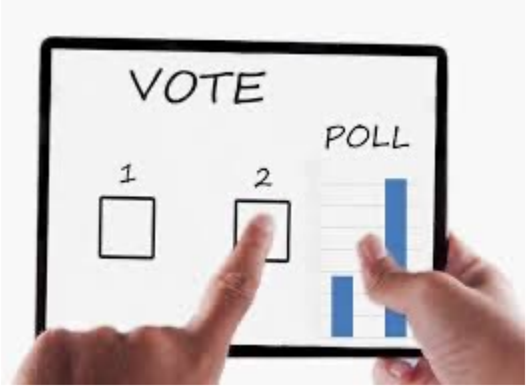
POLL

The carbon emissions for glass bottles are significantly lower than PET bottles

- True
- False

VOTE

Thank you for participating in the poll – we will revisit the results towards the end of the presentation



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Carbon footprint of glass vs. PET

Presented by Dr Aneé Sieberhagen

Nampak R&D

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Agenda

This presentation will highlight

- the objectives;
- the scope;
- the approach; and
- findings of the study.

Objective

- Choosing between glass and polyethylene terephthalate (PET) bottles for beverages in terms of environmental impact is complicated

- In 2019, Nampak Rigids, together with Safripol wanted to obtain an understanding of the carbon footprint of glass vs PET
  - Glass seen as the major competitor for PET

- Commissioned a study and used a consultancy firm to provide an ***independent calculation*** of the carbon footprint of glass and PET bottles

Scope of the study

- A sample of glass and PET bottles were selected based on their volume, for comparison

- Although the bottles have the same capacity, they are not necessarily interchangeable as the intended use, option to refill or reuse, is unique

