

Life Cycle Thinking for a Circular Economy

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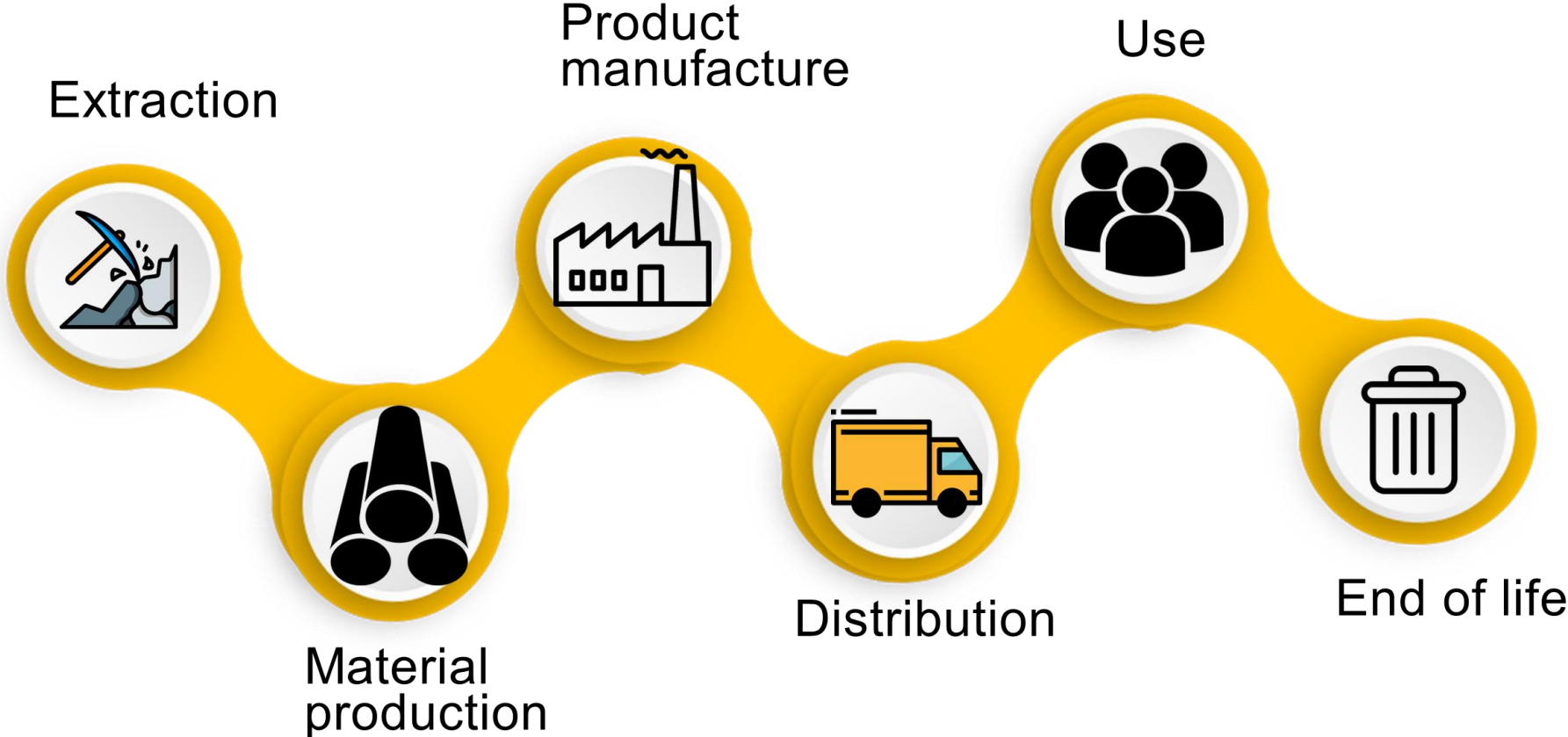
King Mongkut's University of Technology Thonburi



Today's Topics

- 1** Linear to circular economy
- 2** Life cycle thinking in a circular economy
- 3** Stakeholders in a circular economy

