

Ex-ante LCA of emerging CS slag treatment technologies:
Fast forwarding lab observations to estimations
of production on an industrial scale

76th LCA Discussion Forum

M. Buyle





Carbon steel EAF slags contain moderate concentrations of Cr (2.4-6%) in a silicate matrix



High availability CS slag (4,6 mio t/y), but with a low quality application (e.g. road construction)



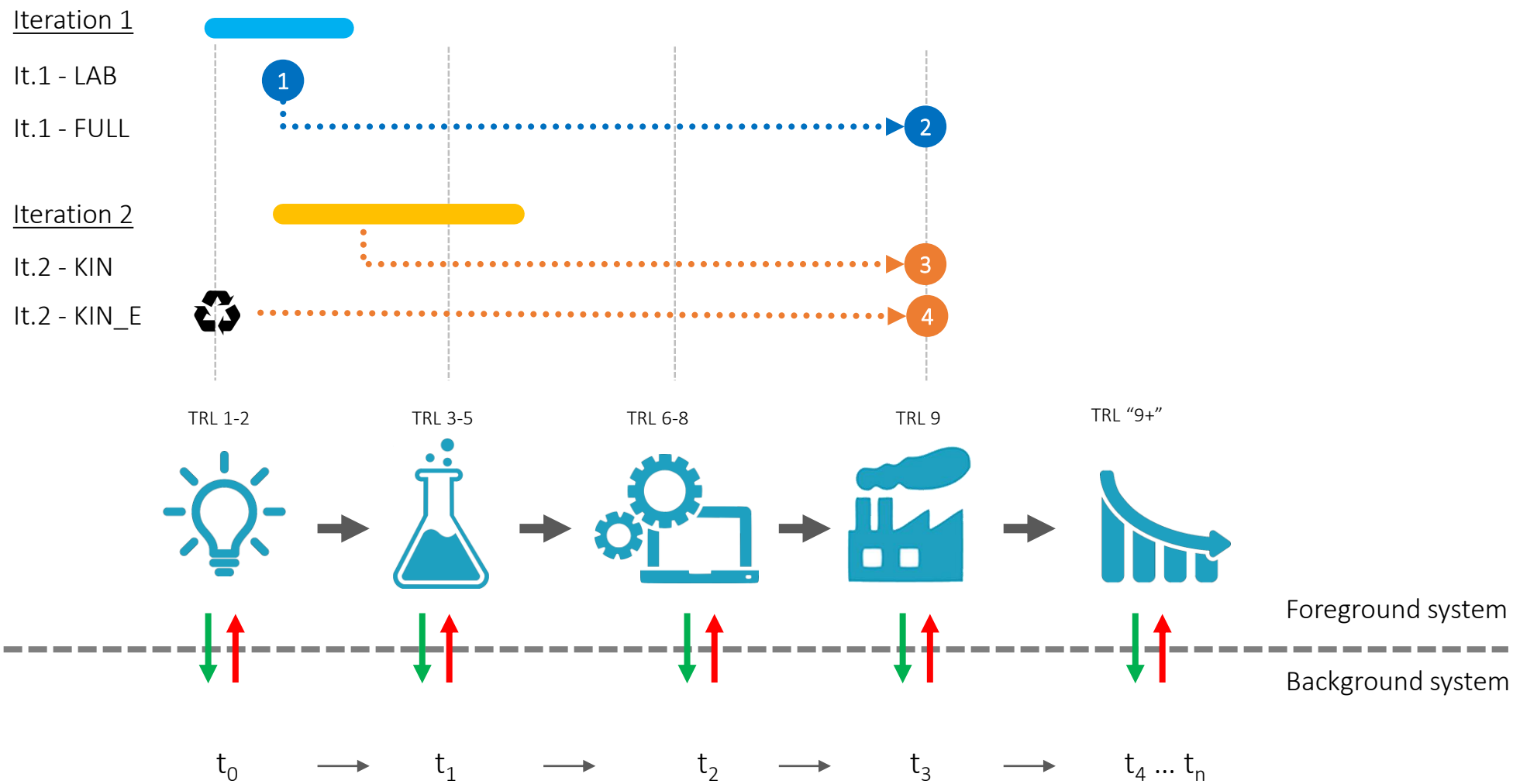
Development of technologies to recover Cr and still valorize the residual matrix material



Integration of an environmental assessment at an early stage of technological development