Scope of the study — bottles included

1.5L glass vs returnable PET

760g

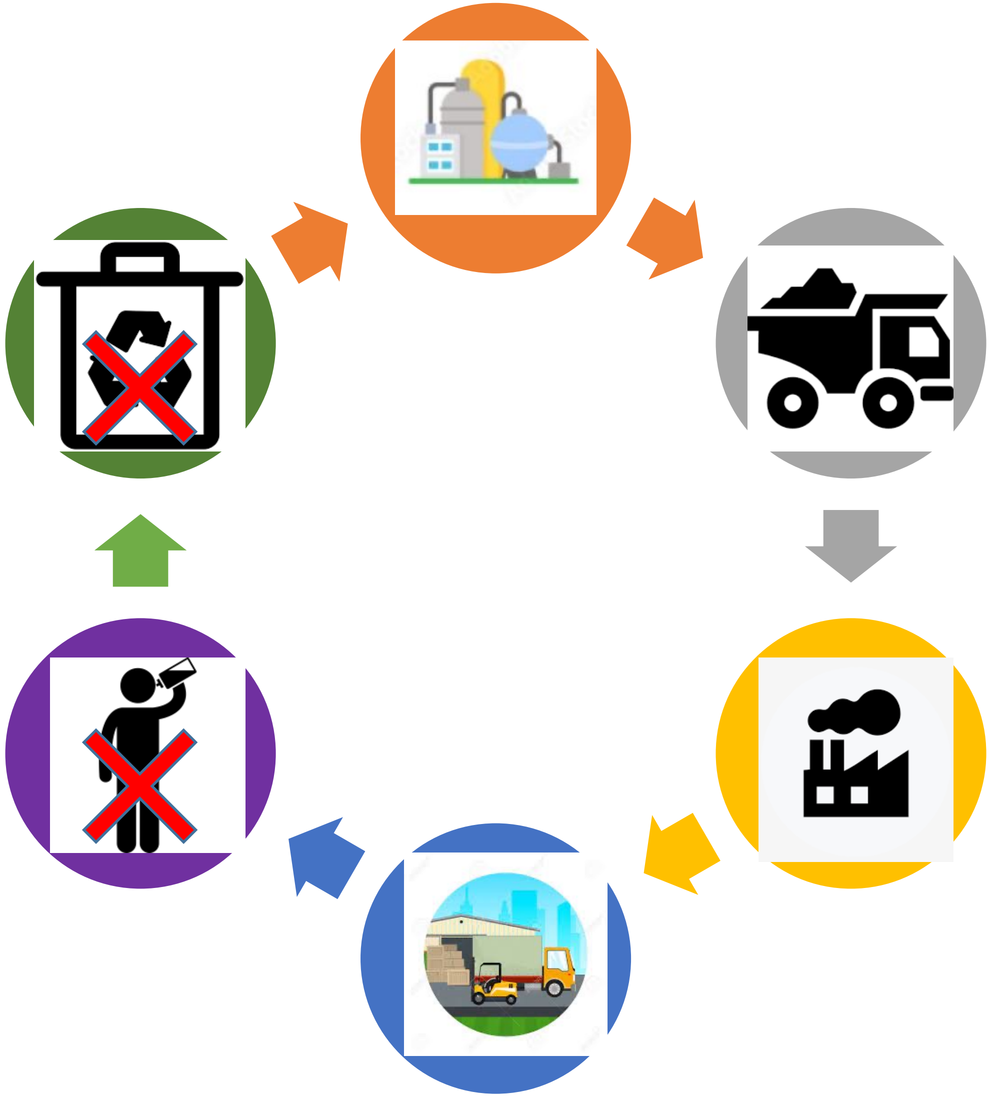
104g

500ml glass vs PET bottle

299g

21g

Scope of the study - cradle-to-gate LCA



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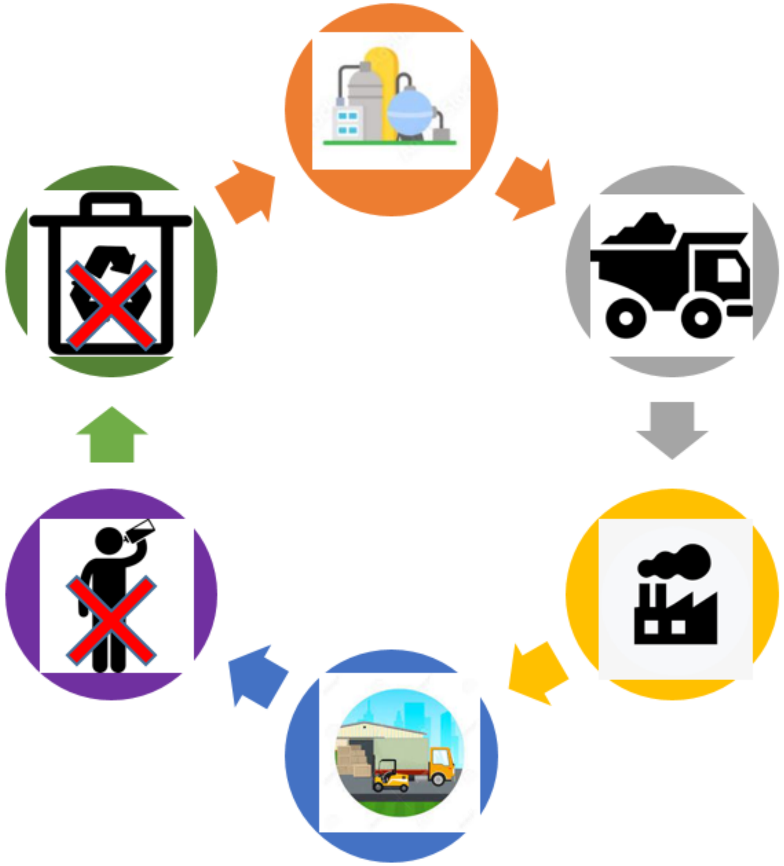
Scope of the study - cradle-to-gate LCA

- Comprised of a cradle-to-gate life cycle assessment of the selected bottles
- Cradle-to-gate is an assessment of a ***partial*** product life cycle from raw resource extraction (*cradle*) to the factory gate (i.e., before it is transported to the consumer). The use phase and disposal phase of the product are omitted in this case
- In this study transport to the warehouse and wholesale customer for filling was included



