



CLEAR WATER

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RESEARCH

1) Researching Current Systems

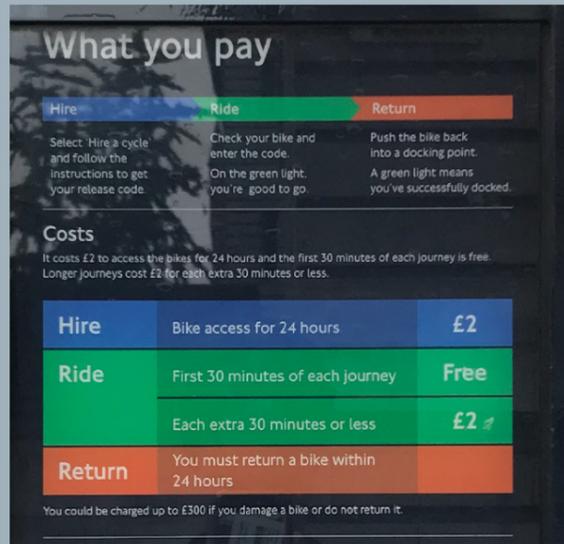
2) Market Research

3) Consumer Questionnaire



1) We looked into the interactions associated with rental/buying machines that are currently provided in the city to gain insights into potential positives and negatives of our proposed system.

SANTANDER CYCLES



- + Costs and return fines are displayed at every pickup point.
- + The interaction is explained so the customer understands the process.
- The information is very text heavy and the interaction is not intuitive.
- The costs and fines are not comparable to a water bottle

BEVERAGE VENDING MACHINES



- + Provides options for both cash and card use.
- + Branding maximised - front is transparent for display of bottles, and includes a panel for more options to purchase specific brands.
- The card section is unintuitive and frequently breaks, forcing cash use.
- Dispensing mechanism is energy intensive and unnecessary.

2) The growth in the bottled water market in Asia Pacific is increasing as preferences shift from carbonated drinks to bottled water.

Asia-Pacific accounts for **42%** of global bottled water consumption

Due to growing health concerns, expansions in distribution channels and interest in innovation, the market has high competition - our product directly addresses the developing customer requirements whilst also providing a sustainable system.

OUR TIMELINE:



(Timeline constructed based on current models such as Santander Cycles)

3) A survey targeted at people currently living in APAC was conducted, in order to develop a personal understanding of the target market and figure out how to tailor the key features of our product to it.

70%

of participants transactions were cash



No participants fully trusted tap water



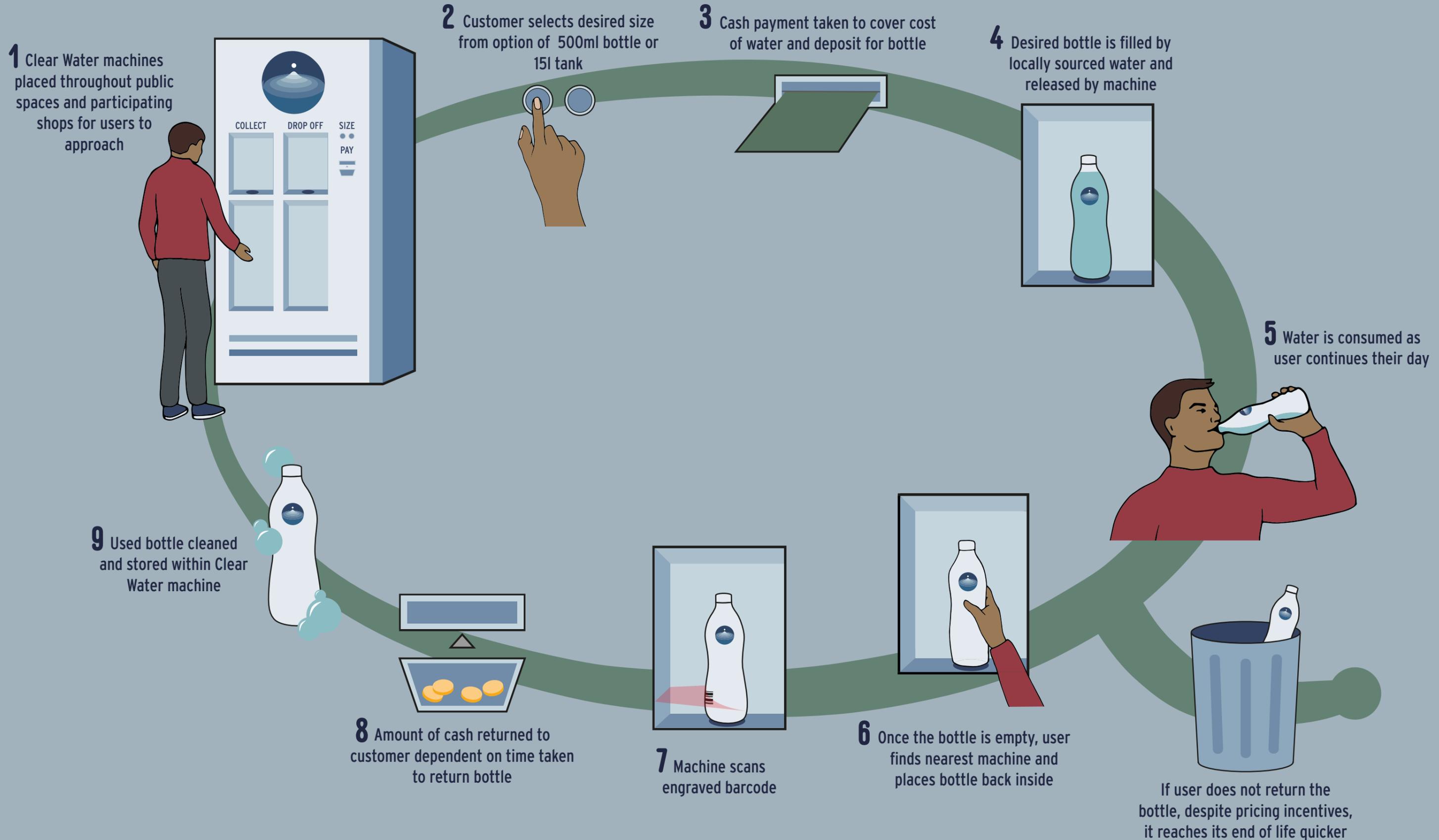
All participants scored 10/10 on hygiene priority