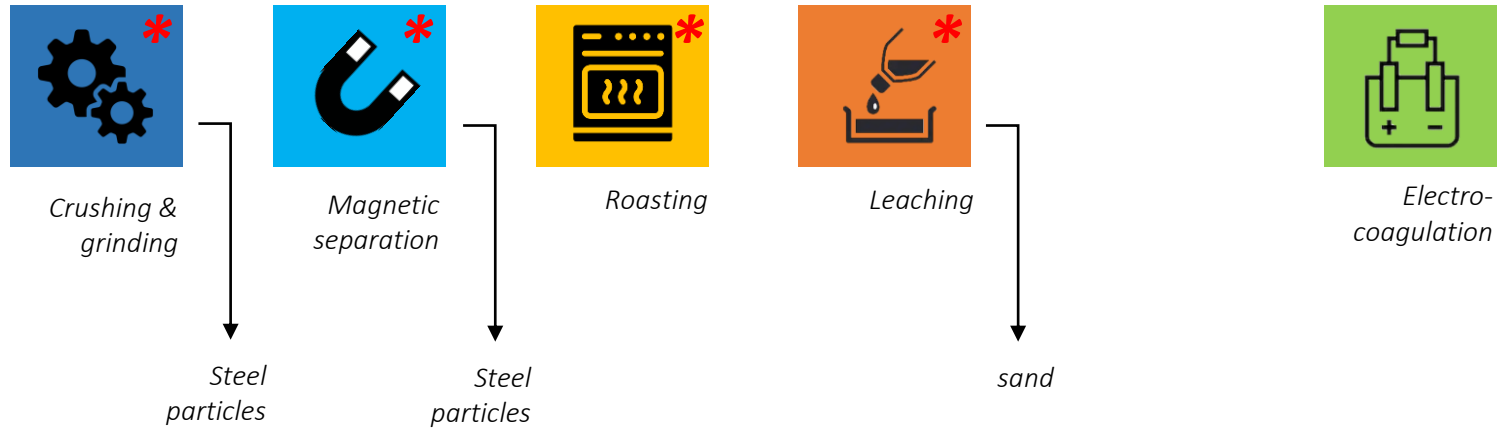


Estimate environmental impact on an industrial scale, based on lab scale information only (ex-ante LCA)

