The environmental impact of WEEE management and benefits of recycling

COLLECTORS: WASTE COLLECTION SYSTEMS ASSESSED AND GOOD PRACTICES IDENTIFIED

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Environmental analysis for WEEE

Cases

- Pembrokeshire (UK)
- Helsinki (FI)
- Genoa (IT)
- Cyclad (FR)
- Vienna (AT)

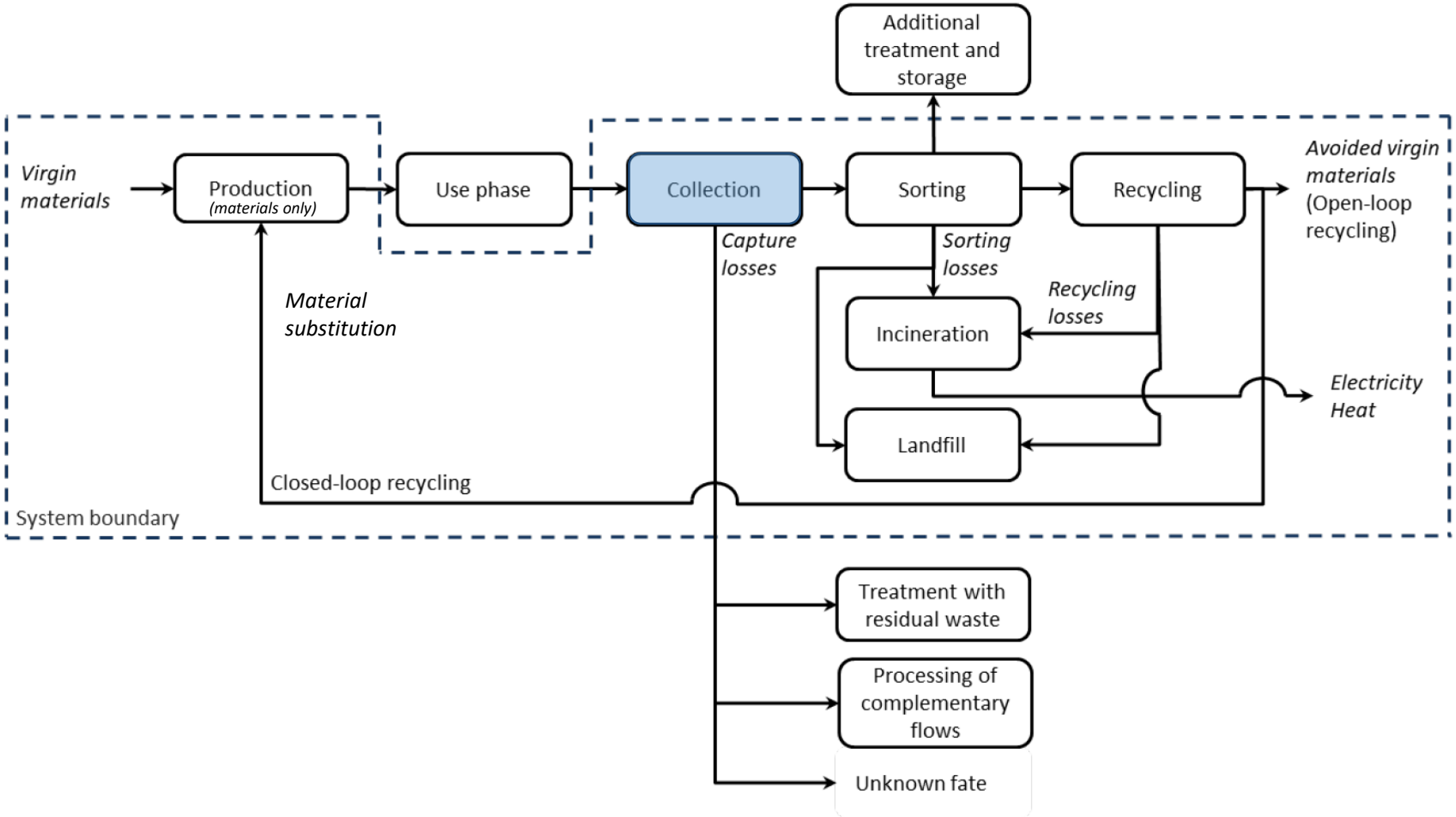
Small WEEE collection (consumers):

