

Flows of engineered nanomaterials through waste treatment and recycling

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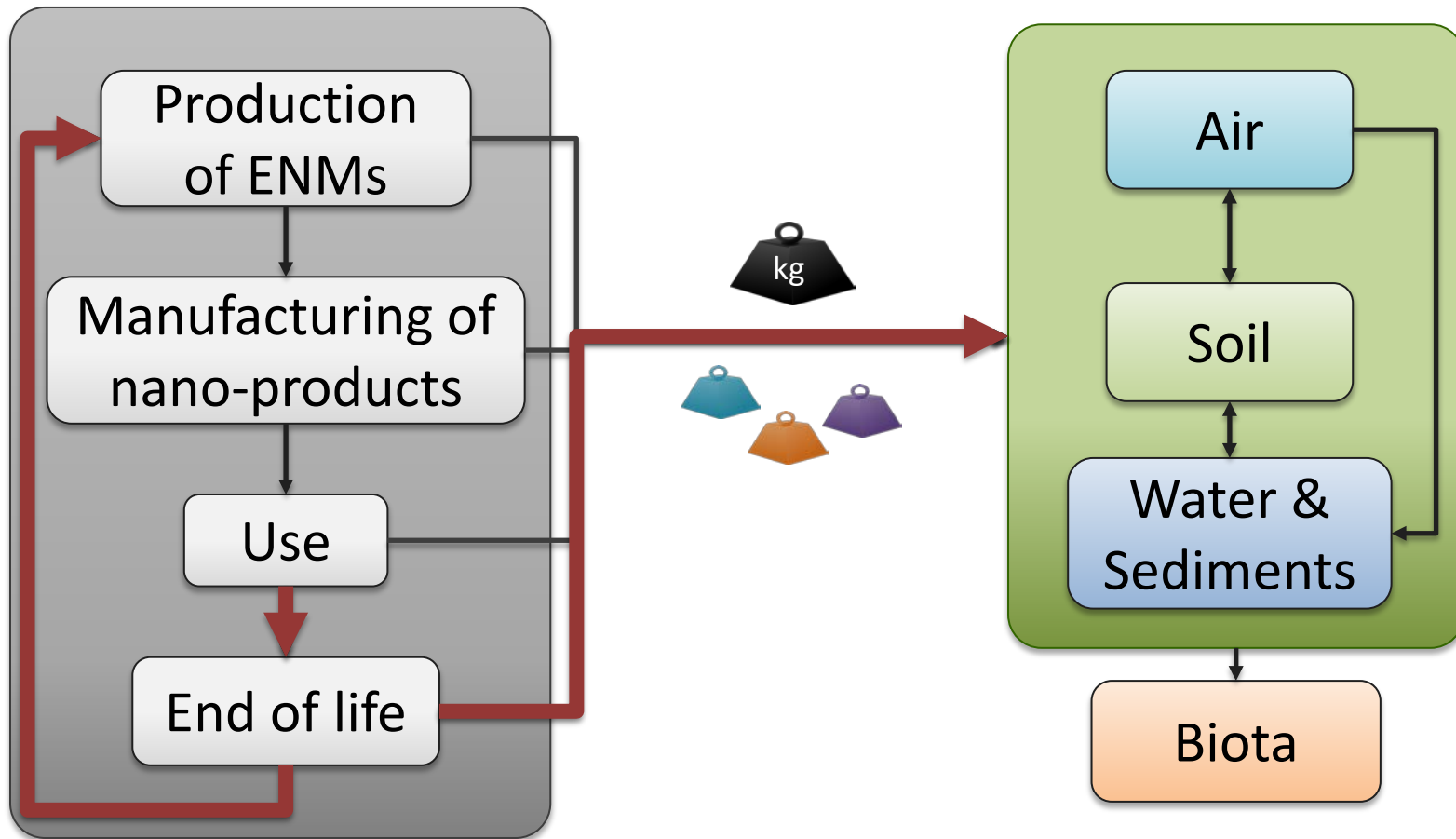
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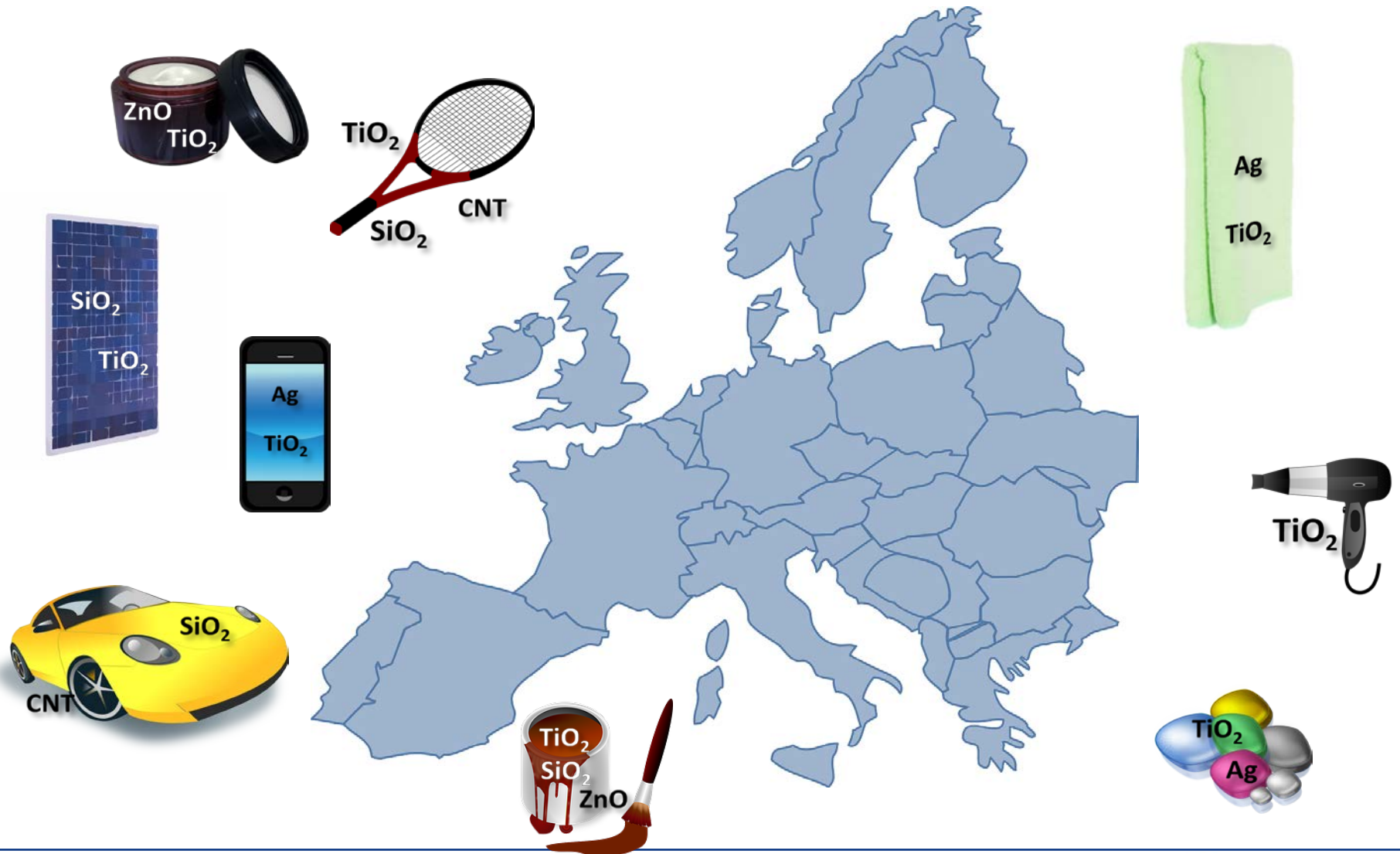
NanoSafety Forum for Young Scientists
Visby, Sweden
15th September, 2016



