Sustainable Design Engineering
Category: Travel and Events

reSTAND

We Stand to Reinvent the Future of Events

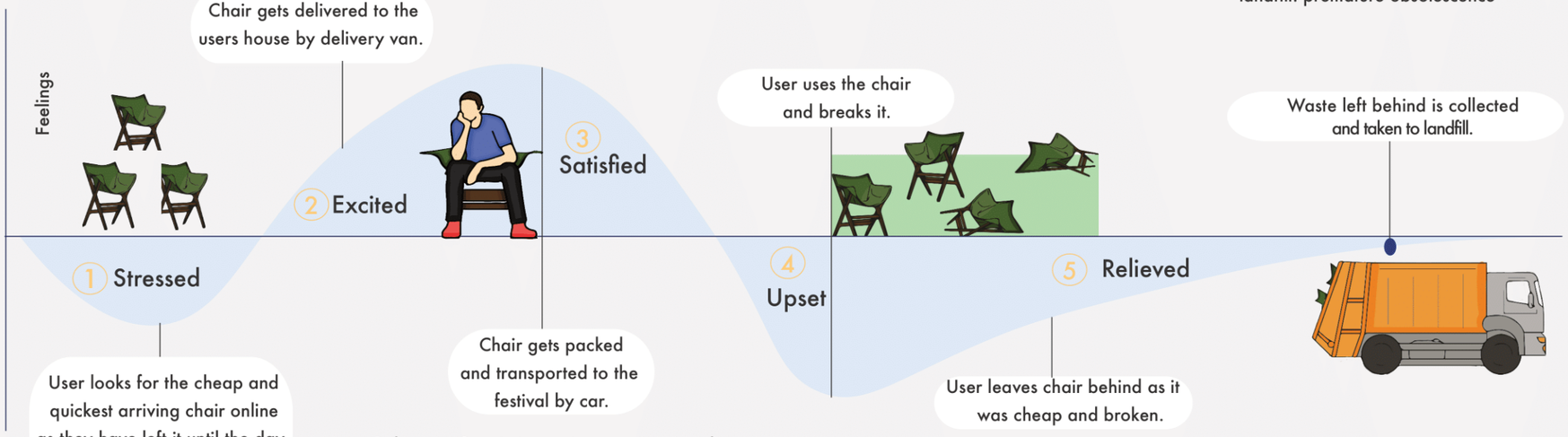
Product ①
Future Scenario ②
System Design ③
Product Redesign ④
Stakeholders ⑤
Solution Analysis ⑥

2D: Anusha Narayan, Archie Bond, Ragavi Thavayoganathan, Ruby Grut

The Problem

The camping furniture industry is expected to grow to a size of $275.8 million by 2025. However, it has a negative impact on the environment - in 2015 for example, there were 2200 camping chairs left at the Glastonbury festival. In general, users are inclined to purchase low cost products, which are typically low quality and therefore prone to breakage. They are subsequently likely to leave the chairs behind, in order to save time and space. There are few product service systems in place to remove the waste left behind and the materials used are generally add to energy wastage and carbon footprint.

Max's Typical Journey:



The System

Camping chairs are designed to be used multiple times but user choices and lack of quality make it prone to disposal on-site: users find it too labourious to take back home or dispose of responsibly

The complexity of the polyester mesh makes it hard to recycle and the chairs are made out of multiple components make them difficult to dispose of.

Staff to identify leftover chairs are not hired due to vast amount of leftover waste

Increasing population in camping and outdoor activities by the millennial population during COVID-19 drives the market for camping furniture over the world

As a generation, they are largely eco-passive which as big players in the products system, do not help it's sustainability.

Ultimately, lack of legislation and existing PSS allows for poor environmental choices with camping chairs

Persona

Max frequently attends festivals all over the country. As an active university student, he has no time to prepare for these events and doesn't try to be sustainable.

Thus, he is eco-passive, and he prioritises price/convenience over sustainability as he isn't directly affected.

Max, 19

User Requirements:

- Aesthetics
- Price
- Convenience
- Sustainability
- Durability

2. Excited - The chair arrived the next day and he can now enjoy the festival with his friends.

4. Upset - Chair breaks after 2 days and he can no longer use it so has to stand for hours.

1. Stressed - Max just wants the most simple and effective solution.

3. Satisfied - Uses the chair during the day and night; all seems well.

5. Relieved - Remembers the chair was cheap and so leaves it where it broke and will buy another one next time.

The product

Camping chairs aren't designed for disassembly, mainly due to permanent fixtures shortens life cycle and limits material circularity: product ends up in landfill

The manufacture process of the polyester mesh is lengthy and energy intensive. Extracting monomers from petroleum oils combined with the spinning machinery, uses a lot of electrical power and emits a surplus of co2.

The legs are sharp at the end so pose a danger to people and animals once they become obsolete. There are 10-12 legs in total which is adding to the amount of resource present in its system flow

Pop rivets have to be drilled apart during assembly, complicating the recycling process of the chair and adding unnecessary waste.

Plastic stoppers have to be injection moulded, increasing the price and environmental impact. The geometries of these plastic parts are quite complex, and do not biodegrade so are mostly left behind in landfill adding to pollution

Opportunities

Product

- Design for disassembly: removing permanent fixtures from the chair will improve its recycling potential
- Decreasing the number of components in the chair will ease it's recycling process
- Materials can be changed to more eco-friendly ones that are easier to work with and stay in the system loop for longer

System

- Moving from an ownership to a rental system will help to reduce the number of chairs needed and encourage care for centralised products
- Introducing legislation could help to ensure that all camping chairs are made from the same recycled materials
- Incentivising users to treat the chairs more carefully and dispose of them in a sustainable way will ensure that there is less breakage and that they are dealt with appropriately.

The Future Scenario

In order for the designed system to be effective, a number of steps first have to be implemented, over a 15 year period. Once all steps are implemented, the system can be optimised, thus working at it's full capacity

Materials

Only recycled PET and mix of recycled and virgin Al can be used for the manufacture of camping chairs.