- Lamps
- Small household appliances
- Small IT

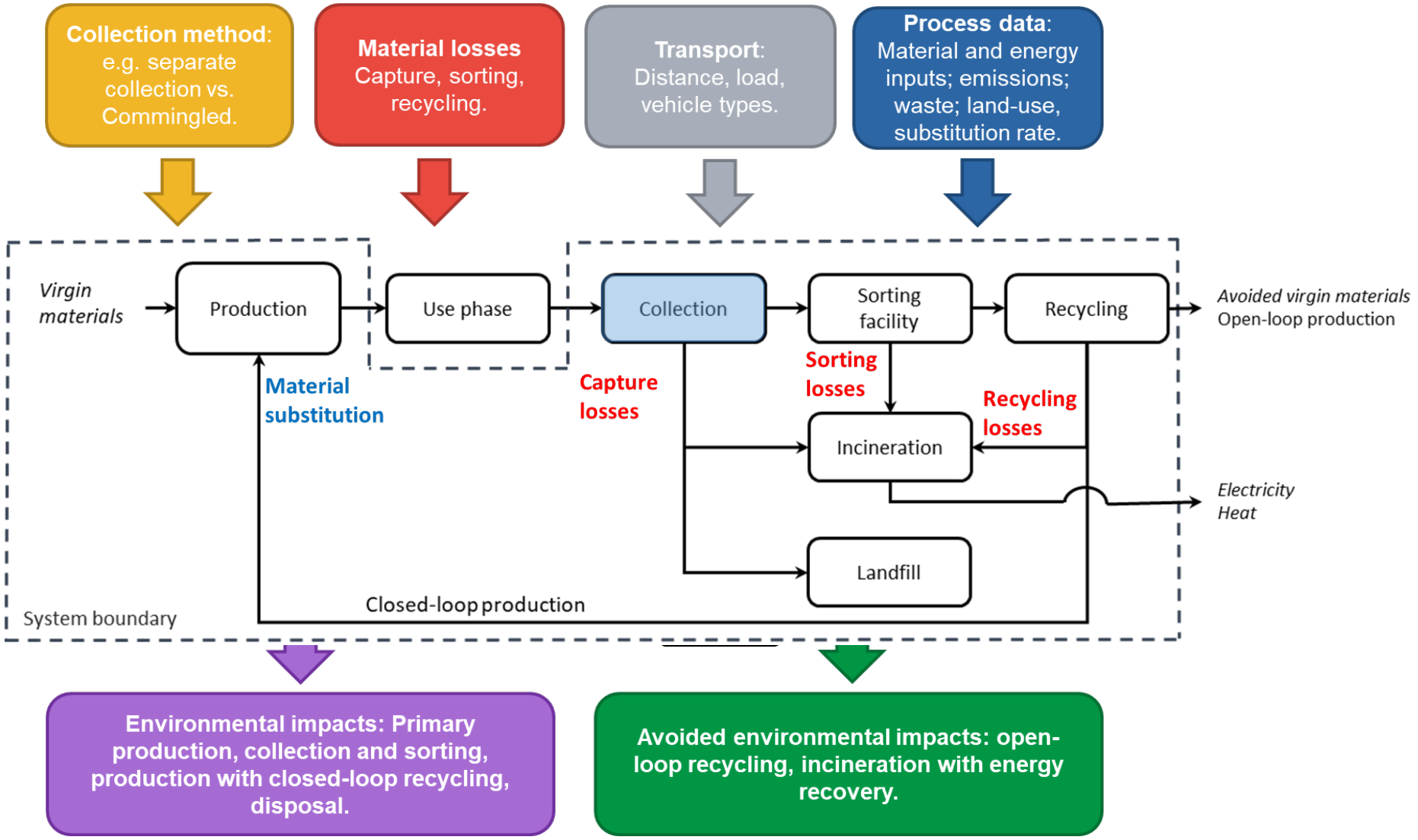
Environmental assessment

- Material flow analysis (MFA)
- Quantifying environmental impacts (LCA)