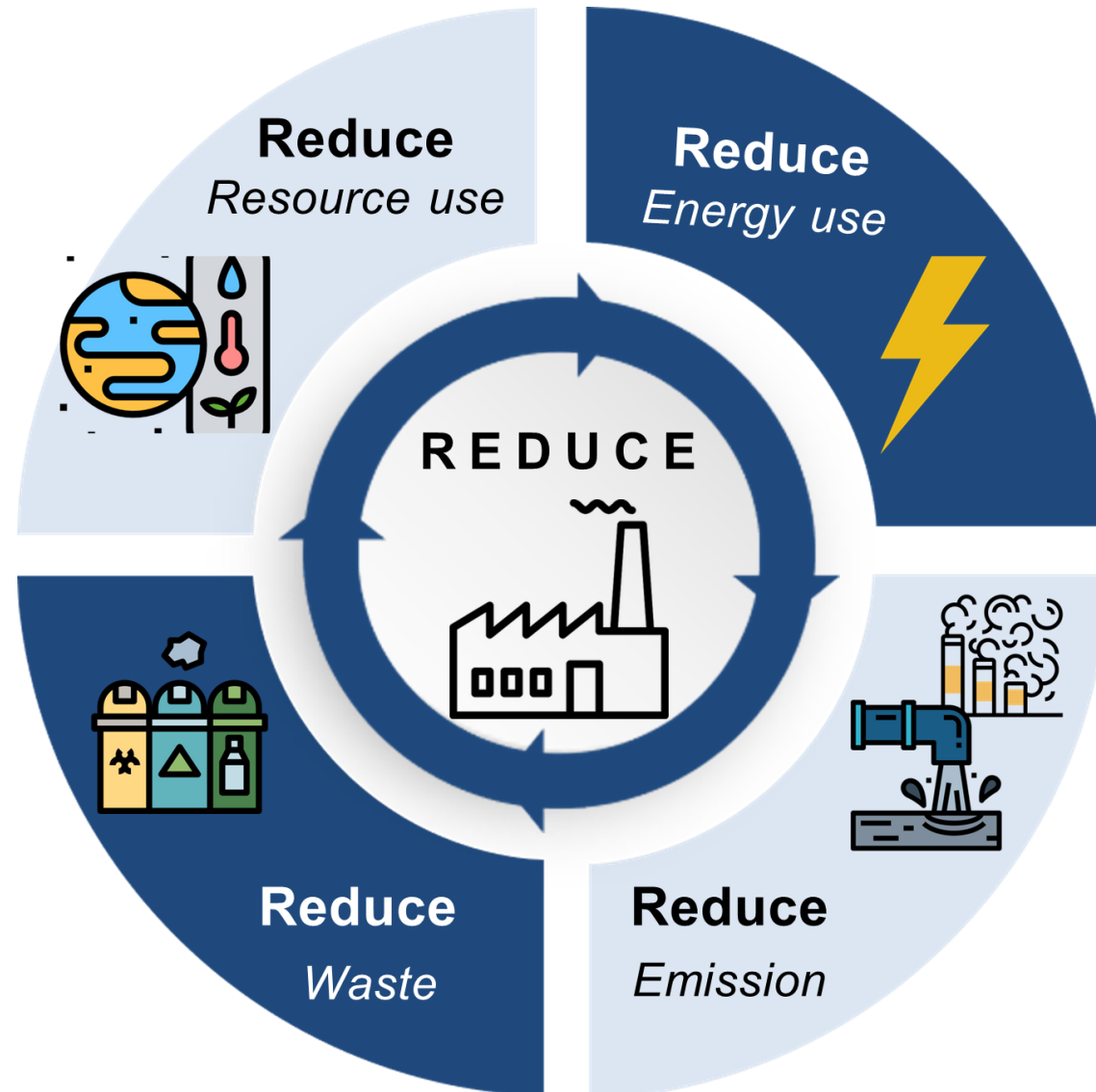
Linear economy



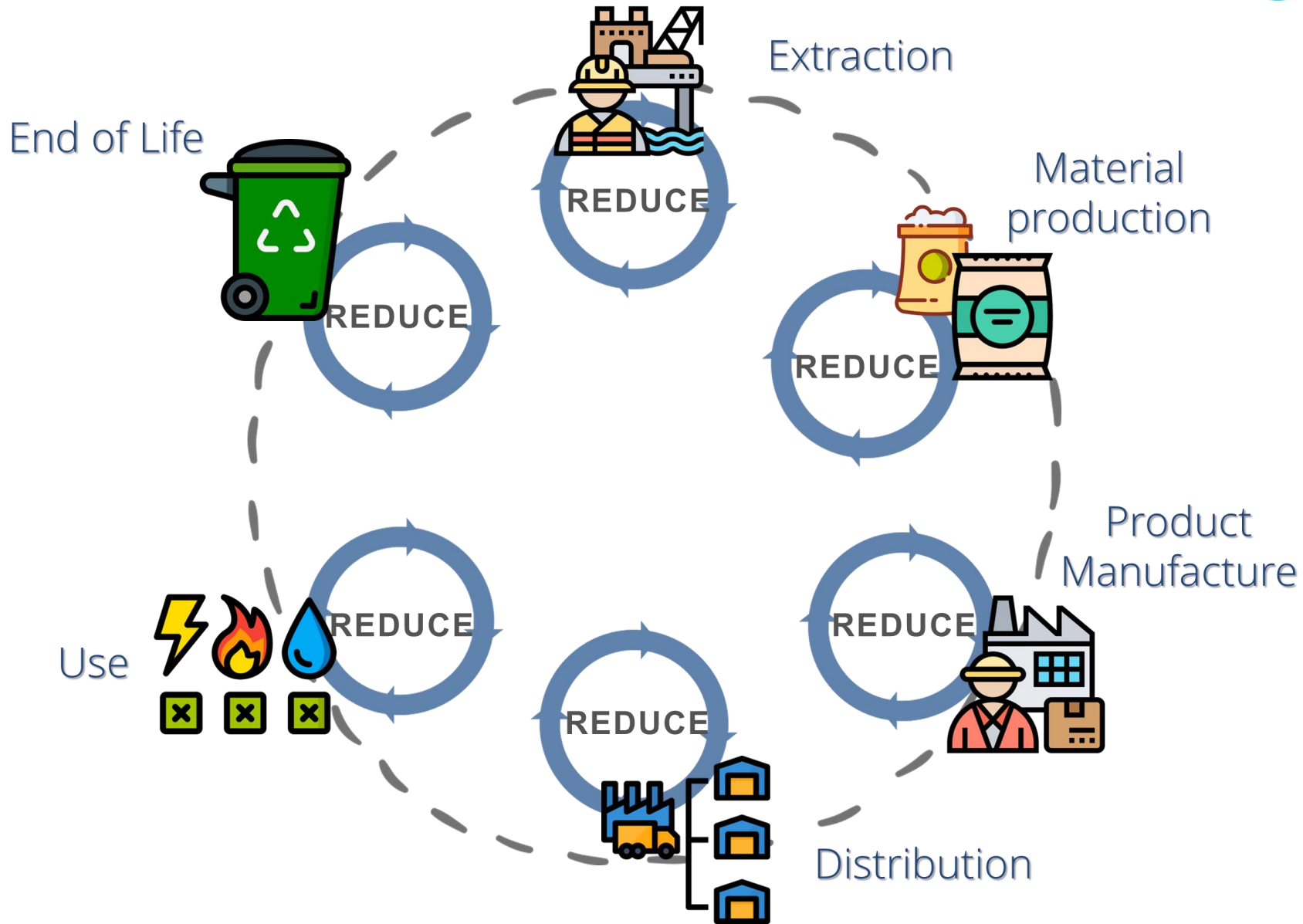
Take → Make → Use → Throw

End of pipe treatment → Money down the drain