\$0.25

was the average cost of bottled water

SYSTEM DESIGN

The Clear Water system was designed for implementation in the APAC region over the next 5-10 years, targeting the growing middle class sector that has an increasing demand for bottled water



BUSINESS MODEL

A Business Model Canvas was developed to define how the Clear Water concept adds value to all stakeholders including **Consumers**, **Partners** and **Governments**



KEY PARTNERS

- **Local Water Suppliers**
Local water suppliers will be in charge of producing drinking water for the machines. The supplier will be selected on their ability to provide high quality, cheap water in a sustainable way.
- **Machine Maintenance**
A small maintenance team will be trained in every region to install/fix the machines.
- **Local Transportation of Equipment**
Transport organisations will be partnered with to transport water/bottles/machines
- **Shops and Public Spaces**
Our partnered locations will benefit from the constant supply of people that our machines attract.
- **Governments and Councils**
Machines will need Government and Council approval. Subsidies of our products may be issued due to the social benefit of less plastic pollution on the streets.

KEY ACTIVITIES

- **Production/design** of water bottles and machines
- **System developments** for greater efficiency
- **Maintenance** of machines
- **Marketing** and changing public perception towards sustainability

KEY RESOURCES

- **Physical**
Factories, Machines, Bottles, Distribution Networks, Property
- **Human**
Design, Maintenance, Transport and Logistics Employees
- **Intellectual**
Design rights, Brand
- **Financial**
Shares

VALUE PROPOSITION

A reusable bottled water service system

System sells water and rents out the container

- **Safe, cheap and convenient access** to drinking water
- **A long term, sustainable solution** to single use plastic bottles and unsafe tap water
- **Improves environmental consciousness** by rewarding users for acting responsibly
- **A business that supports the local economy**
- **Channel for CSR** (Corporate Social Responsibility)

CUSTOMER RELATIONSHIPS

- **Self service, transactional relationship** - only interacts with consumers when paying and returning the product
- **Long term connection** to brand by encouraging recipients to refill bottles

CHANNELS

- **Machines**
Machines will be the primary way Clear Water interacts with consumers. This is where bottles will be purchased, returned and all errors will be reported
- **Website and Phone**
Customers will be able to find more information as well as nearest machines on our website
- **Advertisements**
Online and billboard ads

CONSUMER SEGMENTS

Our product sets up value for two main consumer groups

- **One the go water**
Machines offer 500ml bottles for customers who want a quick drink or something to carry throughout the day. These will often be returned quickly and refilled throughout the day.
- **Water for the home**
Our system also offers large 7.5l bottles that can be taken home and consumed over a matter of days. They are designed to be easily transported in common vehicles (such as motor-cycles) and have handles to ensure comfortable carrying.

COST STRUCTURES

- **Cost driven structure with a focus on sustainability**
Business designed to be as cheap as possible to make product competitively with bottled water, however, cost cutting remains within bounds of sustainability philosophy
- **Fixed Costs:**
Rent, insurance, interest payment, salaries, factory equipment
- **Variable Costs:**
Maintenance of machines, water, bottles, transport, taxes, electricity

REVENUE STREAMS

- **Consumer Revenue**
Asset sale of water, renting out of water bottles (customer places a deposit for bottle and if it is returned, money is partially refunded depending on the time bottle has been used for).
- **Partnership Revenue**
Businesses and public spaces pay fees to feature our machines so that the stream of people our system brings can be made use of (eg: supermarket will pay to have our machines placed so that when costumers come to buy water they may end up buying further supermarket products), pay for advertisements on machines.
- **Government Revenue**
Subsidies given out due to the environmental and social benefits of our system.

