

To design a sustainable milk packaging for daily consumption of the Indian households.

The aim was to look at milk packaging and delivery system and come up with a solution which can replace plastic and can make the whole process sustainable. We started with understanding the landscape, followed by analysis & concept generation to come up with a new packaging and a proposed service to incorporate it in the current delivery system.



Project entry selected as one of the top 16 finalist student team project to represent India in the India-Australia Circular Economy Hackathon.

Problem area



The current milk packaging is highly unsustainable. Even though the material is recyclable, the small quantity of material/pouch makes it uneconomical.



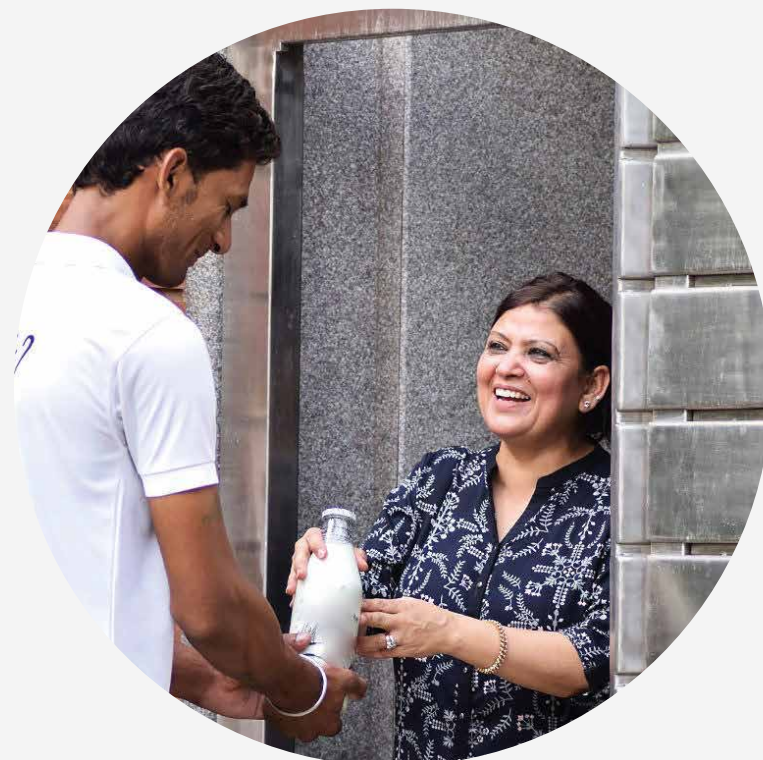
The method of opening (triangular cut-outs) the package also creates a lot of pollution and poses a danger to marine life.



The packaging is produced in high volumes, hence creating a huge impact. (India alone will produce approx. 33 x 10 kg of milk packaging in 2033)



The industry works on very tight margins. The solutions proposed need to match their costs upto the PE pouches to be accepted by the users.



People have a very firm mental model regarding the delivery of milk and the materials that it can come in.



All possible stakeholders are working as individual units without much communication and collaboration.

Why Sustainable Packaging ?

Sustainability is a very important factor considering the imbalanced consumption patterns that we display today. Hence, this project was an opportunity to design with responsibility. We decided to tackle the problem of the current PE milk pouches that are extremely cheap and a common-site around India. We wanted to create something that is just as affordable yet less wasteful.



Stakeholders



End-Users (Middle-income Indian families.)

About :

1. Very conscious about money and spending.

Pain Points :

1. Do not readily accept price fluctuations in daily-use commodities.
2. Find it hard to open the plastic pouches that often leads to spills and wastage.



Dairies

About :

1. Are conscious about environmental impact but avoid greener alternatives due to weight, high cost & damage.

Pain Points :

1. Very strict on price margins.
2. Even a small change in manufacturing cost would reflect in the final price leading to a loss of customers.
3. Cannot invest in excessive maintenance.



Delivery and Service Handlers

About :

1. India has a very well set up delivery channels (for milk and otherwise).
2. These systems already have a good reach within most middle-income Indian households.

Pain points :

1. Need to optimise space in storage cases for affordable transportation.

Design challenge

How might we make milk packaging for daily consumption in India more sustainable in areas of resource consumption and transport, thereby, incorporating circular economy in the process of delivering safe milk.

Methodology

This is the process that we followed for this project.

Desk Research

We started the project off with desk research to understand the current market situation, the current solutions, competition and problems. We also looked at the entire milk production process in depth to understand its nuances.