PET is more eco-friendly than polyester mesh while being strong and durable enough to withstand human weight and can easily be repurposed through recycled bottles.

Aluminium is lightweight, can be easily recycled and is easily accessible, making it a good choice to be used in the camping chairs.

Ownership

Festivals employ reSTAND to provide rental stalls at the festival sites.

They rent out camping equipment such as tents and chairs to users, showing the move away from private ownership.

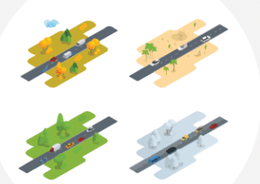
There is also a change in perception, meaning that users take good care of products, regardless of whether or not they own them. Users are incentivised to return products.

Seasonal

While primarily utilised by festivals, they only take place during the summer months.

Throughout the rest of the year, reSTAND rents out their products to a variety of other facilities such as scout and army camps.

This will ensure good usage of the product throughout the year; 10 cycles are expected before the product become functionally obsolete, at which point separate components can be replaced.



2021

2036

DFDA

It is going to be compulsory for all camping chairs to be designed for disassembly, in order to achieve ease of recycling and repair.

The lack of permanent fixtures will ensure that no damage is done to the material and the components can easily be separated, thus making recycling easier and reducing the amount of items that must be sent to landfill

Data

A QR code service is developed in order to ensure that the system is being properly utilised.

It keeps of track of how many chairs are being taken out, how many are being returned, and what conditioned they are being returned in to ensure that they can be reused.

It will also help reSTAND to keep track of their own products, making sure that the system is working effectively.

Expansion

As the usage of the rental system increases, more and more companies begin to take part in the system.

They can help with providing product, reducing the eco impact that reSTAND has to have.

They can also provide aid in supplying the merchandise which is given as a reward for returning products in good condition.

Opportunities

- PET from bottles can be used a material source
- Chairs have to be designed so disassembly is simple
- Rental services have to be designed so that they are efficient and do not come at a high cost
- A tracking app that is easy to use and easily accessible could aid in the return of the chair
- Making the service available throughout the year to other providers will ensure good rotation and minimise storage requirements
- Expanding the service to include other providers can reduce the eco-impact of reSTAND

Product Service System

The future of camping chairs begins with government legislation to standardise their production and reinforce the new system of rental stations at festivals, enhanced by user incentives to return the chairs.

Problem

Intervention Solution

① Idealised Instance of Product Service System

The festival hires reSTAND to provide seating

reSTAND staff at temporary stalls positioned at the festival entrance and throughout festival to rent chairs

£5 To rent a chair

1 1 Chair per person

User pays through card machine or through reSTAND's app where they can look at rewards for returning chair

Each chair has personal qr code, scanned upon rental by staff to track returns. User's personal details taken upon rental

reSTAND staff at temporary stalls positioned at the festival entrance and throughout festival to rent chairs

Chair is used for the duration of the festival

User incentivised to return chair at end of festival by reward range, return stations at festival exits and throughout festival on way to the exit, qr code scanned by staff upon return

10% Discount on spotify membership

10% off next partnership festival ticket

10% Discount for dice events related to festival performers

20% off leftover festival merchandise

All chairs transported through festival to be collected by lorrys, filled to maximum capacity to reduce number of trips

Chairs are taken in lorrys to reSTAND storage facility to be cleaned and restored

Components damaged beyond repair are transported to recycling plant from reSTAND storage, lorrys return with new recycled pet seats so trips are reduced

Legs/seats are removed and replaced
If necessary, life cycle of chair and individual components extended. Chairs transported by reSTAND to next event that has hired reSTAND

reSTAND staff working at rental stations to organise chair rental

User buys chair just for single festival use

reSTAND produces and owns the chairs, users can rent and are incentivised to return, chairs reused by other festivals and events that hire reSTAND throughout year

Personal camping furniture is banned at festivals

User wants to be able to sit down in daytime so rents a chair

Chair seats are made from recycled pet from water bottles, legs are made from mixture of recycled and virgin al

Chair price proportional to production price, cheap enough to rent without thinking but expensive enough to incentivise Returning for reward

As reSTAND company grows, gains more brand partnerships and more products can be rented and more rewards offered

Rewards have enough value to incentivise user to return chair upon leaving festival

Chair is broken by end of festival so gets thrown away

Chair returned to reSTAND and is built for disassembly with snap fit fixtures, has only two components which can be separated and replaced as necessary to extend life cycle

Number of chairs returned and condition of chairs are logged through qr code identification at storage facility, used to determine number to be manufactured and future system changes

Chair is in 50% of original condition by end of festival so gets thrown away

Chair is built to last: can be used 5-10 times

Chairs identified, sorted, cleaned, restored at reSTAND facility. Components restored and reused until *functionally obsolete*

reSTAND transport vehicles replaced every 5 years to keep up with new low emission laws as reSTAND transitions to electric vehicles only

Further Interventions

What happens if the chairs are not returned to the rental station by the user at the end of the festival?
Supplementary product service system to incentivise users to recycle PET bottles and produce recycled PET for reSTAND chair seat production

② PET Bottle Recycling

Plastic bottle deposit stations all over festival: one every 50 m² to minimise effort required by festival-goers to recycle

3 PET bottles can be traded in for e-voucher to get 1 free drink. All single use plastic bottles are accepted

Range of drink vouchers are offered through various partnerships around the festival

Users can scan the qr code at the bottle deposit station through the reSTAND app to track the journey of their bottle through the recycling plant

Plastic bottles transported directly from festival to recycling plant

Bottles are cleaned, ground and shredded, melted into small pellets, then sold to reSTAND manufacturers (and others) to be melted down and made into the fabric of the chair seats

Plastic bottles not recycled at festival

Bottle recycling stalls all over festival, no effort required, incentivised by a free drink and eco intentionality

PET sign shown on bottles, users know they can be recycled

As reSTAND company grows, more brand partnerships and investors, greater range of drinks offered

reSTAND does not require alcohol licence due to event partnerships who do have one and sell alcohol when users give in drink voucher