INTERVENTION AND STAKEHOLDERS

The effects of our system on all stakeholders involved



MAIN INTERVENTIONS

• Redesigning Entire System Top to Bottom

The entire system was redesigned top to bottom so that the market is not selling bottles but rather selling water. This included creating a whole new method for consumers to buy water as well as a method for them to return the bottles once consumed.

• Reduced Transport

Rather than letting water be transported long distances in bottles that often waste huge amount of space inside transportation vehicles, our intervention involves sourcing the closest available water and transporting it in large water tanks. The tanks take up far less space and the water is only transferred into the bottles inside our machines.

• Reduced Disposable Material and Waste

Because our system does not involve the continuous production and disposal of plastic bottles, there are great savings of materials within the system. Instead, our bottles are reused hundreds of times before they need replacement due to damage or wear. The bottles are made from recyclable materials so even once damaged, the landfill waste can be minimised.

• Created Incentive for Sustainability

Arguably the most important intervention to the success of the system is its ability to create an incentive and added value to sustainability. Many sustainable solutions to products, such as redesigning packaging and changing materials, fail to be effective as they do not provide further value to consumers apart from eco-friendliness. Clear Water charges a deposit for the bottle whenever users take out water from our machines. This deposit incentivises people to return the bottle and thus promotes a circular system. Moreover, it means the entire product can be cheaper than bottled water as the only asset being lost is the water itself.

• Promotion of the Local Economy

Clear Water sources much of its capital from local employees and services. The installation is done by a local team, domestic travel is sorted by local companies, the water is sourced from local suppliers and maintenance is done by local engineers. This promotes the economy creating new jobs so cities can develop, in turn creating a better relationship with our users.

STAKEHOLDERS

Clear Water Team



Before

Attempting to make a failed system capable of supplying sustainable water.

After

Created a brand new system that sells the water but rents out the packaging all while supporting local economies and consumers.

Transport



Before

Having to travel long, international distances on a multitude of vehicles to reach site.

After

Transported shorter distances by local workers who only need one vehicle type during the whole journey.

Manufacturers



Before

Manufacturing PET water bottles far away from where product will be used.

After

Manufacturing machines and high quality bottles, sourcing the water and installing/-maintaining machines near site of use.

Customers



Before

Having to pay for both water and bottle, needing to dispose of packaging and creating damage to the environment.

After

Pay for only the water they consume, easily able to deal with their waste and support environment as well as local economy.

Waste disposal



Before

Spending huge amounts of time collecting rubbish and having to burn much of it.

After

Far less trash is needed for collection and thus more of it can be disposed of correctly and safely.

Governments



Before

Having to deal with large and expensive sums of waste produced with no real system of processing it.

After

Far less waste needs processing giving them more time and money to focus on developing communities and infrastructure. Greater local employment and added benefit such as cleaner air, healthier people and better natural preservation.

OUR PRODUCTS

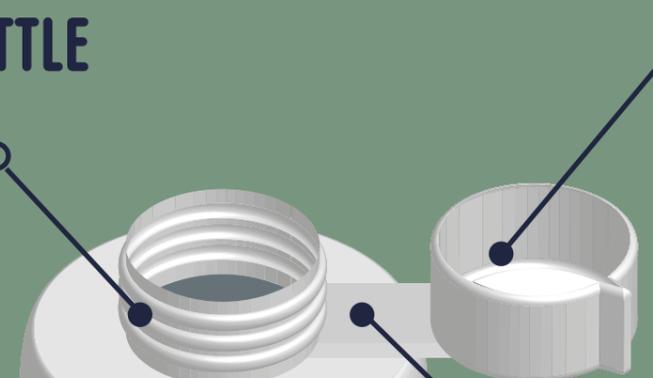
1) Clear Water Bottle

2) Clear Water Machine

The service we provide and the system it sits within essentially requires 2 products - the Clear Water bottle/tank, and the Clear Water machine. These products need to be analysed separately.

CLEAR WATER BOTTLE

Cap closes with a push mechanism and can only be fully closed by the machine manufacturing

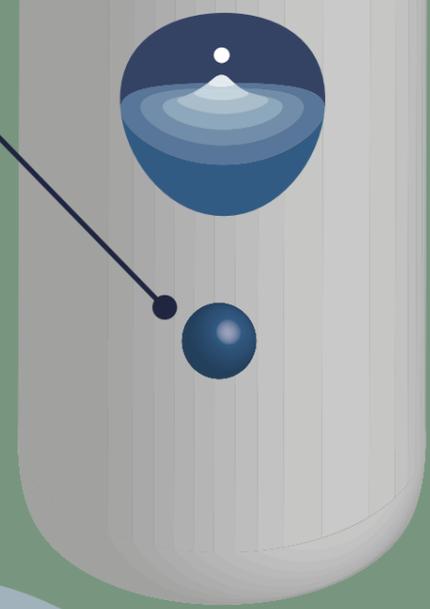


Cap that pops on and off during use, but can be vacuum sealed during cleaning and filling process