Approach

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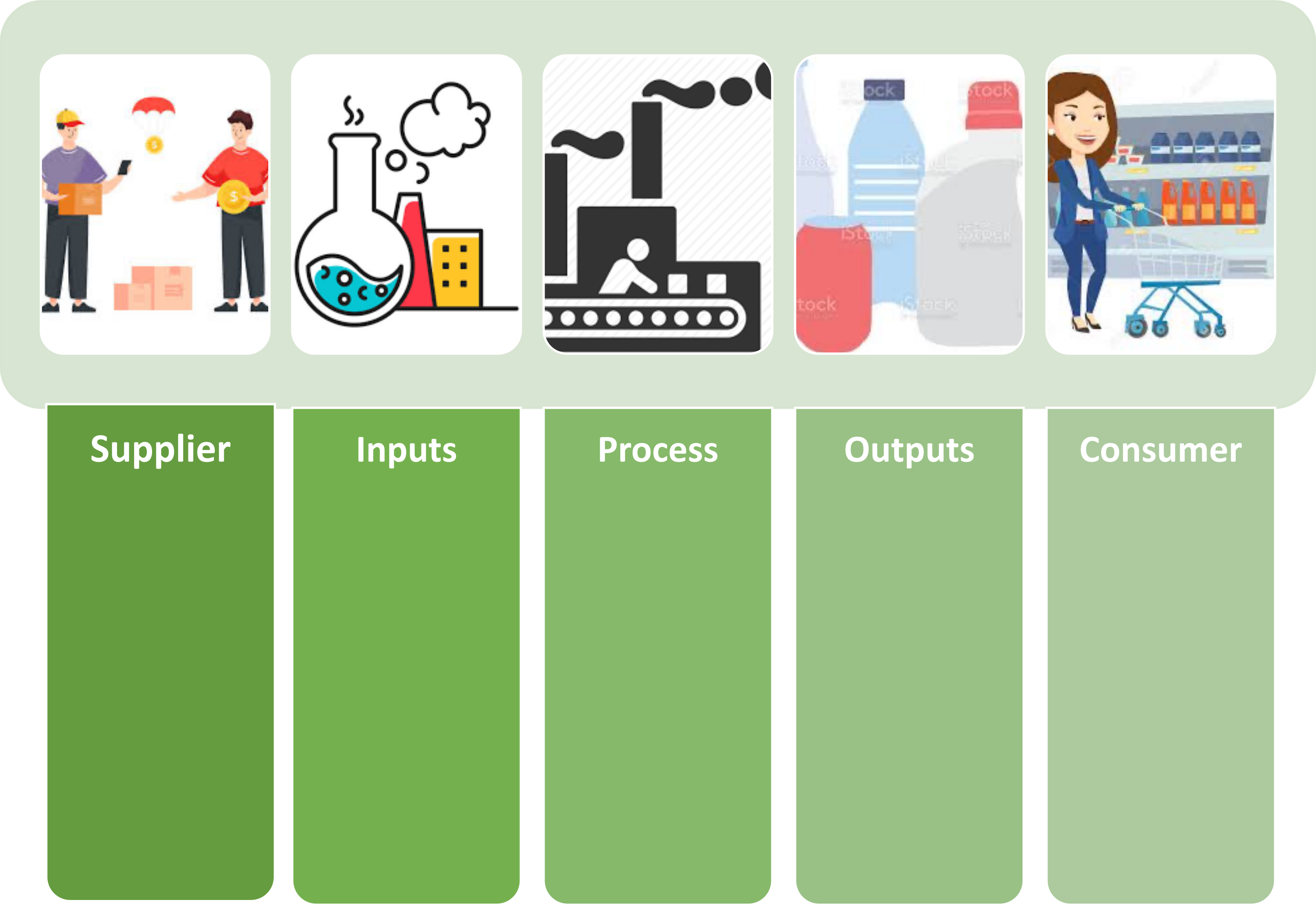
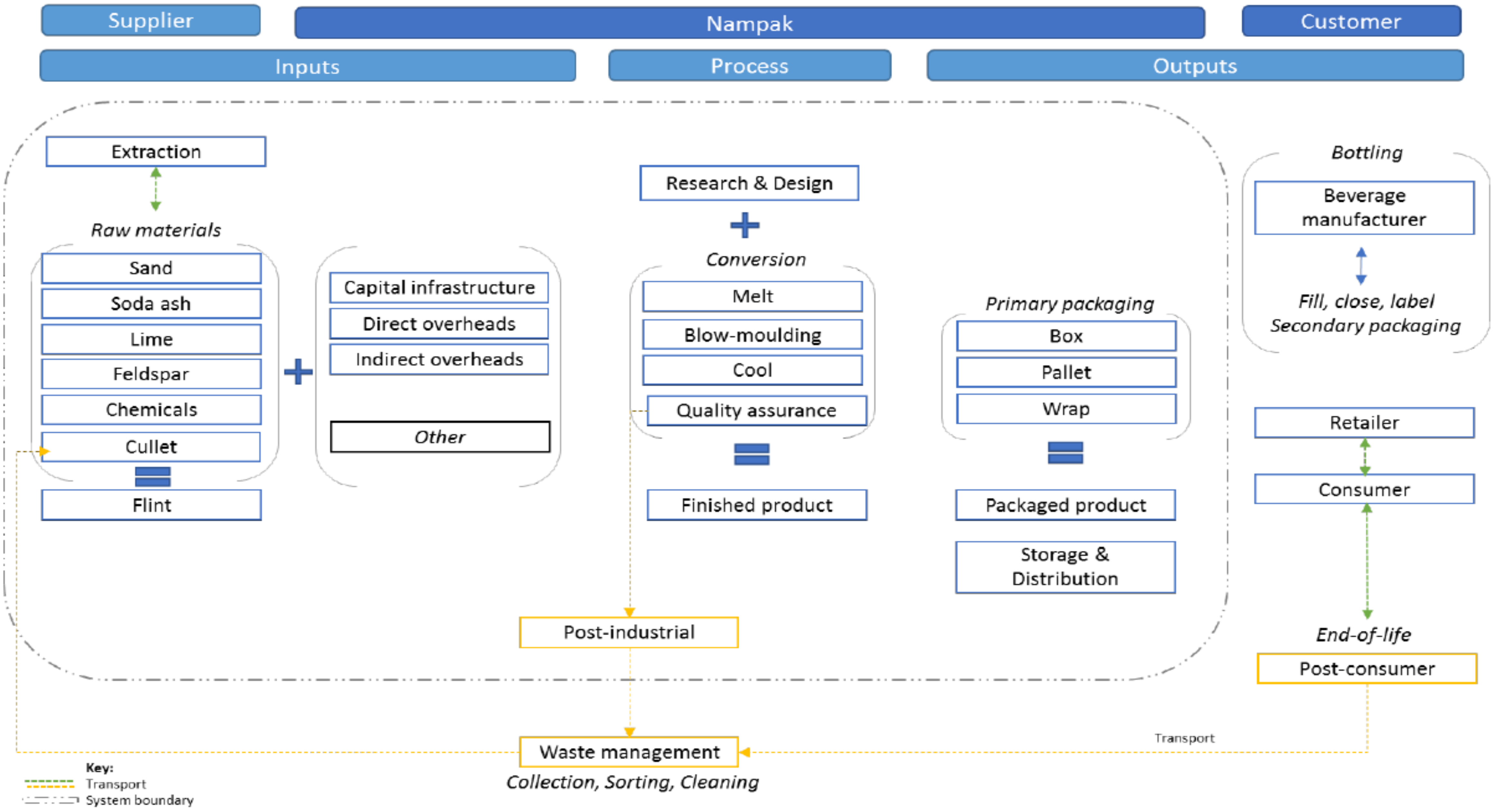