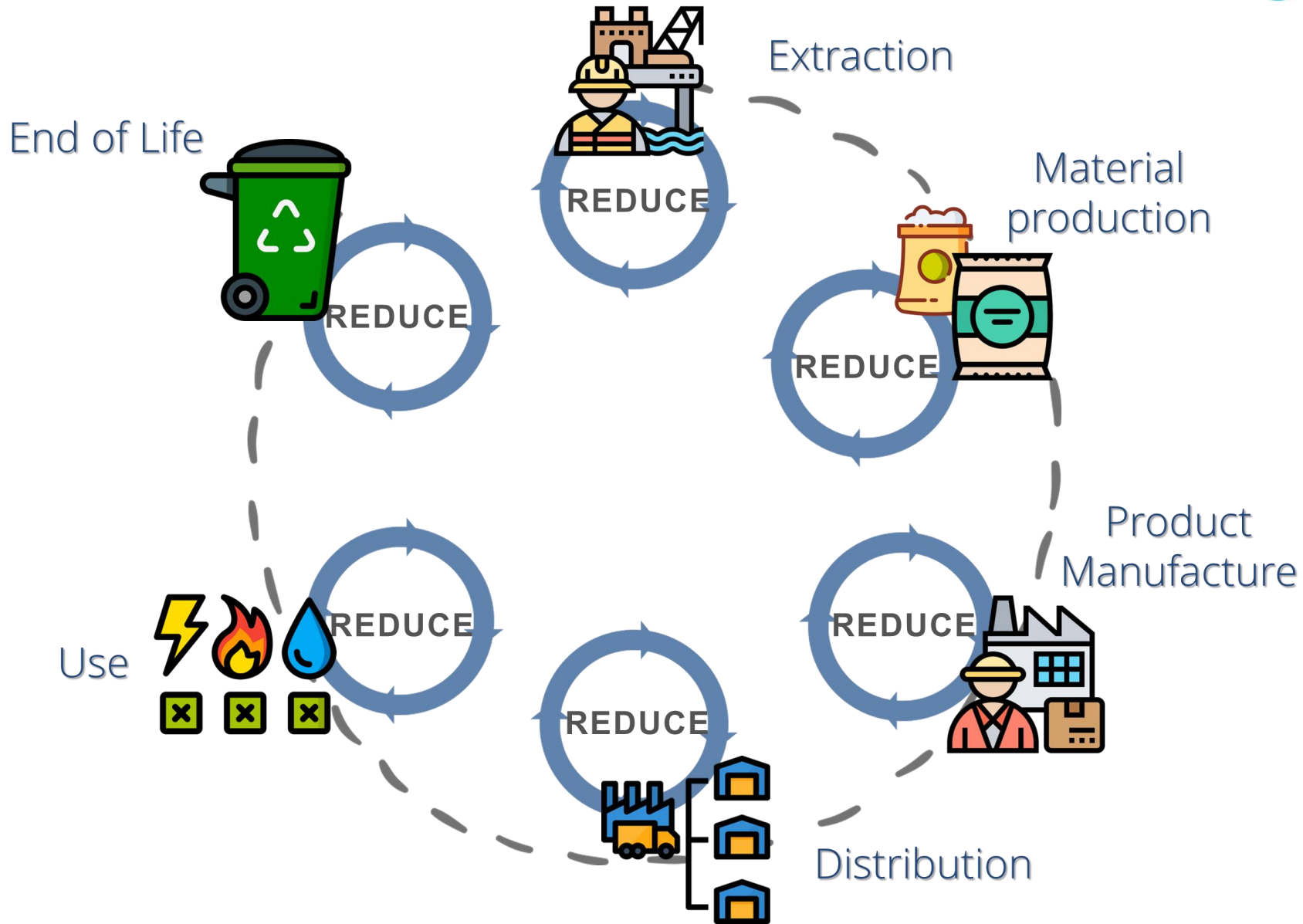
Cleaner Production



Life cycle thinking



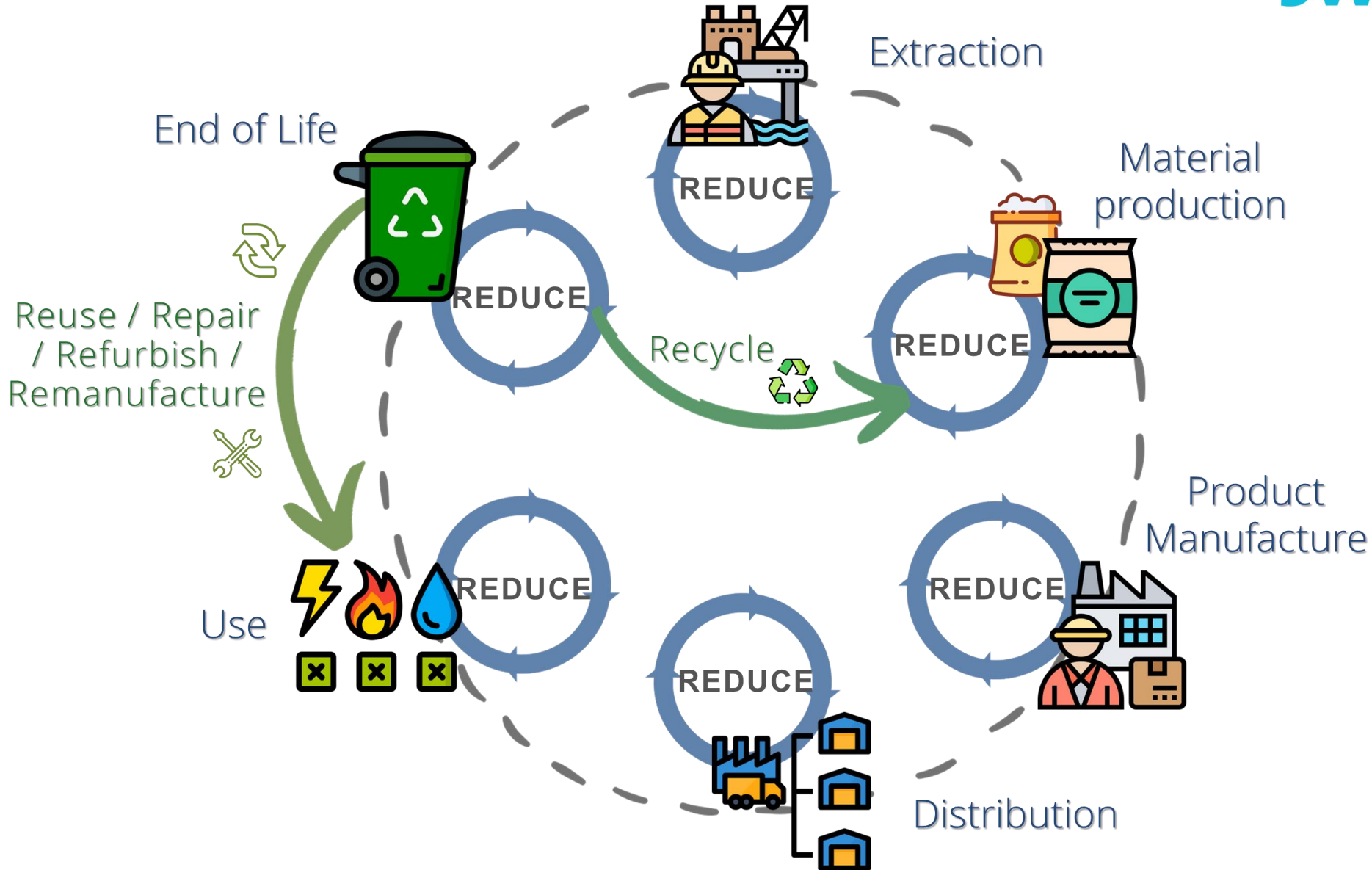
Actual product life cycle