Sorting and Analysis

We developed a set of parameters based on our research and problem statement against which we evaluated all our concepts. This gave us a final direction for our solution.

Expert Interviews

We followed up our research with interviews with dairy owners and material experts, with whom we discussed the business aspects, feasibility and viability issues and tried to understand the customer aspect. We also engaged with some users via interviews and questionnaires to solidify our understanding.

Material Exploration

We also did a comprehensive material exploration wherein we looked at over 35 materials, conventional and unconventional. For each material, we looked at their life-cycle, properties and carbon foot-print.

Ideation

Once we had a clear hypothesis, we conducted multiple rounds of ideations. Between each round, we kept going back to the research phase and looking into the material aspects whilst trying to keep our ideations free of any bias.

Life Cycle Analysis

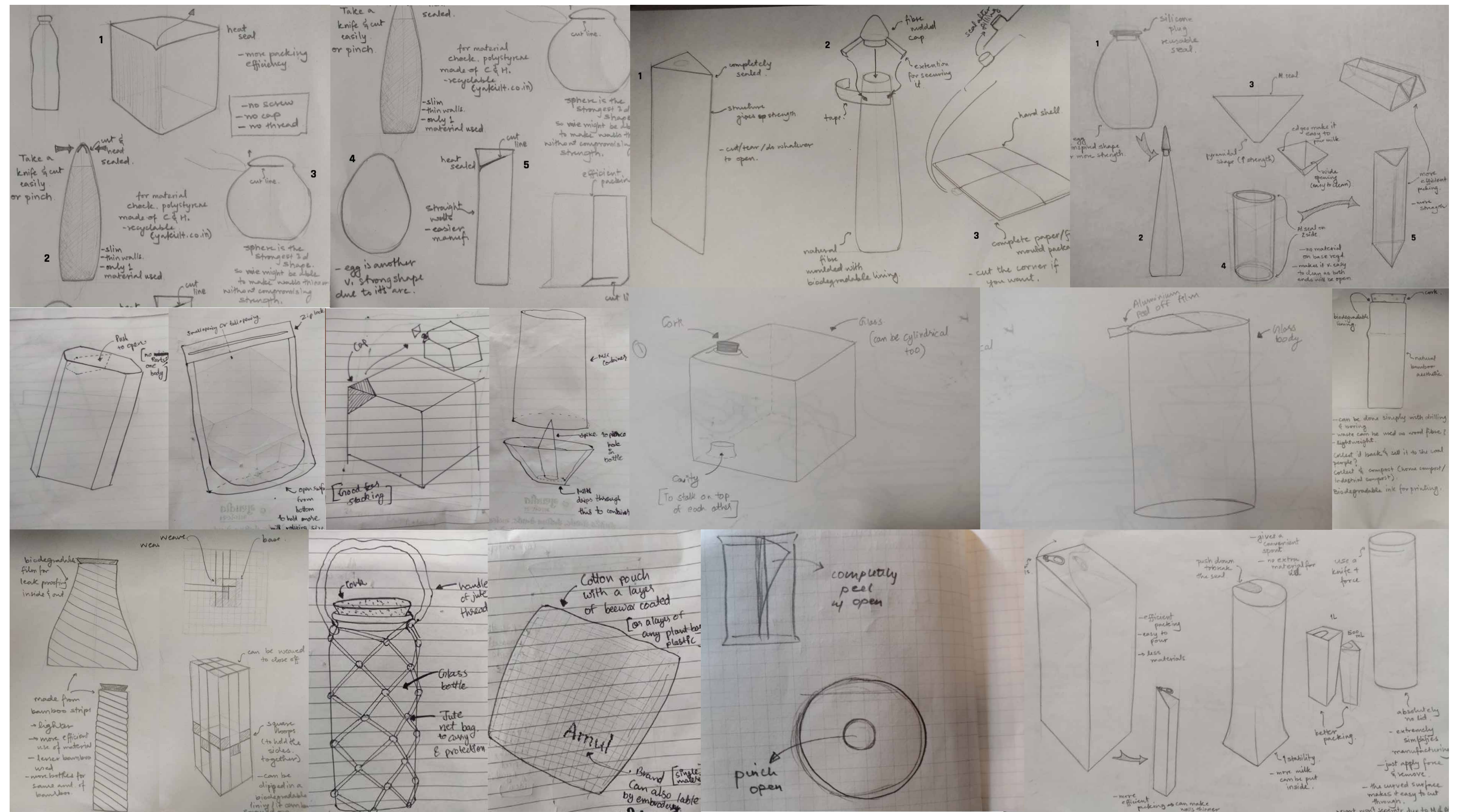
Based on sustainability, safety and costing, we chose 204 grade stainless steel and detailed our solution accordingly. We also did a strength analysis to check for the structural integrity of the packaging.