Initial brief check to see if PET when bottles accepted at festival, but recycling plant sorts through plastic

Users scan qr code on reSTAND app when deposit bottle to access drink voucher, recycling journey visually tracked and increases brand awareness and engagement

Plastic bottles sent to recycling plant located next to reSTAND manufacture and storage facility to reduce trip length when collecting PET for manufacture

PET can only be recycled 3 times before losing its properties

Camping chairs made from 600d polyester mesh

Chair made from recycled PET directly from contribution to recycling plant, more environmentally friendly

③ User leaves Chair behind, collected by reSTAND

User rents chair and leaves it behind at the end of the festival

reSTAND staff comb through the leftover items at the end of the festival to find chairs and return them to the rental/return stations

Chairs are taken with the returned chairs to the reSTAND storage facility to be sorted, recycled, and repaired

reSTAND Restore and Recycle

Chairs are sorted in the reSTAND facilities because:
decreases time taken for changeover at end of festival
Increases chances of identifying chairs which can be repaired
Done in the same location as the parts are produced so can be repaired in site, reduces trips taken
Data on conditions of chairs from different events and users can be logged more accurately
Components must be cleaned to hygiene standards for reuse

User receives notification reminders on app near end of festival about returning chair and potential damage to environment if not returned

User is eco-unintentional and unmotivated to return the chair upon leaving the festival

Value of the rewards is not great enough to motivate the user to return the chair

Chairs left behind after festival, taken to landfill

reSTAND staff comb through leftover festival waste for Remaining chairs to be reused/repaired/recycled depending on condition

reSTAND staff are hired to walk through festival to look for leftover reSTAND chairs

Qr code scanning on collection tracks how many chairs have been left behind, collecting data on eco-intentions of festival goers and if need to adjust incentives in future development of system

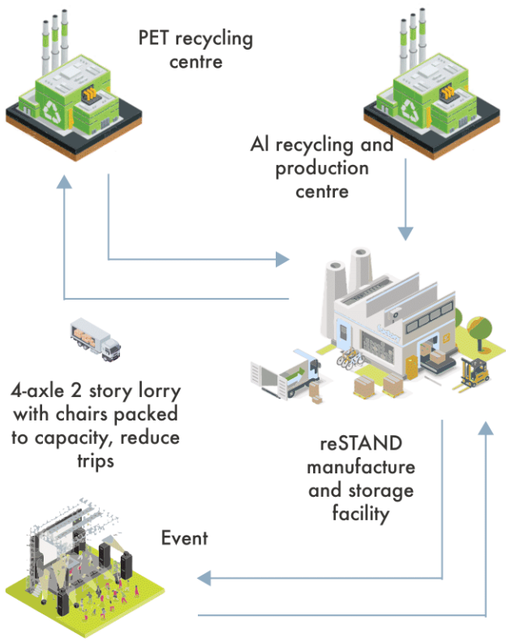
2200 chairs left behind Glastonbury festival 2019

Camping chairs made with different materials and fixtures

All chairs are standardised: rPET seat and Al legs, Impermanent snap fixtures, all can be treated in same way during festival clean-up by reSTAND staff and volunteers

Laws on responsible recycling of camping chairs

reSTAND Vehicles Journey Map



④ reSTAND chairs are Unidentified, Recycled, and Re-manufactured

User rents chair and leaves it behind at the end of the festival

reSTAND chairs are not identified by reSTAND staff or by festival clean-up staff and volunteers

Camping chairs are standardised in material usage, design, and manufacture and widely recognised as recyclable product

Camping chairs are sent with other recyclable festival rubbish to recycling plant to be disassembled in two steps: the back and arm supports are slotted off by removable dowel joints, and the seat is one piece which slides off the aluminium frame

PET is recycled: pre-washed, ground into flakes, washed, separated, and melt purified into pellets to be sent to reSTAND factory for re-manufacture

Al chair frames are shredded, cleaned, melted, purified with chlorine and nitrogen gas to be extruded into tubes for manufacture at reSTAND manufacture facility

Camping chairs are manufactured and stored in the same reSTAND facility near Manchester to reduce trip numbers between manufacture and storage until hired by next event.

Chairs are sent to next event without packaging due to durability of the rPET and Al protecting the product in transit, reducing waste

Camping chairs made with different materials and fixtures

All chairs are standardised: rPet seat and Al legs, Impermanent snap fixtures, all treated in same way during festival clean-up by reSTAND staff and volunteers (and in recycling)

Camping chairs must be made from Al and rPET

User is eco-unintentional and unmotivated to return the chair upon leaving the festival

Local municipality takes to local (unspecialised) recycling facility

Camping chairs made from 12 components: can't dissemble

reSTAND chairs made from only 6 components, all easily disassembled by snap fixtures and slots

No current Al recycling regulations

75% of Al produced is still in circulation, recycling it requires 5% of the energy needed to make the same amount of primary Al

Recycled material is much cheaper than virgin material

Al is sourced from thyssenkrupp materials (UK) in Darton and Preston, closest to reSTAND manufacture facility (location due to most festivals being in north of England) supply, manufacture, distribution trip lengths & emissions are reduced

System intervention evaluation

reSTAND furthers new legislation which forces all camping chairs to be made from rPET and recycled Alby moving away from private ownership of camping furniture, beginning with redesigned camping chairs designed for disassembly to promote a closed loop recycling system where the product's life cycle is also extended by the ability to replace individual components that have become functionally obsolete (1).

This intervention is supported by more product service systems, including encouraging recycling of plastic bottles at events (2) to reduce their environmental impact and increase contribution to the circularity of PET.