1 part build - simplifies cleaning process and reduces manufacturing environmental impact



Mechanical indicator of seal and cleanliness of bottle



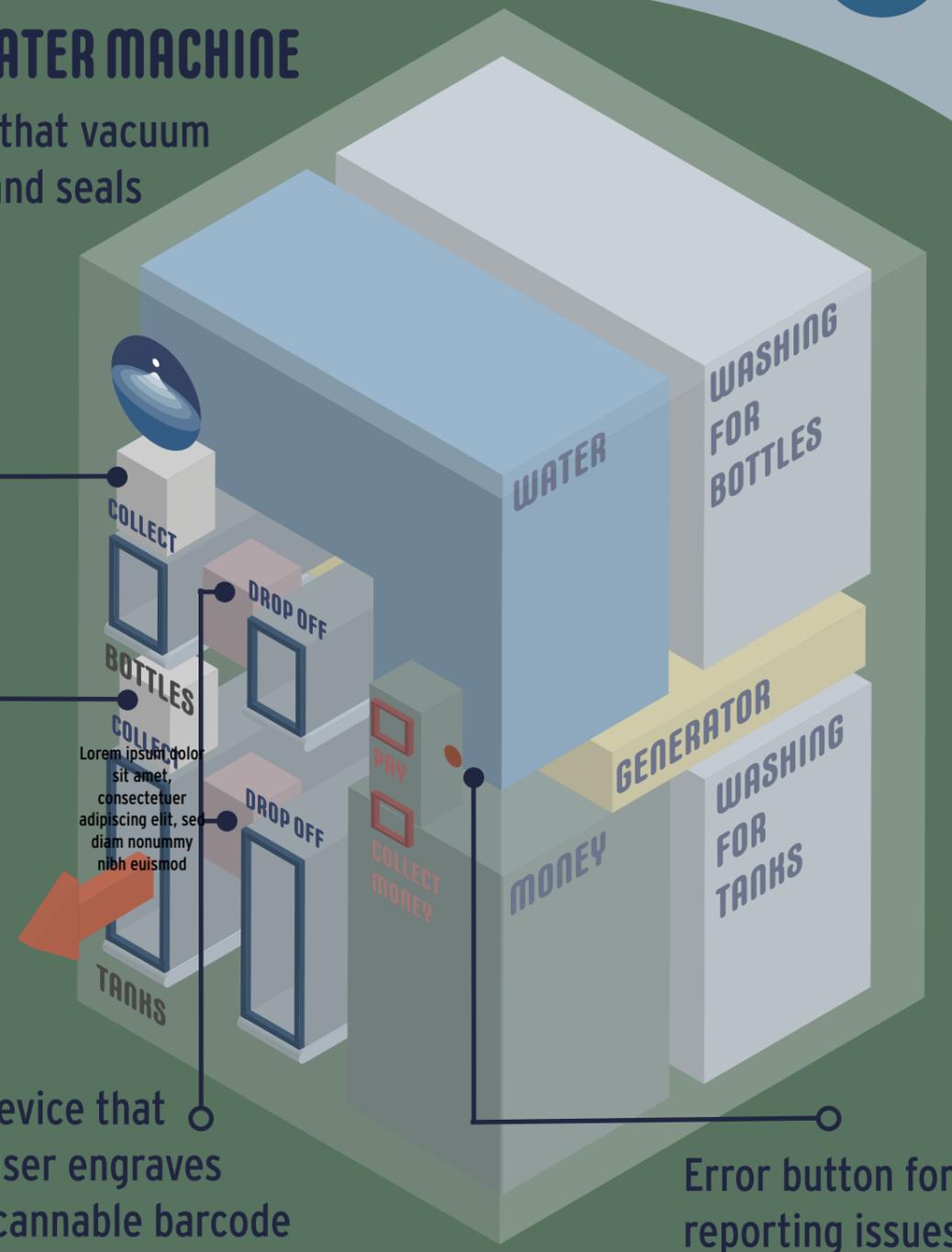
CLEAR WATER TANK

Features the same design elements as the bottle but at a 7.5 litre volume



CLEAR WATER MACHINE

Device that vacuum packs and seals bottle



Device that laser engraves scannable barcode onto product

Error button for reporting issues

STATISTICS:

	WHAT?	WHY?
MATERIAL	PP	Strong, food-safe, washes well
WEIGHT	20g/1kg*	Slightly thicker build; offset by lack of waste
VOLUME	500ml/15L*	Standard expected from current products