Ideation

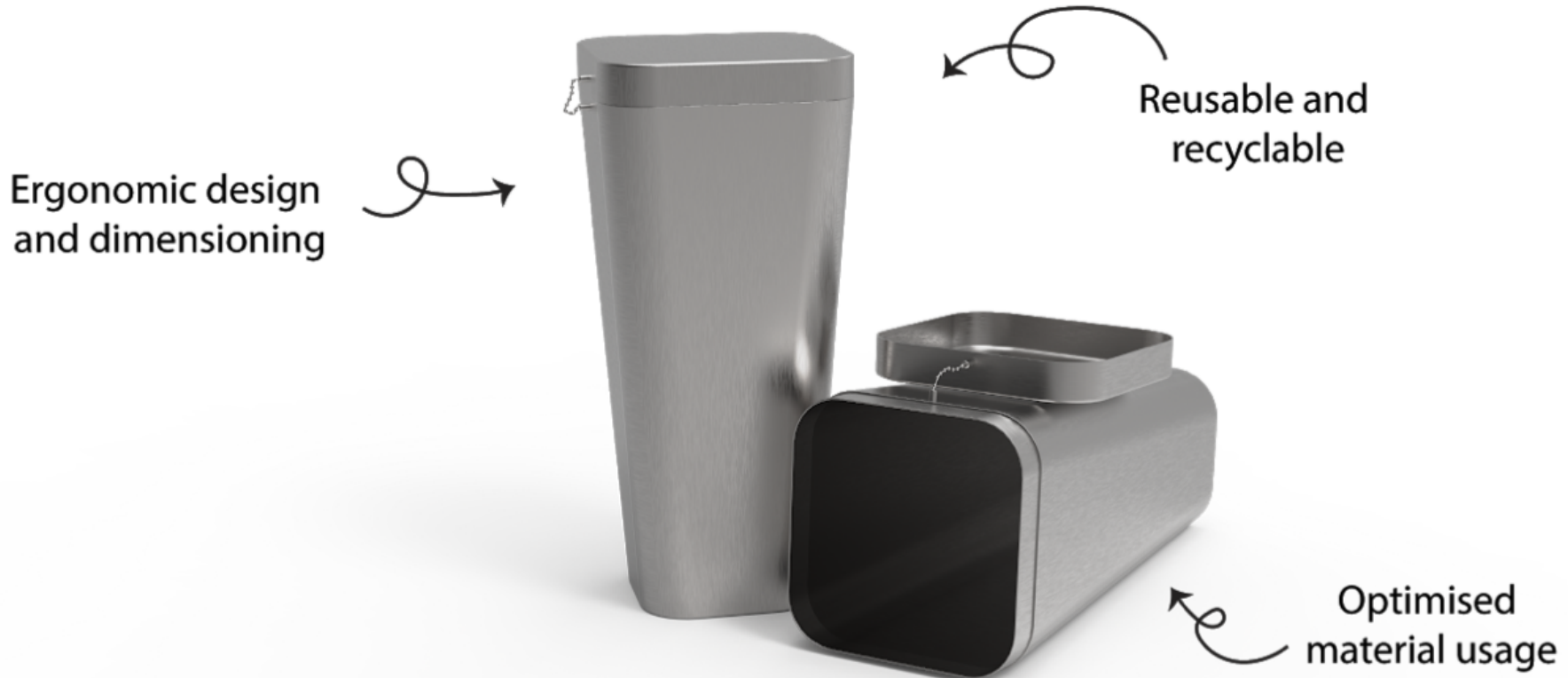
We explored various materials and forms for the required needs of the packaging based on insights that we got from the research.