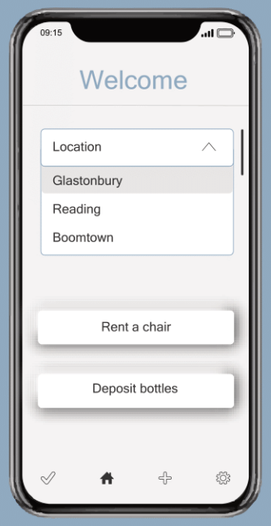
Other systems provided by reSTAND (3 & 4) protect the circularity of the new legislation (material and manufacture constraints) and intervention (PSS for renting chairs and design of reSTAND chair) by accounting for a more realistic world in which not all users are eco-intentional, and some camping chairs are still left behind.

reSTAND's motives are supported by their app which allows users to access rentals, rewards, and track recycling journeys to.

As the reSTAND expands, so will the products available for rent and the rewards offered as incentive for return.

reSTAND App & Response

Overview of reSTAND's app to engage and encourage users to think eco-intentionally, including advertising rewards for returning reSTAND products. Comparison of the user experience of using a camping chair with/without reSTAND



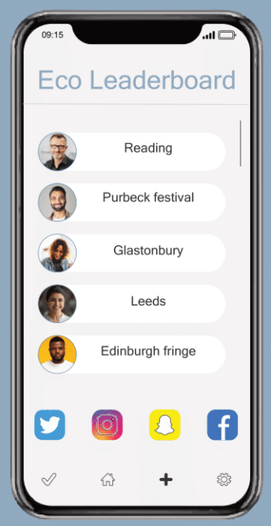
Welcome

User logs into app and selects the festival/event they are attending or organising

Scan qr code

The user can scan the qr code of the chair they are renting or of the stall they are depositing bottles at

Number of chairs rented and bottles deposited by user are shown to keep up engagement and motivation

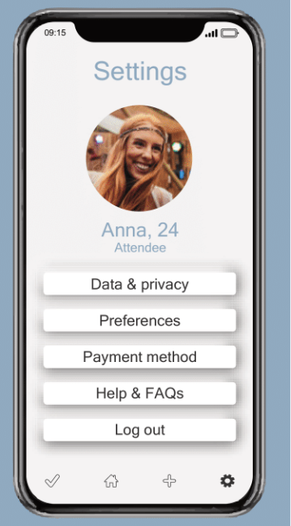


Eco leaderboard

User can be a festival organiser or attendee, so the leaderboard providers friendly competition on those who have deposited and returned the most items (overall reduced Environmental impact) either between users or between festivals depending on user archetype

Settings

User is given full Transparency to see how their data is used and change their preferences such as turning location services on to enable finding nearby rental stations

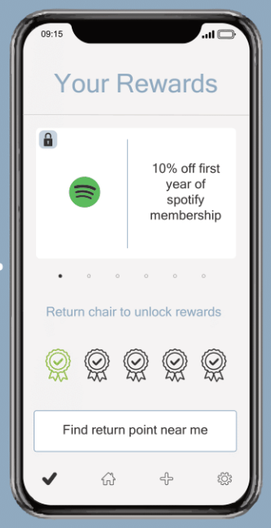


Your rewards

Selection of rewards can be viewed and unlocked when chair is returned

The more chairs returned, the more rewards gained and the value of the rewards increases

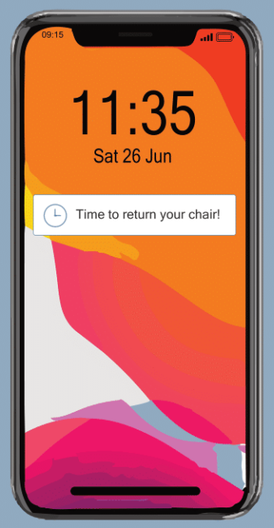
Loyalty to reSTAND and circularity principles increases, and continuous



Your rewards

Selection of rewards can be viewed and unlocked when plastic bottles are deposited

Drink stalls for depositing, drink stalls for collecting free drinks, and chair rental and return stations can be found using the user's current location on the festival map



Reminders

User is notified towards the end of the festival of the nearest drop off points for chairs and reminded to return their chair

Energy saving

User can see how much energy they have saved by renting a chair rather than buying a new chair for the festival

The user can also track the journey their PET bottle is taking to be recycled and re-purposed into more camping chairs

Existing system

User searches online for chair

Chair ordered next day delivery

Chair delivered to house in van

Chair is brought to festival in user's car

Chair breaks mid-way through festival

User leaves chair behind upon leaving

Waste is collected & taken to landfill

reSTAND system

Arrives at festival, no camping furniture

Downloads the reSTAND app

Pays £5 through the app to rent a chair

Chair used for duration of festival

Sees PET bottle scheme advertised on app

Gives reSTAND staff 3 bottles as enter area

User claims free drink reward

Returns chair upon exit at reSTAND station

Claims chair reward while on way home on app

User experience and pain points in the reSTAND system was derived from the results of a detailed questionnaire answered by 25 people

Product Redesign

reSTAND's chair has the functionality of a collapsable camping chair to take up minimal space in transit and storage, yet offers an innovative design for disassembly - by standardising the materials and limiting the amount of components this chair is a great sustainable alternative.

Seat Material and Manufacture

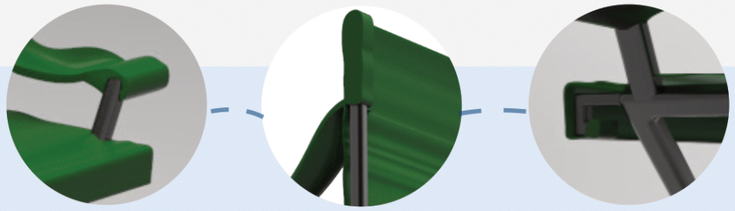
Detachable sheet made from recycled PET (RPET), a lot of which comes from the sourcing stations put in place at our partner festivals to collect EoL water bottles.

Pre-washed with steam, removing any labels.

Ground into flakes, washed, separated, and melt purified.

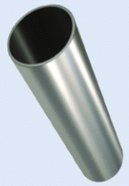
Any extruded material is then pelletized to be reintoduced.

[1]



Seat Material and Manufacture

Sheet slots on at the top of the back supports, the sides of the arms and wraps under the front of the chair - making it designed for cleaning and durability. One component is much easier to keep in good condition and maintain.