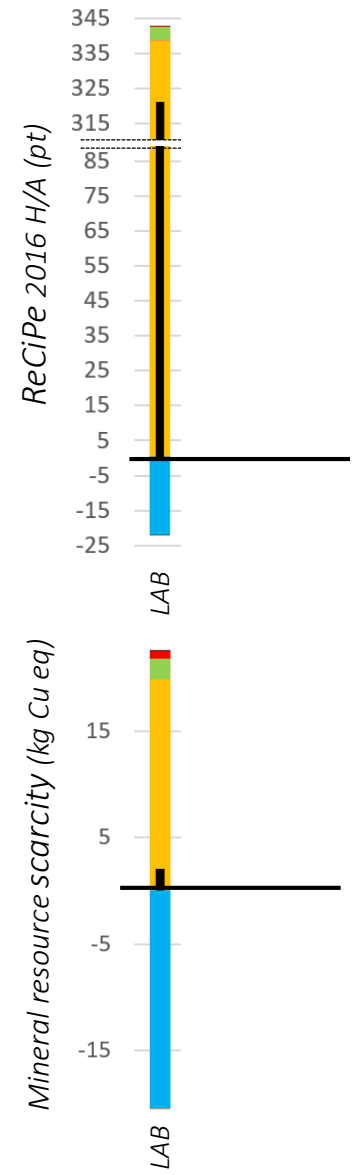


Functional unit:
treatment 1 ton CS slag

* Lab scale data only

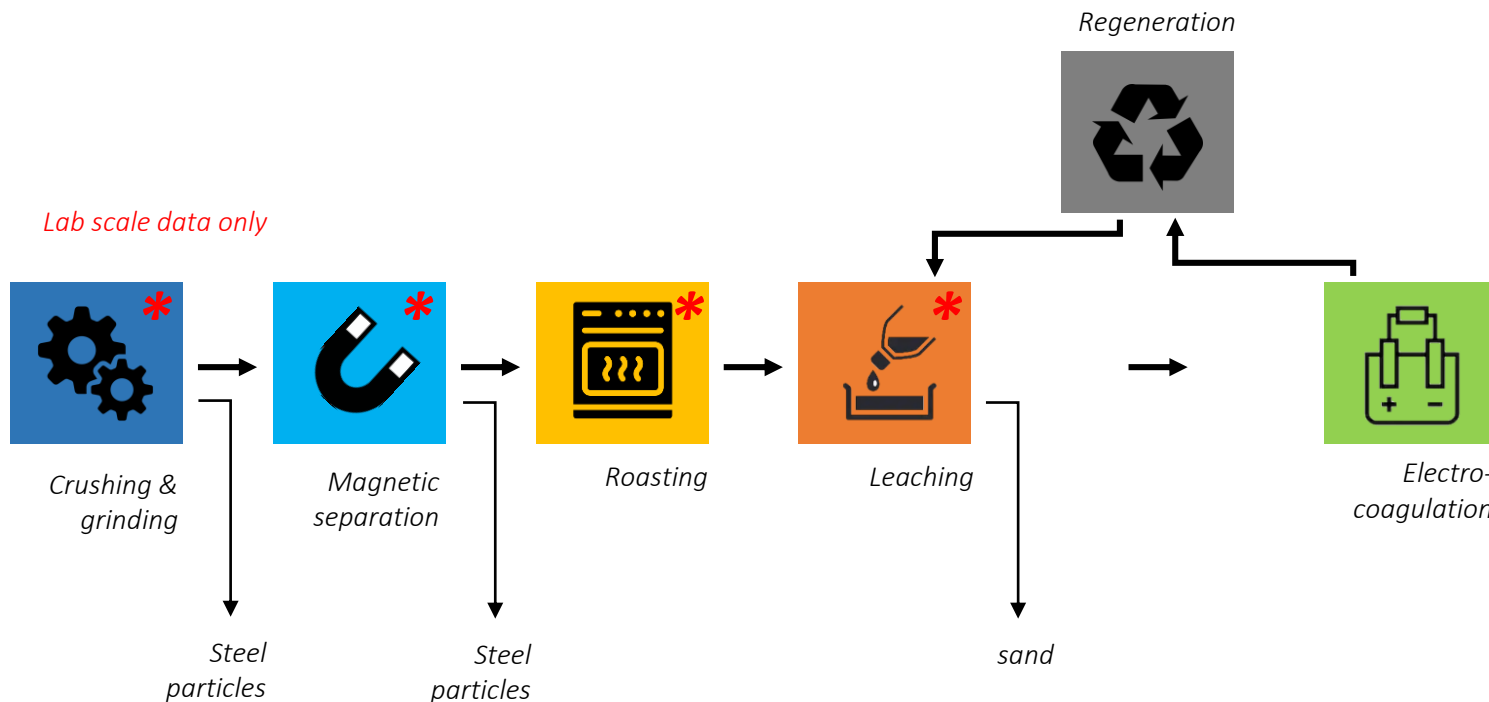


→ Cr-Comp.

