

I'm on a mission to reduce the impact of... stuff

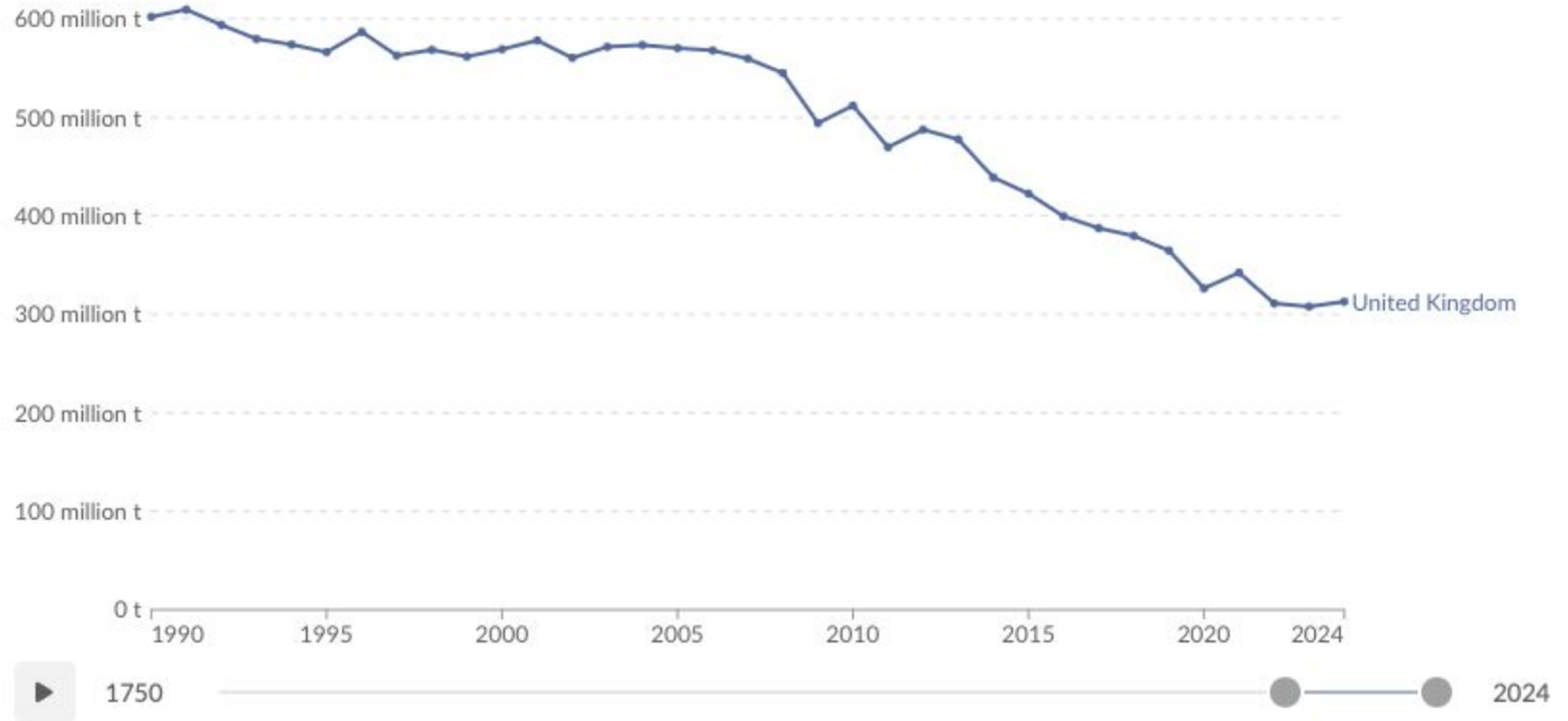
Annual CO₂ emissions

Our World
in Data

Carbon dioxide (CO₂) emissions from fossil fuels and industry. Land-use change emissions are not included.

Table | Map | **Line** | Bar

Edit countries and regions | Settings



Data source: Global Carbon Budget (2025) - [Learn more about this data](#)
OurWorldinData.org/co2-and-greenhouse-gas-emissions | CC BY

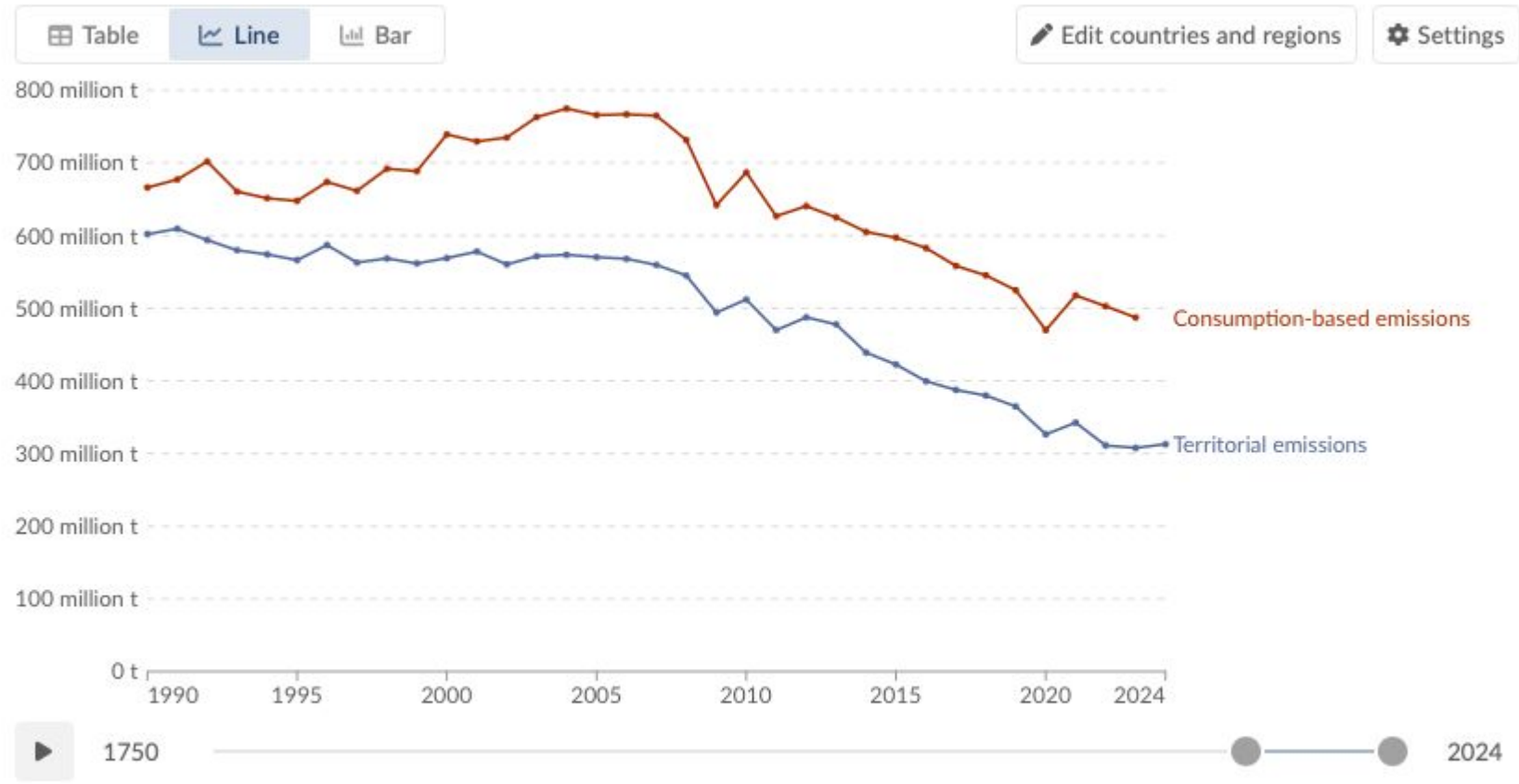
Download | Share | Enter full-screen

Related: [CO₂ data: sources, methods and FAQs](#)

Territorial and consumption-based CO₂ emissions, United Kingdom

Our World
in Data

Consumption-based emissions include those from fossil fuels and industry. Land-use change emissions are not included.



Data source: Global Carbon Budget (2025) - [Learn more about this data](#)
OurWorldinData.org/co2-and-greenhouse-gas-emissions | CC BY

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Related: [CO₂ data: sources, methods and FAQs](#)

The small appliances market is broken.



60M



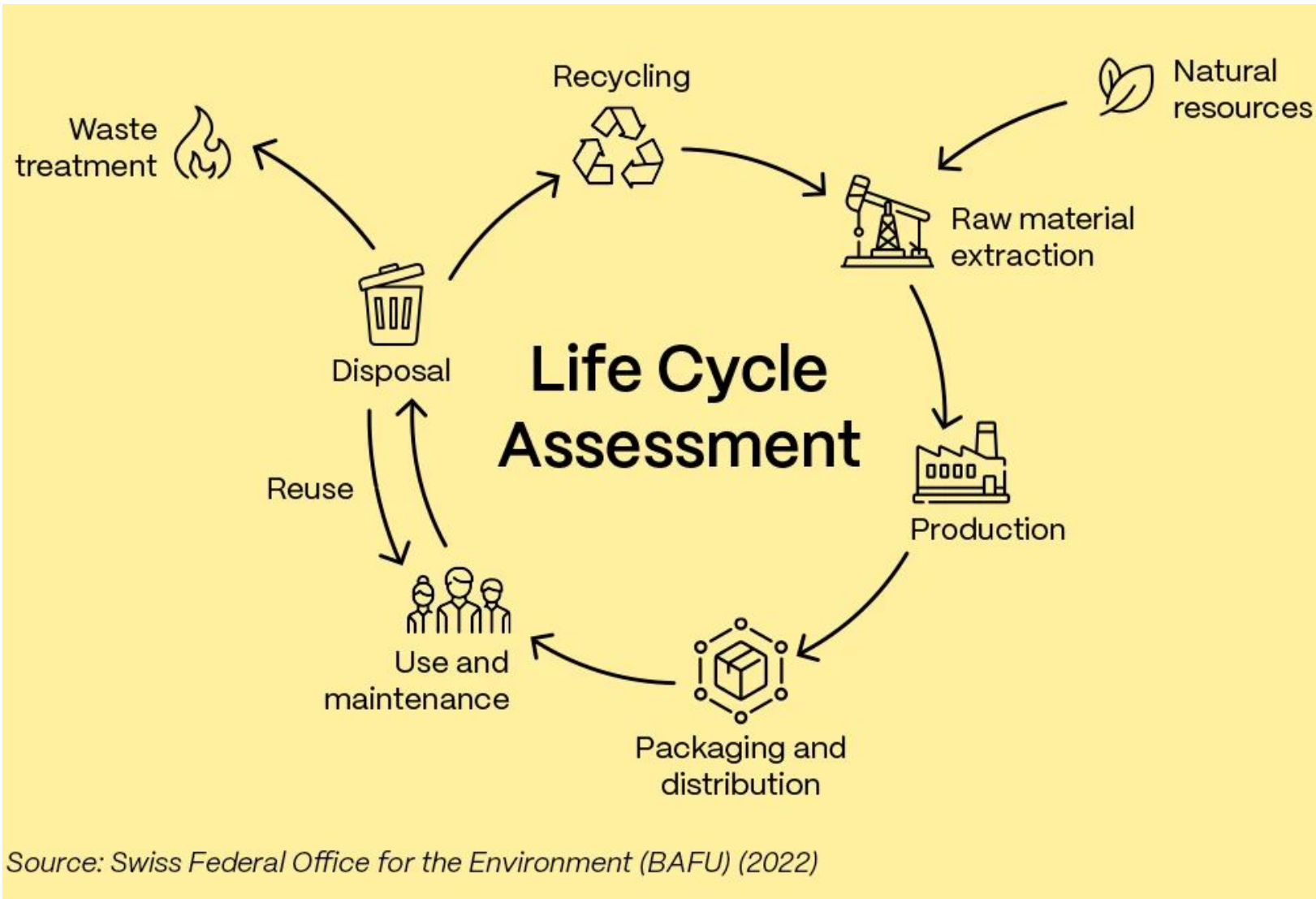
4 Years
7 Years



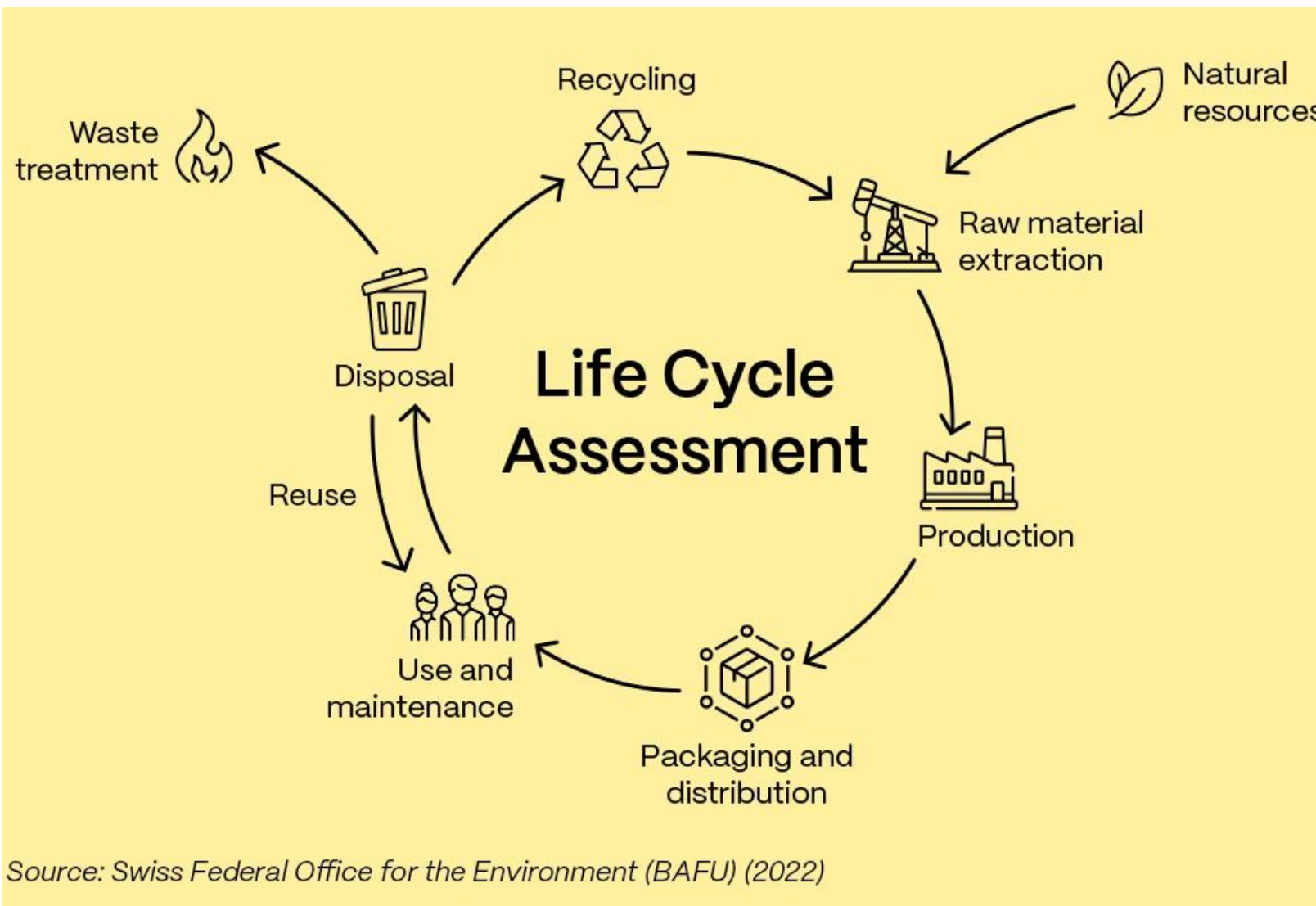
500kT

- A pragmatist's guide to product sustainability.
- How business models influence 'design for sustainability'.
- What I learned about sustainability in a corporate setting.
- Last. the story so far.

“What's measured improves”



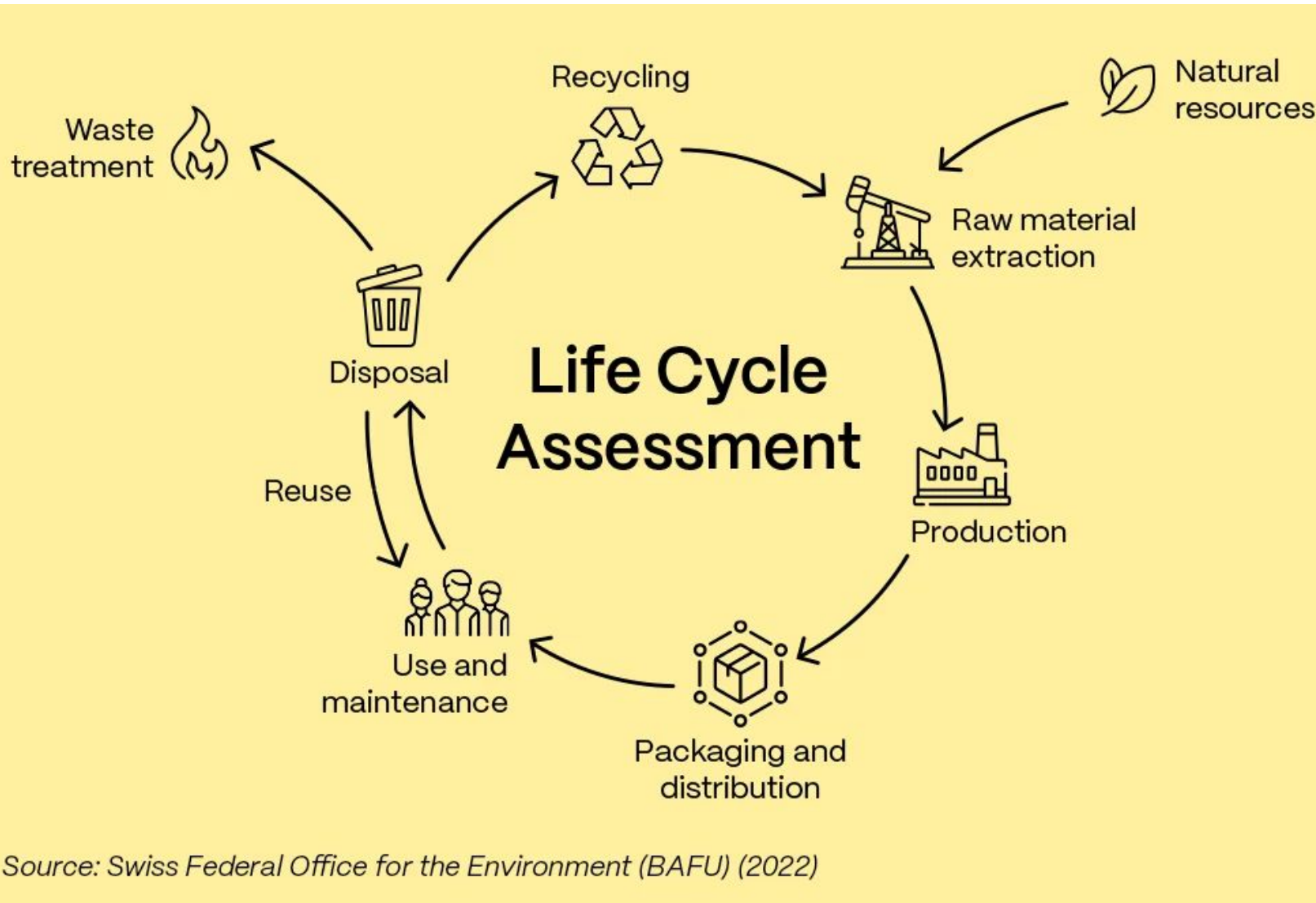
Source: Swiss Federal Office for the Environment (BAFU) (2022)



ISO Standards:

How to
Rules about claims
Comparison

Accuracy



Source: Swiss Federal Office for the Environment (BAFU) (2022)

ISO Standards:

How to
Rules about claims
Comparison

Accuracy

Ethos Engineering

Life Cycle Assessment (LCA) Specialist

Ethos Engineering · Birmingham · via LinkedIn

12 days ago · Full-time

[Apply directly on Recruit.net](#) [Apply on United Kingdom...](#)

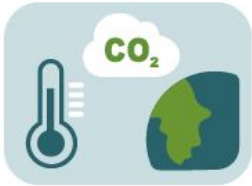
Job description

The Role

We are seeking a skilled and detail-oriented Life Cycle Assessment (LCA) Specialist to support the delivery of sustainable, high-performance projects, with a strong focus on the data centre sector. The successful candidate will lead and contribute to whole life carbon assessments, sustainability certifications, and regulatory compliance across a range of projects.