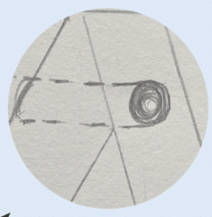


The aluminium is cast, more specifically pressure moulded. It is also anodized to protect the metal from oxidising during adverse weather conditions.The additional prongs that slot into the arms and legs are welded on and then these parts are sent to the reSTAND assembly factory.

Ergonomics

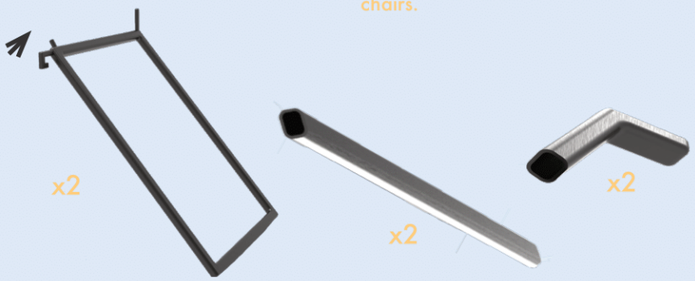
The sizing of the the chair have largely stayed the same; users will be more inclined to pay into the system if it is with a product that they know and have used before.

Disassembly



No permanent fixtures meaning they are easy to disassemble and sort through at EoL to be recycled. Two leg parts held together by a removable Al dowel.

Aluminium frame made from a mix of virgin and recycled Al. The 2 back supports and 2 arms slot off, leaving the 2 legs parts behind. Meaning there are a total of 6 aluminium parts - halving the amount of previous chairs.



Life Cycle

If our users adhere to our idyllic system loop, then the reSTAND chairs should withstand up to at least 10 uses without any maintenance or replacements.

This is turn would increase the products overall lifetime by more than a year if the chair was used once a month at different events.

+1 year

User Interest

RPET is a lightweight yet durable material that can withstand a lot of weight, so offers the support of normal chairs.

The product is rented for the duration of the festival, meaning that it eliminates the effort of making space and transporting it home.

Users will be greatly encouraged to return the chairs by reSTAND's incentives that provide a variety of different points and offers (see next page).

Material Sourcing

The aluminium is sourced from supplier Thyssenkrupp Materials (UK) which has sites across the country to match the locality of our events. Majority of business would occur at the northern branches (Darton & Preston) since most large festivlas are located in the north, preventing long haul trips and carbon emissions.

Once the PET water bottles are collected they are sent to a spcialist materials recovery centre where they are recycled and sent back to our local factory.

Transport and Storage

After the material is fabricated, it is sent to the reSTAND factory in Manchester, assembled and prepared for shipping.

To maximise efficiency, the chairs are packed together tigthly on a two-story lorry so as much product can be distributed at once.

If the event takes place over one day, the lorry will stay at the location, to reduce back and forth trips and petrol fumes.

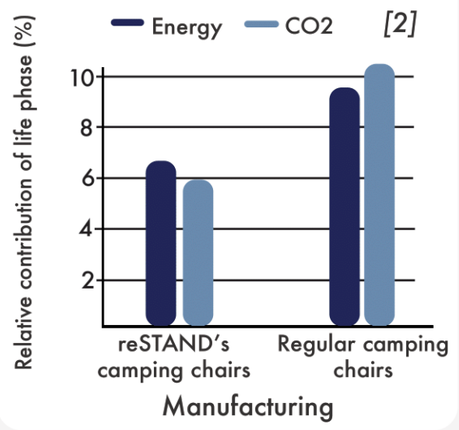
After the event and when not in use, they are taken back to the factory and put in storage until they are needed again - with an aim to be permanantly stored at the events as time goes on (eliminating transport altogether).

Environmental Analysis

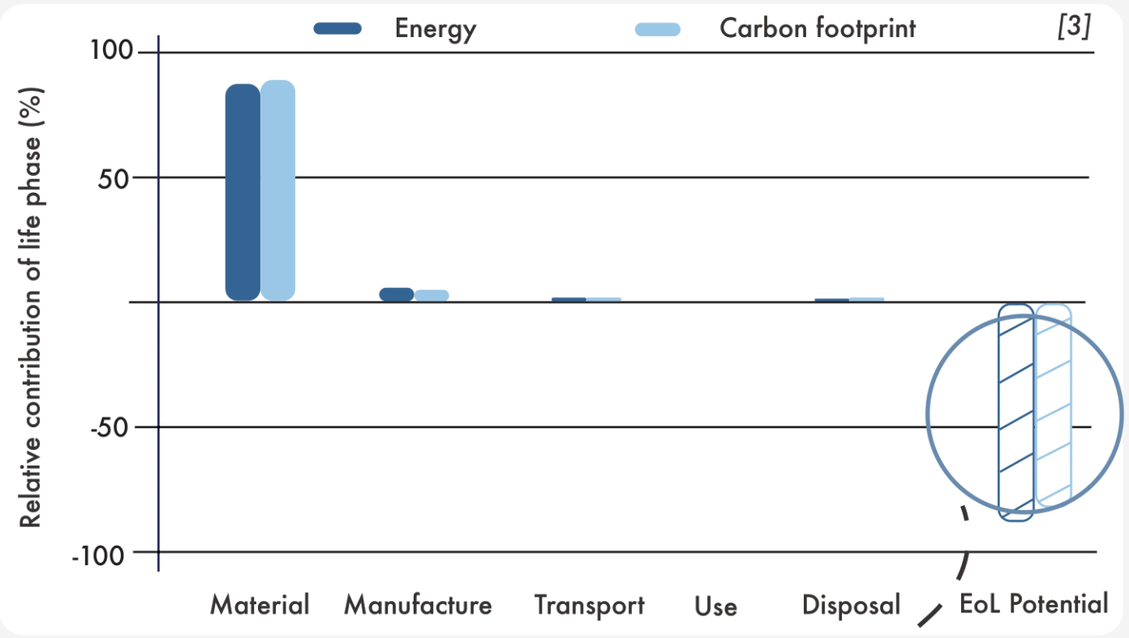
1. https://www.thebalancesmb.com/recycling-polyethylene-terephthalate-pet-2877869
2. https://imperiallondon-my.sharepoint.com/personal/ab2920_ic_ac_uk/_layouts/15/onedrive.aspx?id=%2Fpersonal%2Fab2920%5Fic%5Fac%5Fuk%2FDocuments%2Fchair%20eco%20audit%202%2Epdf&parent=%2Fpersonal%2Fab2920%5Fic%5Fac%5Fuk%2FDocuments