Introduction



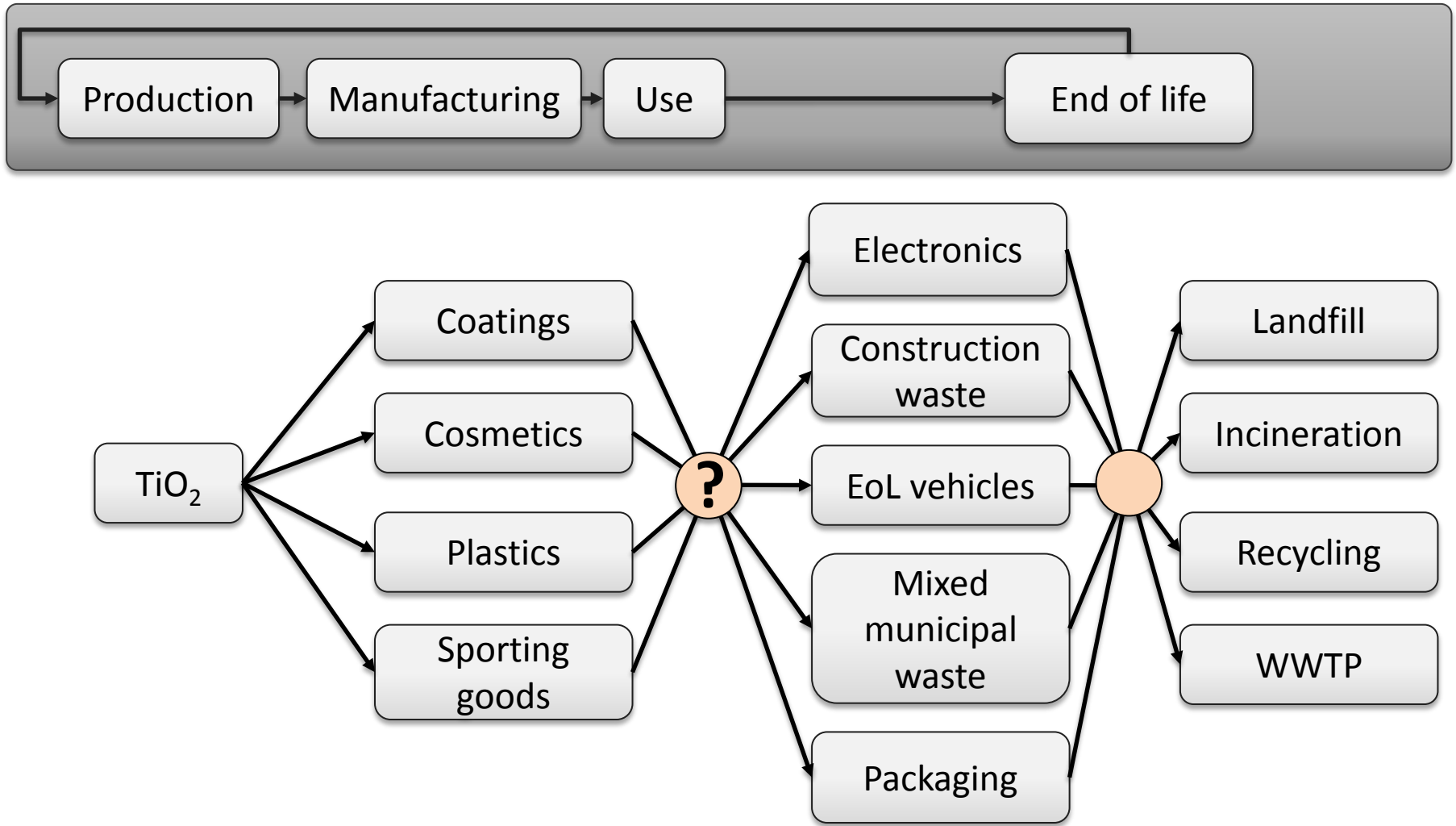
Scope of the study



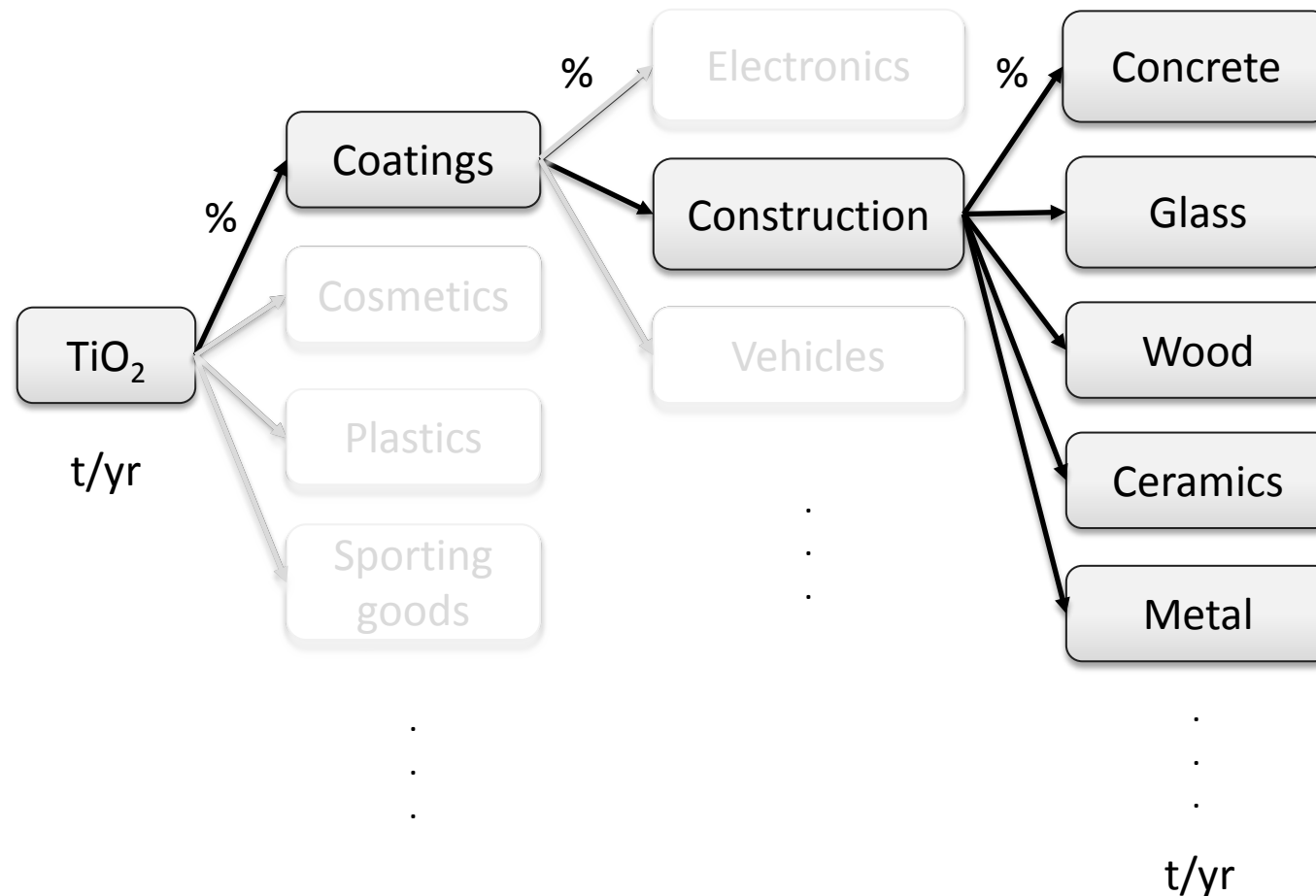
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Method - Conceptualisation