Key Responsibilities

- Conduct Life Cycle Assessments (LCA) and Whole Life Carbon (WLC) analyses for building projects, particularly data centres
- Use One Click LCA software to model, analyse, and report environmental impacts



CLIMATE CHANGE



WATER USE



LAND USE



ACIDIFICATION



OZONE DEPLETION



**HUMAN TOXICITY
NON-CANCER**



**EUTROPHICATION
MARINE**



**ECOTOXICITY
FRESHWATER**



**RESOURCE USE
MINERALS AND
METALS**



**HUMAN TOXICITY
CANCER**



**EUTROPHICATION
TERRESTRIAL**



**IONISING
RADIATION**



**RESOURCE USE
FOSSILS**



**PARTICULATE
MATTER**



**EUTROPHICATION
FRESHWATER**



**PHOTOCHEMICAL
OZONE FORMATION**



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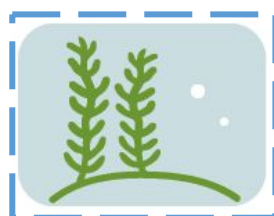
**IONISING
RADIATION**



**RESOURCE USE
FOSSILS**



**PARTICULATE
MATTER**



**EUTROPHICATION
FRESHWATER**



**PHOTOCHEMICAL
OZONE FORMATION**

Scales with
CO2

Less relevant
for small
appliances

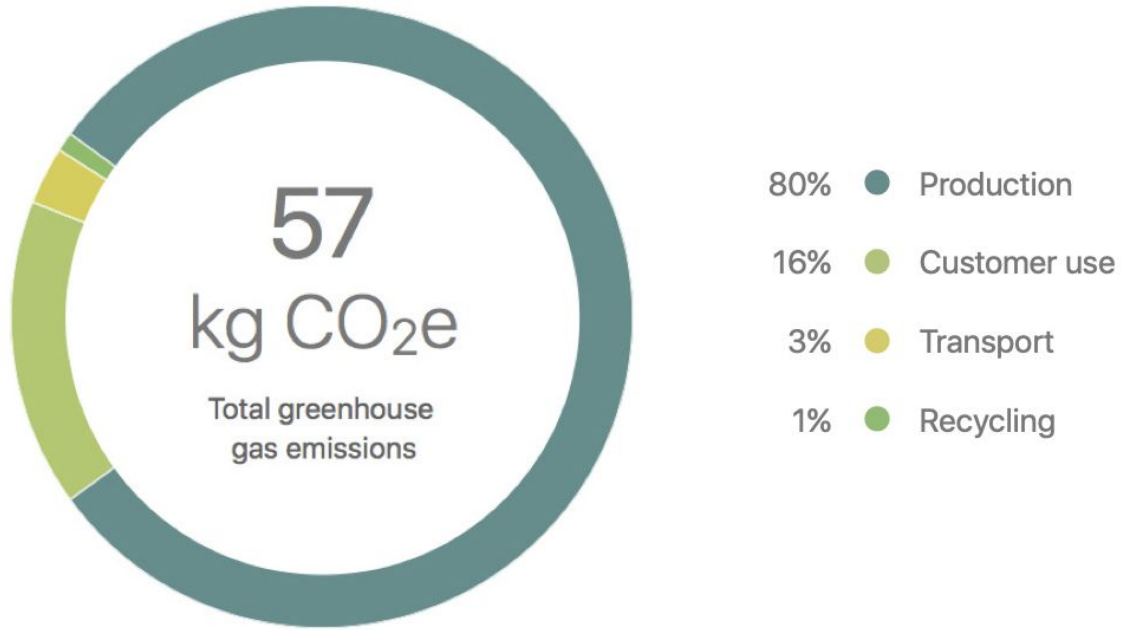
What is it made from?

How much energy does it use?

How long does it last?

Where? (is it from, where is it used & when, where does it go)

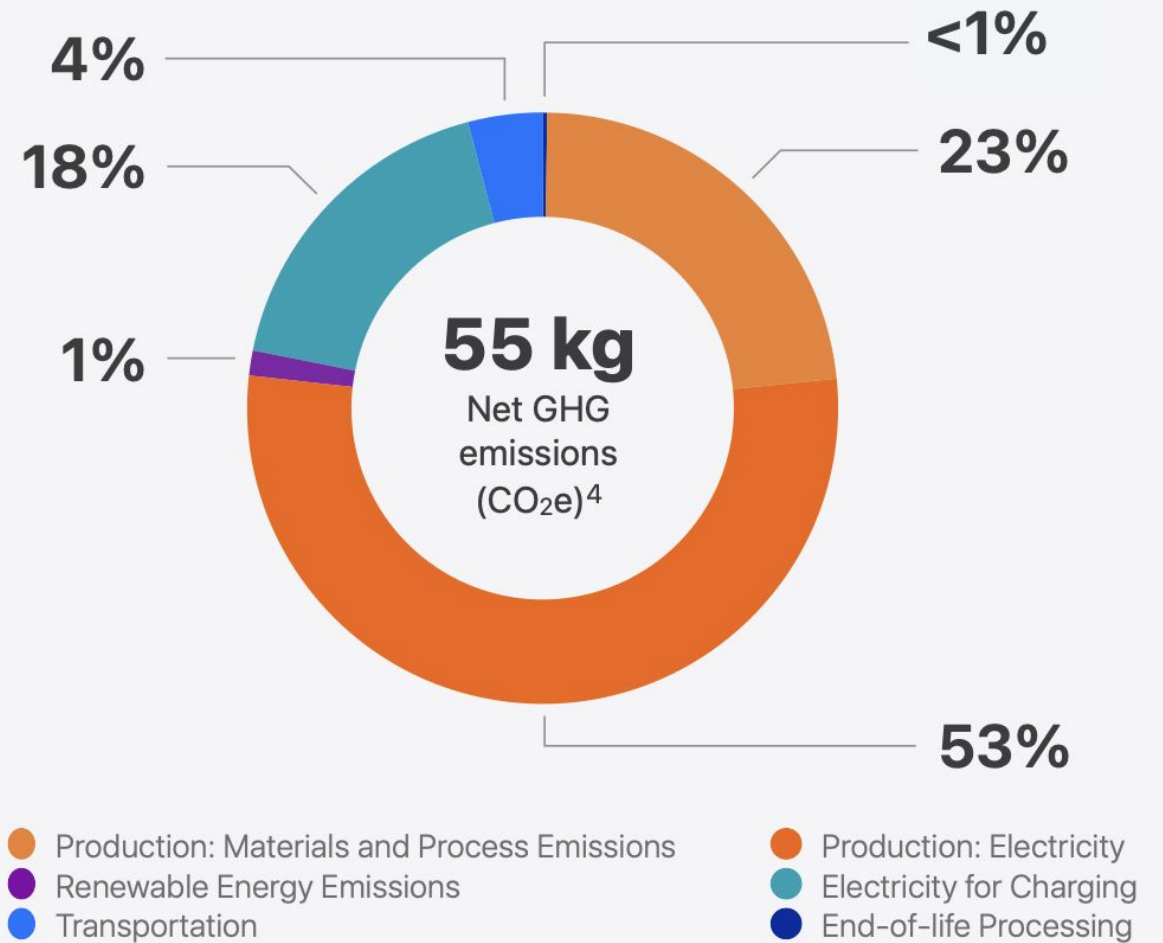
Greenhouse Gas Emissions for iPhone 8—64GB model



Environmental Report | iPhone 8 | September 2017

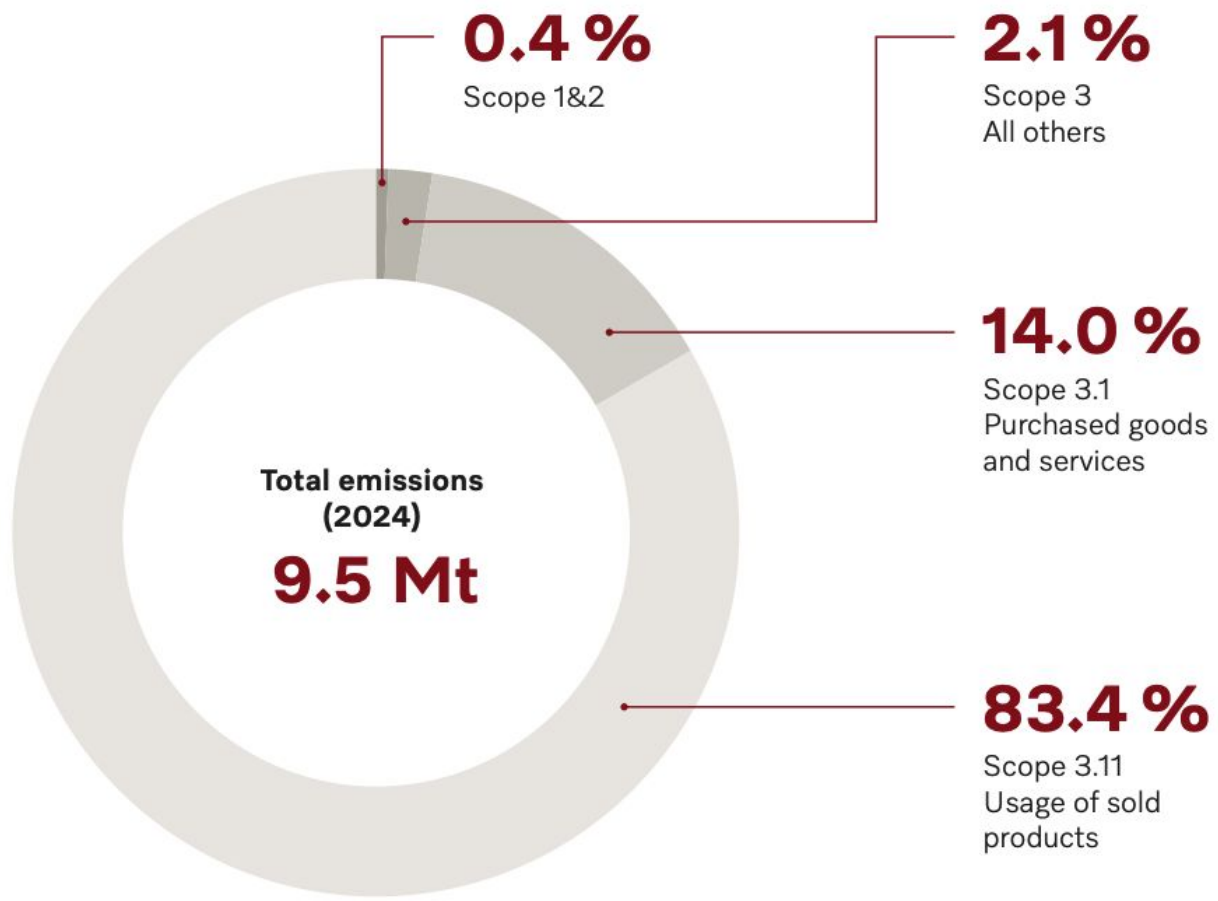
iPhone 17

256GB



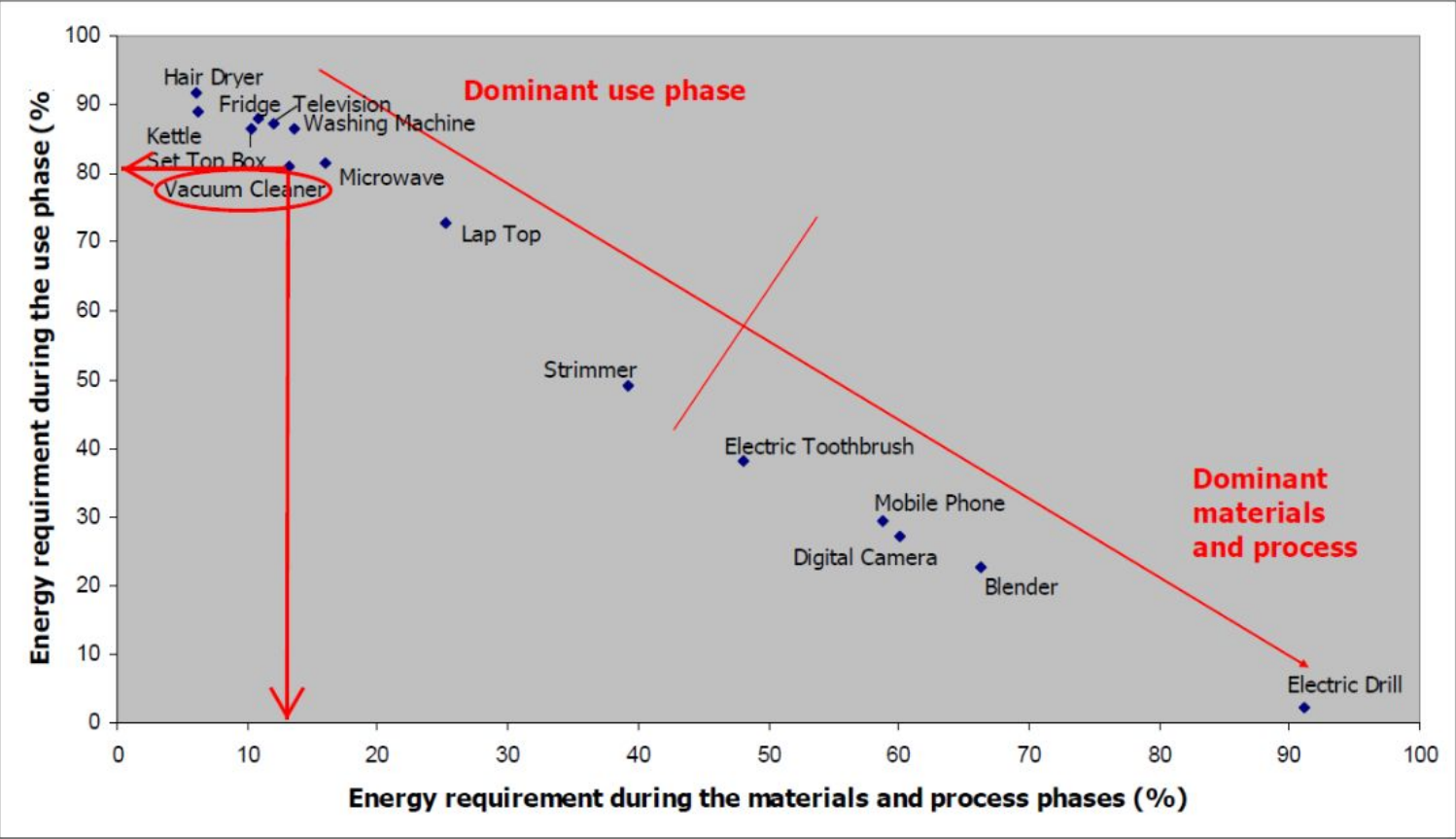
Production: Materials and Process Emissions
 Renewable Energy Emissions
 Transportation

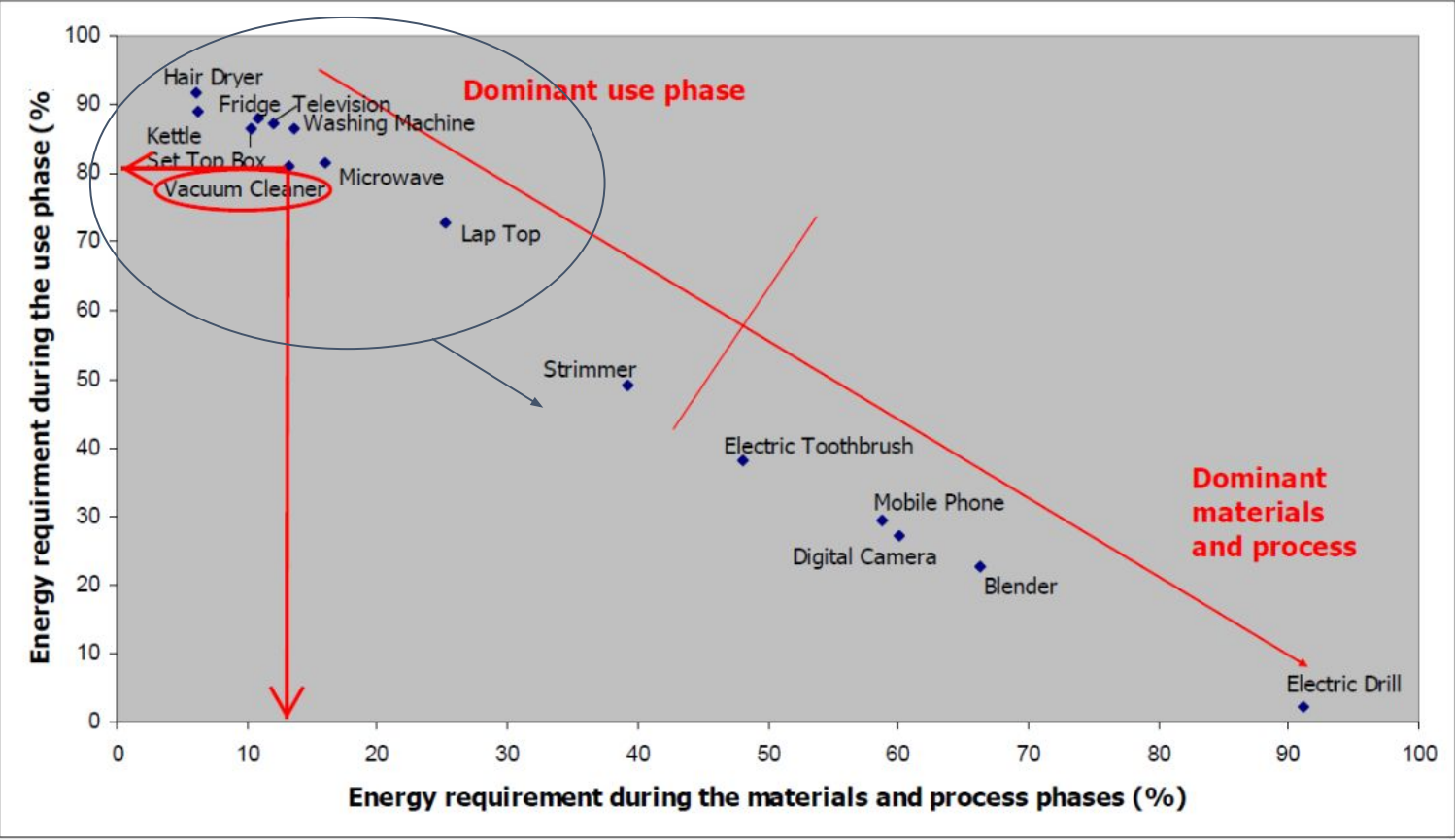
Production: Electricity
 Electricity for Charging
 End-of-life Processing