Areas of Focus

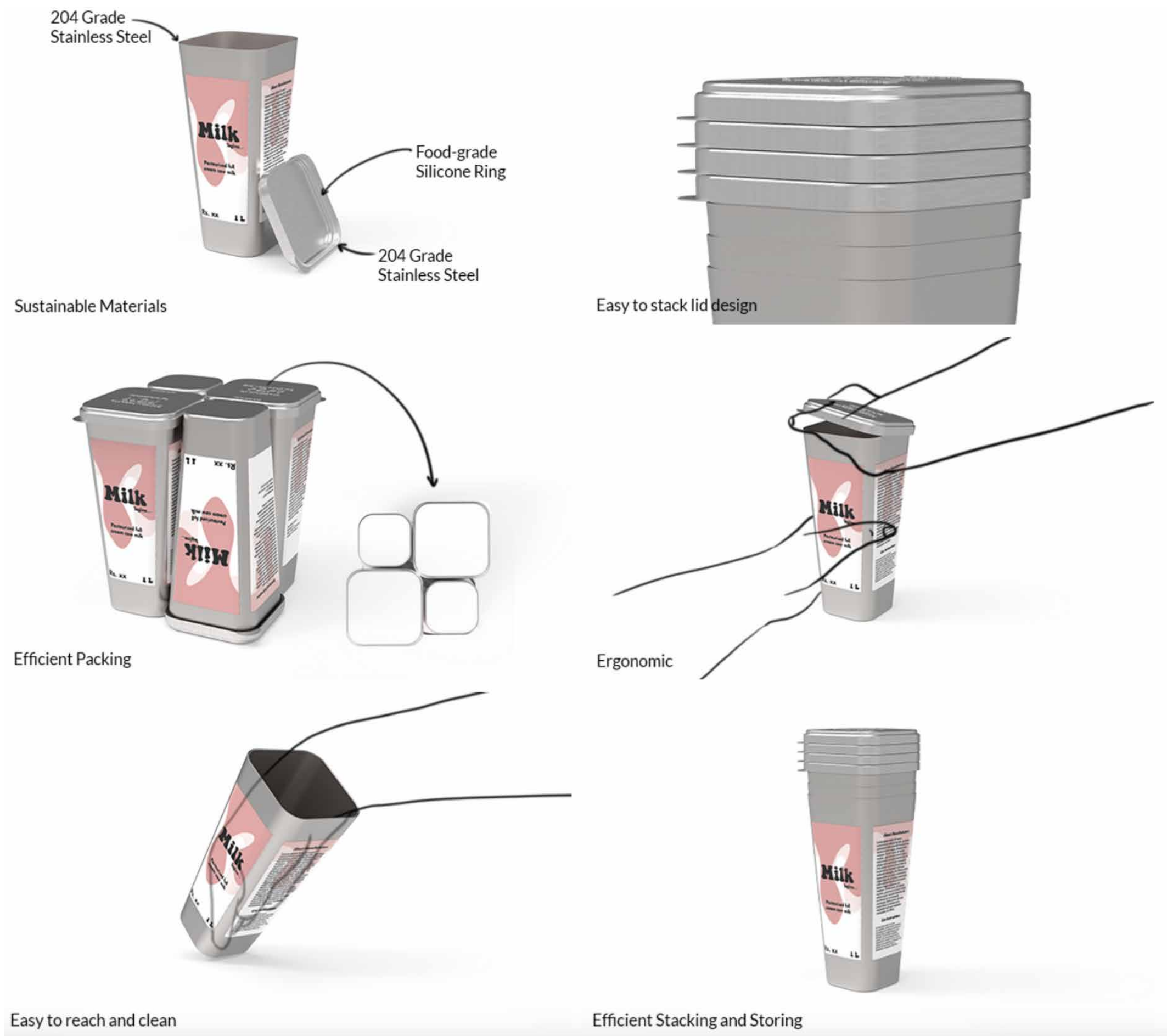
- Material of Packaging
- Consumer Involvement
- Recycling
- Cleaning of Glass Bottle
- Transportation of Milk
- Exchange System
- Form of Packaging & Milk



Solution



(Prototype of a half liter can)