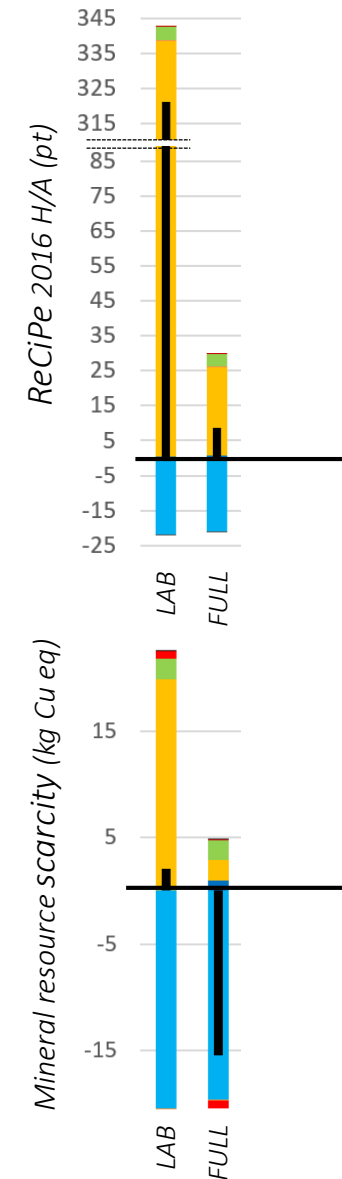


Functional unit:
treatment 1 ton CS slag

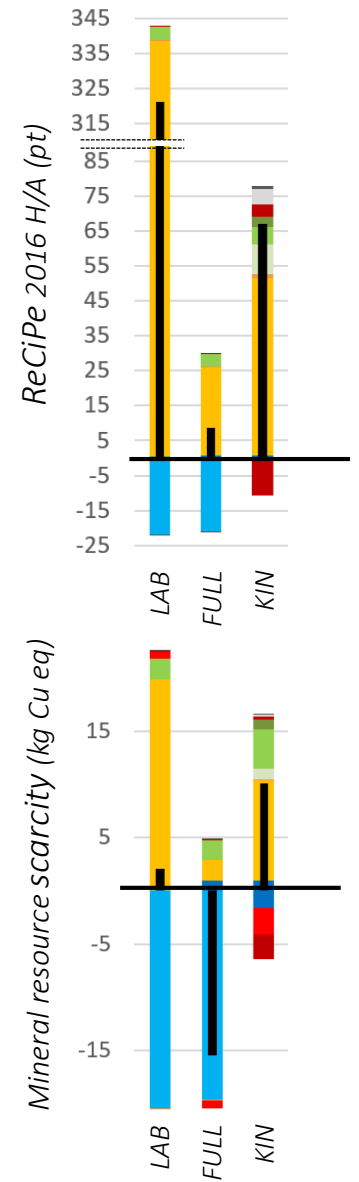
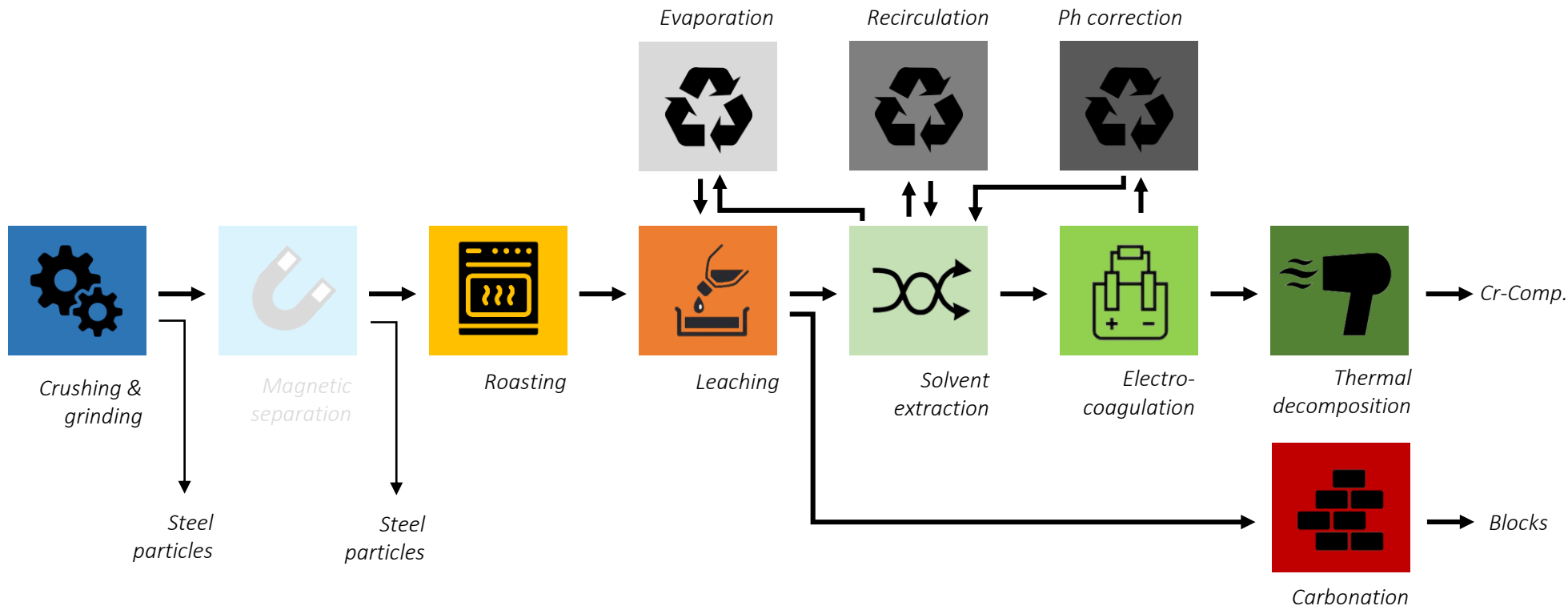
Lab scale data only