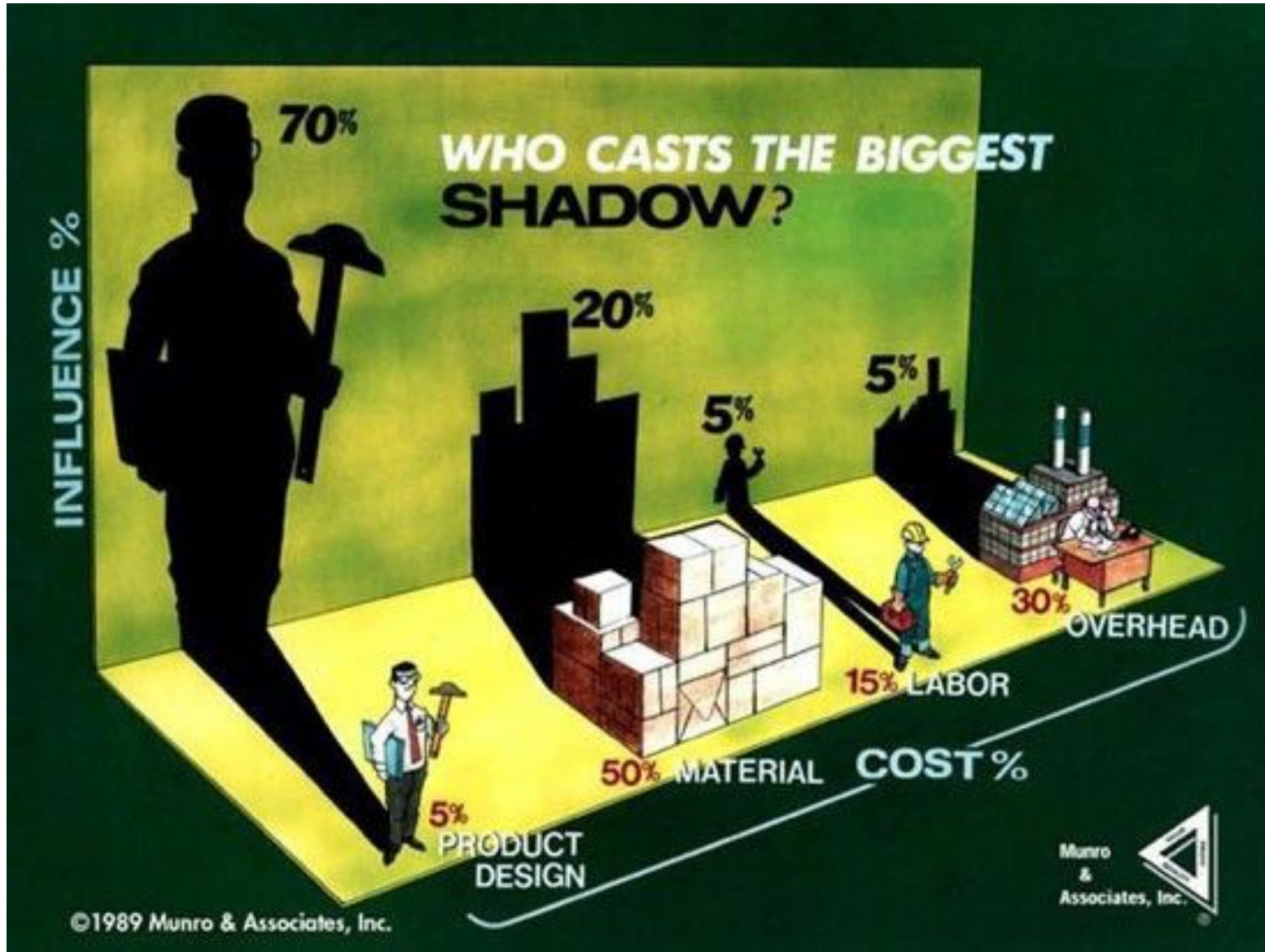


Miele GHG inventory (CO₂e)
market-based approach









Cost vs Environmental Impact

Both designed in early.



Disassemble and weigh all the parts
(virtually or physically)

Group materials.





Disassemble and weigh all the parts
(virtually or physically)

Group materials.

Multiply by an emissions factor.





What are all the possible power states?

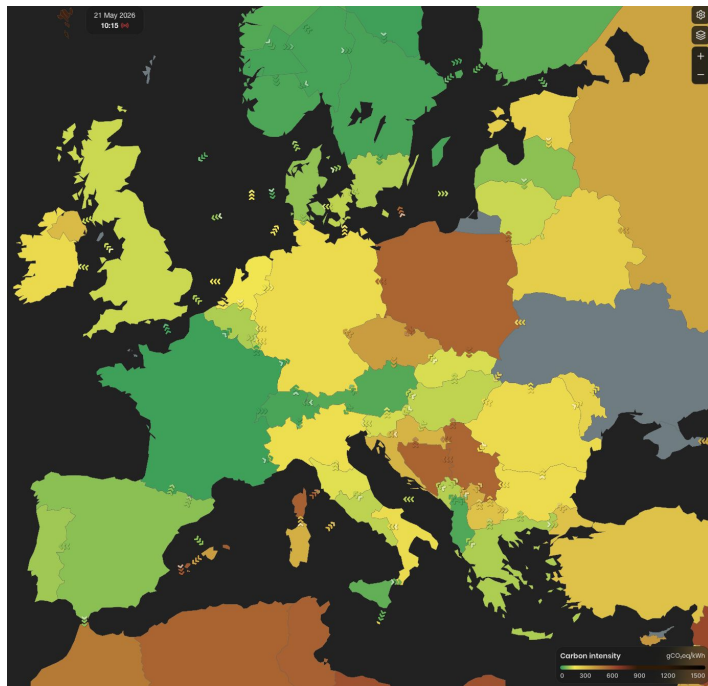
x

How long spent in each state?

=

Total energy consumed



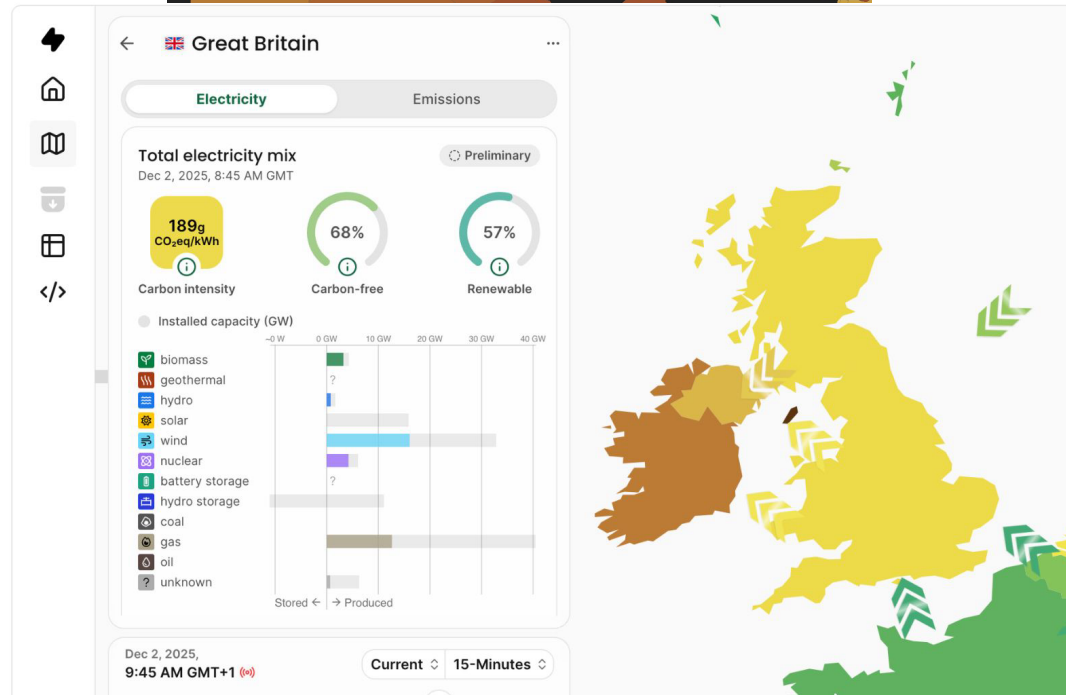


Total energy consumed

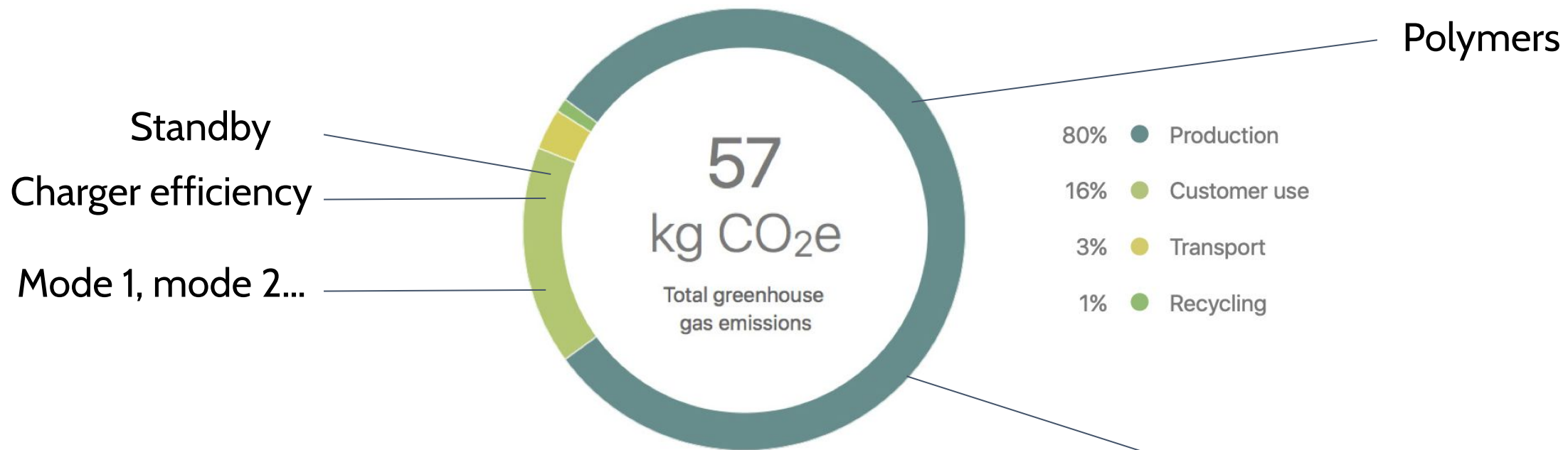
X

Emissions factor

= CO₂



Greenhouse Gas Emissions for iPhone 8—64GB model



What can designers do?

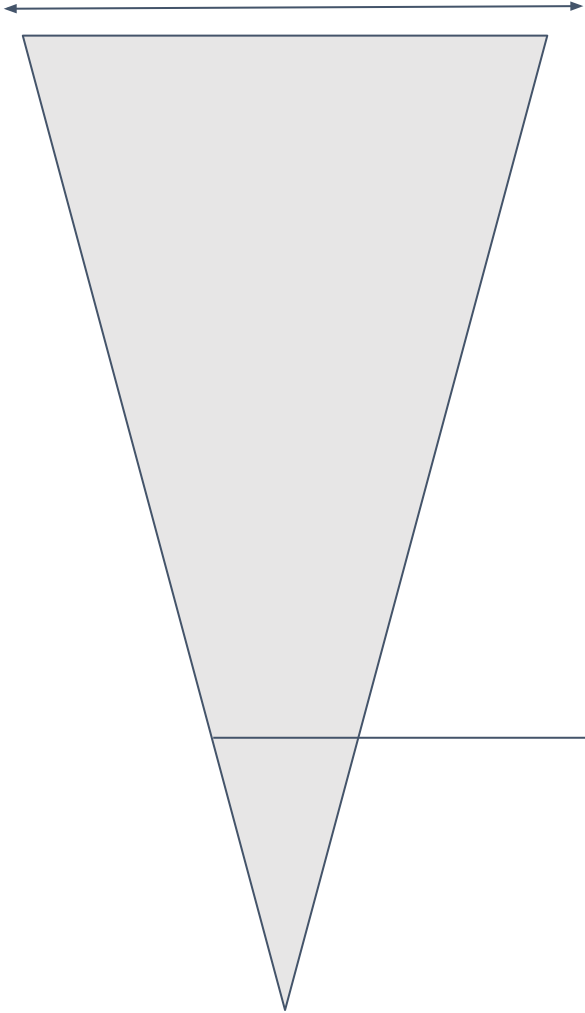
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How long does it last?

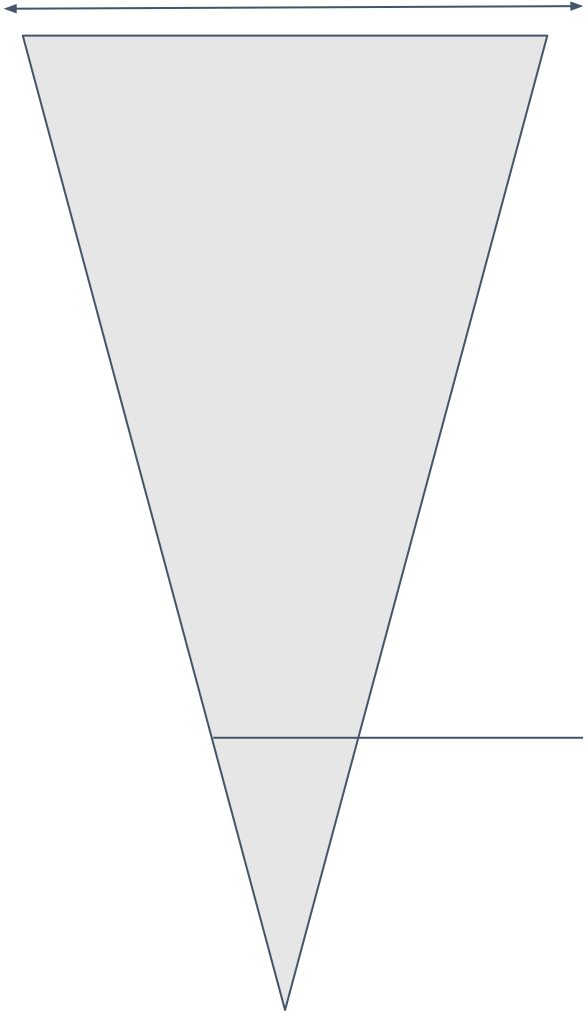
Where? (is it from, ~~where is it used~~ & when, where does it go)

One product impact



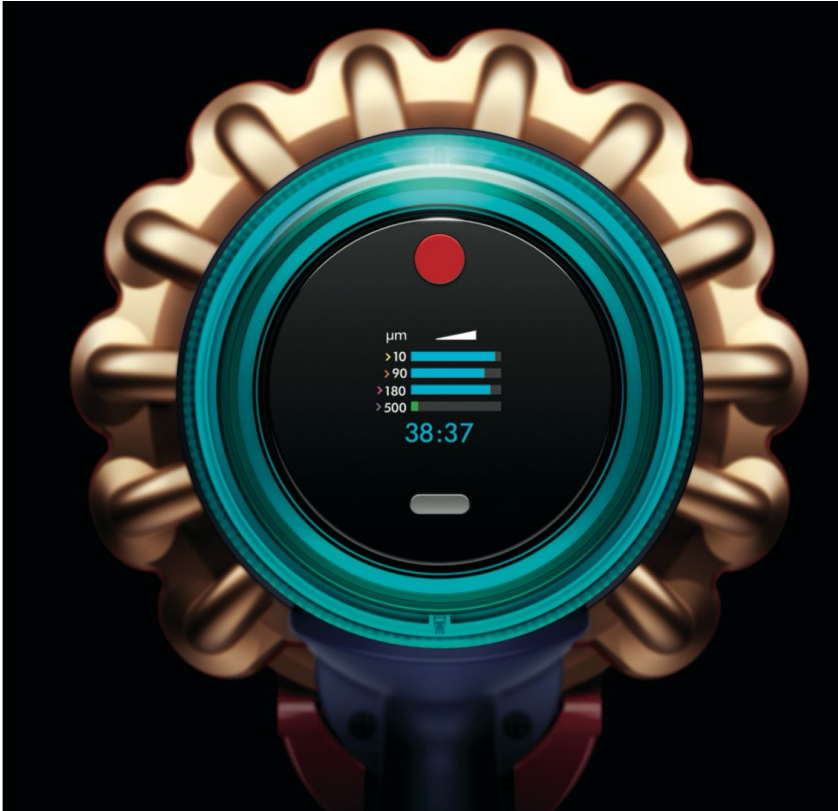
Efficiency - “doing more with less” (materials or energy)

One product impact

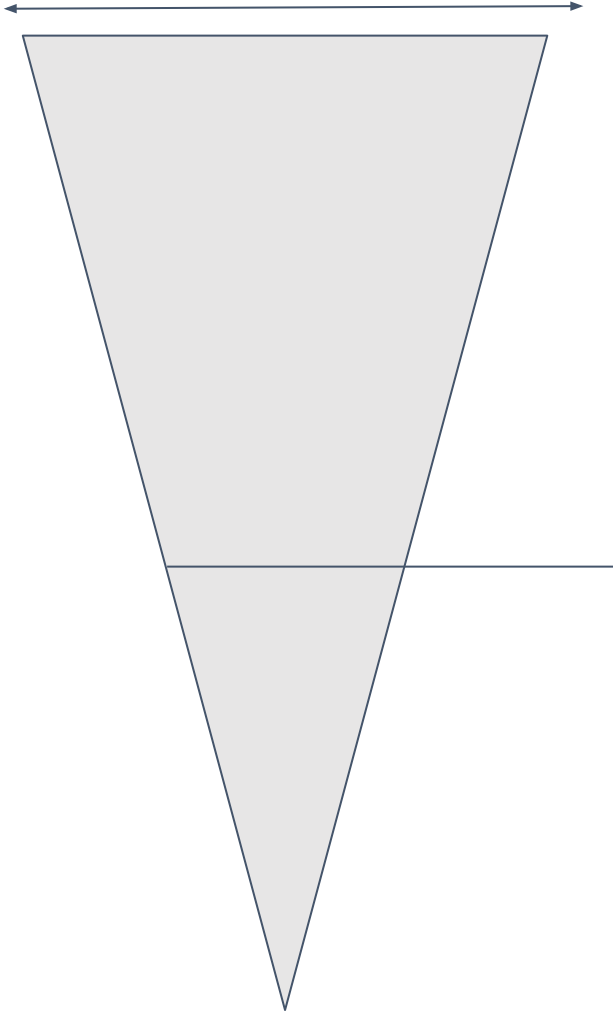


Reducing standby energy use by 50%

Energy-saving software onboard the Dyson Gen5detect™ vacuum puts the machine in a deep sleep when on standby, reducing its standby energy consumption by 50% compared to its predecessor.



