

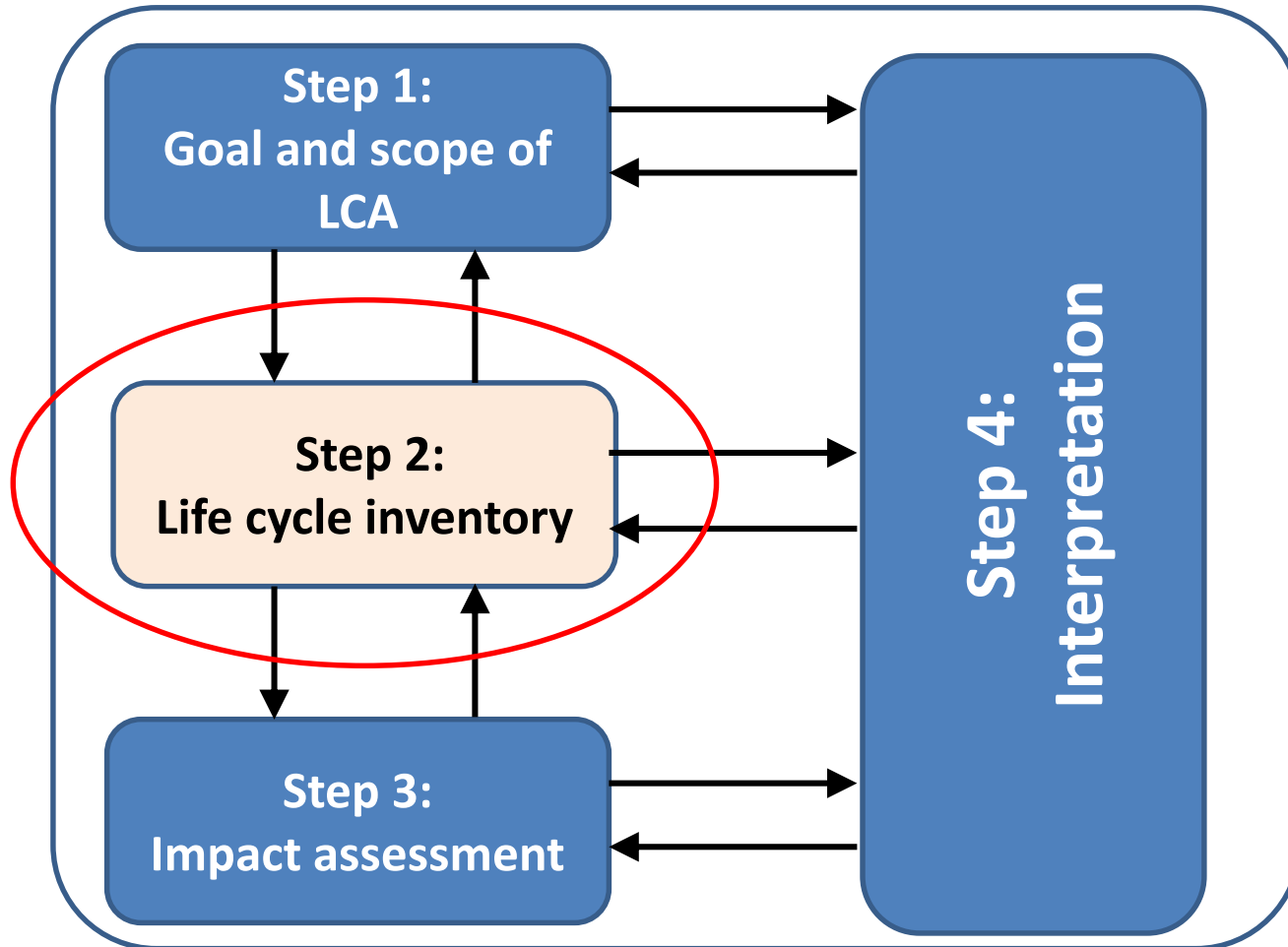


Life cycle inventories of nanoparticle production

Sustainability Workshop, Oslo, 2,4. December 2014

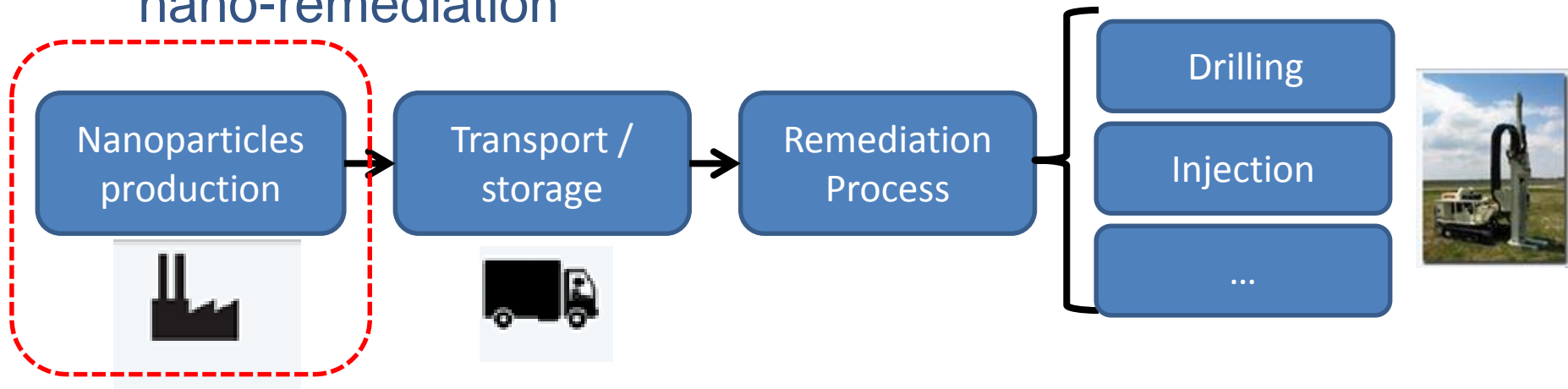
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Life cycle assessment (LCA)



Goals of LCA for (in) NanoRem

- Provide data for environmental impact assessment of nano-remediation



- **Nanorem choice: focus on Life Cycle Inventories (LCI) of nanoparticle products**
 - No data available in life cycle inventories databases
 - Nano production suspected to have a high share in overall environmental impact of nanoremediation

LCI and LCA in NanoRem so far

Ideally for LCI:

- Product already available on market
- Product that will be used in pilot application and large scale experiment

Results so far :

- Aggregated LCI obtained for one of the nanoparticle
 - Preliminary impact assessments carried out (climate change, Human toxicity, Urban land occupation, Metal depletion; etc.) and discussion with producer on data input