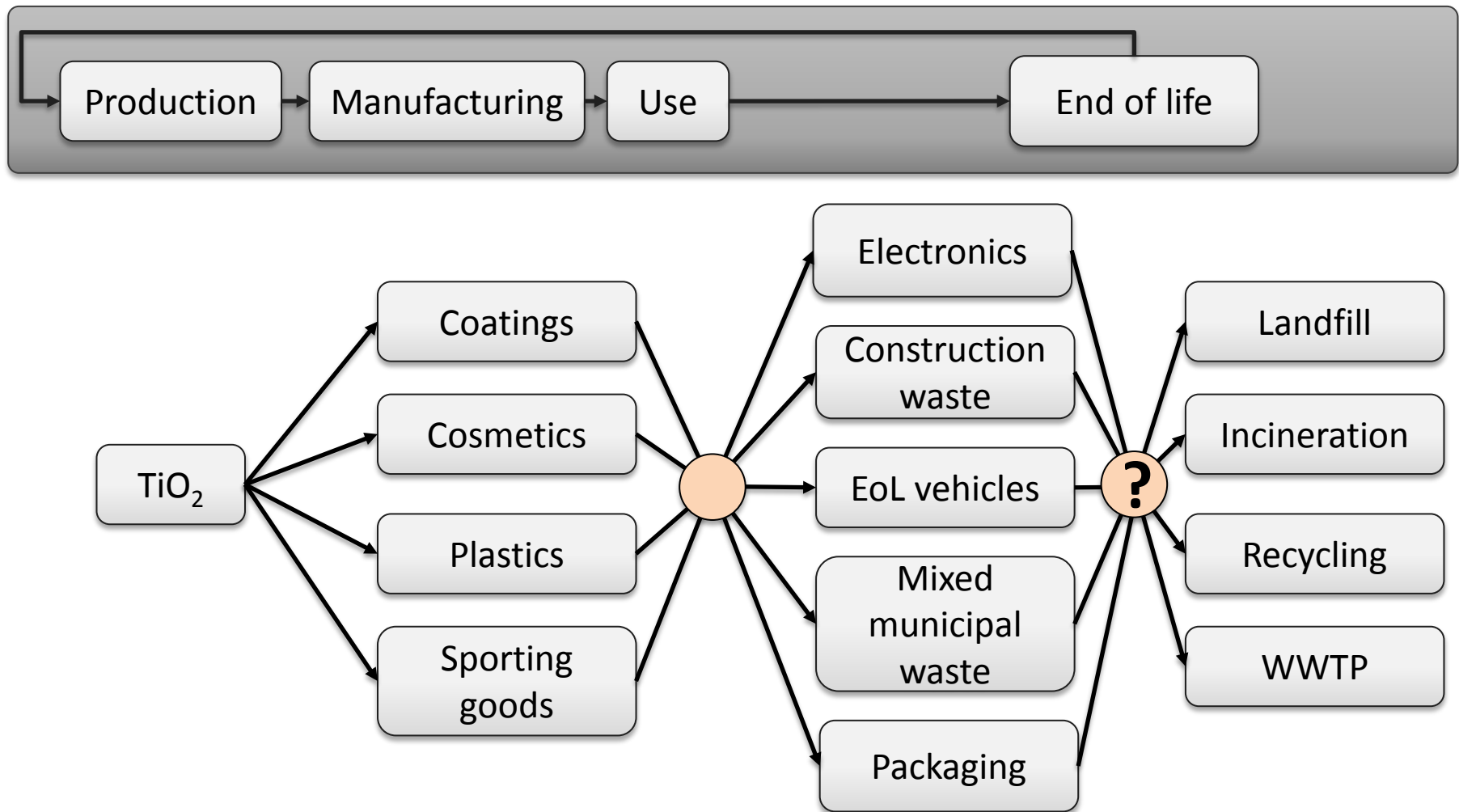
Method – Allocation to subcategories



Method – Allocation to subcategories

- Various sources
 - Consumer product inventories (Nanodb,...)
 - Commercial platforms (Amazon,...)
 - Google
 - Scientific reviews
- Application of quality criteria
 - Include at least 20% of the product categories considered
 - Written/Updated since 2012