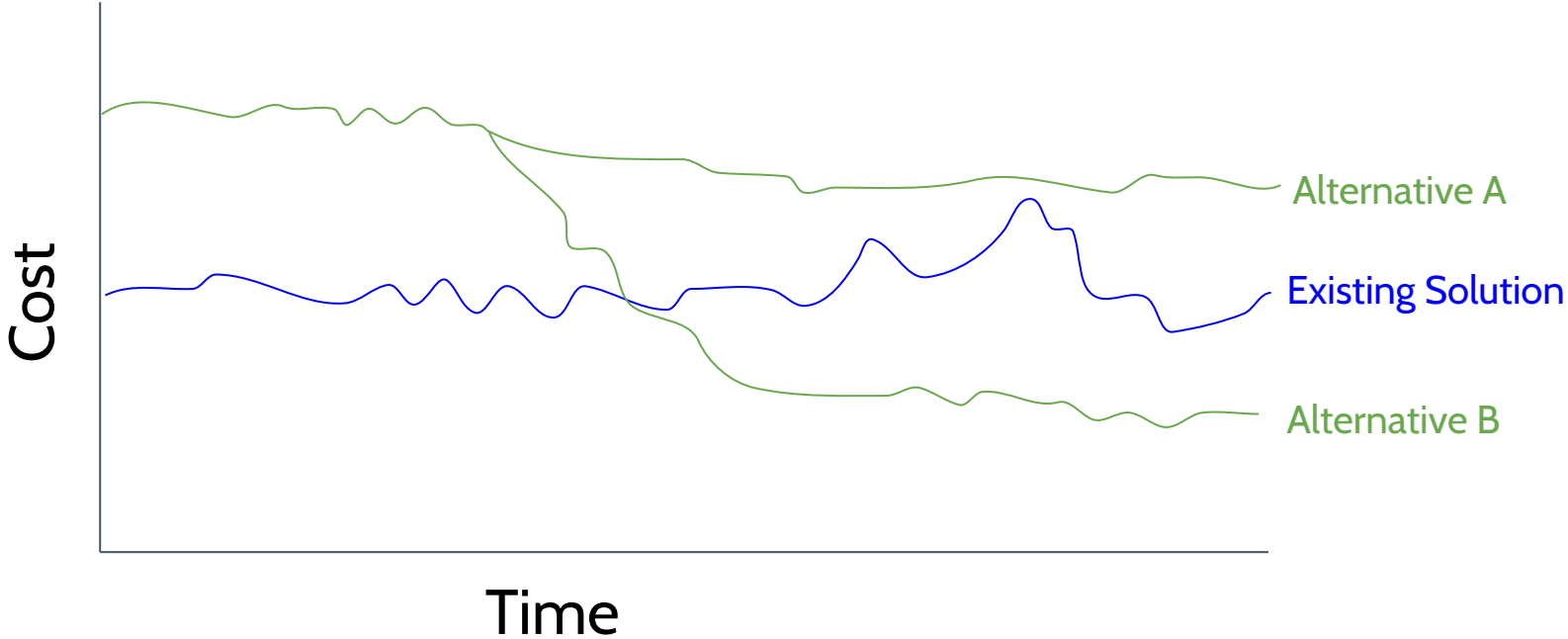
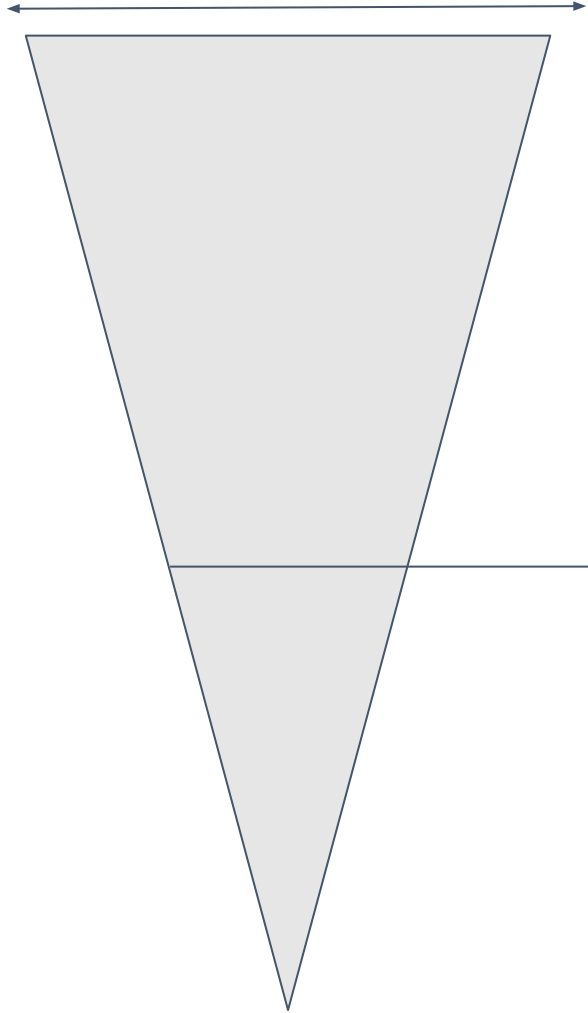
One product impact



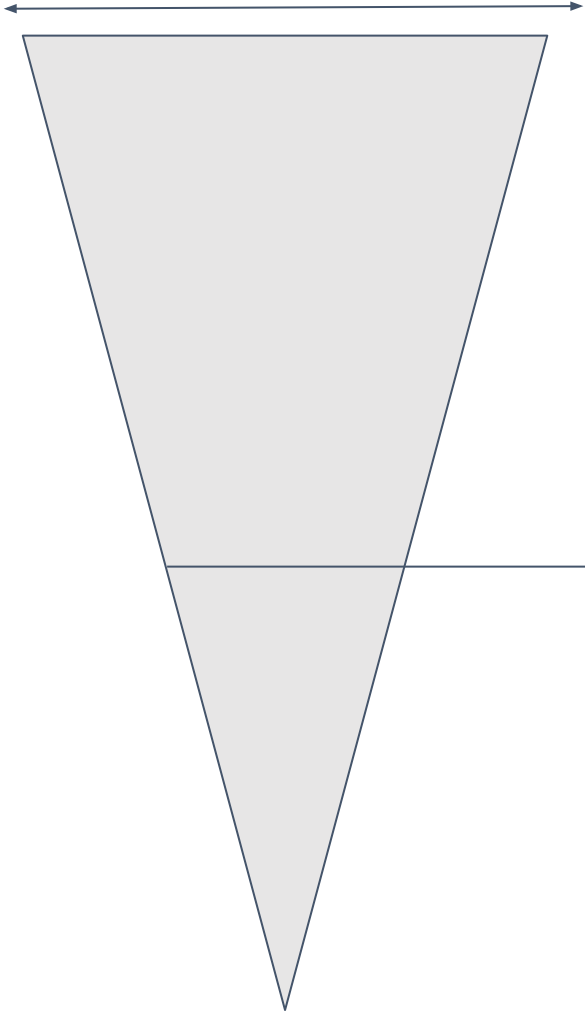
Old Wheels	New Wheels
0% Recycled Content	30% Recycled Content
Cheaper to Manufacture	70% MORE expensive to produce.
Higher Profit Margins	£0 Price Increase



One product impact

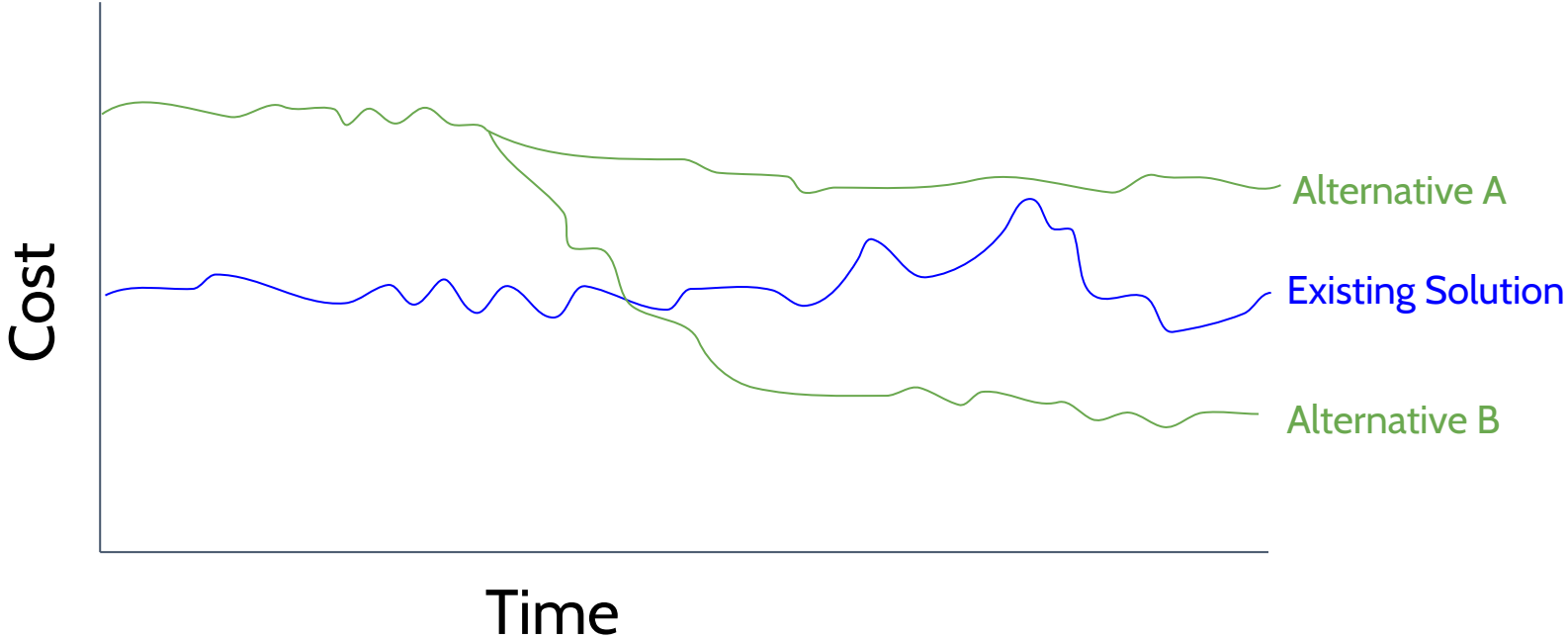


One product impact

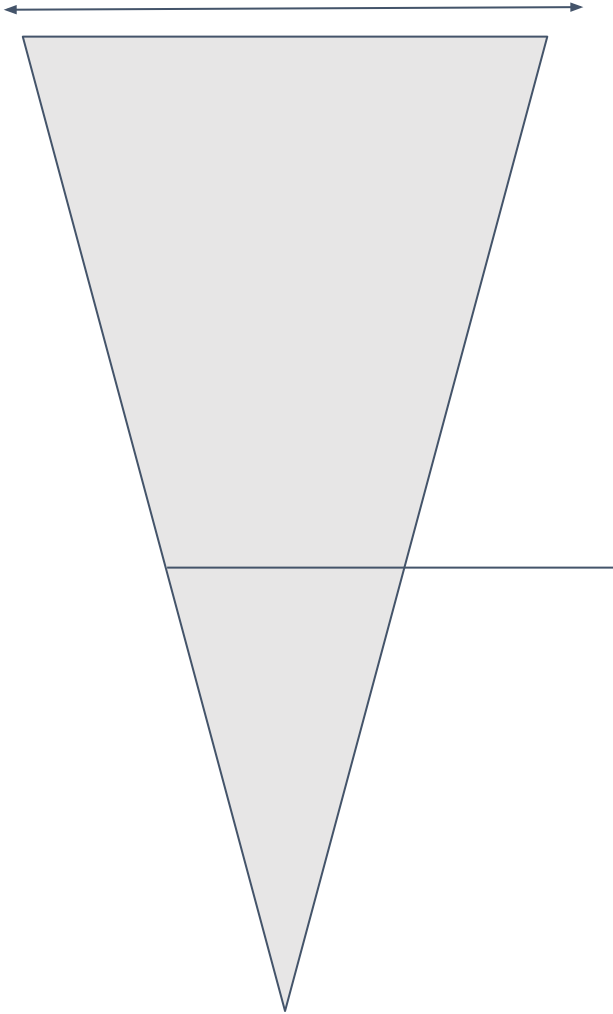


Requires:

- Strategic leadership
- Ideally, customer demand



One product impact



iPhone 17
30% recycled content,¹ including:

85% recycled aluminum in the enclosure	100% recycled cobalt in the battery	100% recycled gold plating and tin solder in all Apple-designed printed circuit boards
100% recycled gold wire in all cameras and Camera Control as well as gold plating in all connectors	95% recycled lithium in the battery	80% recycled plastic in the antenna lines, some of which comes from recycled textiles
100% recycled rare earth elements in all magnets	80% recycled steel in the display support plate, speaker, and receiver	100% recycled tungsten and copper wire in the Taptic Engine

- ~Claims
- ~Shareholders

Cost

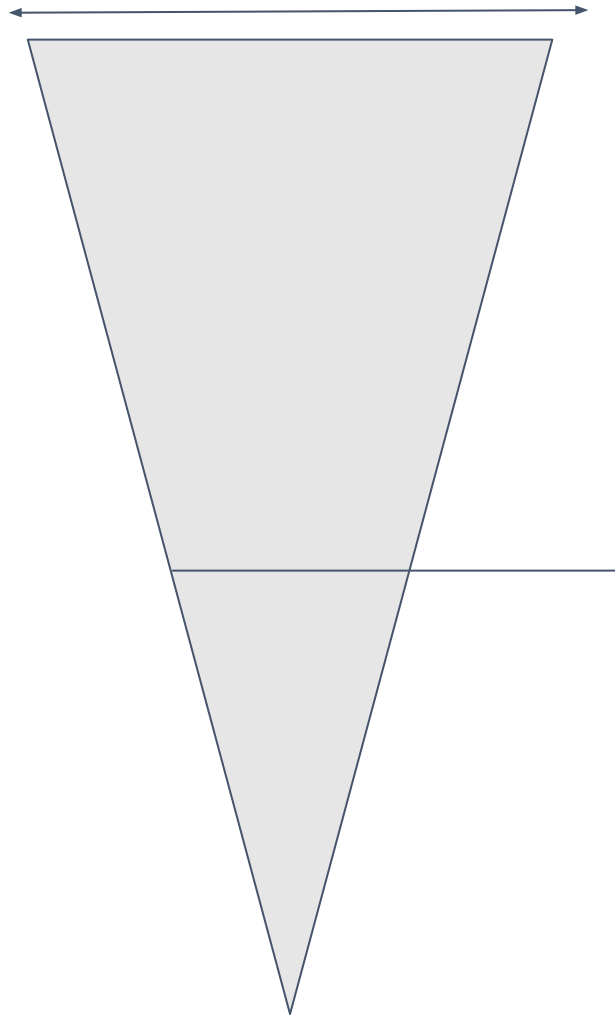
Price certainty

Resilience of supply

Ethical risk

Brand

One product impact



What can designers do?

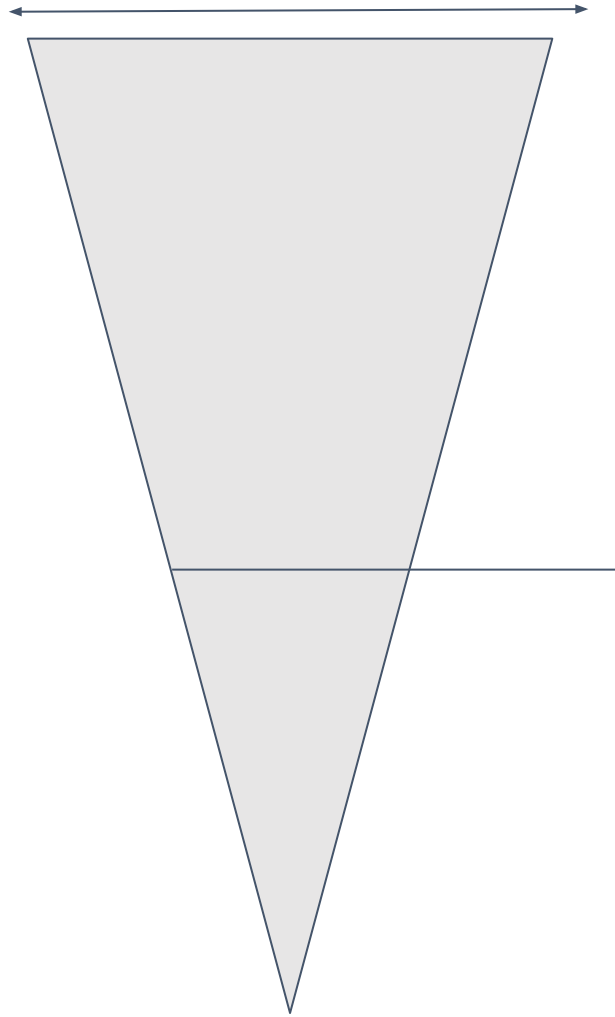
Design for recycled materials from the outset.

Design decisions need to be considered alongside recycled material limitations (if applicable)

Target specific materials/parts early on.

Build in additional testing/verification contingency (recycled vs virgin).

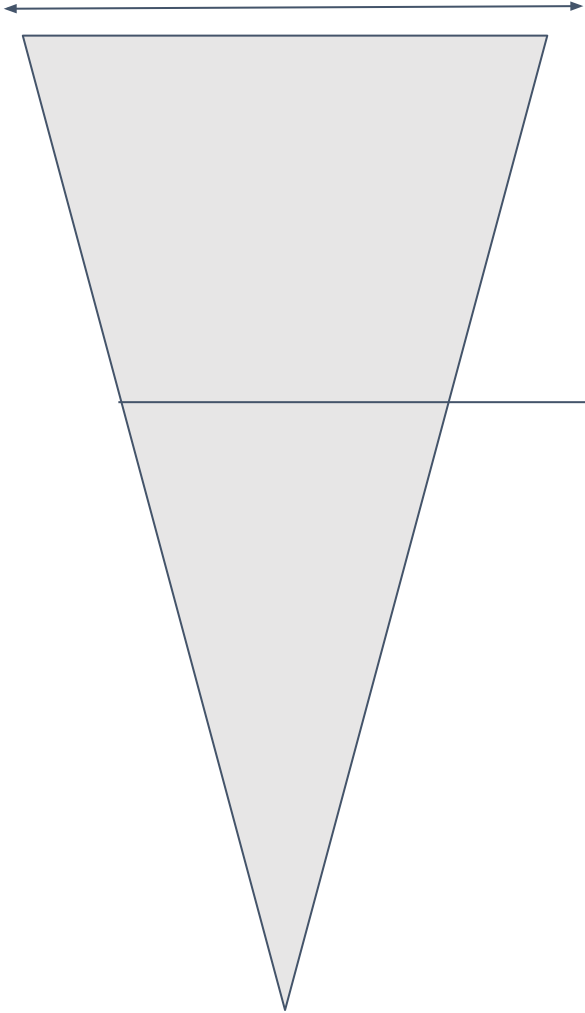
One product impact



Product managers/leaders:

- Long term strategic thinking.
- Identify most beneficial strategic areas to brand (especially if claimable percentage is low to begin with).

One product impact

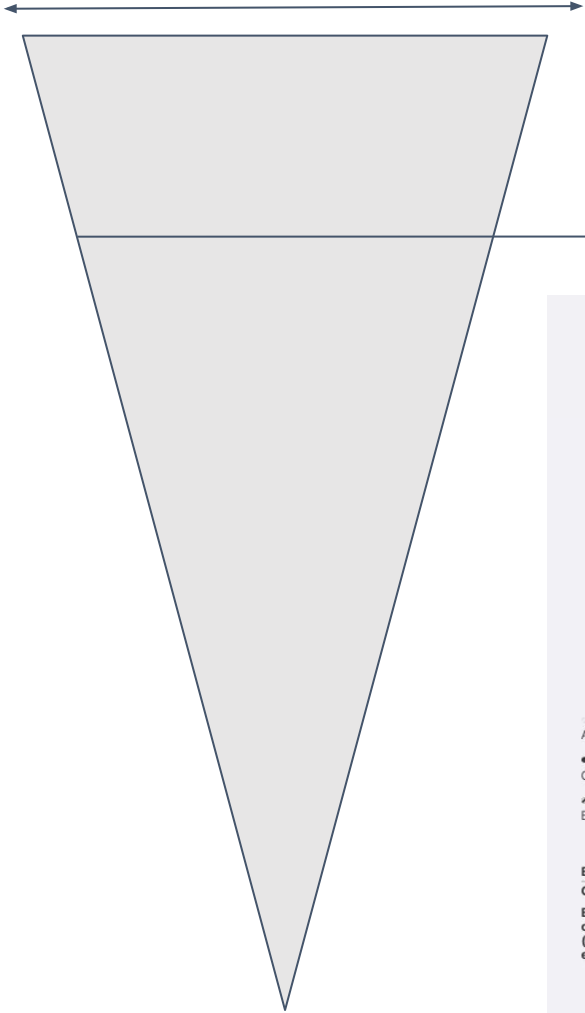


Redesign - function, materials, components, processes.