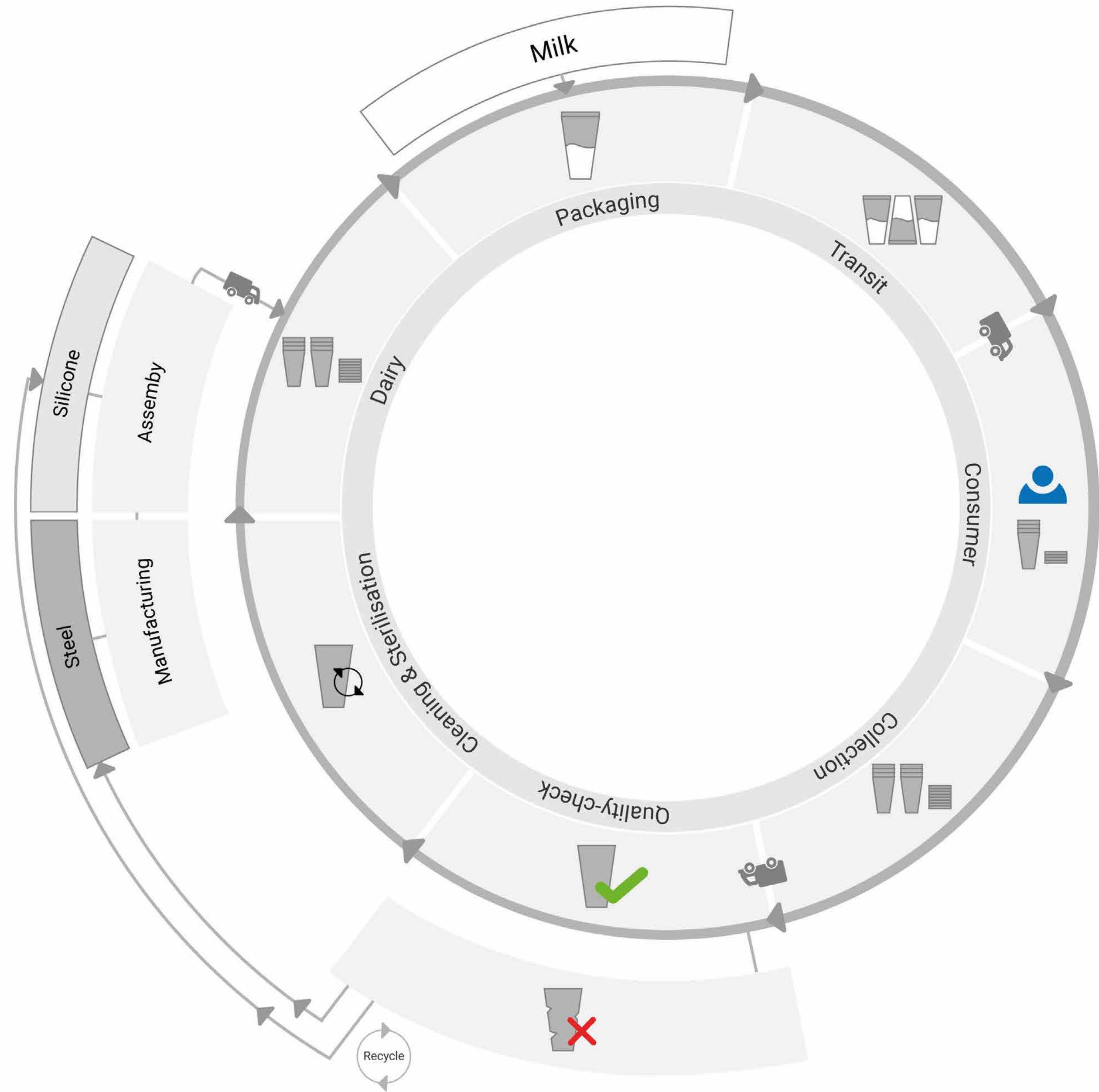
Proposed service

Use case

Step 1. Once the packet is delivered, users have to open the seal, pour out the milk or can store it in the same container itself for a few days.

Step 2. Once done using it completely they have to wash the utensils and stack the empty ones in each other.

Step 3. After a week or two the containers will be collected by the factory.