*Statistics for Clear Water Tank

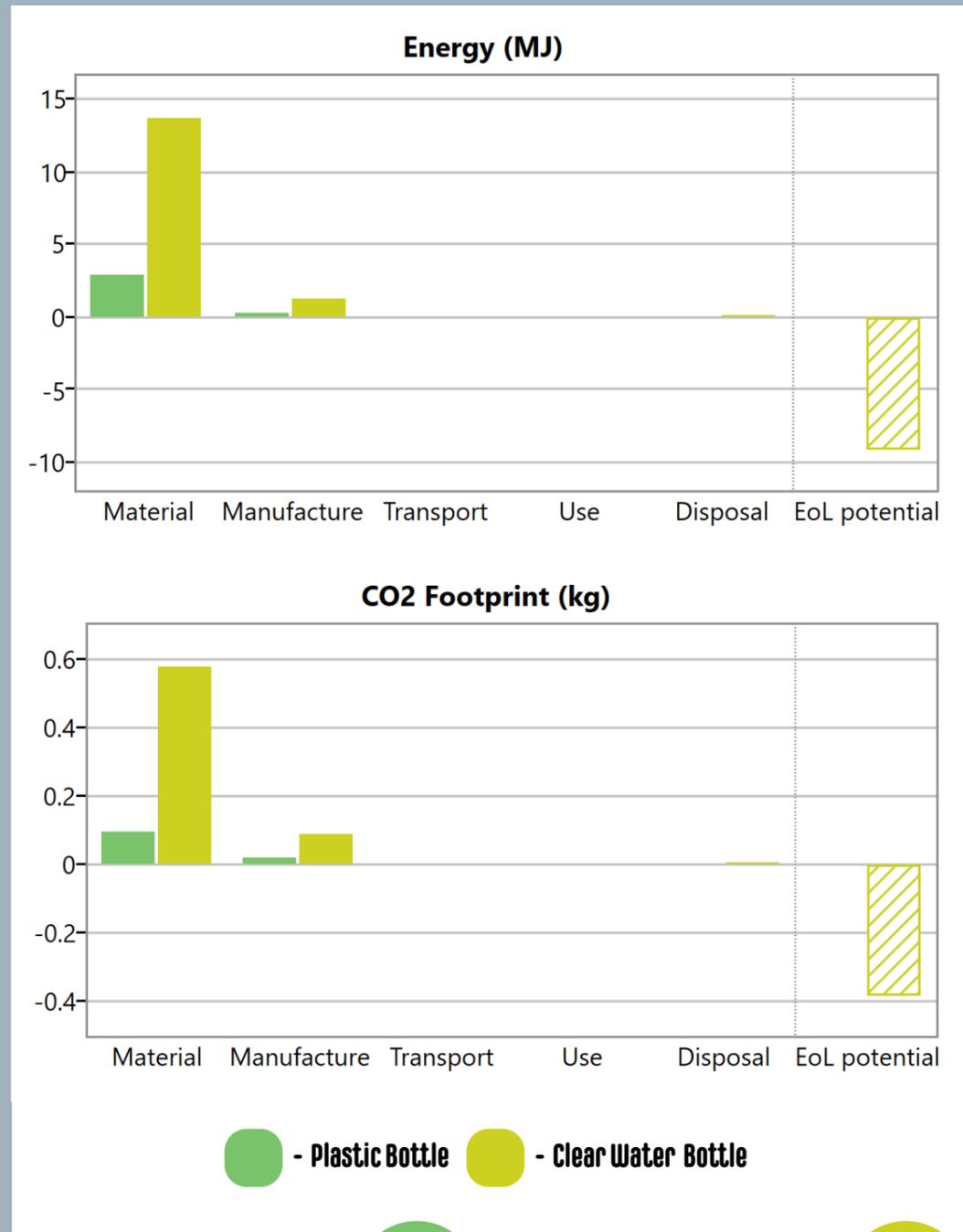
The Clear Watermachine ensures that the water that would originally be bottled and transported hundreds of miles goes straight to our customers without plastic waste. Water companies would be given incentives to provide water straight to our machines, such as advertising and publicity opportunities.

ECO ANALYSIS

The Clear Water system presents a solution to the sustainability issues of single use plastic bottles while being optimised for minimal environmental impact



Despite the material and manufacturing processes of the Clear Water bottles requiring greater energy and CO₂ emissions, the end of life potential due to reusability and guaranteed recycling offsets these values.



Our potential customer base spans 300,000 that make up the urban population of the APAC region.

if only 10% of our potential customers use our bottles, **30 million bottles** could be saved

5.49 MJ
OF ENERGY SAVED
PER BOTTLE
PER YEAR

5.49 x 30 million =
164.7 million MJ/year

0.128 KG
OF CO₂ SAVED
PER BOTTLE
PER YEAR

0.128 x 30 million =
3.84 million kg/year

Our Clear Water machines will be manufactured as energy star certified by incorporating more efficient components and featuring an occupancy sensor that switches the machine to a low power mode after 15 minutes of inactivity.



40% more efficient than standard vending machines, reducing energy consumption from 3650 kWh/year to 2,190 kWh/year

END OF LIFE



Bottles remain in the system for their whole lifetime (upto 450 years), and in case of breakage, the machine will notify the redistribution team, and the broken item will be returned to the manufacturer so the plastic can be reused to make another bottle. Clear Water bottles having their own end of life cycles solves the issue of incorrect disposal.