Conclusions of reduction in environmental impact

- The energy produced during the material phase has decreased by 95% from 279 MJ to 13 MJ. This could be largely due to the RPET; the nylon mesh used before was a complex material with many different fibres weaved together, requiring a lot of energy when being made.
- In regards to manufacturing, reSTAND's chairs are reused for multiple life cycles, creating material circularity and thus not requiring new material to be made so often.
- Reusability and recyclability make the reSTAND chair more sustainable in every aspect. The EoL potential for the product is really high for energy, proving that the more product life cycles there are, the more environmentally friendly the product becomes.



The fabrication of our chairs produce nearly 50% less emissions, with an aim to decrease even more if our aluminium parts were standardised further, elimIWnating the need for welding.

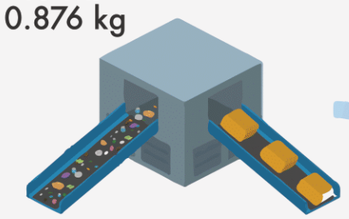


No Packaging

This redesigned product removes all packaging, saving on unnecessary material costs and environmental damage, e.g 4.9 MJ of energy and 0.24 kg of C02.

Materials

13 MJ
0.876 kg



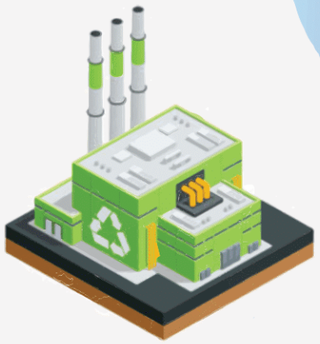
Manufacturing

0.919 MJ
0.06 kg

reSTAND chair life cycle analysis

EoL Potential

-10.4 MJ
-0.67 kg

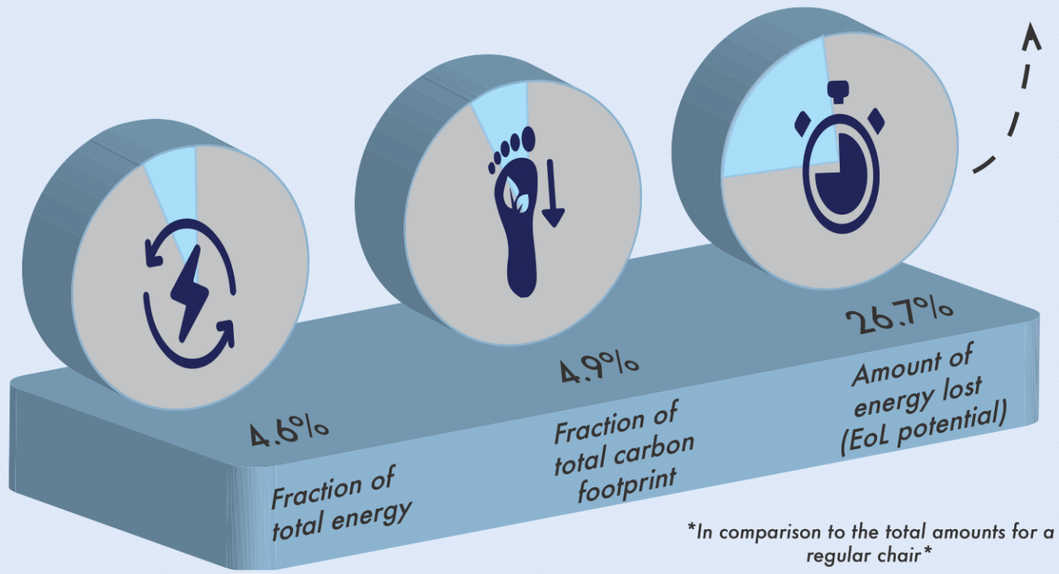


Transport

0.06 MJ
0.004 kg

End of Life

The EoL potential has a value of -10.4 MJ meaning that if users recycle their product (completing the idealised loop, returning chair each time, reSTAND recycles when broken), they would save up to 73% of the products original energy that would go back into the system.



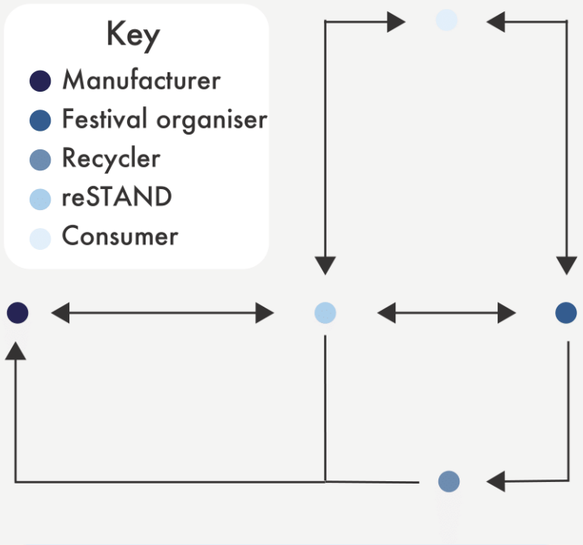
In comparison to the total amounts for a regular chair

It should be noted here that these values are all estimations predicted by CES Edupack that assume our users exist within the idealised system flow loop.
reSTAND recognise that even by offering incentives, some users may choose to not return the chair, or that it may be damaged beyond repair and therefore unable to be recycled and utilised.