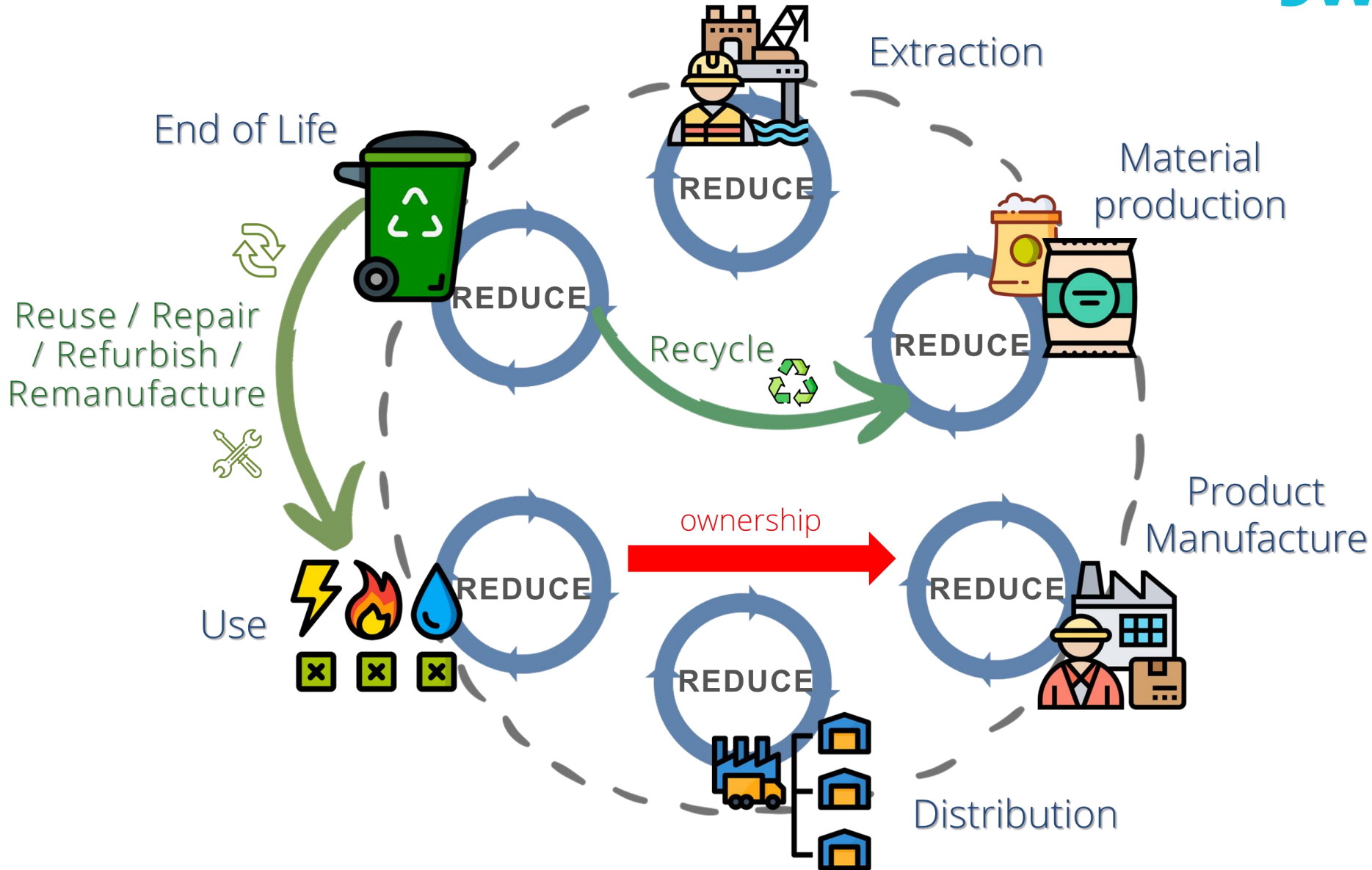
Circular thinking



Circular thinking



Circular thinking



Stakeholders in a circular economy

Owner-user:

repair / resell / donate

Owner-manager of used goods:

dismantle used objects / re-market components

Salesperson / distributor (logistics):

Repair / takeback

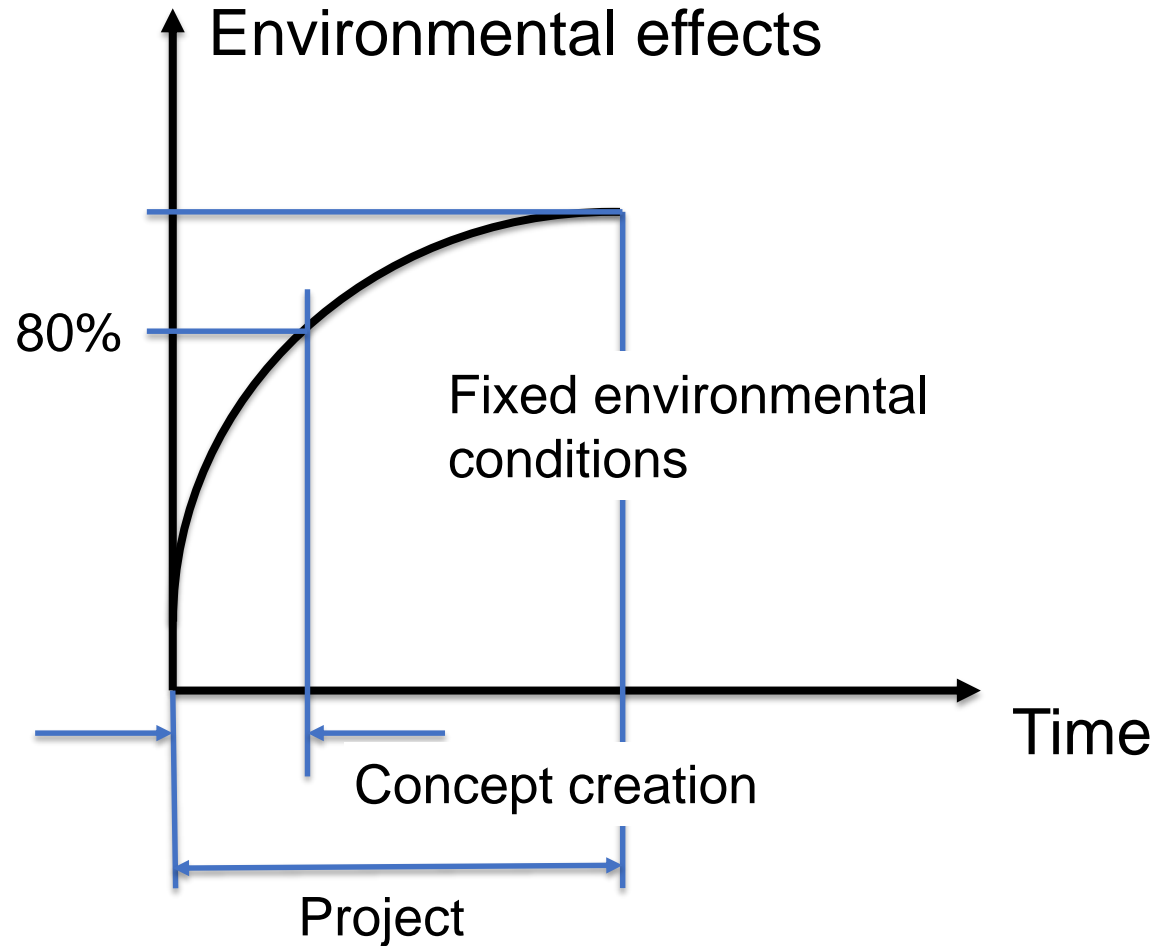
Policymaker:

Legal instruments to facilitate/induce/support circular economy

Producer as service provider

Repairer / Recycler

Adapted from: Stahel (2019) The Circular Economy: A User's Guide



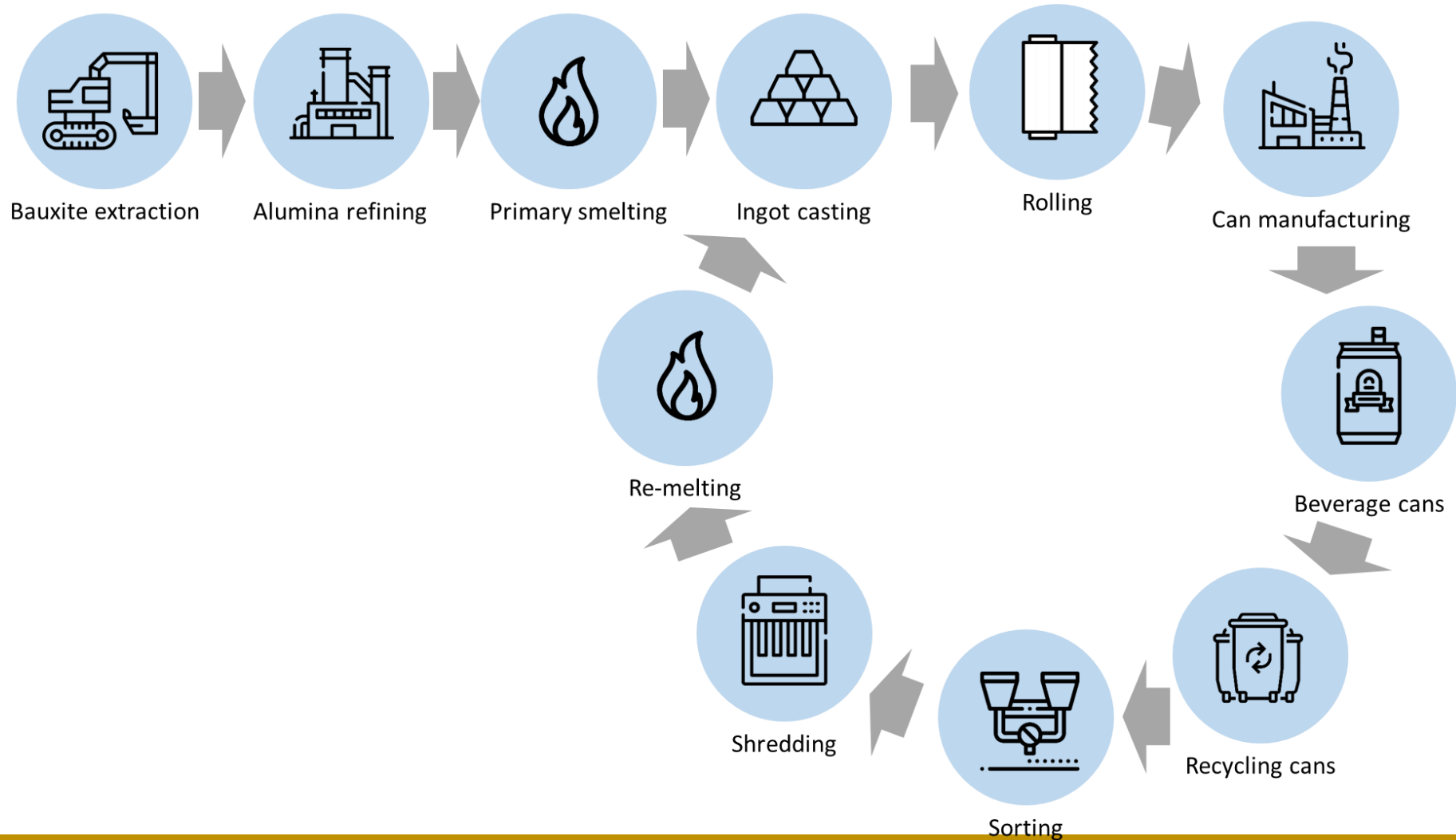
Approx. 80% of a product's environmental profile is fixed under concept creation in product development