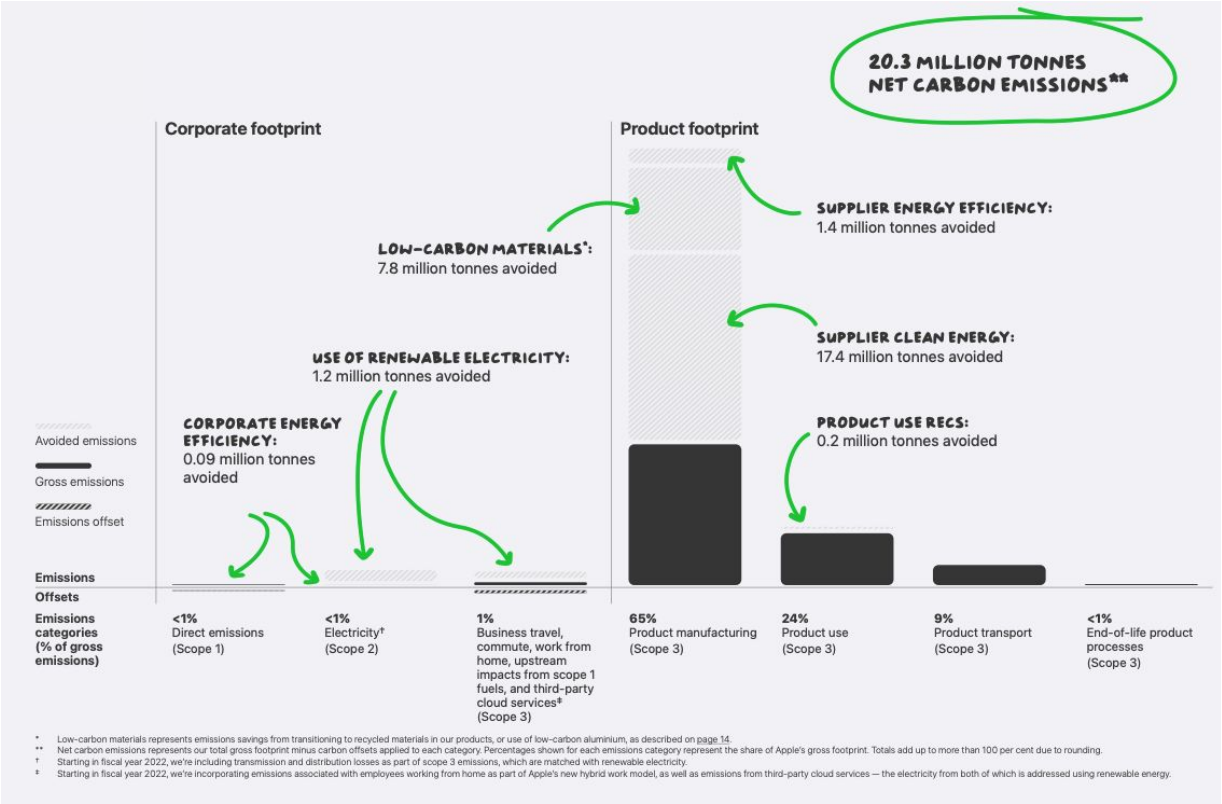


“40% smaller and lighter Slim Fluffy™ cleaner head”
Equal or better performance.

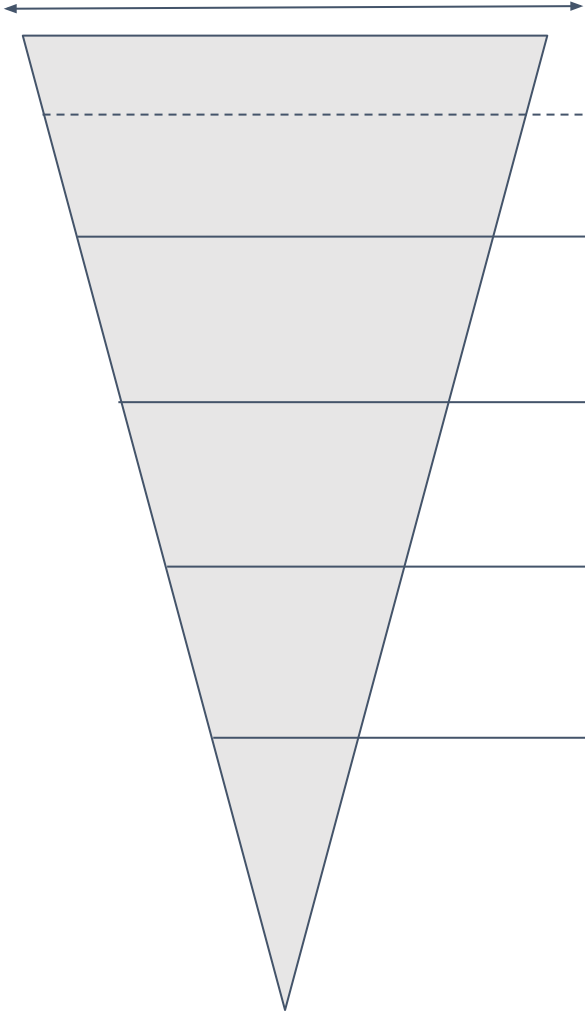
One product impact



Sourcing - Renewable energy, materials, processes.



One product impact



Business model change / longevity improved

Sourcing - Renewable energy, materials, processes.

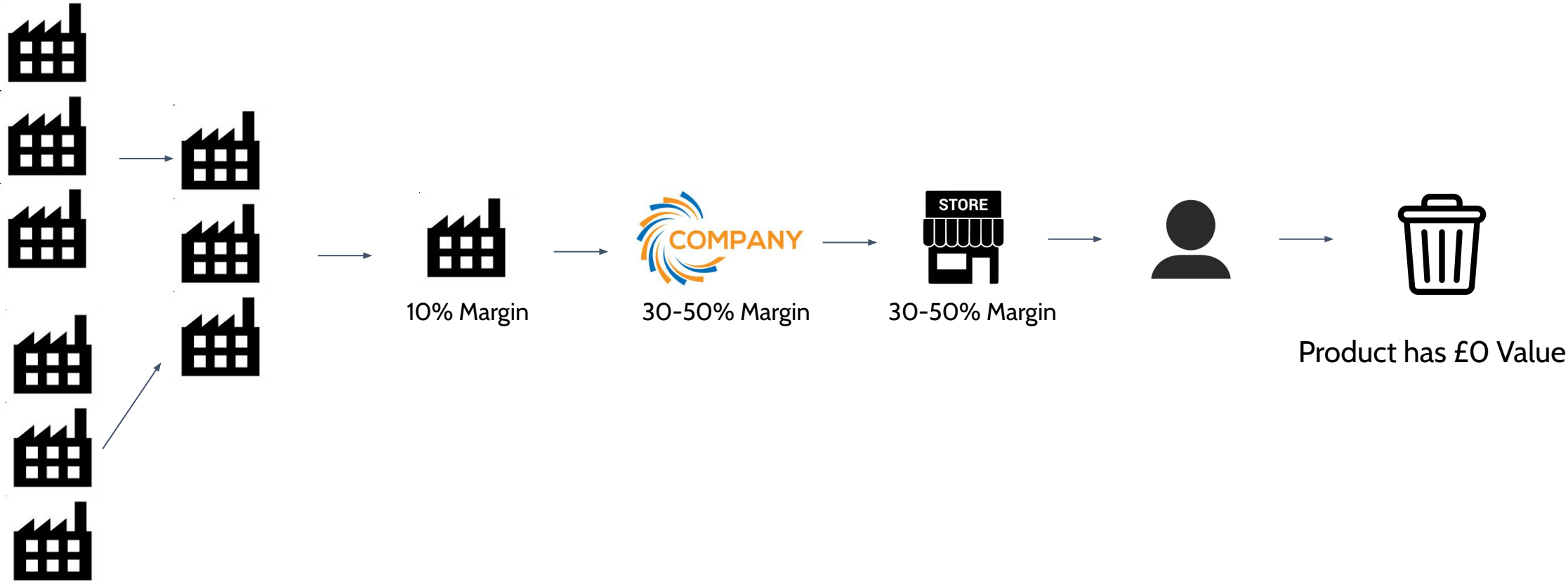
Redesign - function, materials, components, processes.

Specification changes - materials, components, processes.

Efficiency - "doing more with less"

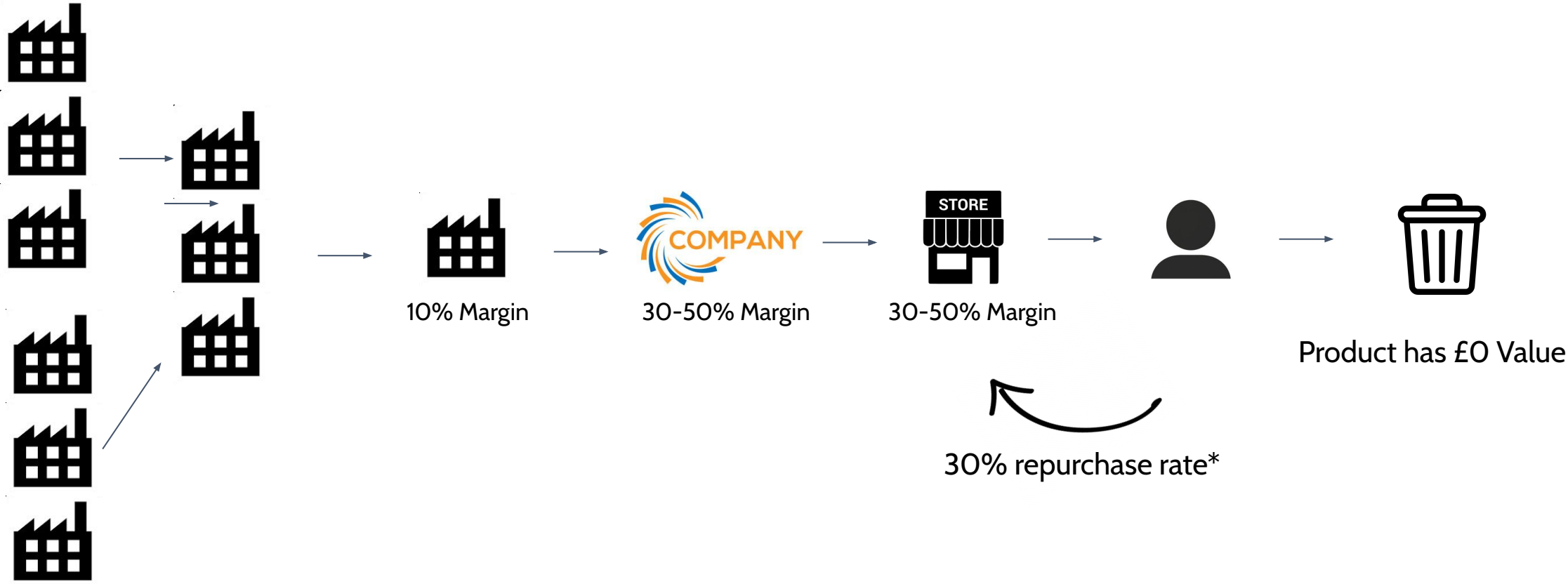
Traditional Business Model

Last.



Traditional Business Model

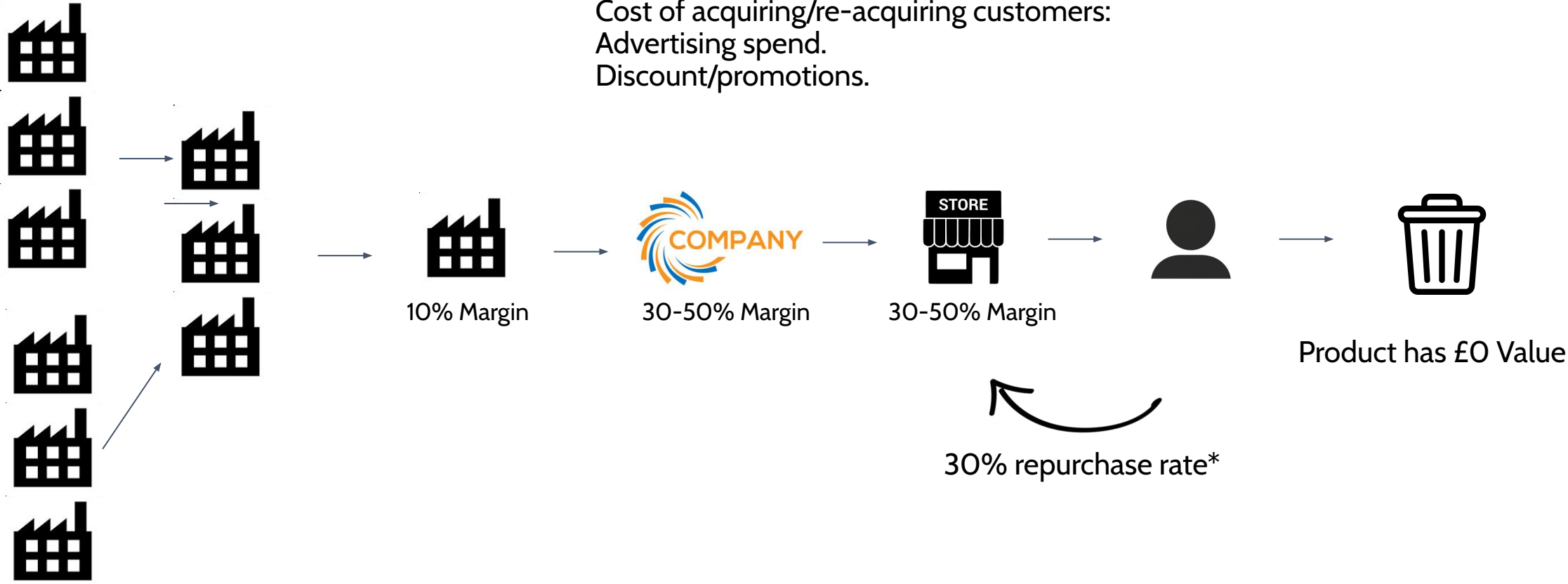
Last.



Manufacturers make no money post sale.

Traditional Business Model

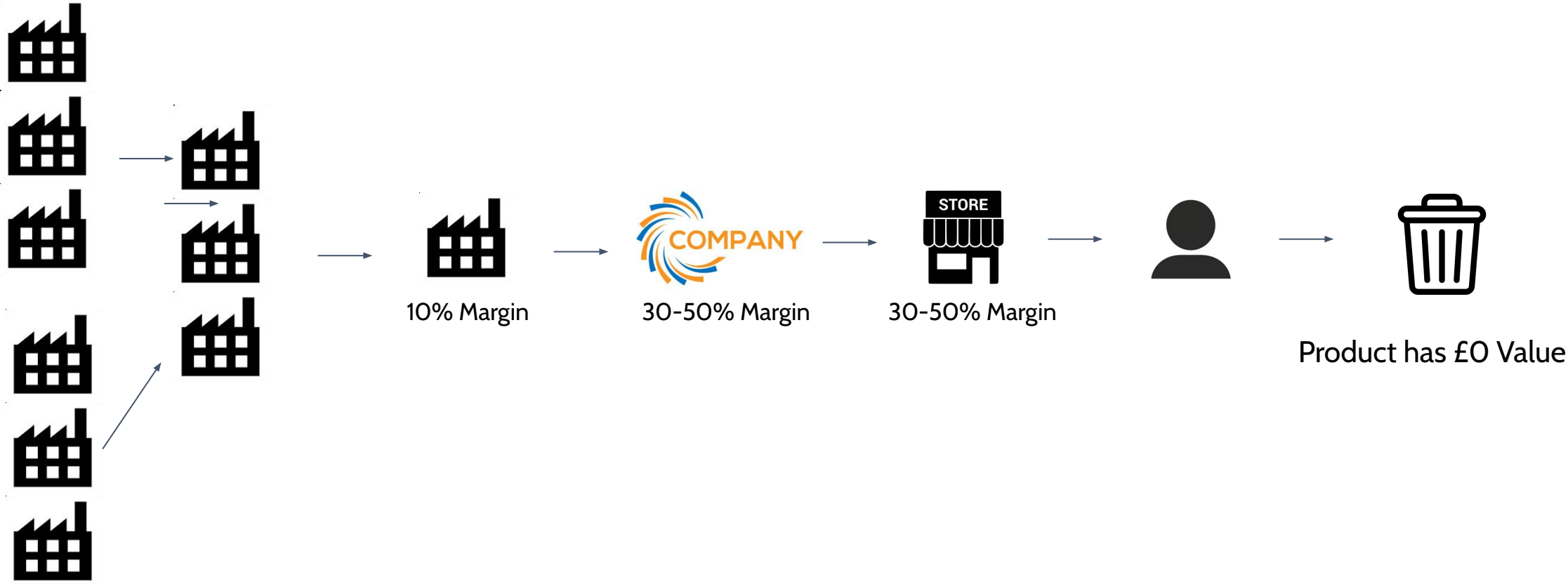
Last.



Manufacturers make no money post sale.

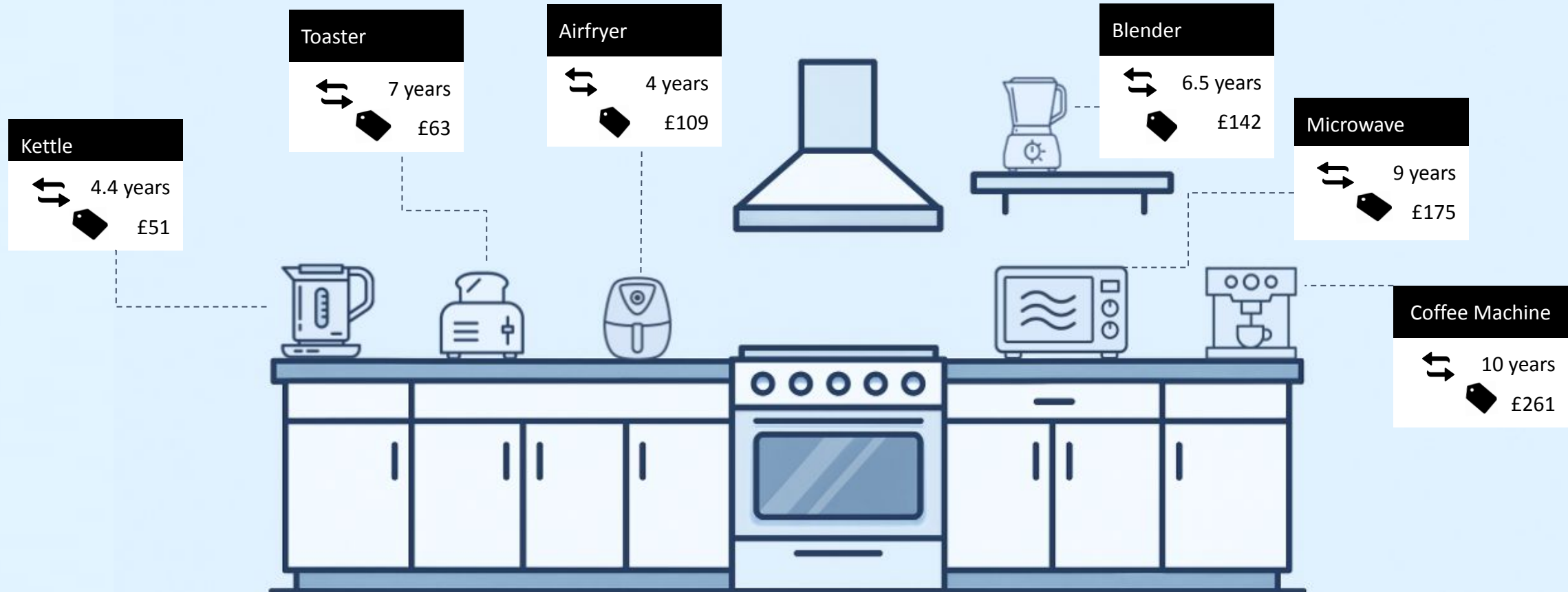
Planned or unplanned obsolescence?

