

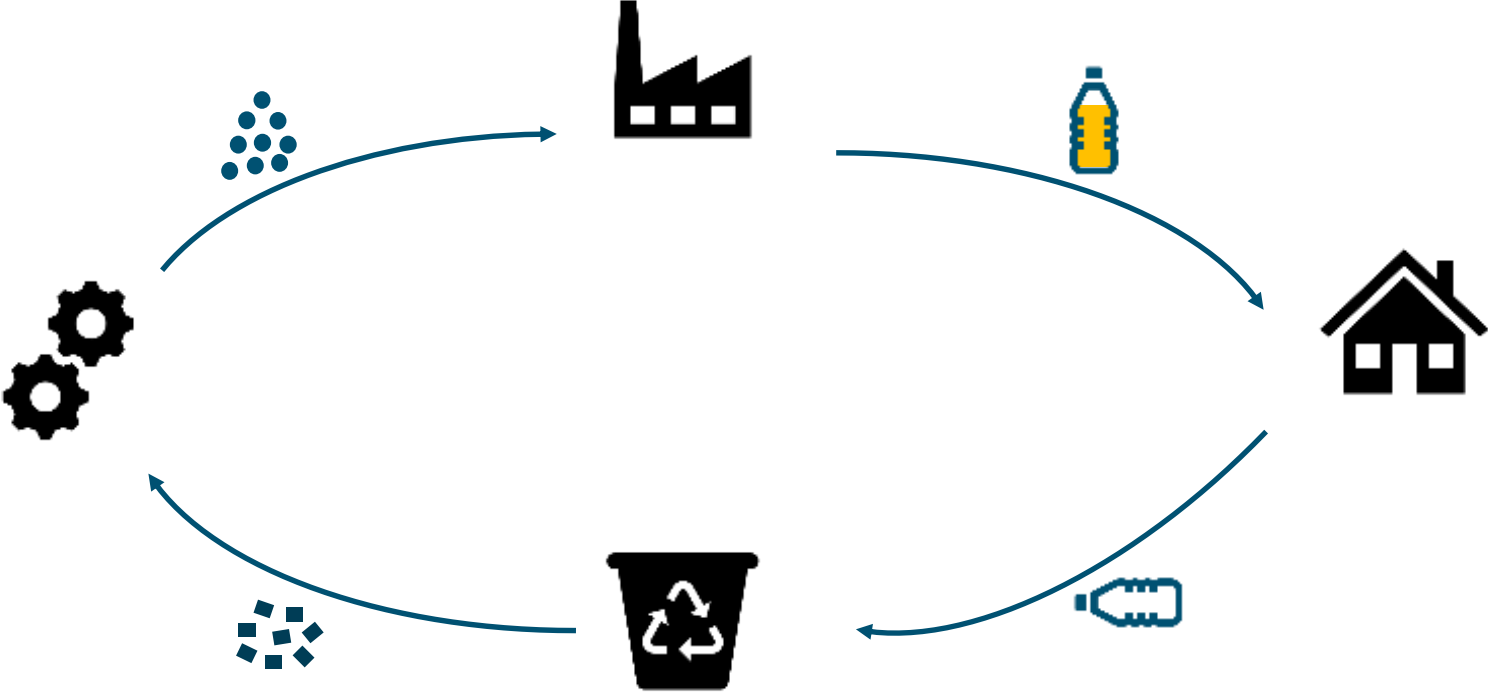
Circularity

Simplicity versus complexity – Ulphard Thoden van Velzen

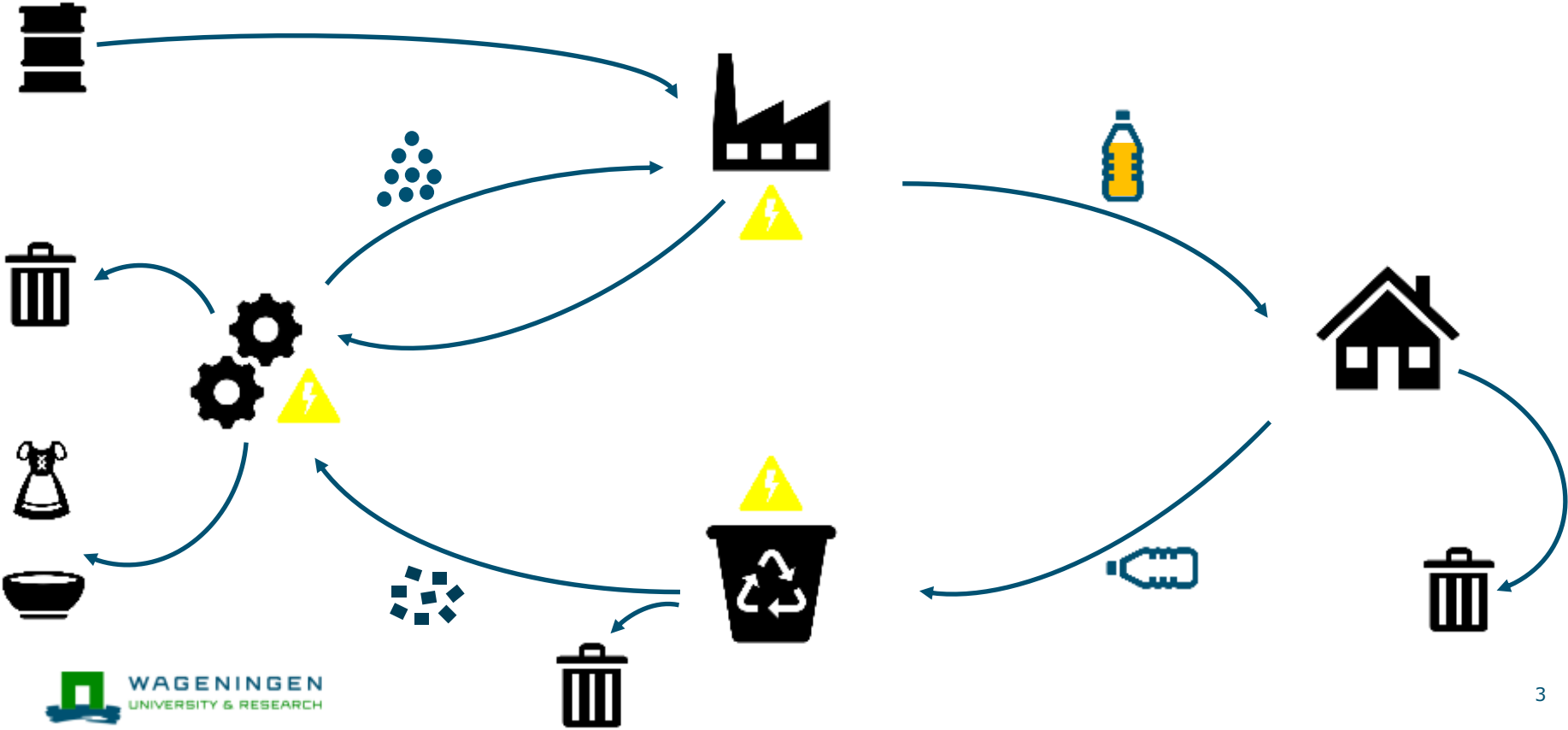
October 11th 2023



Circularity – the dream



Circularity – closer to reality



Thermodynamics

- All material cycles have losses in:
 - quantity – recycling rates
 - quality – contamination / food safety
- Can partially be corrected with the input of energy, water, chemicals
- And require the dissipation of wasted heat: $\Delta S > 0$

Circles aren't simple

- We must account for material loss, quality loss, energy use and material use...
- Scientists have proposed > 55 sets of circularity indicators
 - For various audiences
 - Often require complex data
 - Sometimes complex dashboards -> pressies for geeks
 - Sometimes rendering a single parameter in which much data is aggregated -> simple but incomprehensible

Simple, meaningful & practical

- **Scorecard**
- Scores only material circularity
- Suitable for a wide audience
- Root causes of non-maximal scores can be traced and understood