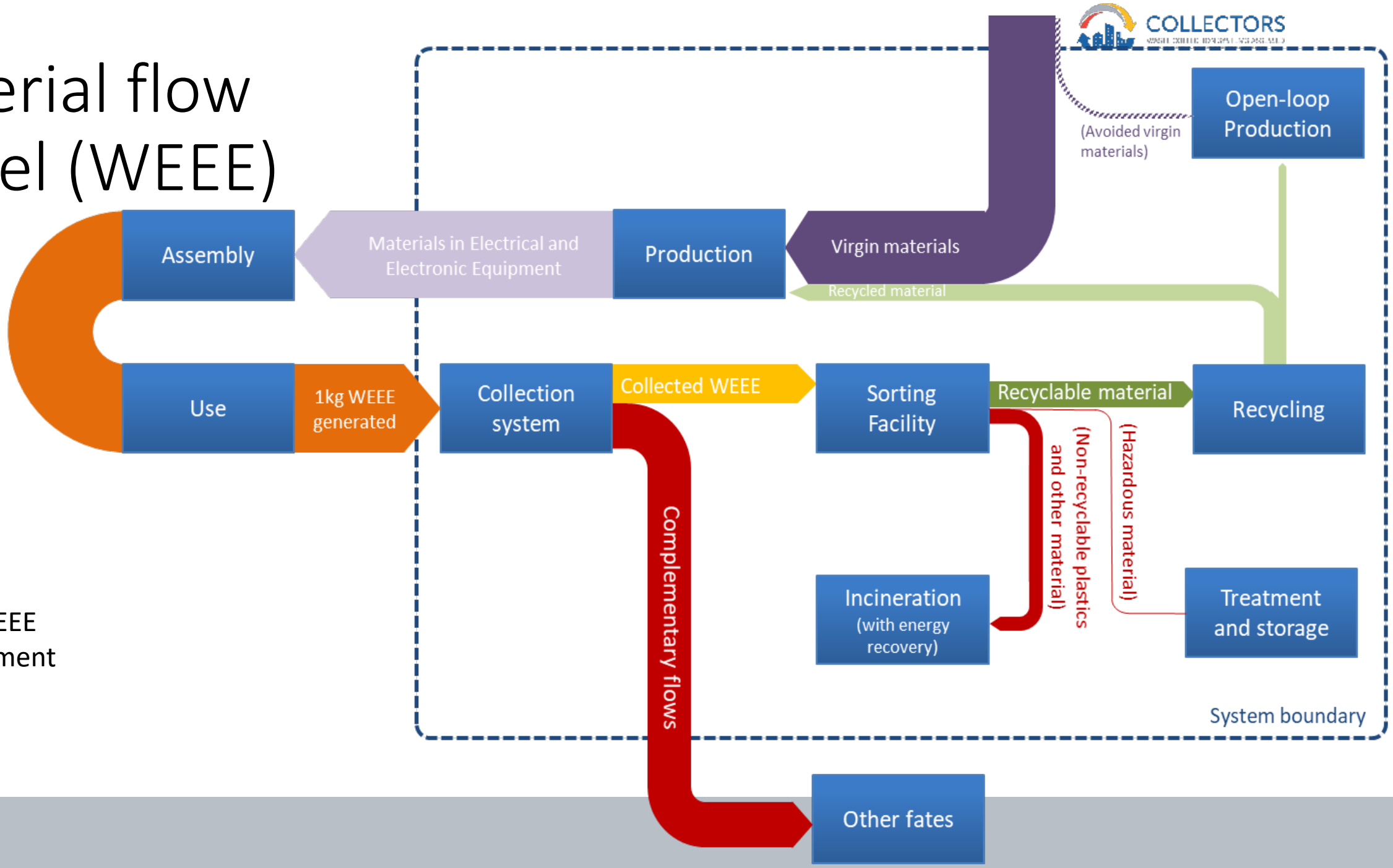
System boundaries



Data sources and model outputs

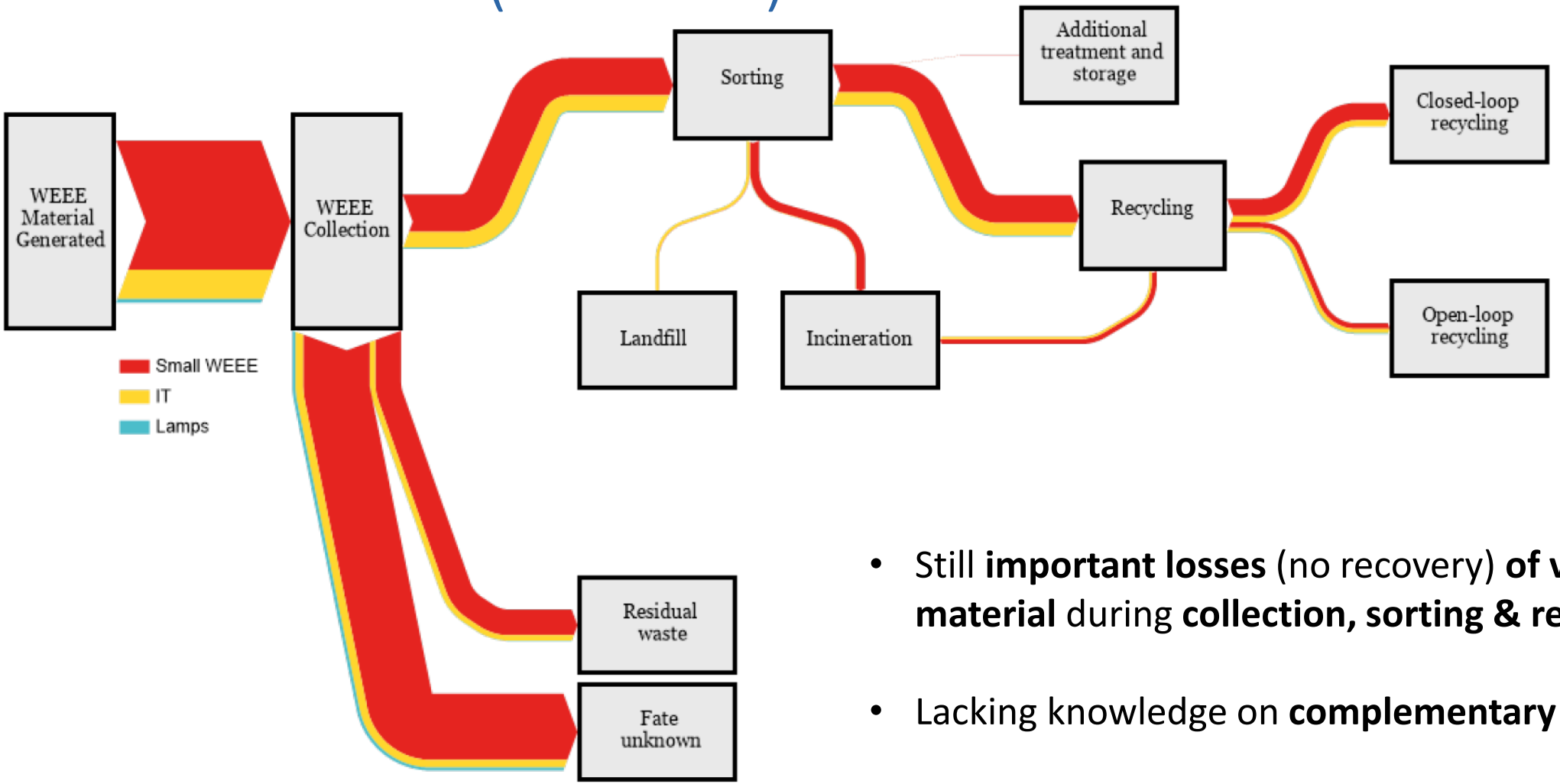


Material flow model (WEEE)



- Small WEEE
- IT equipment
- lamps

Material flows (Helsinki)



- Still **important losses** (no recovery) **of valuable material** during **collection, sorting & recycling**
- Lacking knowledge on **complementary flows**

Impacts and sensitivity of capture rate (Helsinki)