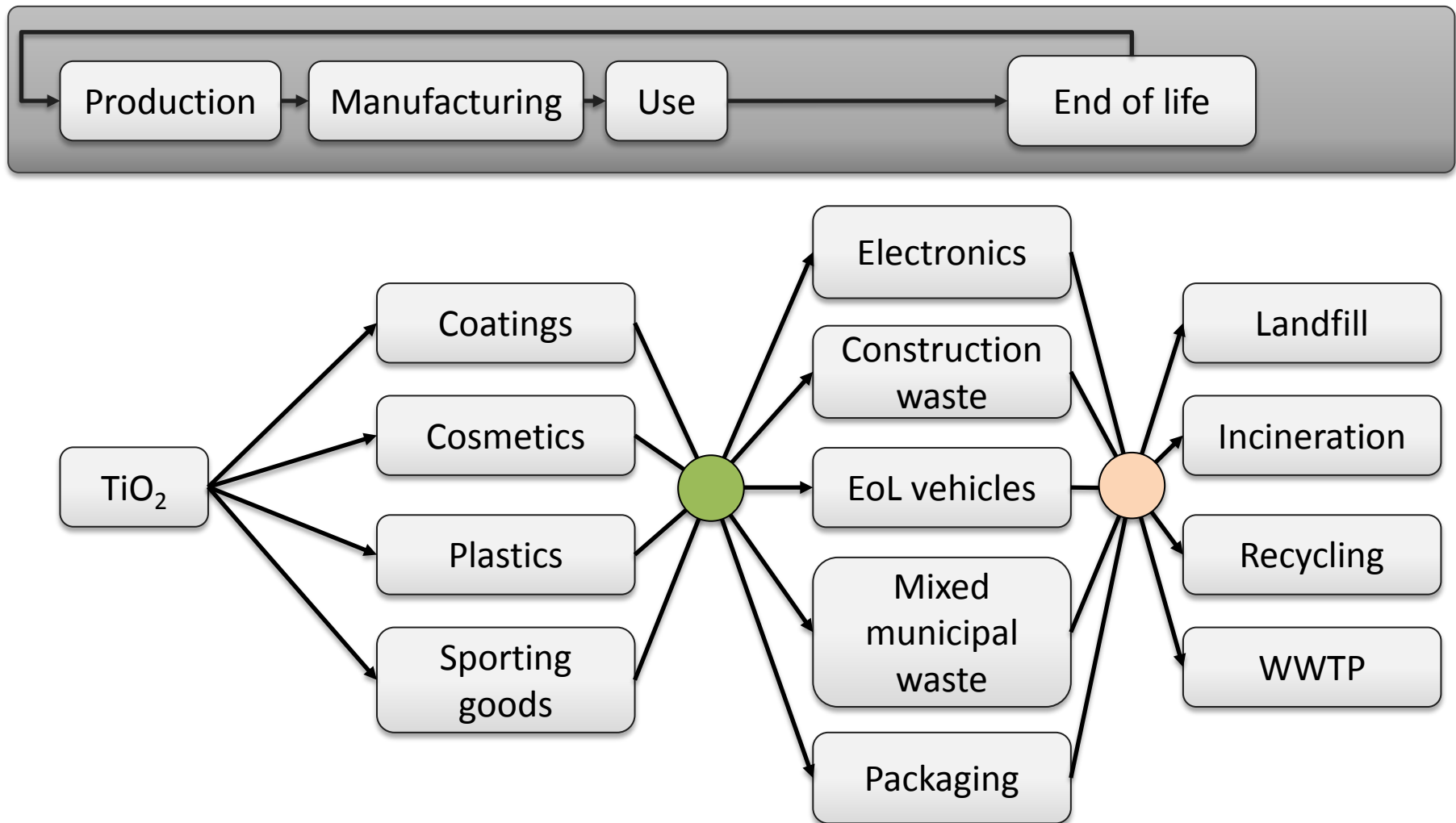
Method - Conceptualisation



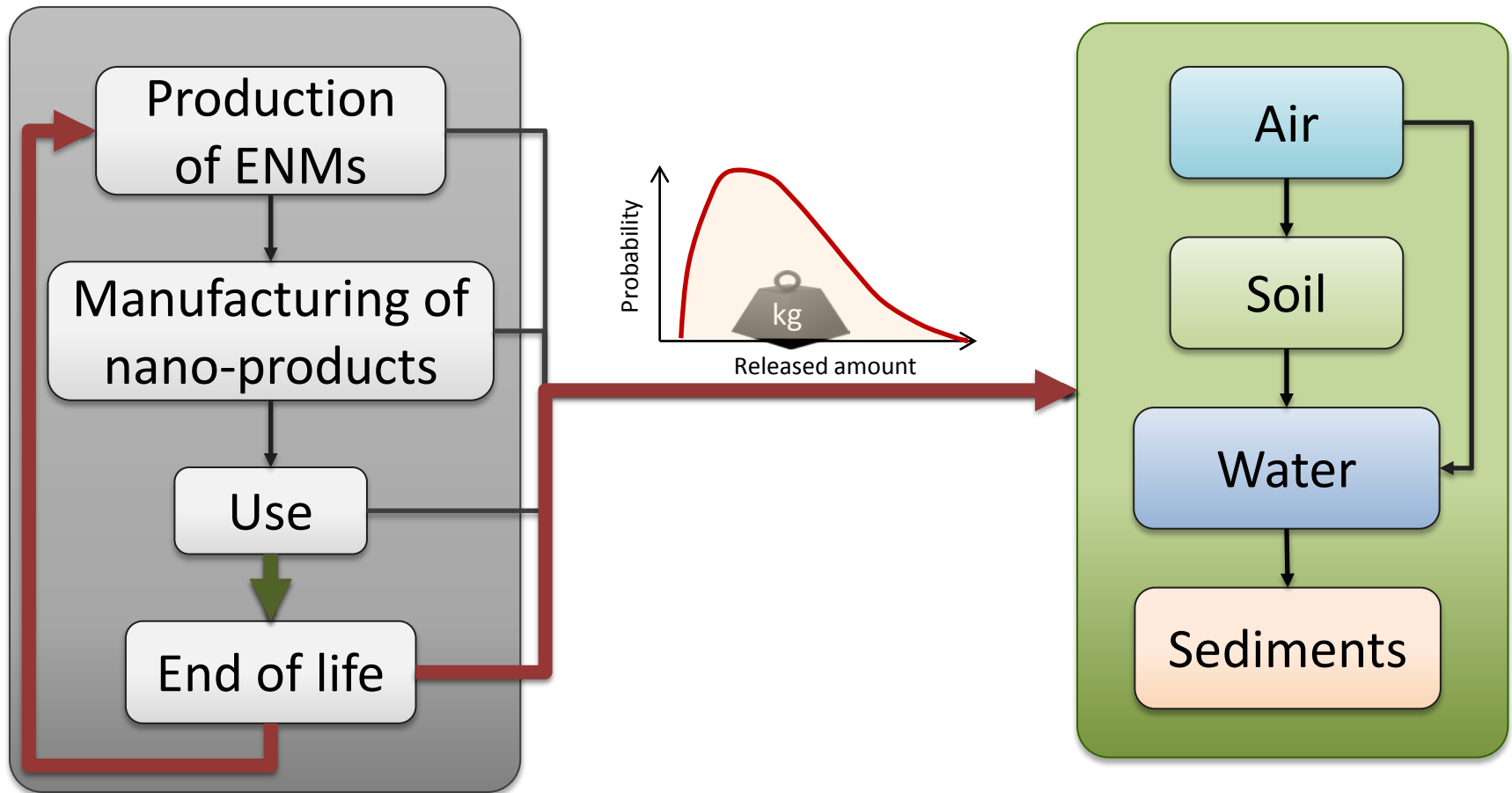
Method – Allocation to waste treatment

- Reports from government organisations
- Eurostat
- Data (un)availability:
 - Different years of reference
 - Different waste categories
- Quality criteria