- Two other nanoparticles to be looked at

Needed data for a LCI

- **Inputs: economic flows**

- container (material, number, expected life time, weight)
- materials used in the process
 - Iron oxide or oxihydroxide
 - Gases...
 - other material?

- **Needed energy**

- electricity
- fuel
- gas
- steam?

- **Outputs: economic flows**

- Nanoparticle Waste (being sent to landfill, sent to incinerator, recycling)

An LCI dataset is associated with each economic flows reported to a functional unit (and then aggregated)

Needed data for a LCI

- **Inputs: environmental flows**

- Water used in the process
- Facility land occupation

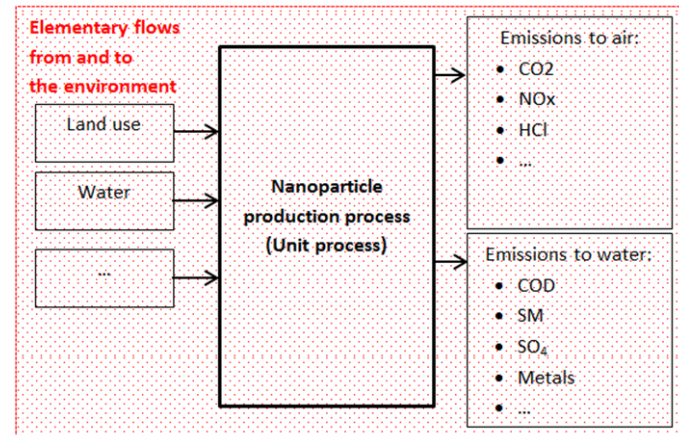
- **Outputs: environmental flows**

- Air emissions

- CO₂
- SO₂
- NO_x
- Particulates, < 2.5 mm
- Acids: H₂S ...
- Others?

- Water emissions

- SM, Suspended Matter
- COD, Chemical Oxygen Demand
- N_{tot}
- P_{tot}
- Others?



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