EMBODIED ENERGY



After initial distribution, the production energy will be close to zero as our machines will be permanent fixtures that only require occasional maintenance and bottle replacement. Machine usage will consume an average of around 2000 kWh per year per machine, but this is offset by the reduction in energy currently used to create and distribute water bottles continuously.

CARBON EMISSIONS



Carbon emissions will be reduced in all aspects of getting water to the consumer: Emissions associated with PET bottle production will almost be eliminated as bottles will be immediately reused (and production will only be required for the occasional replacement of broken items). Transportation of water will be greatly decreased as water only needs to be transported via lorry to the machines; the rest is carried out in human hands. There will be carbon emissions associated with infrequent maintenance and routine redistribution, but this will be minimal.

30% OF PLASTIC BOTTLES CURRENTLY RECYCLED



*Based on 2015 Environmental Protection Agency Figures

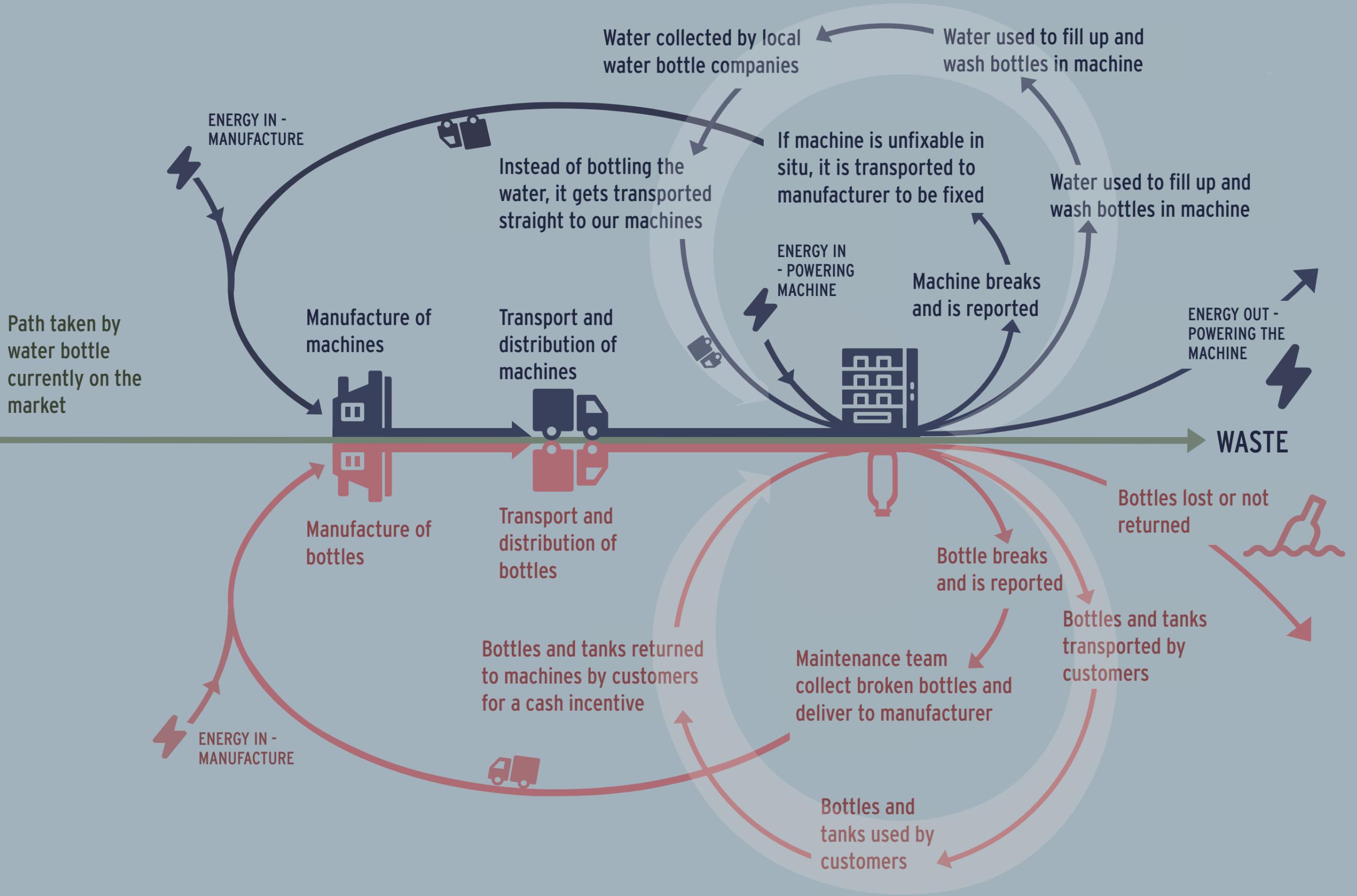
100% OF CLEAR WATER BOTTLES RECYCLED



*Assuming all bottles are returned as intended

LIFE CYCLE DIAGRAM

Diagram to show the stages involved in manufacturing, circulating and disposing of Clear Water Bottles and Machines the from cradle to grave