Stakeholder Interactions

Mapping of the interactions between different stakeholders, and how they contribute to reSTAND systems' circularity through their behaviours, needs, motivations, and sustainability awareness. The needs and intentions of a typical user are explored through the reSTAND solution.

Behaviour & Interactions · Needs & Motivations · Sustainability Awareness



Manufacturer

The manufacturer is a branch of reSTAND, and works Closely to keep up with demand for different Components. Inspections are carried out periodically by reSTAND manufacture experts
Not involved in materials supply decisions(rpet from recycler and AI from thyssenkrupp UK)

- Matching supply to reSTAND demand
- Technological developments leading to increased production efficiency and cost reduction
- Develop intervention to reintroduce components rejected under quality inspection

eco-indifferent

PET recycler

Works closely with other stakeholders to receive pet bottles and recyclable materials from reSTAND and the festival organiser and deliver recycled pet to reSTAND

- Technological development to maximise efficiency and reduce carbon emissions and costs of extracting pet from bottles
- Supply to reSTAND and other companies buying rpet
- Legislative changes on camping chairs mean higher demand for rpet and more investment into pet extraction methods
- Reliable sources of pet to reduce sorting time and contamination risk

eco-devoted

Festival organiser

Hires reSTAND to provide seating and bottle deposit Stations, uses reSTAND's app as touchpoint to track and compare festival's sustainability engagement with others. Touchpoint with consumer when selling tickets and during festival, sends leftover bottles and camping seats to recycler

- Sustainably positioned to attract attendance of younger festival-goer demographic
- Bans personal camping chairs to reduce waste
- Equal partnership: incentive to hire reSTAND for free is to address sustainability concerns
- Responsibility of post-event clean up, hiring reSTAND reduces some waste

eco-intentional

Consumer

Interacts with reSTAND at deposit, rental, and return stations at organised festival through various incentives Touchpoints with festival organiser and reSTAND through reSTAND app.
Pick up empty bottles found during festival for free drink, enter reSTAND system, help support low effort system to source rpet for chairs and reduce landfill

- Range of free drinks when trying to save money at a festival is additional incentive to protect environment
- Incentivised to return chair to gain rewards
- Personal camping chairs banned at festival, want to be able to sit down during the day
- Touchpoint with reSTAND on app to browse rewards, rental opportunities, bottle depositing scheme and more, enhances engagement and motivation to contribute to system

eco-intentional

Sacha, 24

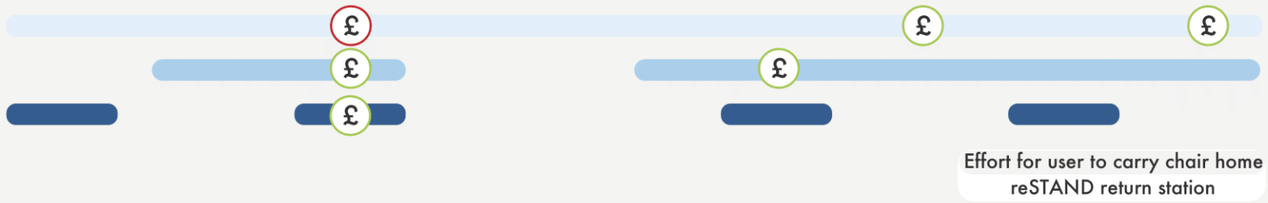
Nurse
Eco passive
Regular festival goer

User requirements:

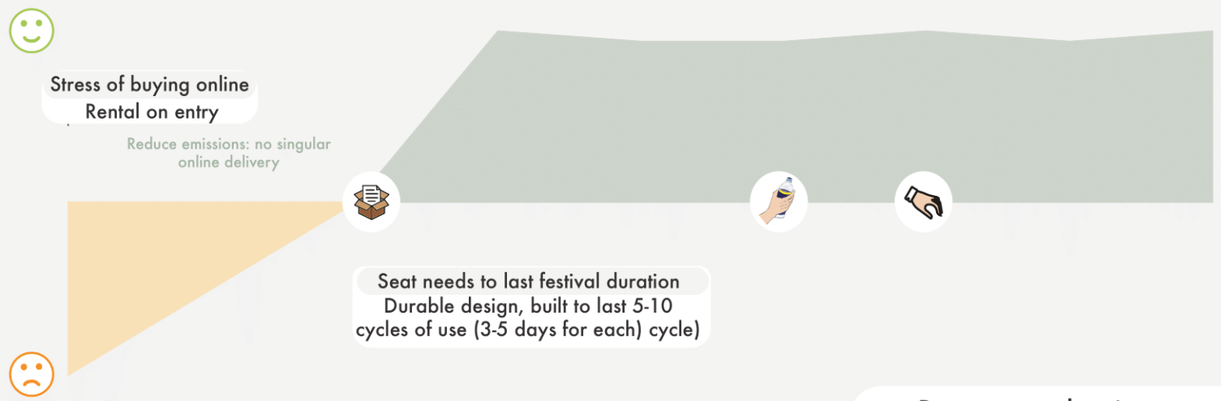
- Aesthetics
- Price
- Convenience
- Sustainability
- Durability

User journey map

Arrives at festival, no camping furniture	Downloads the reSTAND app	Pays £5 through the app to rent a chair	Chair used for duration of festival	Sees pet bottle scheme advertised on app	Gives reSTAND staff 3 bottles as enter stage	User claims free drink reward	Returns chair upon exit at reSTAND station	Claims chair reward while on way home on app



Effort for user to carry chair home
reSTAND return station



Stress of buying online
Rental on entry

Reduce emissions: no singular online delivery

Seat needs to last festival duration
Durable design, built to last 5-10 cycles of use (3-5 days for each) cycle)

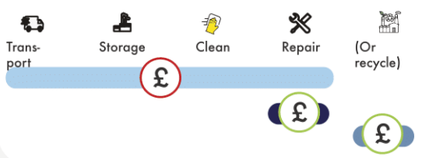
User Needs
Solution

Stakeholders

- £ Profit
- £ Loss

Seating functionality
reSTAND chair works exactly the same in use as regular chair, functional difference is post-use