McAloone and Bey (2009) Environmental improvement through product development: A guide, Danish Environmental Protection Agency

Recycling should not be an afterthought



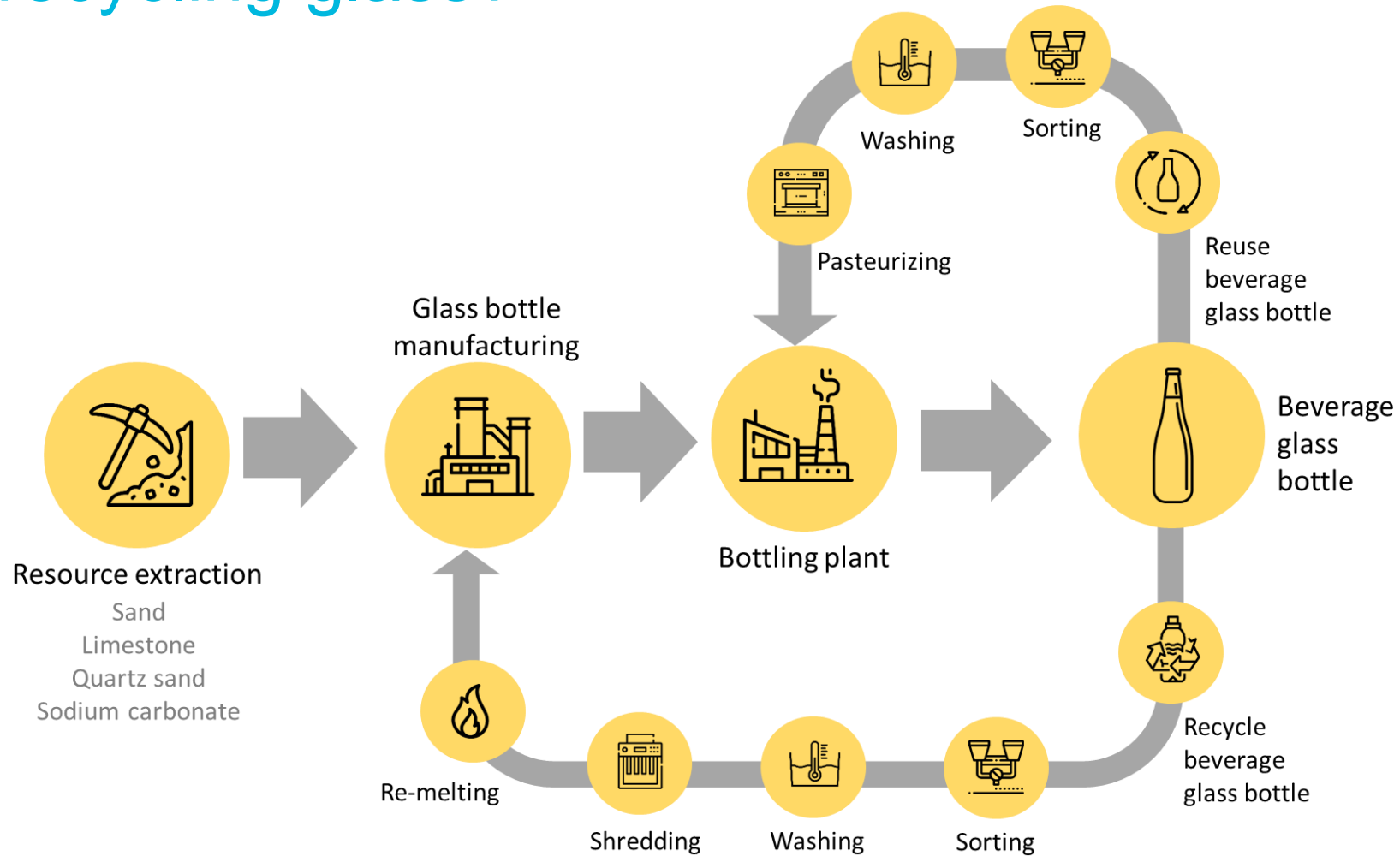
What is the consequence of recycling aluminium?




**LIFE CYCLE
OF THE
ALUMINUM
CAN**



What is the consequence of reusing/recycling glass?



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**LIFE CYCLE
OF THE
GLASS
BOTTLE**

To Rent or Not to Rent: A Question of Circular Prams from a Life Cycle Perspective

Piya Kerdlap, Shabbir H. Gheewala, Seeram Ramakrishna

Published in Sustainable Production and Consumption
(DOI: 10.1016/j.spc.2020.10.008)



Study objective

Quantify the life cycle environmental impacts of owning versus renting prams for children in Singapore for 5 years