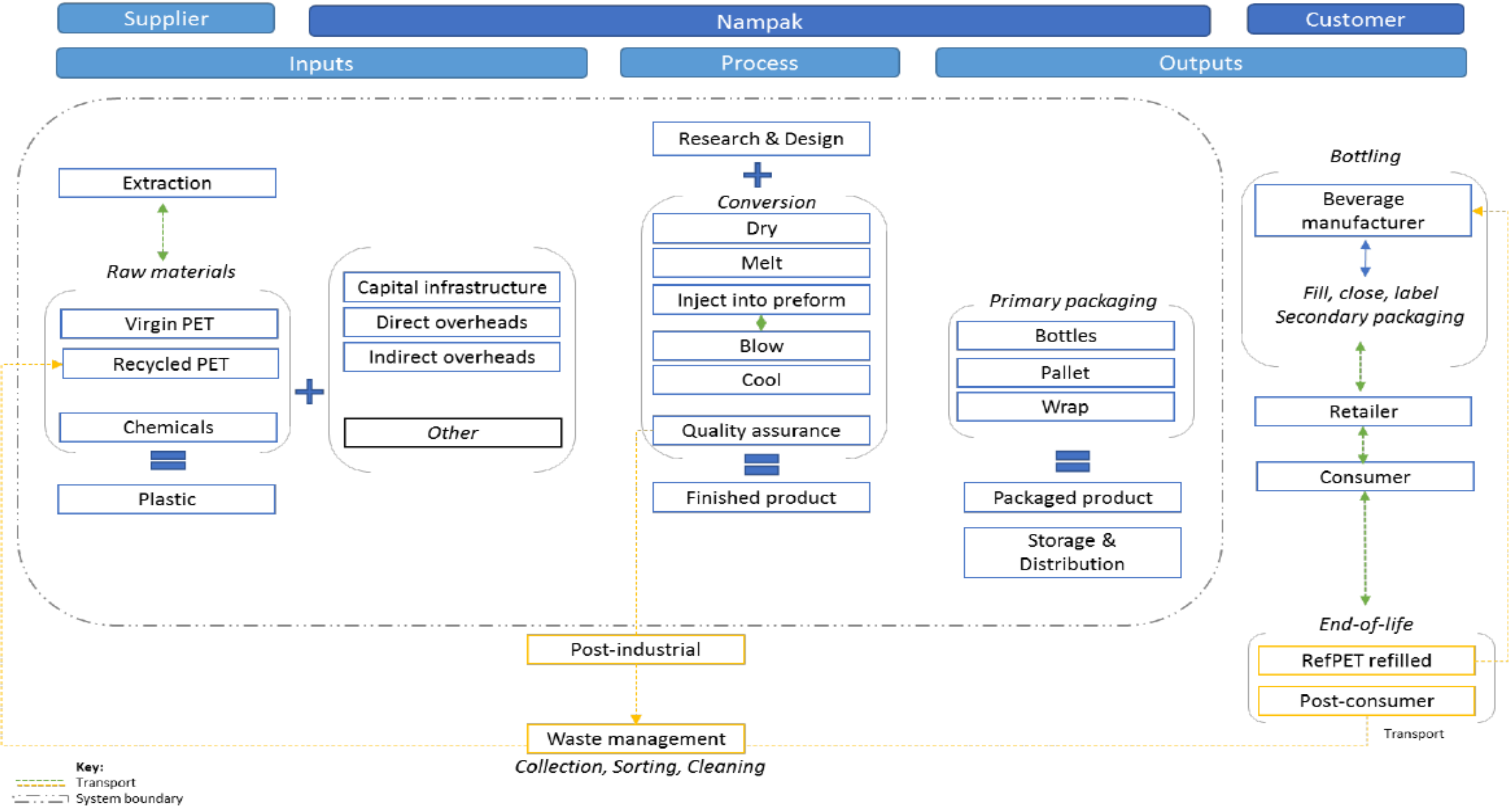
- Documented the manufacturing process using SIPOC methodology - aligned to the cradle-to-gate LCA