Last.



65% of UK consumers say they “often feel frustrated about how long products last”

Green Alliance “By popular demand” 2018 (n=1093)



10 Years - Average

13 Products

£1,501

28.4 Million UK Households

Toaster

x2

£126

Airfryer

x3

£327

Blender

x2

£284

Microwave

x2

£350

Kettle

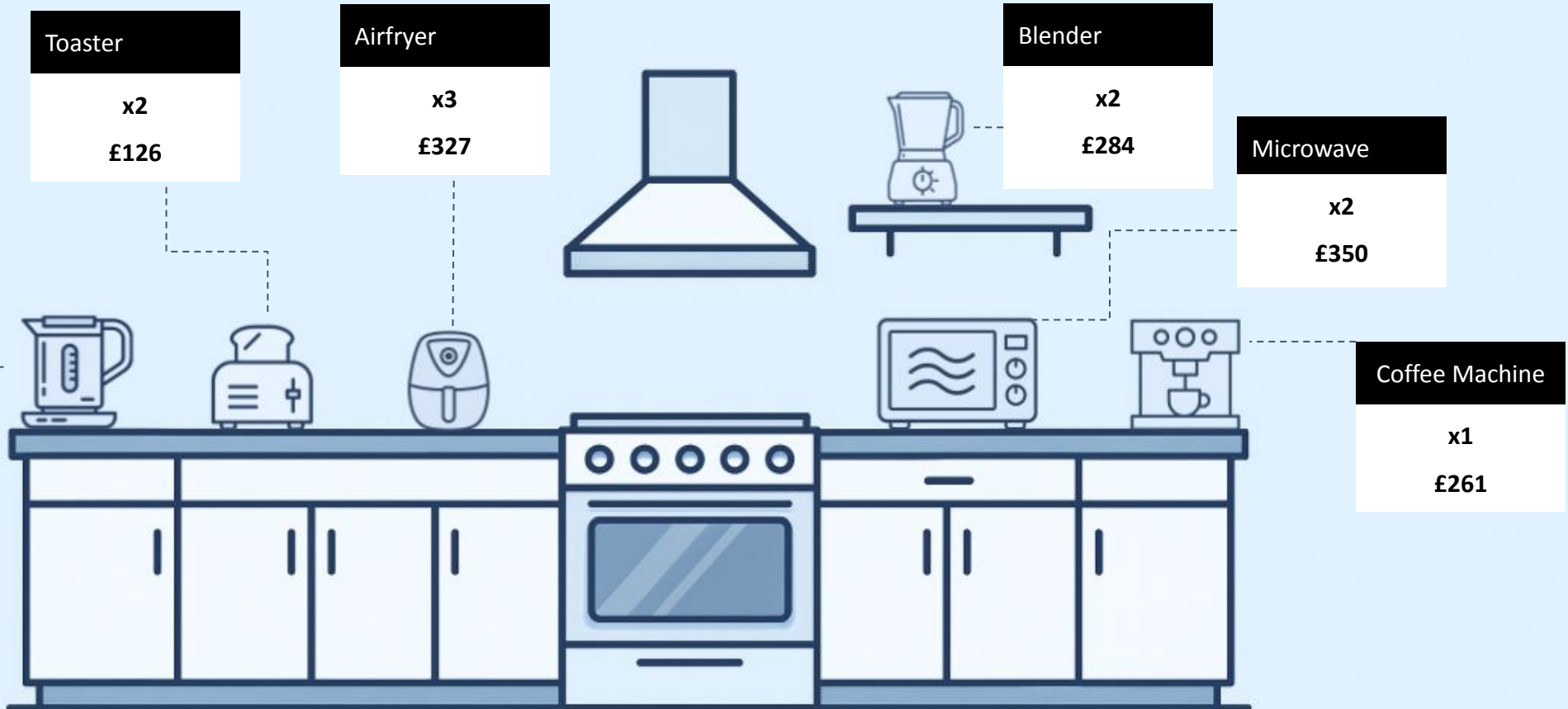
x3

£153

Coffee Machine

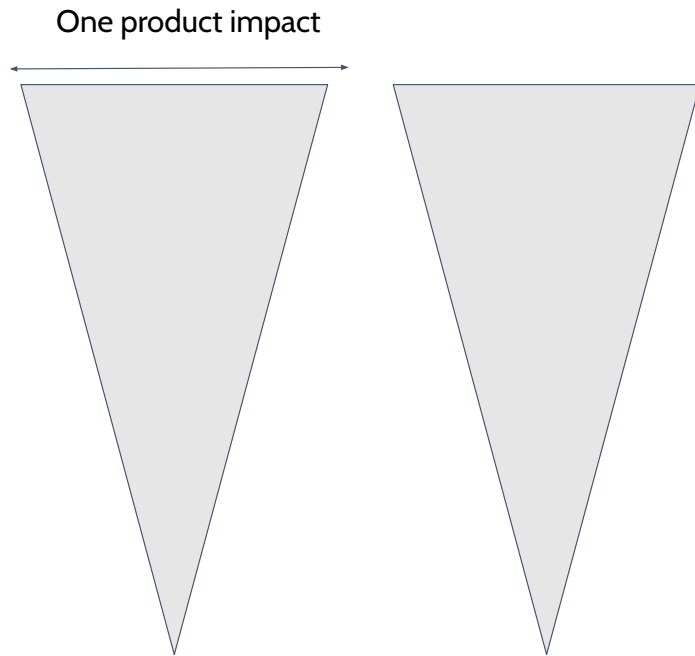
x1

£261

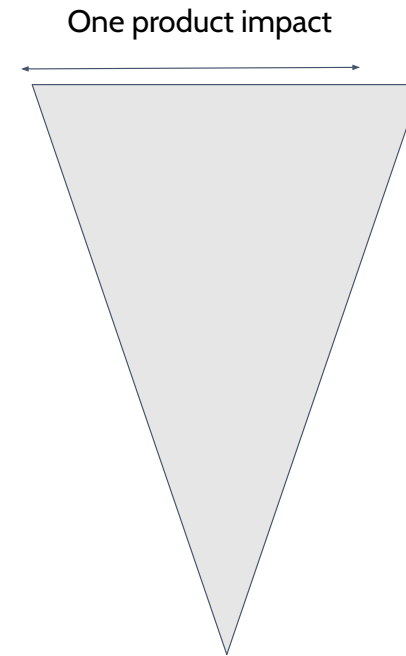


Business model change

10 years use



10+ years use





Last.

- Mechanical Engineer**
 Sep 2018 - Jul 2019 · 11 mos
 Malmesbury, Wiltshire, United Kingdom
 - Delivered as part of global team on the development of the Dyson Slim Fluffy Cleanerhead, from concept-stage to working in Malaysia alongside downstream teams to deliver the design into... more
 ▾ User Interface Design, Problem Solving and +3 skills
- Graduate Mechanical Engineer**
 Sep 2017 - Aug 2018 · 1 yr
 - Owned the soleplate assembly design on the Dyson 360 Vis Nav from concept development to project handover. Delivered an innovative solution in a challenging design envelope, including a novel... more



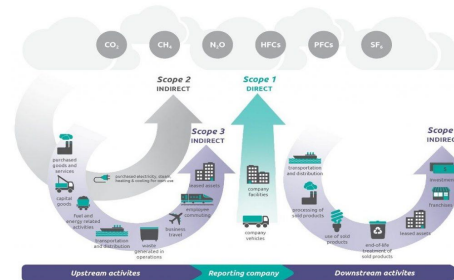
Sustainability forum

- Senior Sustainability Engineer**
 Full-time
 Oct 2020 - Mar 2022 · 1 yr 6 mos
 - Created sustainability metrics for product design and implemented them into the product development process including measurement methods, target setting and governance.... more
 ▾ Stakeholder Engagement, Management and +6 skills
- Sustainability Engineer**
 Jul 2019 - Oct 2020 · 1 yr 4 mos
 Malmesbury, Wiltshire, United Kingdom
 - Developed product energy consumption calculations and used analysis of outputs to lead reviews with senior leadership, gaining buy-in for internal targets. The Dyson Gen5detect vacuum achieved a... more
 ▾ Management, Circular Economy and +4 skills



Sustainability team

- Dyson**
 7 yrs 2 mos
- Sustainability Manager**
 Full-time
 Mar 2022 - Oct 2024 · 2 yrs 8 mos
 - Led the Data & Forecasting function to develop historic, baseline and forecast range level carbon footprints for core categories. Analysed data to create new insight into performance trends and... more
 ▾ Sustainability Strategy, Corporate Sustainability Reporting Directive (CSRD) and +9 skills



“embedding sustainability”

Last.

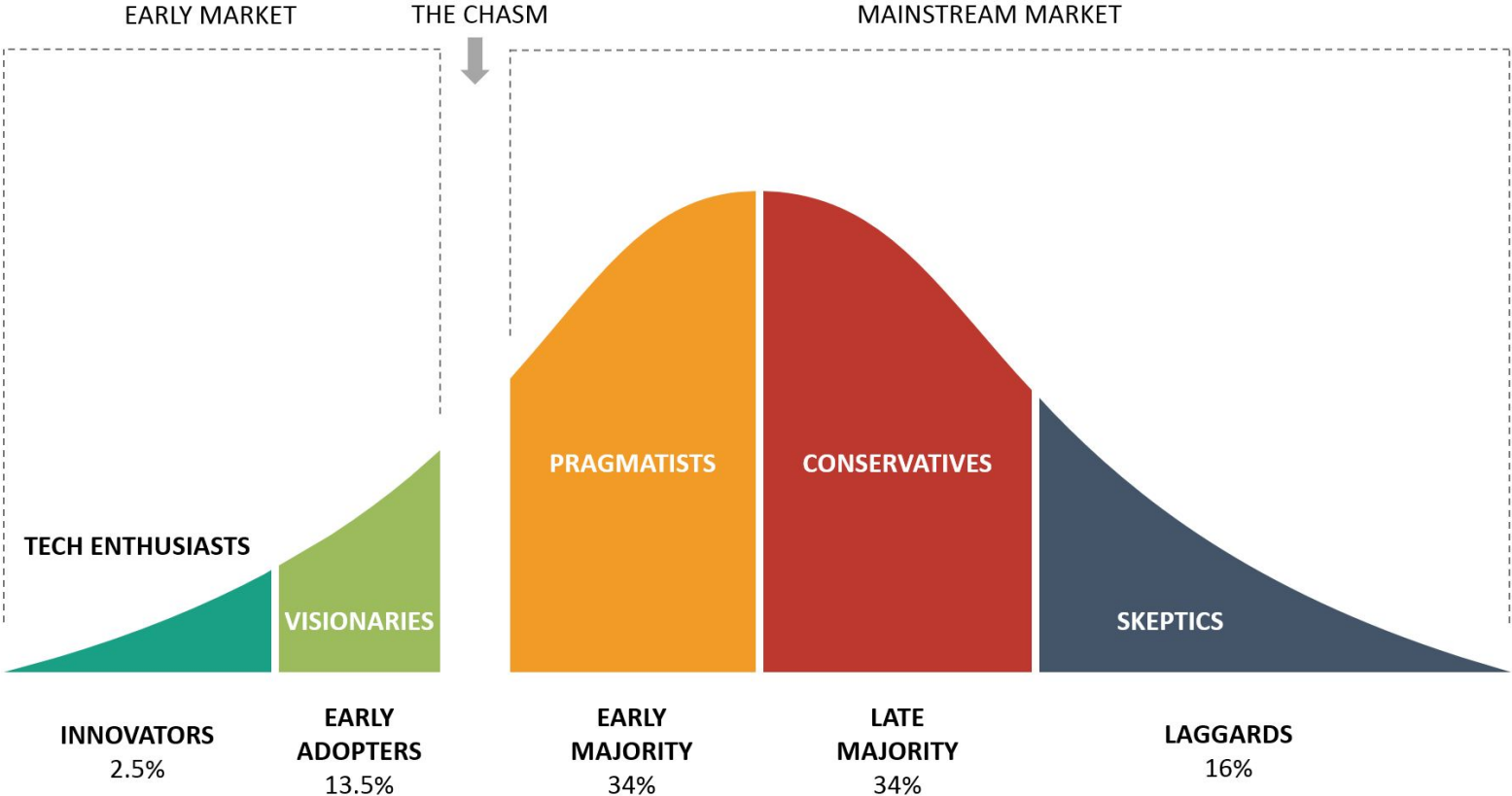
Sustainability is everyone's responsibility.
If you're not considering it, who will?

Challenges:

- Requires strong leadership push for sustainability change.
- People constrained day-to-day by business model & culture.

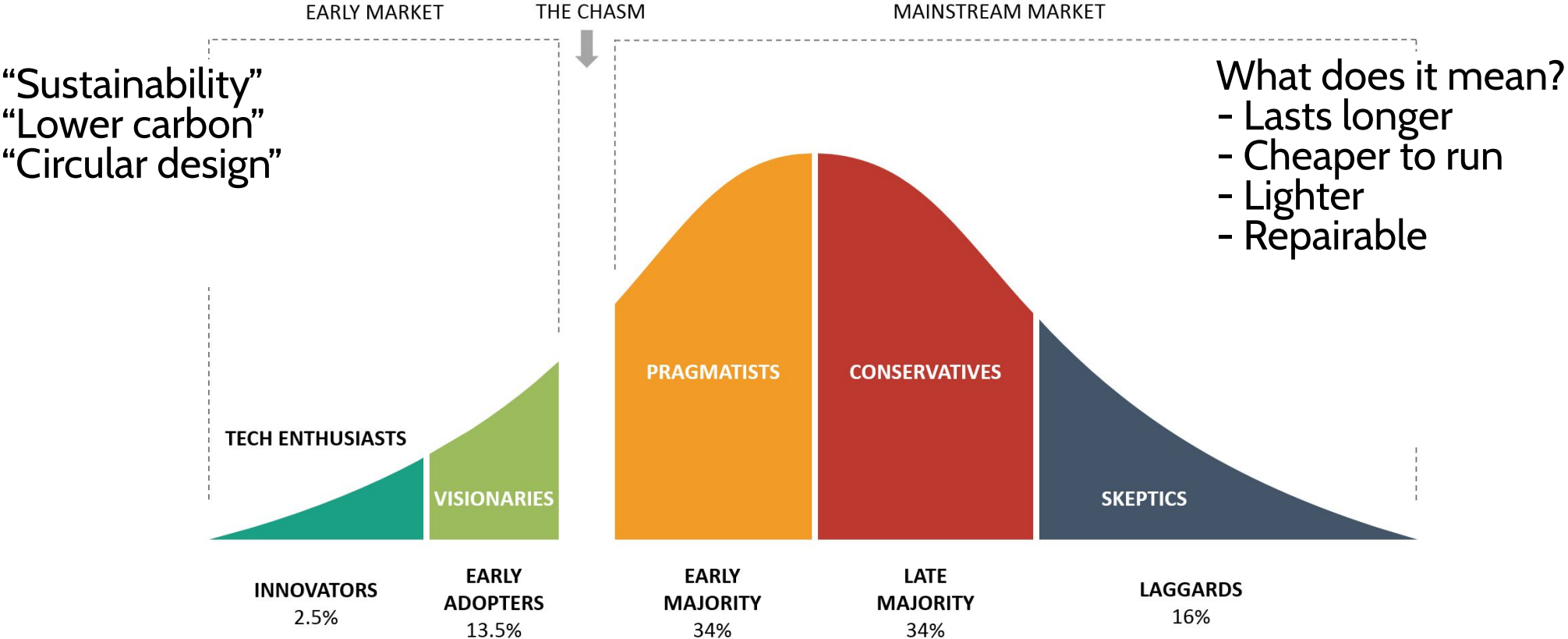
Crossing the chasm - the sustainability communication challenge

"A compelling use case that will create pull, a whole product that nails the use case, and a word-of-mouth community that can communicate and reinforce the marketing message."
—Geoffrey Moore on the three dependencies for 'crossing the chasm'



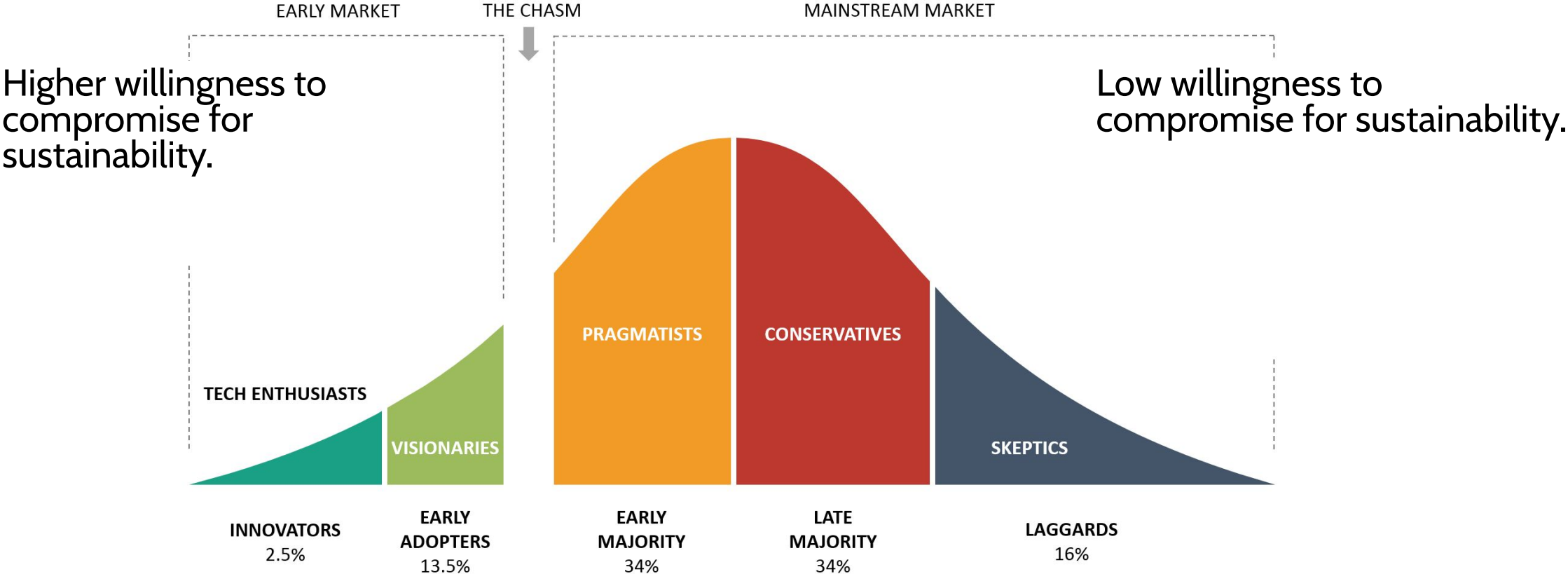
Communication gap - most customers don't care about "sustainability"