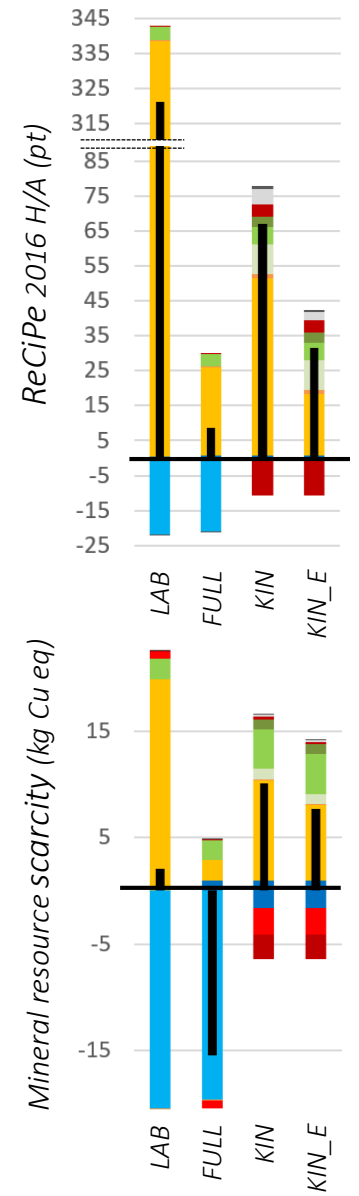
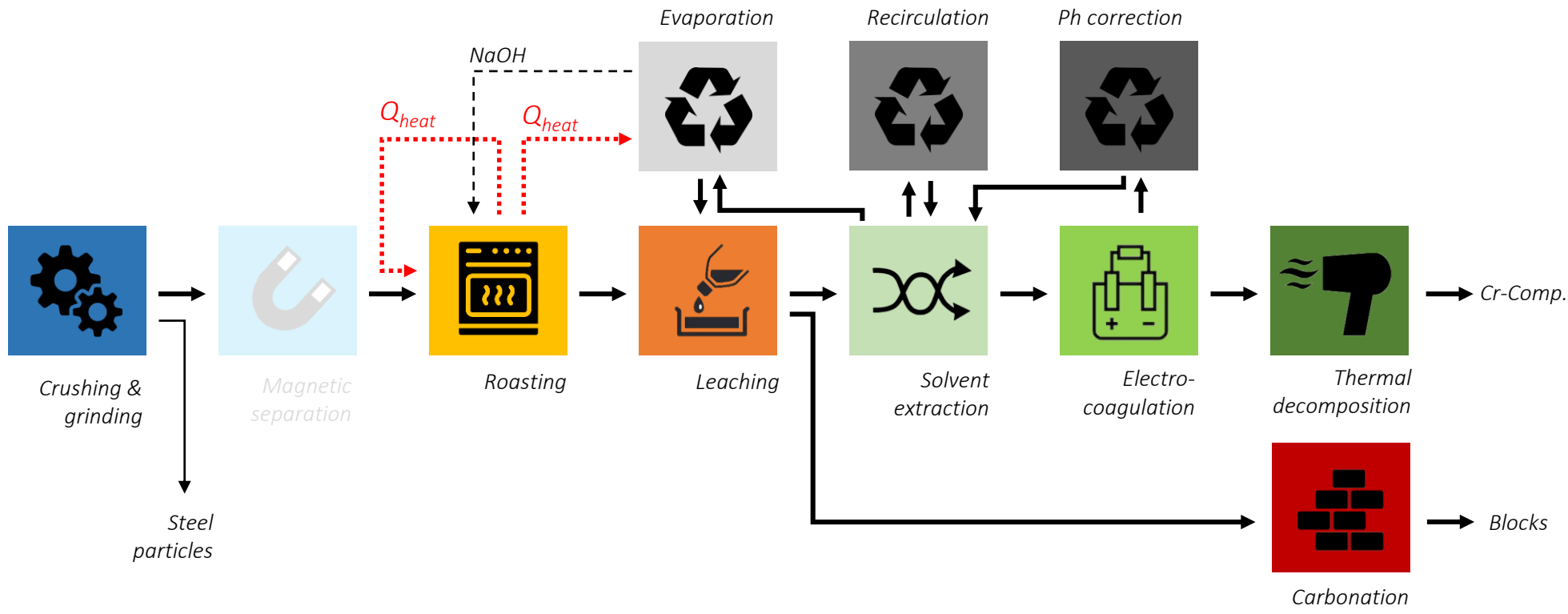
Cr-Comp.