Climate change: Measure the prams' greenhouse gas emissions into the environment

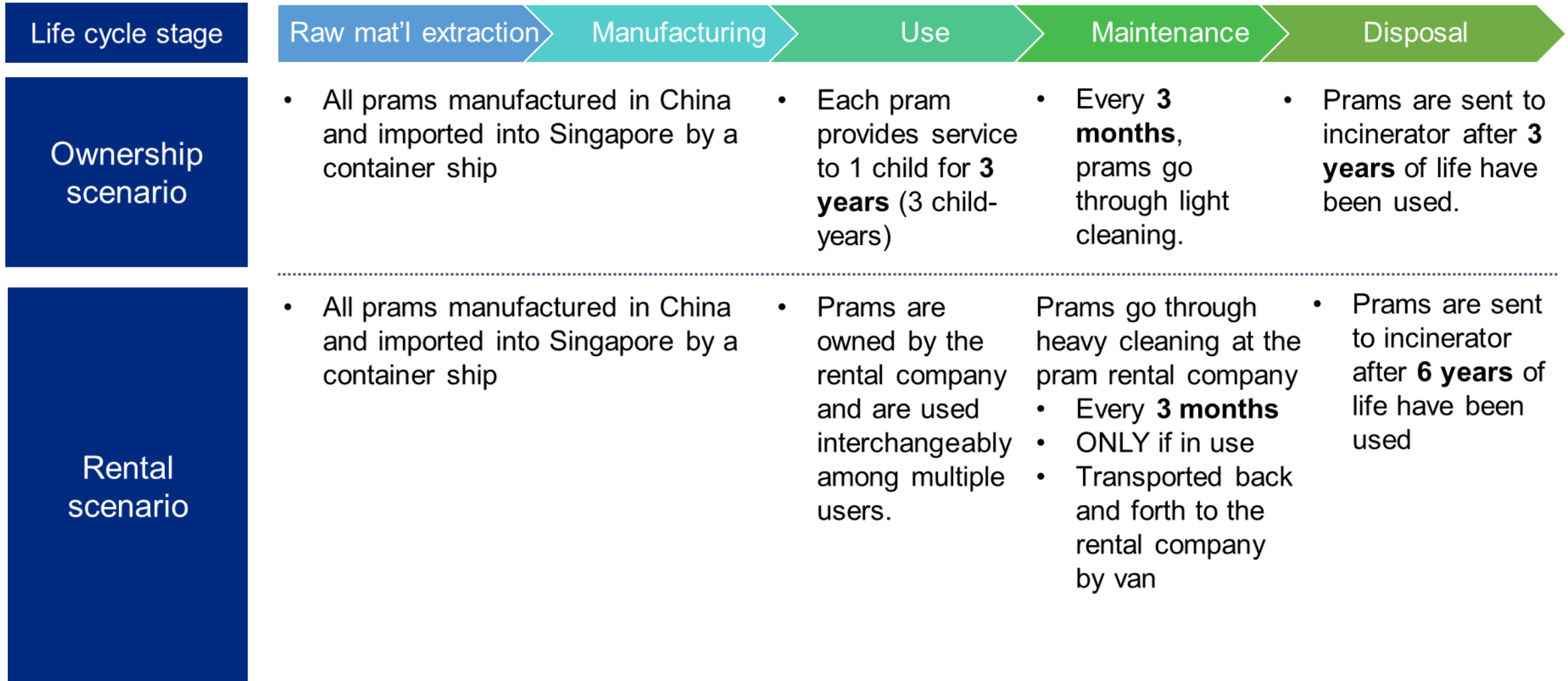
Fossil depletion: Measure energy resources used by the pram business models

Metal depletion: Measure the material requirements of the pram business models

Water depletion: Measure the water requirements of the prams from all activities such as washing



Scenario definition



When to rent? Users should rent prams if the alternative option is to own a pram, use it for only 3 years, and immediately dispose it.

How much cleaning? When sending rental prams for heavy cleaning, it is recommended that users do this no more than once per month (12 times per year). If possible, sending the pram for heavy cleaning no more than once every 3 months (4 times per year) would further reduce the impacts of rental prams.

What if I still want to own a pram? Those who still choose to buy and own a pram can reduce their impacts by passing their prams onto another parent or a company that can refurbish it for use as a rental pram.

Best scenario for the environment? Passing prams onto second users is the best scenario. Practicality of finding a second-hand use; tedious or time-consuming to bring the pram to a shop or person who will accept it.

Is it okay to have more rental prams in stock than required? The LCA results showed that having a fleet of rental prams that is larger than the demand does not have greater impacts than the traditional business model, so long as the remaining life of rental prams are fully utilized by other customers in the long term.

How can a pram rental company reduce its impacts? The best option is to reduce the number of cleaning cycles done each year. This is ideal environmentally but may be impractical from a customer service standpoint:

- Unlike the prams owned by customers, pram rental companies have to ensure quality control of prams since there are multiple users.
- The prams must also be hygienically clean so that users of rental prams are not concerned about the spread of germs between different rental pram users.
- Pram rental companies could consider doing different types of cleaning for certain conditions. Light cleaning, where only water, cleaning agents, and air drying is required, could be done for rental prams that are returned in good condition. Heavy cleaning could be done for prams that are returned stained or damaged.

Policy intervention is needed from local government agencies to **facilitate nationwide pram reuse**.

The main objectives of policies and programs should be to ensure that the **useful life of prams is extended** for as long as technically possible.

A government agency could form partnerships with different pram rental companies. The government agency could help **identify sources of used prams** and connect their owners with pram rental companies. The pram rental companies would be responsible for **refurbishing prams** back to a good-as-new condition.

This same government agency could be given the authority to **certify second-hand prams**. The government's certification of refurbished prams could improve customer confidence in the quality of second-hand prams.

Healthcare agencies and reputable parenting organizations could play a role in **facilitating the circularity of prams**.



Funded by the
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Thank You 