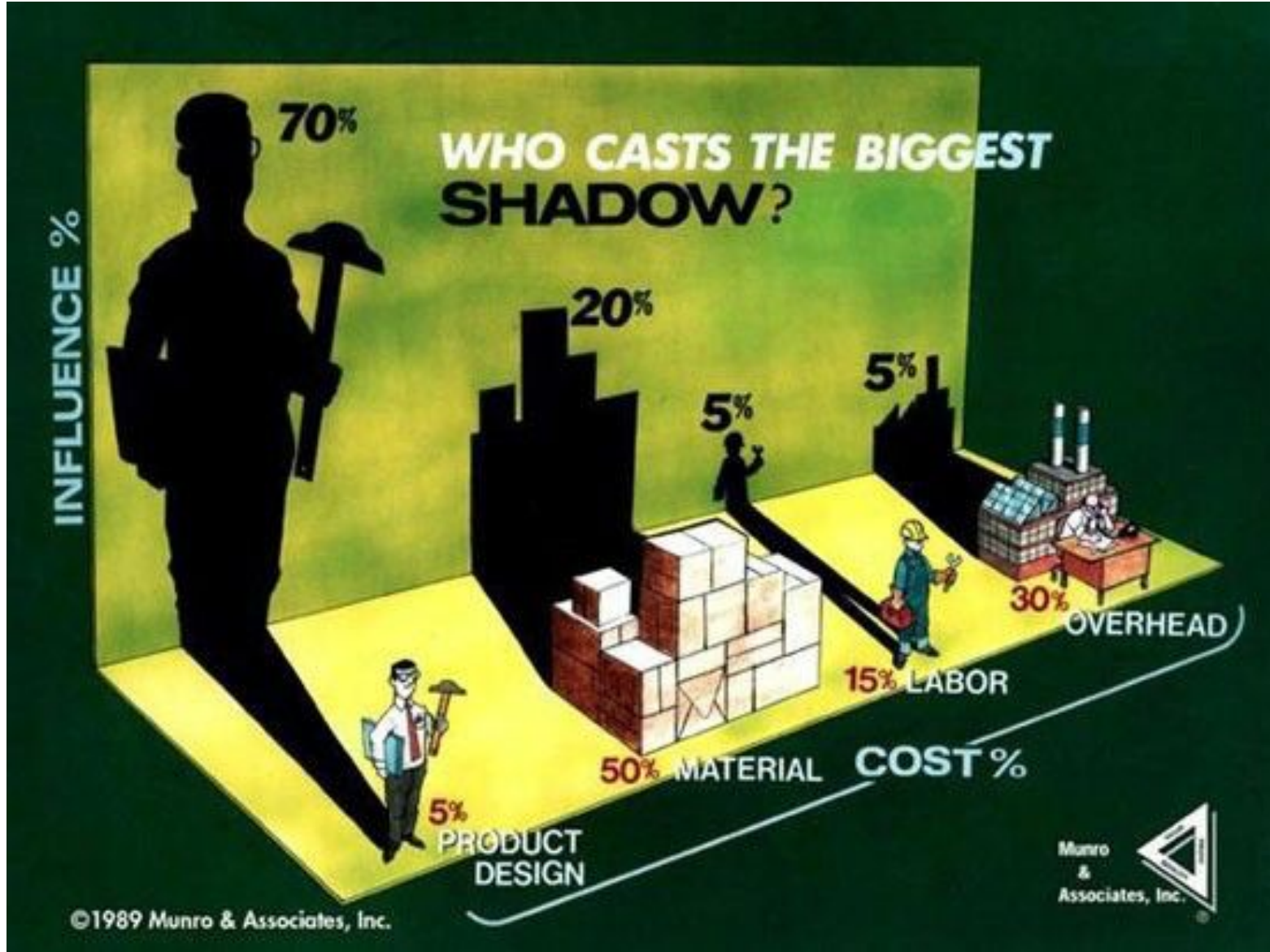
"A compelling use case that will create pull, a whole product that nails the use case, and a **word-of-mouth community that can communicate and reinforce the marketing message.**"
—Geoffrey Moore on the three dependencies for 'crossing the chasm'



Compromise

"A compelling use case that will create pull, **a whole product that nails the use case**, and a word-of-mouth community that can communicate and reinforce the marketing message."
—Geoffrey Moore on the three dependencies for 'crossing the chasm'





Cost vs Environmental Impact

- Wide scale business model change requires:
- Competition
 - or
 - Legislation

Last.

Products that last, empowering customers, without compromise.



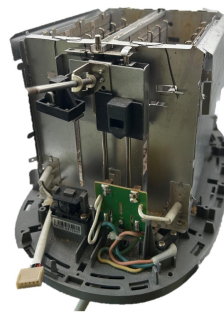
60M



£45



£150

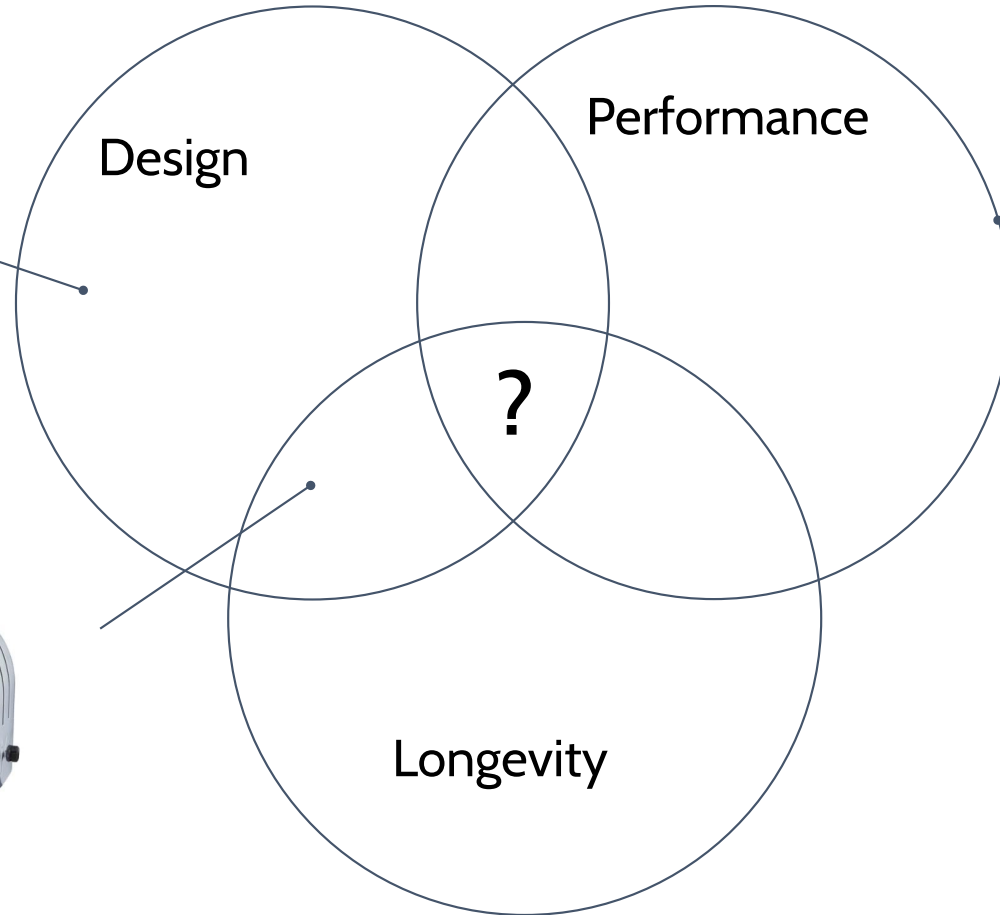


500kT

Last.



Which?
DON'T BUY
Test score [i](#)



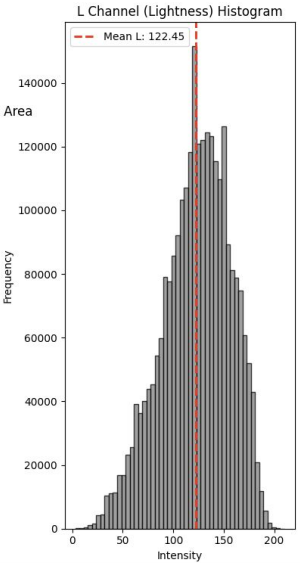
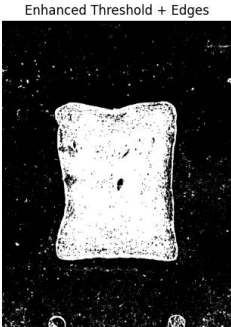
Toast Science

Last.

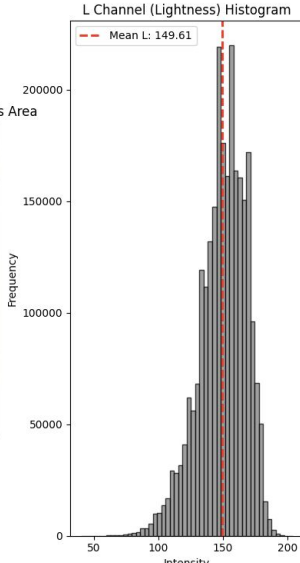
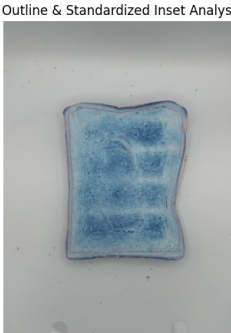
Which?
BEST BUY



Side 1 Analysis



Side 2 Analysis



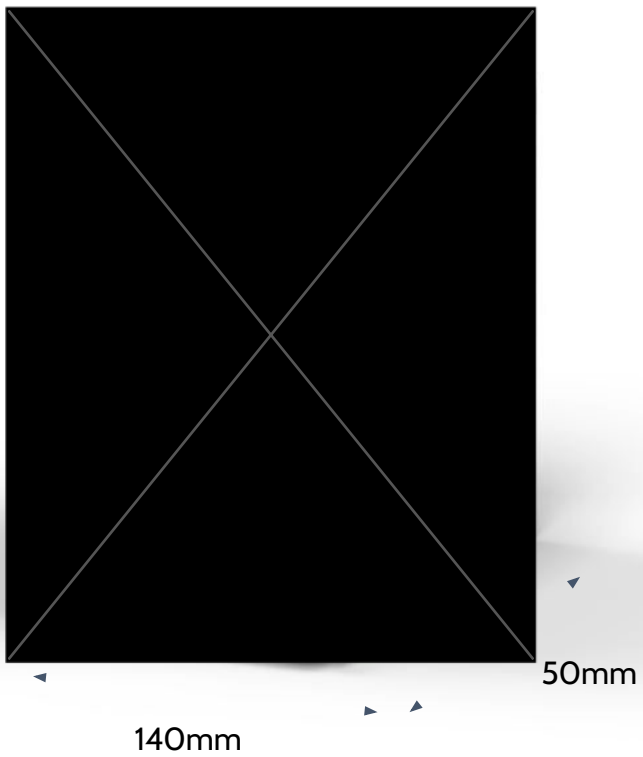


Disposable designs.
Mediocre performance.
Poor longevity.

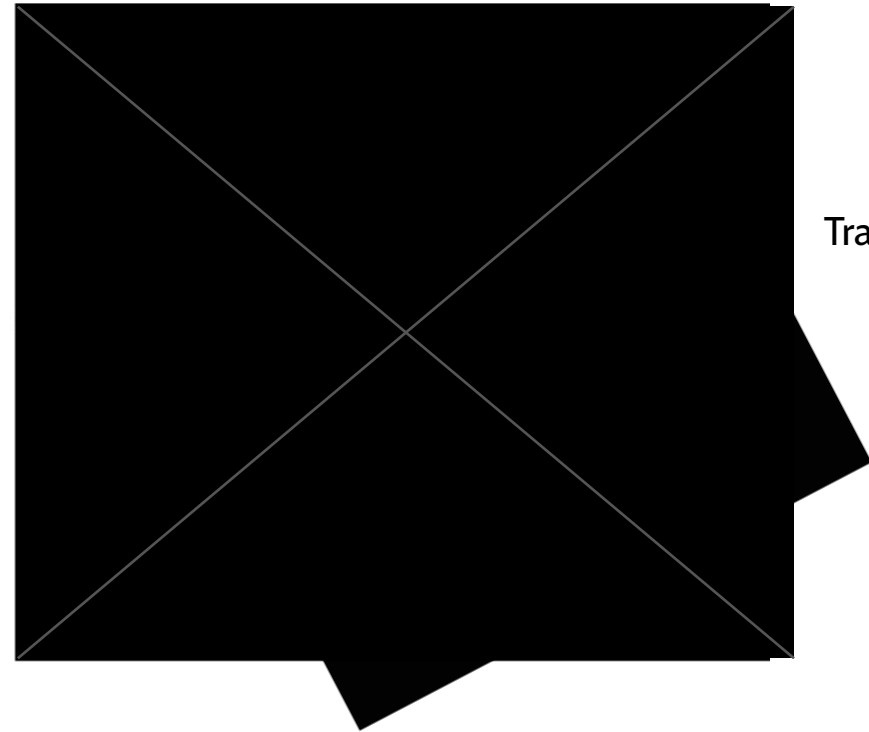
The same is true for every small
appliance sold today.

Last.

Design - Creating the best toaster on the market.



30%+ smaller footprint than key competitors.



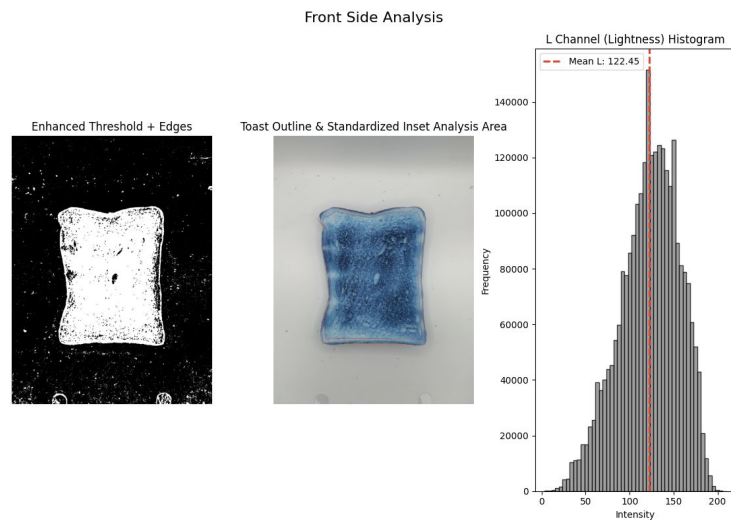
Traditional Design

The only toaster to fit 4 sourdough slices (4-slice).

*Patent pending.

Last.

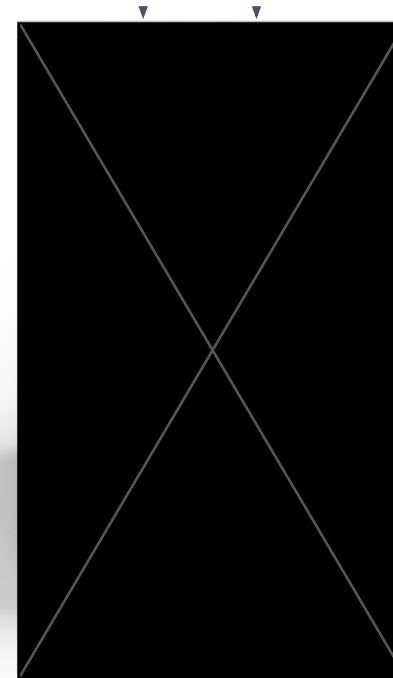
Performance - Making the best slice of toast.



Even, repeatable browning.

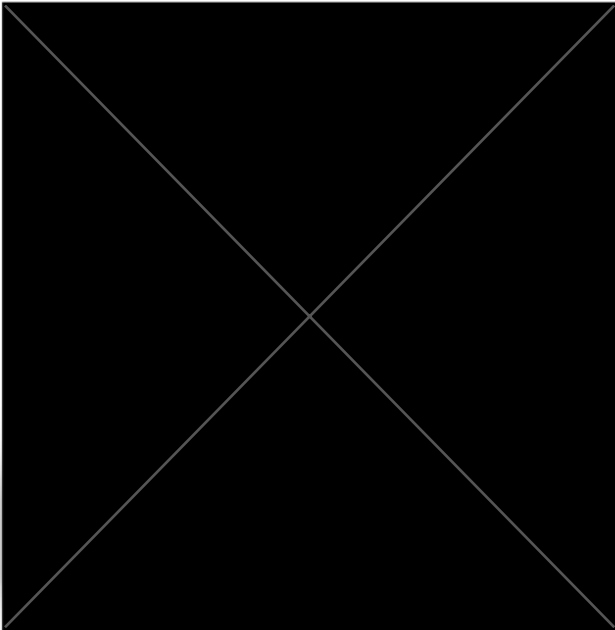
Consistent results.

1 or 2

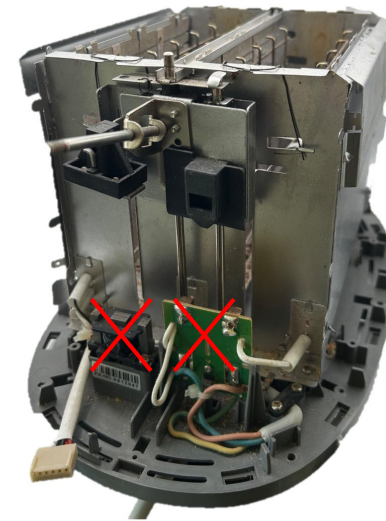


Last.

Longevity - Creating products that last.



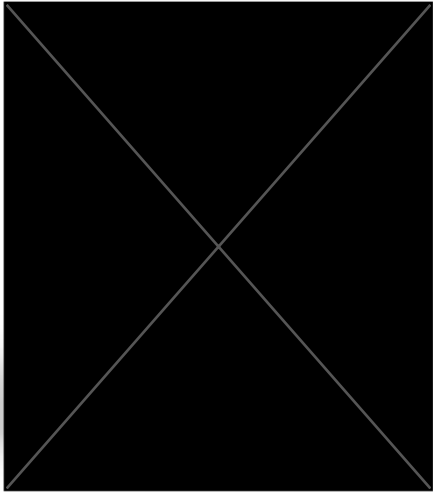
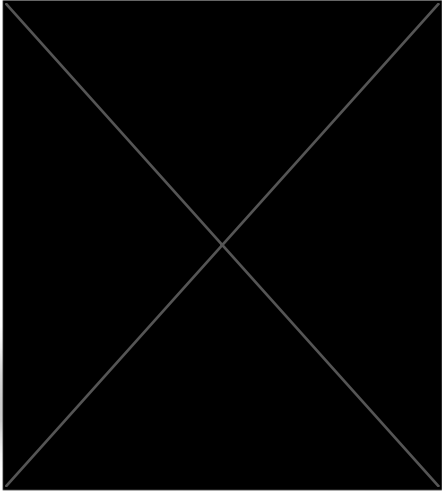
Quality materials.



Designed out two of the most common failures.

UK Manufacture - Quality & Customisation

Last.



Assembled in the UK

Customisation

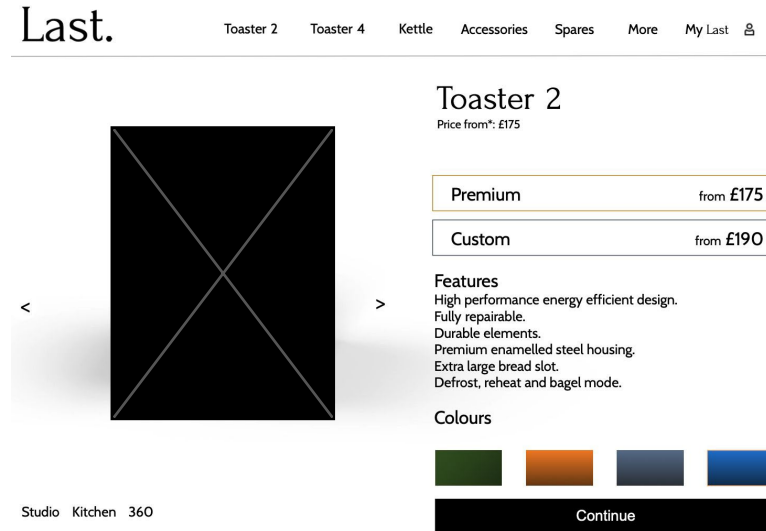
Competitors

Last.