Collection and sorting:

- have low direct impact
- yield indirect environmental benefits

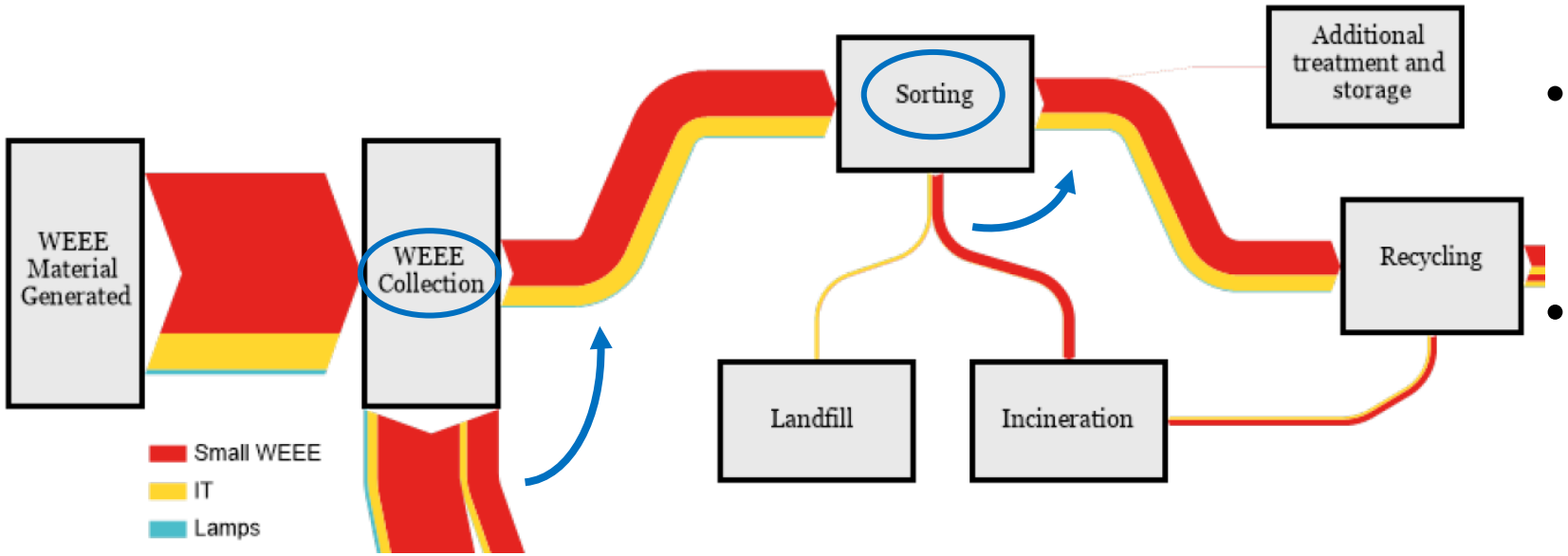
Improving capture rate can lead to significant environmental benefits

Factors limiting environmental benefits:

- Downstream recovery efficiency
- Impacts generated during recovery

Role of complementary flows unclear (real environmental impact probably higher)

Sensitivity analysis



Change in **climate change impacts** per kg when **losses are reduced by 10%** in each step (Helsinki):

Parameter	small WEEE	IT	Lamps
Capture loss	-1.19%	-0.61%	-2.25%
Sorting loss	-2.33%	-1.70%	-1.57%
Gross total	**-3.76%**	**-2.48%**	**-3.97%**

- Identification of «bottlenecks» along the recovery chain
- Joint improvements yield higher benefits than the sum of the individual improvements
- ➔ i.e. collection, sorting, recycling, substitution efficiencies should be improved *jointly* – life cycle perspective

Conclusions

- Collection phase has *low direct*, but *high indirect* environmental relevance

➔ Losses during collection, sorting, and recycling should be further minimized

- Increasing re-use can yield high environmental benefits

Limitations

- Only material inputs to EEE production considered (not production processes)
- Complementary flows (e.g. storage or exports):
  - Have environmental consequences, but these are difficult to quantify
  - Need to be further studied and reduced where they are detrimental