, 10, 0

GHG-emission (kg CO2e/FU ⟶

Hybrid LCA as a shortcut to carbon footprint

- IO-data used as starting point for all carbon footprints
- Then the process is by default 'complete' but very inaccurate
- Accuracy is increased by
  - adjusting inputs
  - exchanging inputs with process-based data

	FU: 1 kg product			FU: 1 kg product
Agricultural products	x		Agricultural products	x
Paper	x		Paper	x
Chemicals	x		Process-data: NaOH	x
			Process-data: cleaning agent	x
Fuels	x		Fuels	x
Electricity	x		Electricity	x
Land transport	x		Land transport	x
Air transport	x		Air transport	x
Hotels	x		Hotels	x
Legal services	x		Legal services	x
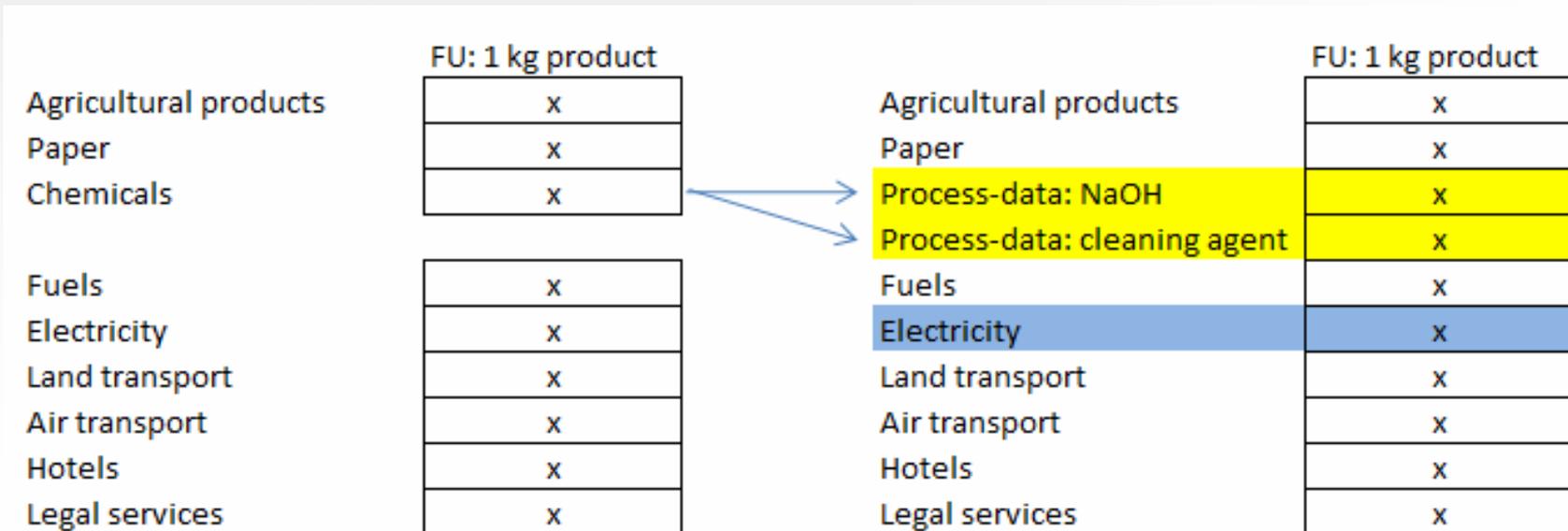
Constant completeness and process-data for increasing accuracy

- Following the procedure on previous slide:
  - The IO-data ensures initial completeness
  - When more specific data are available, accuracy can be improved to any appropriate level
  - Comparison: Starting point for process-LCA is an empty process
- Trade-off between high cost&accuracy and low cost&accuracy
  - Usually low costs for carbon footprint means lower accuracy <u>and</u> more underestimation of GHG emissions
  - With IO, low costs do not lead to underestimation of GHG emissions – but only lower accuracy
  - Hybrid LCA balances costs for carbon footprint and costs for mitigation based on the uncertainty in GHG emissions

Uses of carbon footprint (CFP) labels

1. Product information to the users

2. Carbon footprint labels on substitutable/competing products

   => can lead to more climate friendly choices

3. Producers that contribute with specific data for a label are likely to have lower emissions than the average. When subtracting the specific data from the original average, the emission factor for the new (residual) average will increase.

   => the incentive for non-labeled suppliers to join the label will increase

4. Option to include company carbon footprint in LCI databases, e.g. ecoinvent

   => above mentioned self-amplifying effect further strengthened

5. Knowledge on GHG emissions can be used to buy corresponding carbon credits

   => facilitates documentation of claims to be "carbon neutral"

6. CFP labels can be included in the bar code of a product

   => knowing the total GHG emissions from one day's or one year's sale or purchase