Method - Conceptualisation



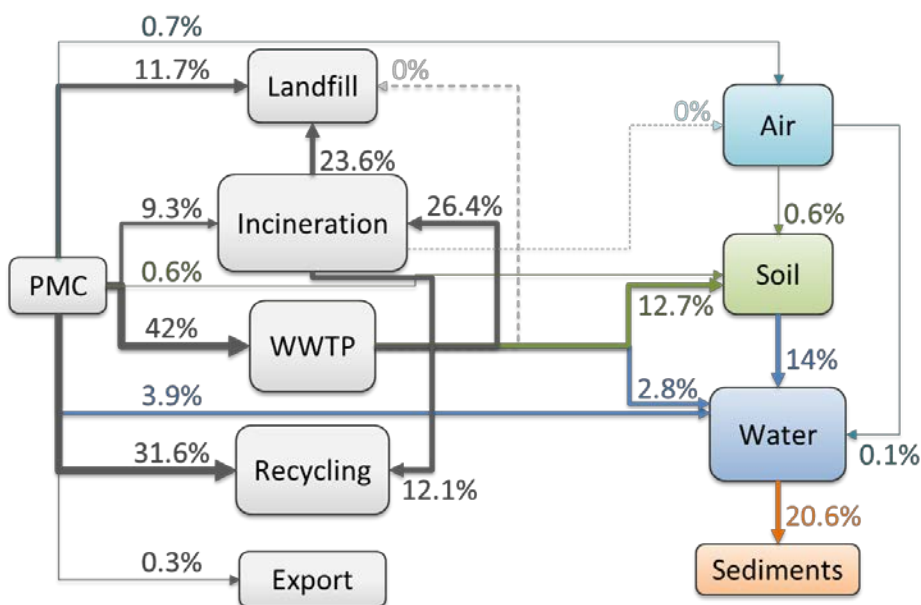
Method - Modelling



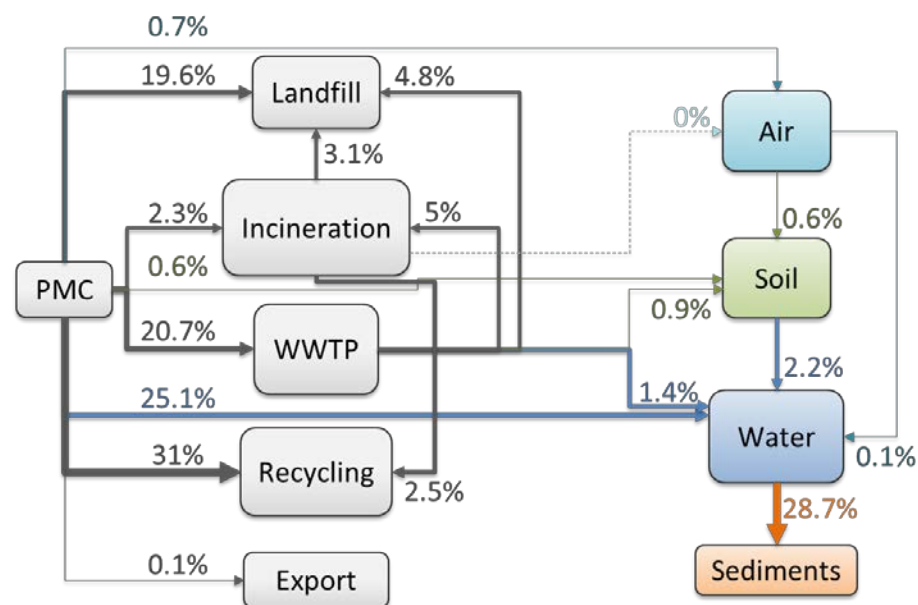
Gottschalk et al. 2010, Environmental Modelling and Software

Preliminary results - Flows

GERMANY
nTiO₂ input: 2'100 t



Romania
nTiO₂ input: 178 t



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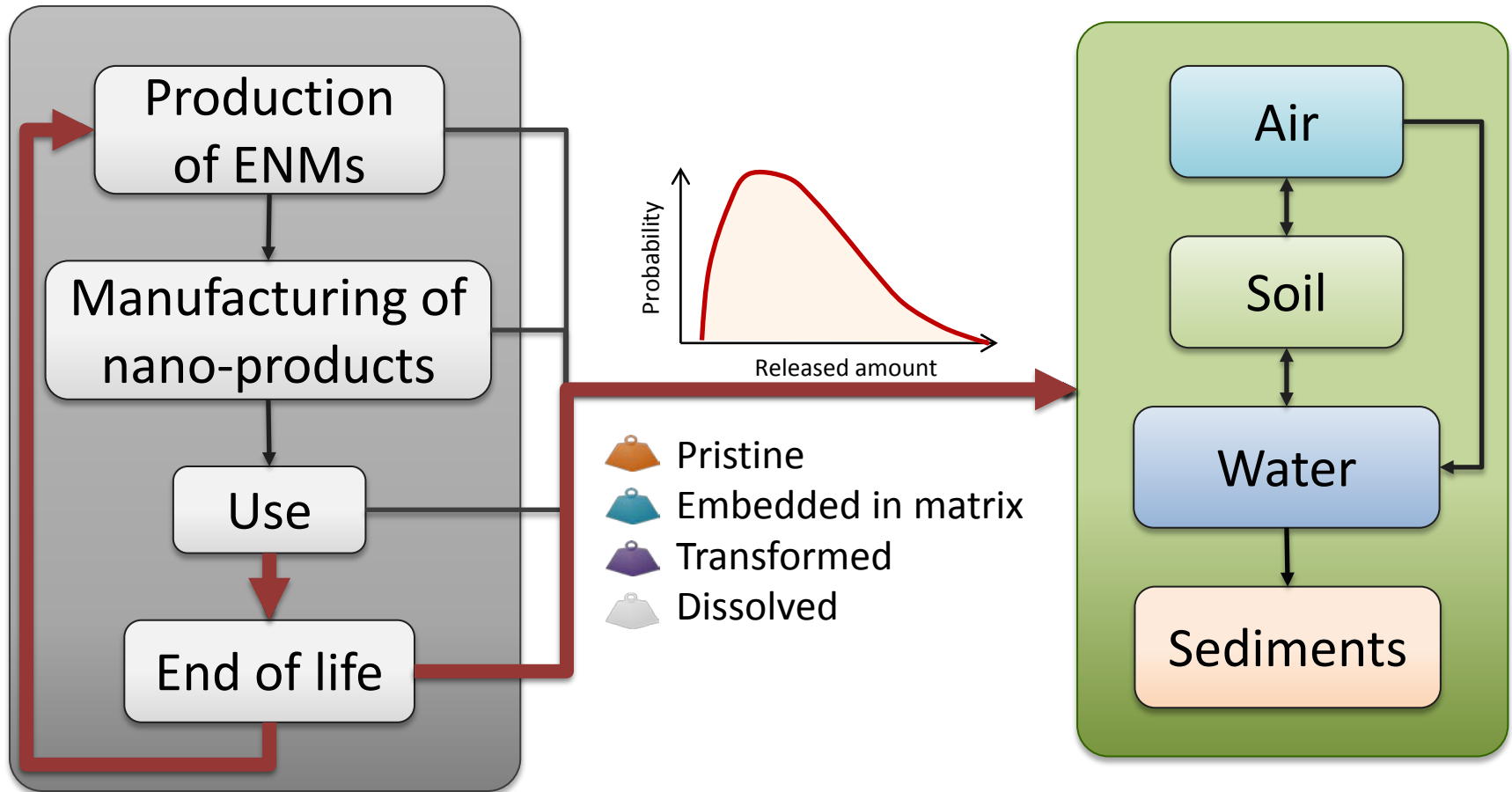
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Preliminary results – Mean environmental concentrations