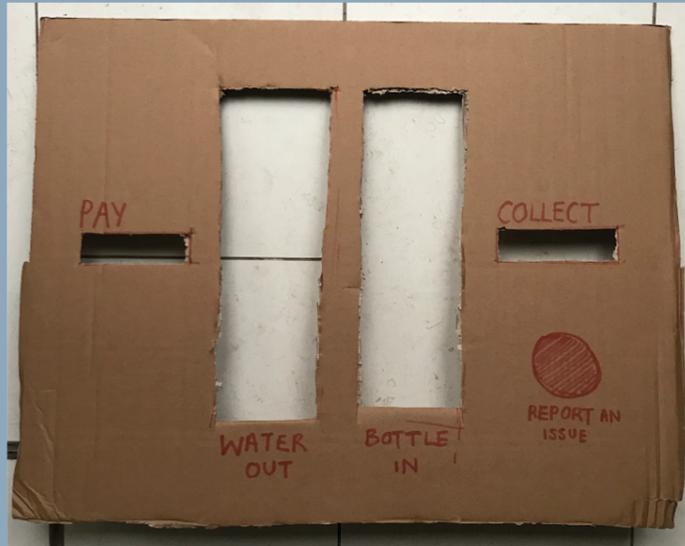


PROTOTYPE

Testing the interaction through a low fidelity prototype to gain user feedback



CARDBOARD MODELLING



A prototype of the interaction section of the Clear Water Machine (left) was made to gain insights into how customers would use the machine to withdraw water. This interaction was prioritised, as the ease of use will determine the frequency that the machine is used, and therefore the amount of plastic bottle waste ultimately reduced.



1. Customer approaches and pays the machine, then selects whether they want a bottle or tank of water.



2. Customer has paid and so receives the bottle which has been cleaned, sealed and barcoded for when it is returned.



3. After use, the bottle is returned; if within time limit, the maximum refund is rewarded through the 'Collect' slot.

FEEDBACK



"The simplicity of the interaction makes it fun to use and it feels easier than buying bottled water from a shop."



"The interactive panels are in use order - it is intuitive to move along as you pay, collect, return, and receive refund."



"The in and out slots are too close together, it's hard to tell them apart cause they look so similar."



"Choosing a tank or bottle should happen before you pay and it would be nice if the prices were displayed on a screen."



"The 'report an issue' button does not need to be so big - it implies that the machine is going to have a lot of issues."



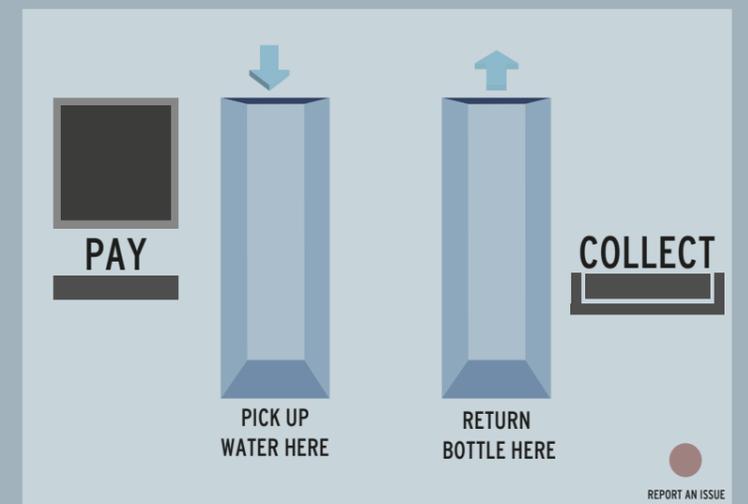
"More descriptive instructions - I only knew what I was getting and how I was getting it because I was told."

INSIGHTS GAINED

A key incentive for customers to use our machines is providing a way of buying water that requires less effort on their part than buying a bottle from a shop.

The interaction must be intuitive but not confusingly minimal.

A redesign of the interaction panel based on feedback



CONCLUSION



Clear Water successfully provides a sustainable and clean alternative to bottled water that is tailored to the requirements of consumers in the APAC.