	Market Leading Performance	Safe DIY Repair	Customisable & Upgradable	Made in UK
Last.	✓	✓	✓	✓
Dualit [®] Classic	✗	✗	✗	Toaster Kettle
KitchenAid	✗	✗	✗	✗
S M E G	✗	✗	✗	✗

Launch Strategy

Last.



Launching DTC Ecommerce:

- Own the customer relationship and margin.
- Low-cost acquisition through PR, SEO, content and partnerships.
- Retention via existing customer discounts and refer a friend.

New Kitchens - Partner Channel:

- Over 1 million new kitchens sold per year in the UK.
- 300,000 mid-range, premium and luxury (£20K+).
- Kitchen studios as showroom, referral and specification partners.

B2B Opportunities & Expansion

Last.



B2B Opportunity:

- Bakeries, brunch cafes and boutique hospitality.
- Fits four full sourdough slices, no cutting or turning.
- Brand halo: Professional performance and durability.

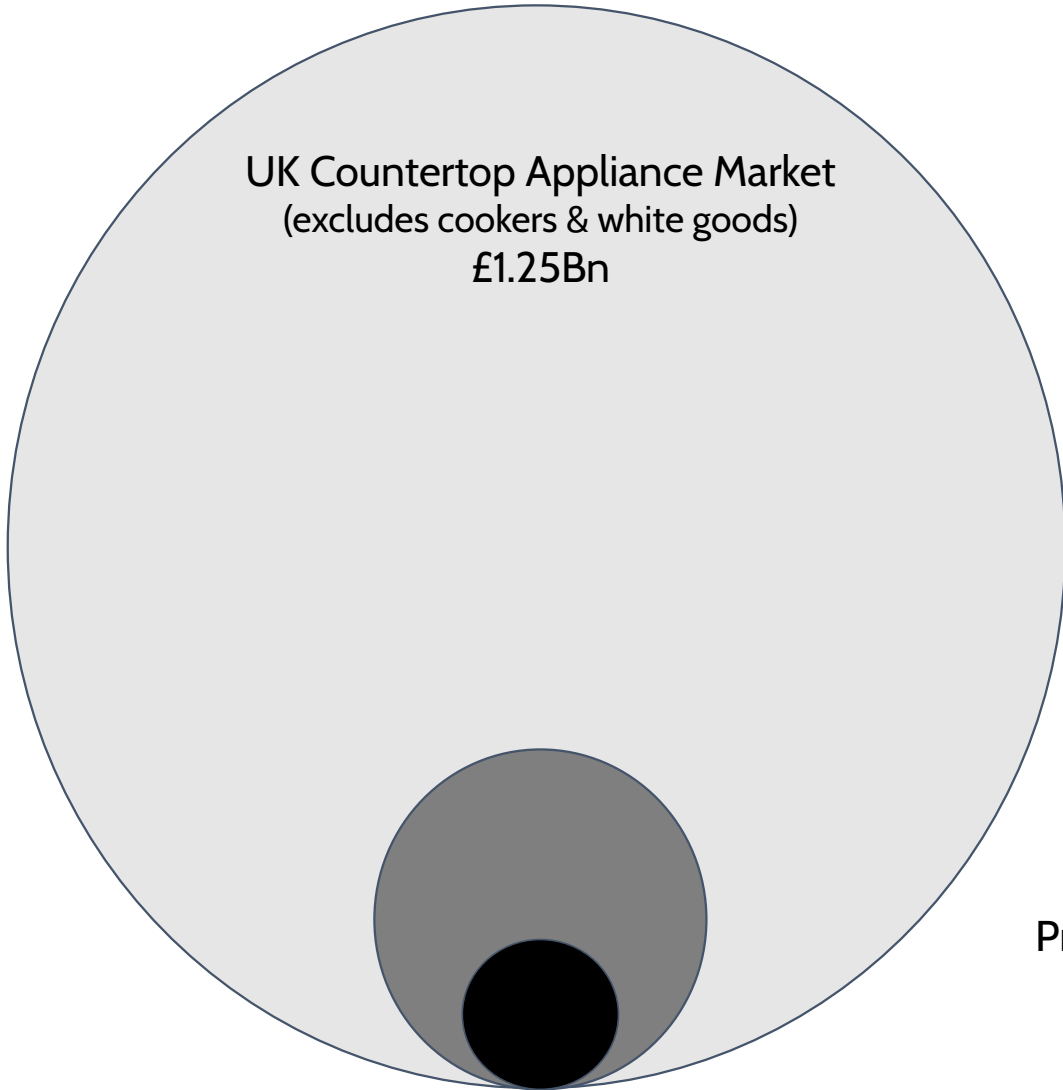


Expansion Opportunities:

- Expand product portfolio.
- Custom colourways and kitchen-matched finishes.
- Accessories.
- Retail partnerships.
- International expansion.

Last.

UK Market Opportunity



UK Toaster Market
£122M
4.3M Units

Premium Toaster Segment (£150+)
280K Units
£42M

Year 5 Financial Projection
20K Units
£4.5M Revenue

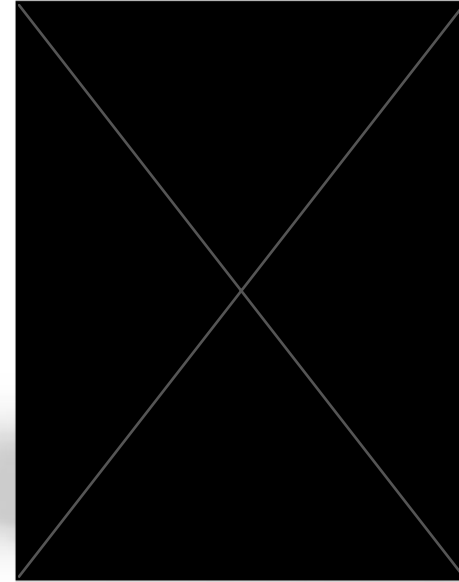
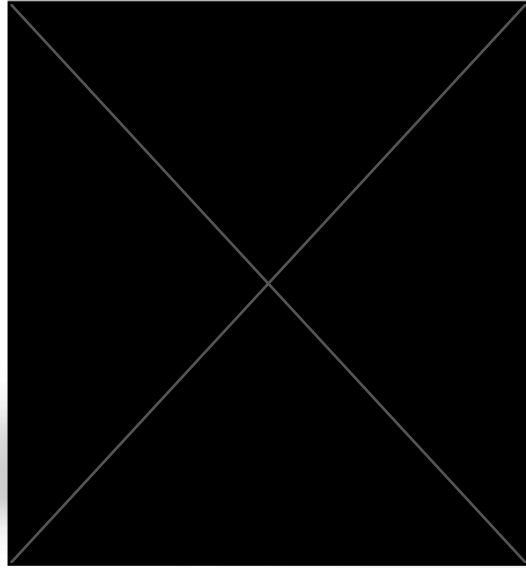


+



Modularity

Last.



-

Customisation & Upgrade.

- Accessories.
- Cosmetic upgrade kits.

Safe DIY Repair.

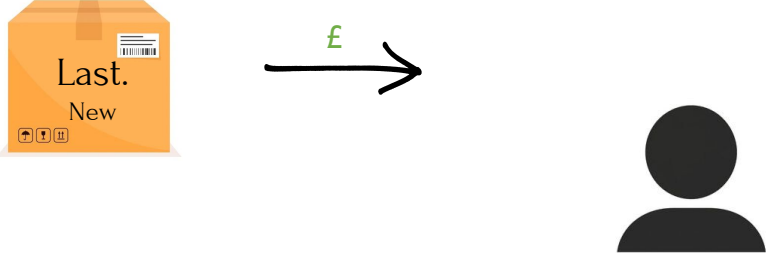
- Spare parts availability.
- Support information.

Trade-in.

- Products have residual value.
- Refurbished product sales.

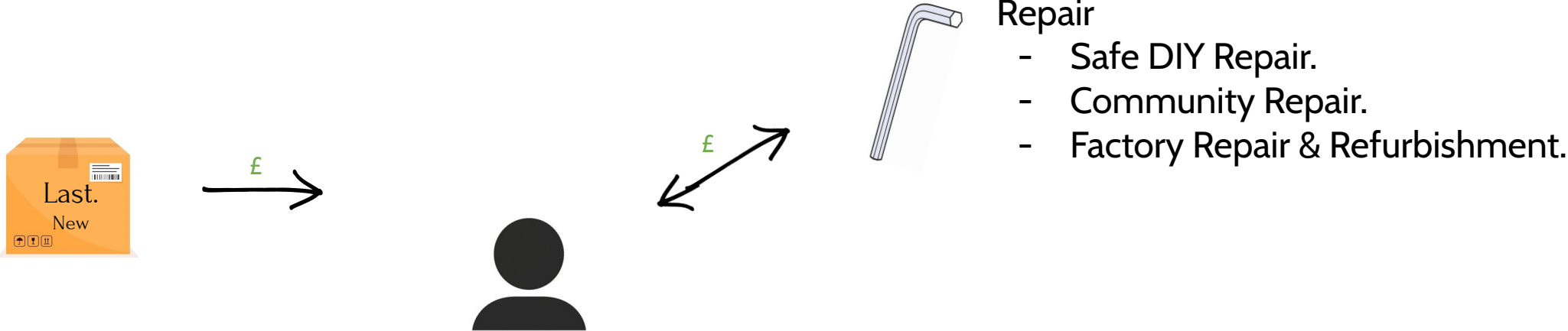
Loyalty Centric Business Model

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Loyalty Centric Business Model

Last.



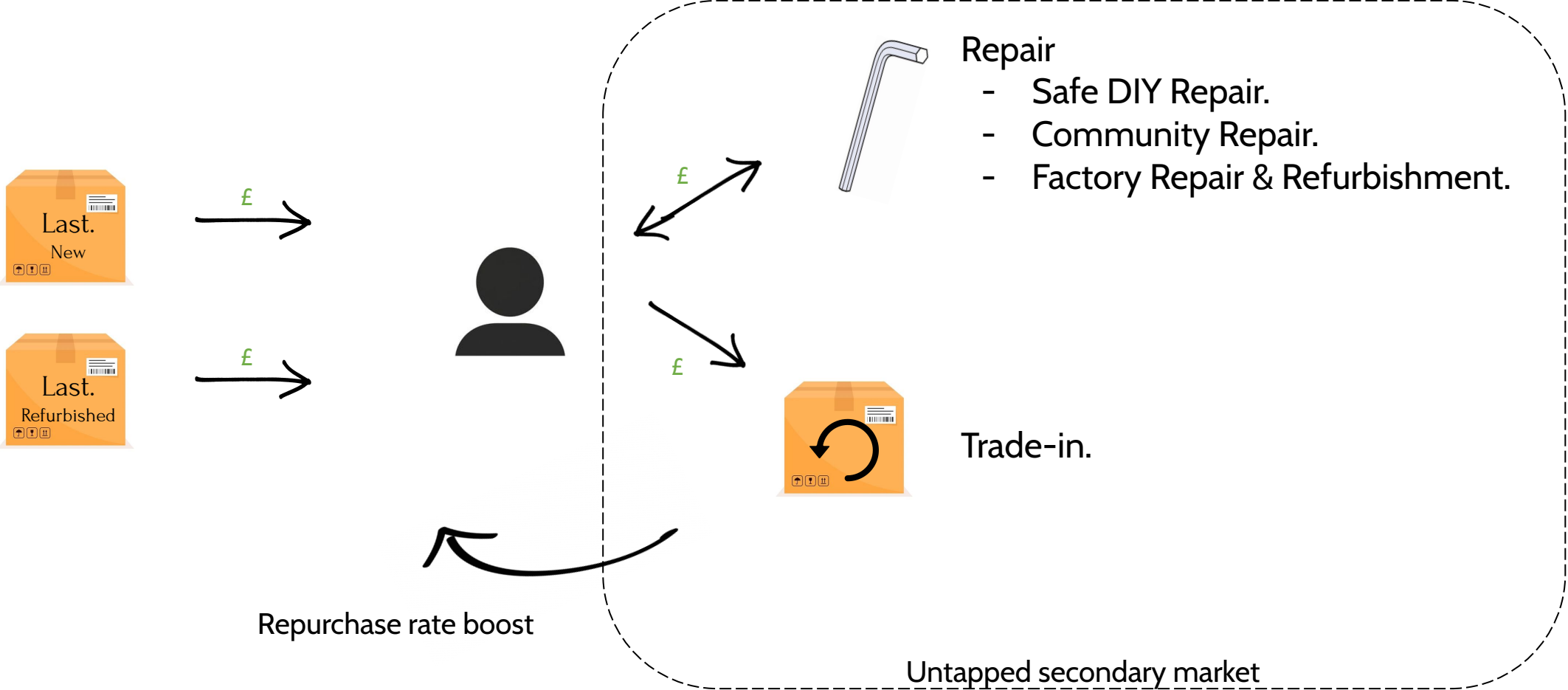
Loyalty Centric Business Model

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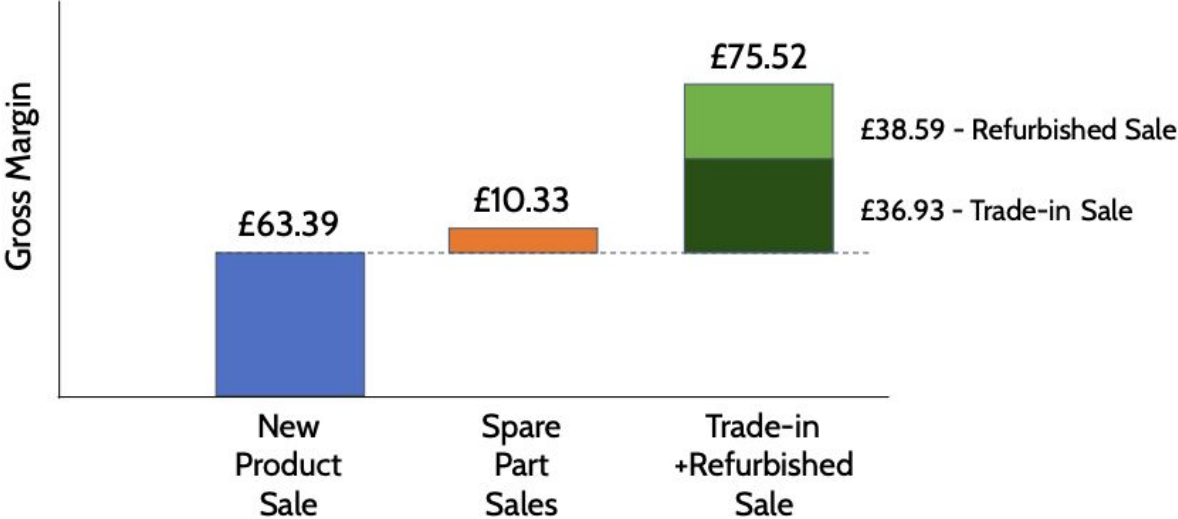
Loyalty Centric Business Model

Last.



Untapped Secondary Market

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Sustainable recurring revenue.

Experiences that promote loyalty and referrals, reducing CAC.

Grant-Funded Validation



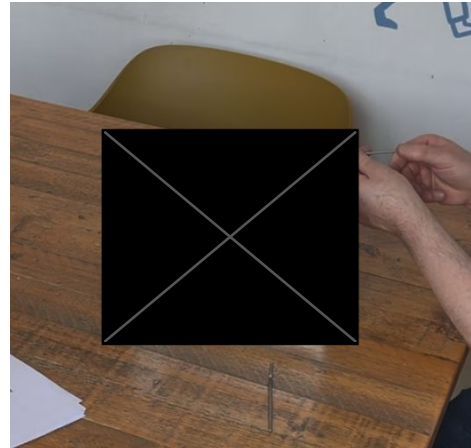
Resource Efficiency for Resilience & Sustainability
February-March 2026

Last.



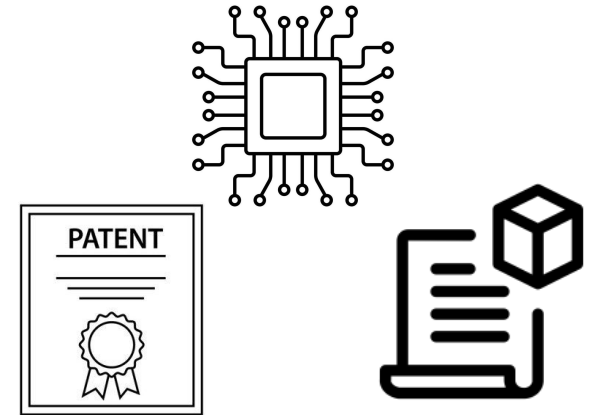
User Studies

- Validated user pain points.
- Prioritised key features.
- Tested pricing and value.
- Evaluated repair options.



Repairability Trials

- Repair feasibility demonstrated.
- Learnings fed back into design.



Technical & Business Model Development

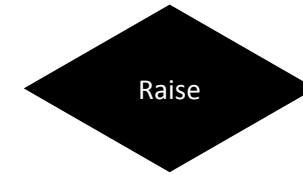
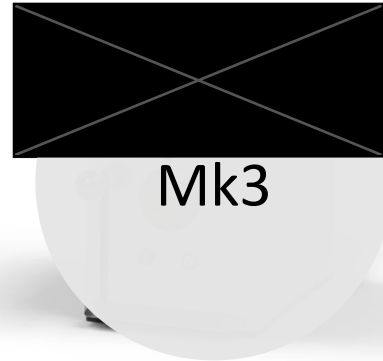
- Electronics feasibility demonstrated.
- Costed BOM with supplier quotes.
- Manufacturing strategy developed.
- IP drafted.

Path to £450k Raise

Last.



Pathfinder Awards
March 2026



£450k SEIS/EIS
Q4 2026

Funding Secured

- £40k CLN secured

Validation Milestones

- Integrated works-like Mk3 prototype.
- Validate GTM messaging and pricing.
- Reservation / crowdfunding readiness test.
- B2B customer engagement.
- Supplier, BOM and manufacturing validation.
- Further IP protection.

Launch Funding

- Lean team development.
- Develop MVP to launch.
- Tooling and certification.
- DTC launch and partner pilots.
- First batch produced and sold.



Sean Polden

Founder



MEng Mechanical Engineering
2013-2017

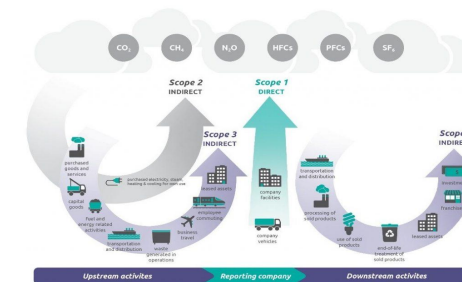
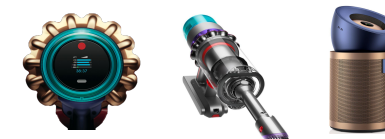


Business Sustainability Management
Short Course - 2024



Mechanical Engineer
2017-2019

Sustainability Manager
2019-2024



Last.

Advisors:



Mark Corderoy

Business Strategy
UWE Launchspace



Davinia Marshall

Go-to-Market
Ex Dyson Global Commercial Director



Carol Taylor

Commercial Strategy
Ex Dyson Global Marketing Director



Daniele De Iuliis

Product Design & Usability
Ex Apple Industrial Design

With experience from:



iron
blender
kettle
The Last. toaster you'll ever need.
air-fryer
coffee machine
microwave

Thank you!

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