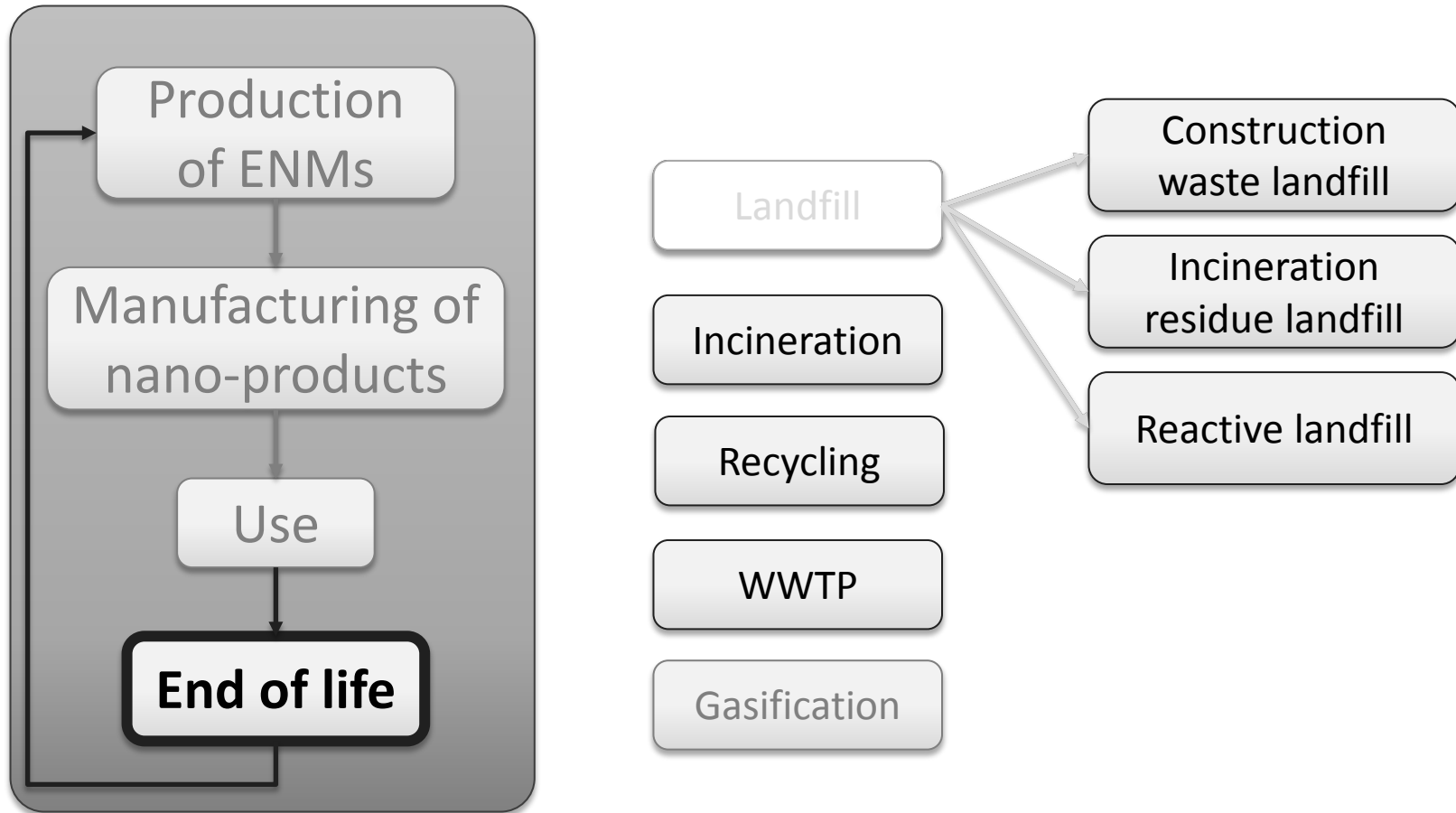
- Concentration = Mass flow / Volume of compartment
- Volumes are calculated based on ECHA's guidance
- Well-mixed, homogeneous compartments