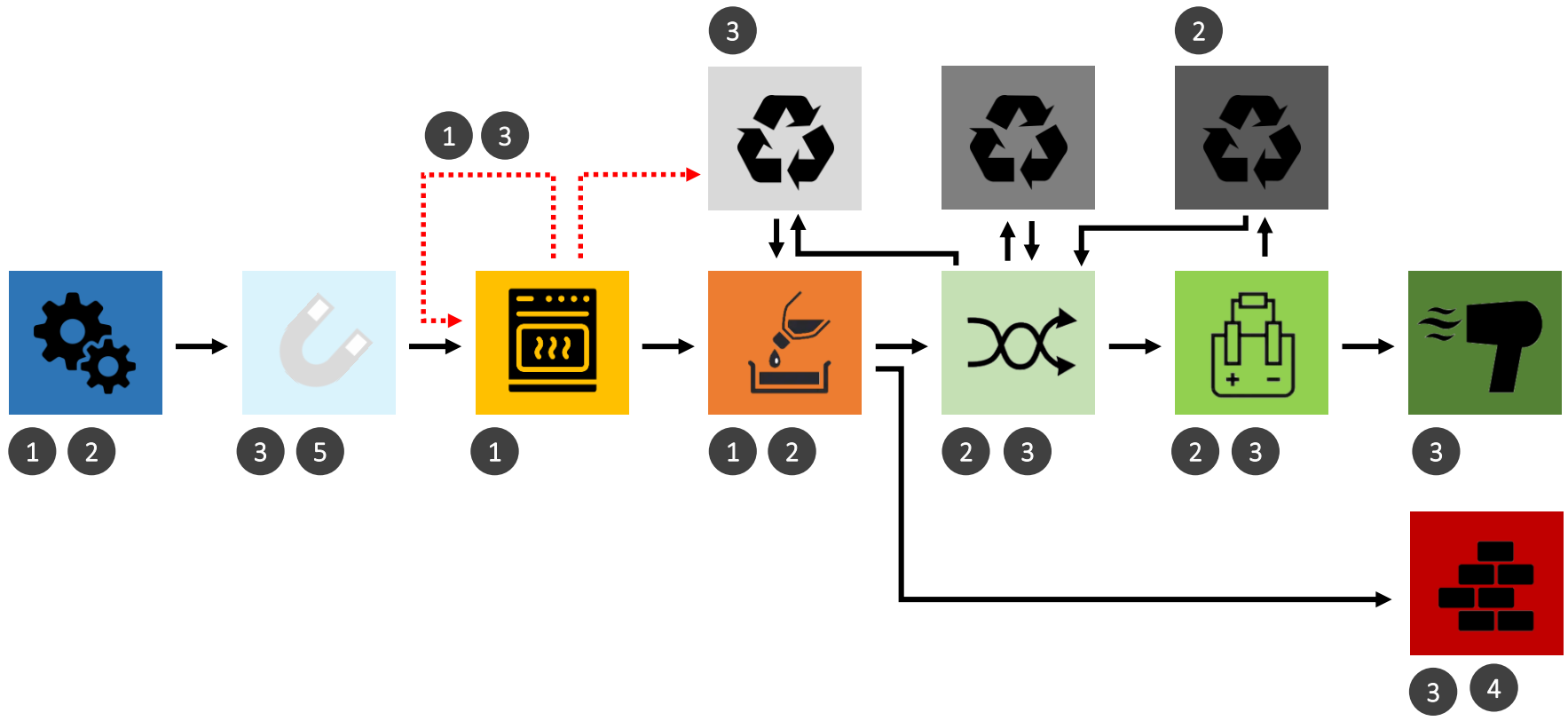


Functional unit:
treatment 1 ton CS slag



Functional unit:
treatment 1 ton CS slag





- 1 Ideal system baseline
- 2 Empirical relationships
- 3 Proxy tech. transfer
- 4 Scaling & extrapolation
- 5 Expert judgement

Ex-ante LCA of
CS slags
Matthias Buyle

Discussion & conclusion
Applied techniques



- Wide range of techniques available
- Early stage results accounted for in next iteration



- Technical validity remains a challenge
- Creativity experts is essential
- Broad set of scenarios needed to deal with uncertainty



- Account for dynamics in background system

Thank you for the attention!

Special thanks to:



Ex-ante LCA of
CS slags
Matthias Buyle

Questions?