Post-use product journey



reSTAND

Hired by the festival organisers, in direct Communication to deliver material and buy rpet from pet recycler, touchpoints with consumer through rental, return, and deposit stations and the reSTAND app.
Collect leftover chairs identified after festival, oversee entire system: material sourcing from recycler, manufacture, storage, distribution, rental, returns, cleaning, restoration, and repair of chairs

- Develop technology and use data from to reduce costs of production and match supply to demand
- Organise collection and identification of leftover chairs that havent been returned
- Brand advertisement to increase brand recognition for non-reSTAND clean-up staff to recognise chairs and deposit at reSTAND return stations
- Adhere to legislation to produce chairs made from rpet and AI
- Move towards 100% electric distribution vehicles
- Aim for 100% circularity of camping chairs by comprehensive evaluation of chair condition at storage and manufacture facility
- Reduce trip number and length by streamlining delivery and pick-up from festivals and recycling centre, manufacture on-site at reSTAND storage
- Sustainable company without price increase: sourcing recycled materials is cheaper than virgin
- Move towards 100% electric vehicles, reduce co2 emissions
- Jet washes ensure hygiene standards are met, promote perception of cleanliness and sustainability, make chair last as many cycles as possible to prevent premature obsolescence

eco-devoted

Solution

reSTAND becomes the solution to all the problems that are faced in the existing scenario. Starting with the legislations that are put in place to ensure the new system is reinforced, reSTAND offers an innovated camping chair, that makes it feasible to last 10 complete cycles and eliminates the negative environmental impact from the existing system. Different stakeholders, within the system are motivated to contribute to the system to create a circular flow, and the users are incentivised to return the chairs, with each stage being adapted to connect with their needs.

Key

Feasibility · Innovation · Environmental

[1] https://www.ianmankin.co.uk/blog/britons-send-over-50-per-cent-of-reusable-furniture-to-landfill-every-year/
[2] https://www.recycle-more.co.uk/household/recycling-facts
[3] http://www.petresin.org/news_introtoPET.asp
[4] http://www.petresin.org/PETfacts.asp
[5] https://www.jerseyislandholidays.com/plastic-bottle-pollution-statistics/
[6] https://www.somersetlive.co.uk/whats-on/music-nightlight/what-happens-tents-left-behind-56851
[7] https://www.businesswaste.co.uk/disposable-bbqs-should-be-banned-to-prevent-further-devastating-wildfires/
[8] https://theexpertcamper.co.uk/blog/camping/how-many-campsites-are-there-in-the-uk/

Product

An innovative design that enables the extension of the chair's life circular life cycle in the reSTAND system through durability and ease of disassembly, while maintaining the widely recognised design and functionality of a regular camping chair.

Designed to be easily disassembled to repair or replace any damaged parts

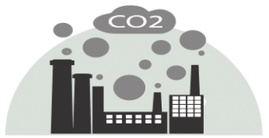
Materials re-enter and circulate the loop over a longer time period

Number of chairs that end up in landfill is reduced

Around 22 million pieces of furniture are discarded every year in the UK

Designed using only 2 materials: rPET and Al

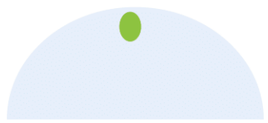
Low variety of materials and recycled content reduces cost and energy in material sourcing



Mass production with less manufacturing processes required, less CO2 emissions

90% of energy in manufacturing is saved when recycling Al[2]

Designed to take up minimum space when packed up to reduce trips and emissions in distribution



More chairs can be packed up in one lorry: no packaging, collapsible design

Less trips from where they are stored to the festival reSTAND has been hired at

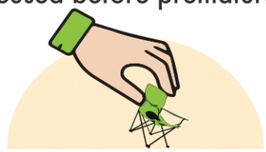
Reduces the CO2 emissions produced by vehicles whilst moving towards 100% electric

System

Innovative solution to the yearly chair and plastic bottle waste in festivals and all related events through every season.

Stages implemented so the chairs are reused before premature obsolescence

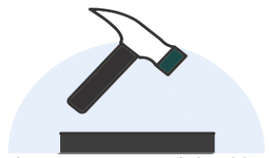
Repair stations to fix broken chairs



Staff are employed by reSTAND to find and collect chairs left behind

Chairs re-enter the loop instead of being thrown away

Durable materials that makes the system feasible for 10 cycles



rPET and Al are strong and durable enough materials to last 10 cycles and not be damaged in transit without packaging [3]

PET is chemically resistant so can be deep jet cleaning & has a large strength:weight ratio.

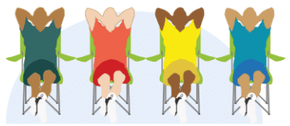
PET bottles can hold 50 times its weight in water [4] huge durability of rPET

Collecting left behind bottles and providing a drop off station for bottles

Bottles that would end up in landfill are responsibly collected, recycled, and reused

More than 60 million plastic bottles end up in landfill everyday [5]

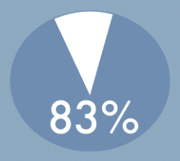
Doesn't take away from the Users experience



User interacts and use the chairs as they normally would

Takes away the responsibility of users to having to store and dispose of chairs responsibly

Feasibility



Of potential users interviewed said they'd prefer to rent than carry and buy their own camping chair at a festival, if it was convenient

Future Developments

This system can be expanded to incorporate a wide range of different products used at festivals, including:

TENTS: In a similar product service system to the chairs with development into reducing the many components in tents
BBQ: reSTAND would be able to supply sawdust briquettes at a refillable station for disposable barbecues with reusable recycled Al trays, as an eco-friendly alternative to coal
STORAGE: As reSTAND grows it can set up deals with campsites around the country to reduce need for storage: all chairs on constant cycle

5,500 tents were abandoned at the Glastonbury festival in 2015.[6]

Disposable BBQs are brought in the UK per year.[7]

4,803 campsites in the UK.[8]