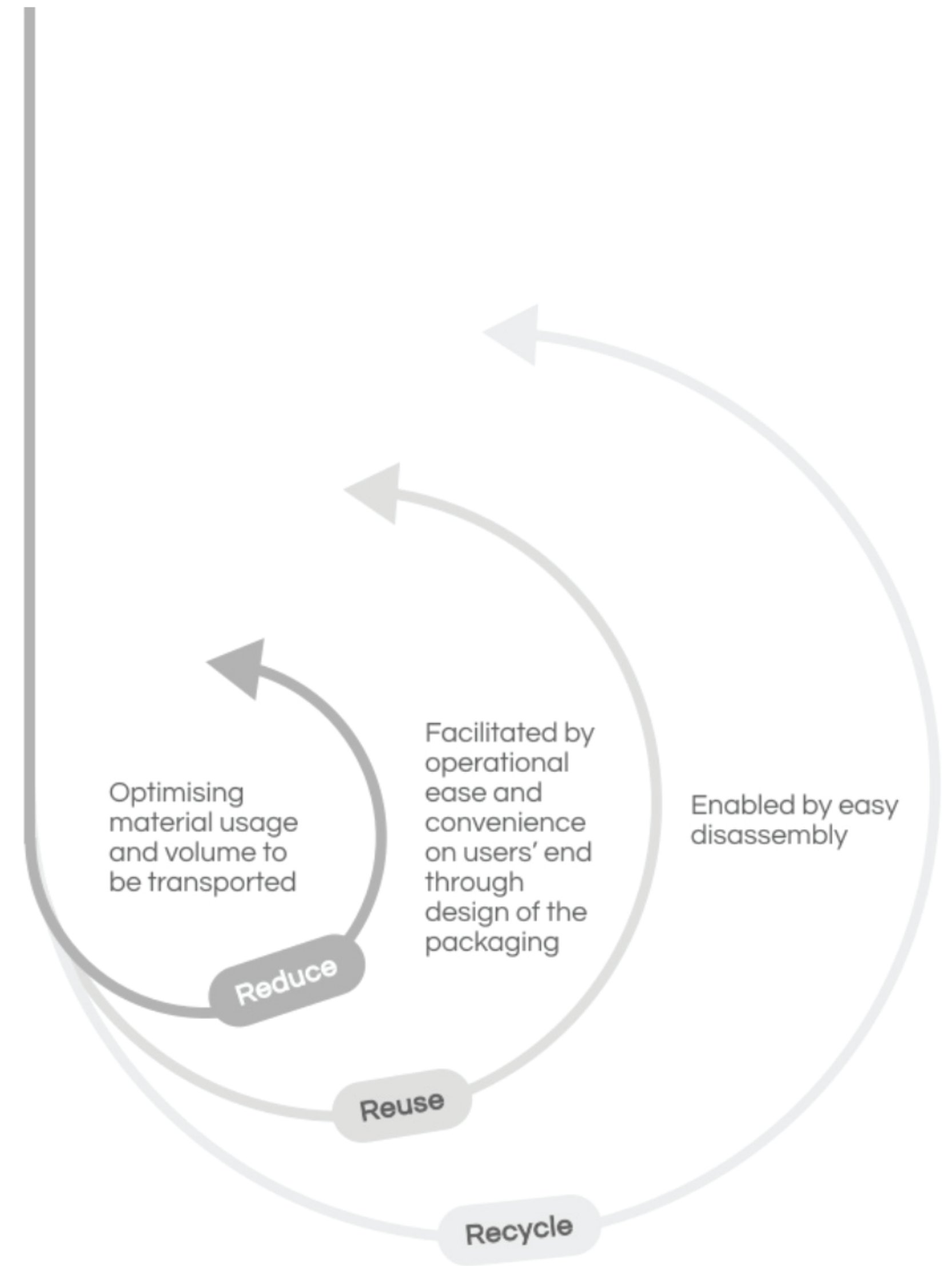
Ensuring Circularity

Sourcing recycled material

Simple manufacturing techniques

Trust establishment through the pressure seal

Better user experience easy storage eliminating the need to transfer milk to other containers



Technical Cycle

Economics of service



The cost of Stainless Steel container manufacturing will be divided into the number of reuse cycles that it undergoes and charged along with the MRP.



The service subscription will let liquid capital into the transport and other functions



Security deposit will cover for damaged containers and the ones lost during the cycle



The stacking of the containers makes the system space efficient and ultimately making it fuel efficient

How will this solution benefit



The packaging is designed in a way that ensures maximum packing efficiency and the structure makes it easy to stack and transport.



The sealing method acts like a badge of trust, catering to a user's concerns.



The reusable and recyclable material not only takes care of the environmental aspect, but also the economic aspect.



This cradle to cradle economy is what gives us an upper hand when compared to everyone else in the current market scenario.

Learnings & Reflections

Materials that seem sustainable, might not be sustainable.

Materials like glass and bamboo, that first seemed like the obvious go-to choice for a sustainable packaging, turned out to be less sustainable, when a thorough Life Cycle Analysis was carried out. A lot of factors account for sustainability, which change according to every project.

Dealing with f&b needs trust and assurance.

Milk as a substance that is consumed by people of all age groups including the most vulnerable ones like infants, needs to be pure and untampered with. I understood that the design needed some element that could act as a feedback mechanism to prove that the milk is pure and safe to consume. The unique "pop to open" lid provides this, making sure that the feeling of trust is being fostered.

Both Product and Service need to be sustainable.

Having just a product that is sustainable isn't enough. If the entire logistics revolving around it are too energy or labour intensive, or its maintenance is too difficult, or its life is too short, then the entire service, along with the product fails to serve its purpose. This is where the glass bottles failed.