Compartments	Germany	Romania	Units
Atmosphere	1.07	0.14	ng/m ³
Sediments	2.11	0.82	mg/kg
Soil (Natural and Urban)	445	56.5	ng/kg
Soil (Sludge treated)	1.08	0.01	mg/kg
Surface water	14.8	7.45	ng/L

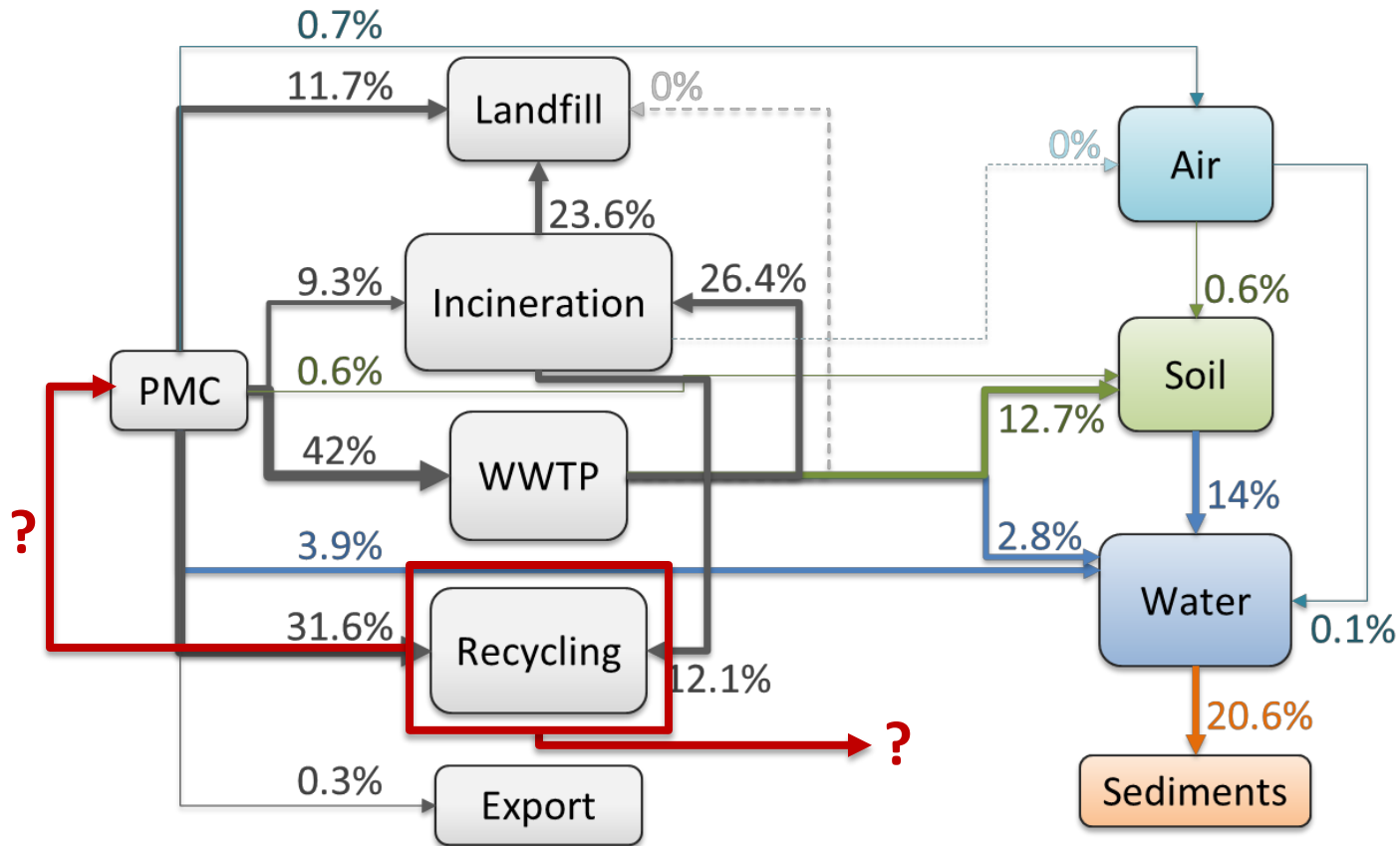
Next steps – Assessing the flows out



Next steps – Refining the structure



Next steps – Refining the structure



Conclusions and outlook

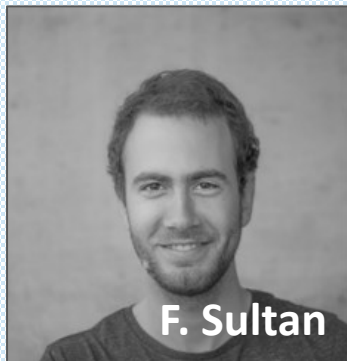
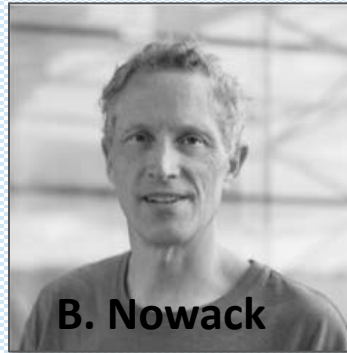
- The quality of the data needs to be assessed
- The national scale is relevant
- The forms of the releases are to be assessed

- Need for a good balance between efficiency and accuracy!

NanoFASE

Fate and Exposure models for you - www.nanofase.eu

Thank you!



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