SIPOC of glass



SIPOC of PET and returnable PET



Approach

- How?
  - Brainstorming
  - Review of existing process information
  - Interviews
  - Plant visits
  - Research
  - Data collection
    - Nampak’s enterprise resource planning platform JD Edwards
    - Financial records
    - Production volumes
    - Energy usage
    - Wastage rates
    - Suppliers
    - Method of transport

Approach

- Each of the elements of the SIPOC was assigned a cost and carbon footprint

Cost

- Bill of Materials (BOM) – raw materials
- Manufacturing costs, overheads

Carbon emissions – calculated using the guidelines in the GHG Protocol

- Scope 1 – **direct emissions** are those from activities owned or controlled by the company, for example, emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.; emissions from chemical production in owned or controlled process equipment
- Scope 2 – **energy indirect** emissions generated by purchased electricity consumed by the company
- Scope 3 – **other direct** – an optional reporting category that allows for treatment of extraction and production of purchased materials – sources not owned or controlled by the company scope 3 activities are extraction and production of purchased materials; transportation of purchased fuels; and use of sold products and services

Findings - CO_2 emission calculated per bottle

1.5L glass vs returnable PET

853.32g

427.58g

500ml glass vs PET bottle

335.29g

85.11g

Findings - Carbon emissions and manufacturing cost

1.5L glass vs returnable PET

760g

104g

7% More cost effective

50% Less carbon emissions

500ml glass vs PET bottle

299g

21g

64% More cost effective

78% Less carbon emissions

Findings

The study found that it is more cost effective to manufacture a 1500 mℓ (1.5 L) returnable PET bottle or a 500 mℓ PET bottle, than the same sized bottles, in glass. The carbon emissions to manufacture returnable PET or PET was calculated to be **significantly** less than that of glass.

Poll revisit

The carbon emissions for glass bottles are significantly lower than PET bottles

- True
- False

VOTE

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THANK YOU

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