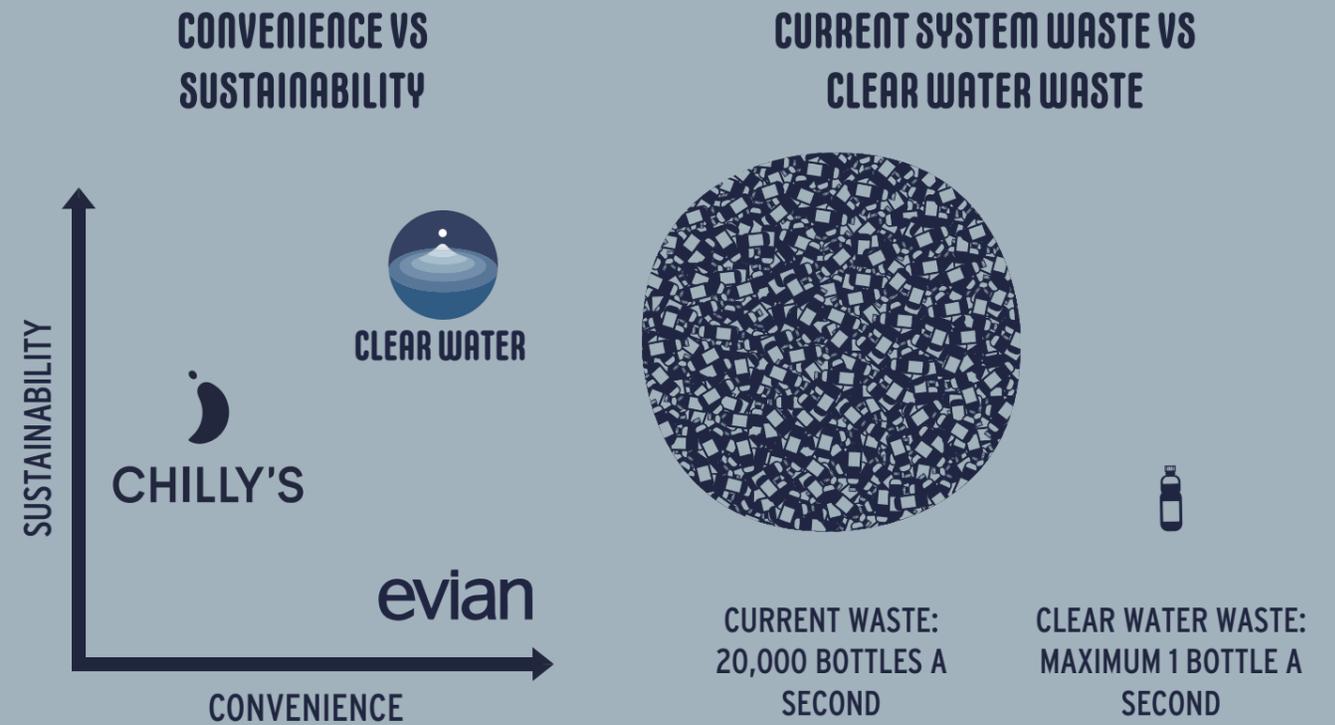
Clear Water will initially reduce the waste output of the bottled water industry - and as machines become widespread, hopefully halt waste altogether - through implementation of a circular economy and closed loop system.



Through research, innovation and iteration, Clear Water has come up with a solution that directly targets what will become the producer of waste globally, essentially pulling bottled water waste to a reluctant standstill before the issue gets out of hand.



We believe our system addresses the mistakes made by traditional bottled water companies across the globe. We aim to define a new culture for an environmentally conscious society and deliver a product that we can't without, all whilst saving a planet we also can't live without..



REFERENCES

Anon (2019) Asia Pacific Bottled Water Market | Growth | Trends | Forecast. [Online]. 2019. Mordorintelligence.com. Available from: <https://www.mordorintelligence.com/industry-reports/asia-pacific-bottled-water-market> [Accessed: 9 December 2019].

Anon (2019) Barcode Engraving with a Laser System. [Online]. 2019. Epiloglaser. Available from: <https://www.epiloglaser.co.uk/how-it-works/applications/barcode-engraving-system.htm> [Accessed: 9 December 2019].

Anon (2019) Energy Efficient Products. [Online]. 2019. Energystar.gov. Available from: https://www.energystar.gov/products/other/vending_machines azocleantech.com/article.aspx?ArticleID=2 [Accessed: 9 December 2019].

Anon (2018) Greenhouse Gas Equivalencies Calculator. [Online]. 2018. epa.gov. Available from: <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator> [Accessed: 9 December 2019].

Downey, R. (2016) Asia-Pacific: Growth Region for PET Bottles. [Online]. 2016. Euromonitor International. Available from: <https://blog.euromonitor.com/asia-pacific-consolidates-its-position-as-headline-global-growth-region-for-pet-bottles/> [Accessed: 9 December 2019].

Laville, S. & Taylor, M. (2017) A million bottles a minute: world's plastic binge 'as dangerous as climate change'. [Online]. 2017. The Guardian. Available from: https://www.theguardian.com/environment/2017/jun/28/a-million-a-minute-worlds-plastic-binge-as-dangerous-as-climate-change?fbclid=IwAR3JdAeBuLTMaprgq4NrThleP_f0SEhC1gZuVjQArJI3F2LILoSorecvHvI [Accessed: 9 December 2019].

Leblanc, R. (2019) Plastic Recycling Facts and Figures. [Online]. 2019. The Balance Small Business. Available from: <https://www.thebalancesmb.com/plastic-recycling-facts-and-figures-2877886> [Accessed: 9 December 2019].

Zygga, L. (2019) How Much Energy Goes Into Making a Bottle of Water?. [Online]. 2019. Phys.org. Available from: <https://phys.org/news/2009-03-energy-bottle.html> [Accessed: 9 December 2019].