56° V4 SHOE DRYER

Heating for life

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Design Brief

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56° V4 is a compact, long-lasting shoe dryer designed for urban users who need reliable drying without wasting space or materials.

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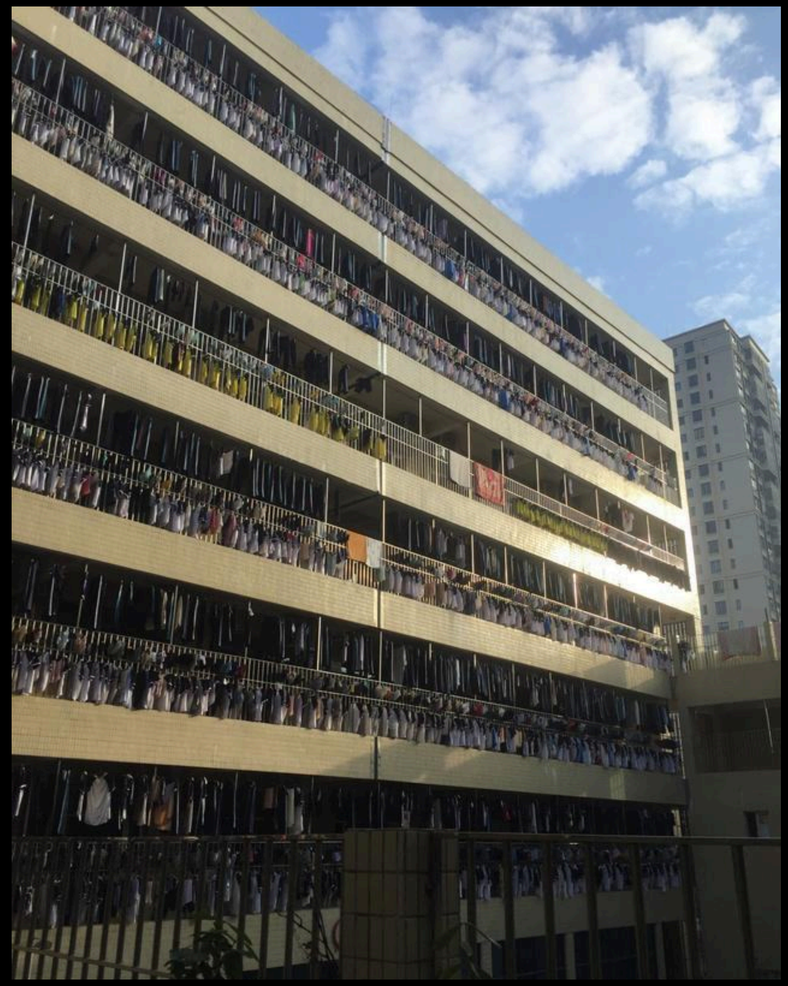
Story — One Life, Many Phases



2025

2028

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Story — One Life, Many Phases

2030

2038

2043

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Interview

Zotion Snow Boarder

Performance isn't the key, it just needs to be there when I need it

Itarc Designer of Shark NINJA

If it's a Shark Ninja product, normally when it work well,
it meets the sustainable standard

Dr. Chen Pediatric Specialist

The wet cause more problem than you expect,
while how kids don't avoid it makes it worse

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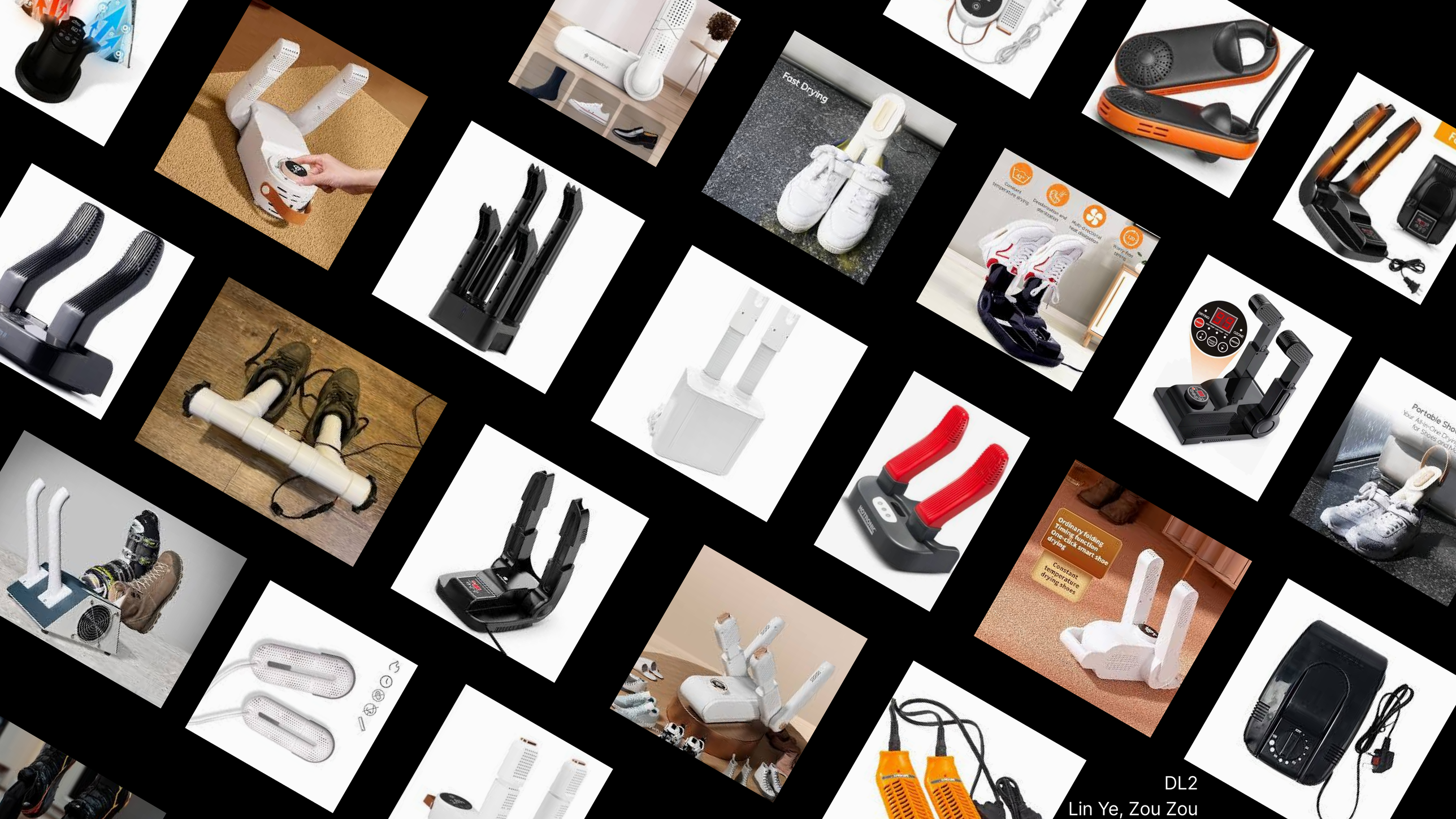

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Benchmark Product

Benchmark Shoe Dryer

- Benchmark Shoe Dryer
- Market-standard electric shoe dryer
- Purchased as a typical household product
- Used as baseline for LCA and redesign

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Benchmark Analyze

Benchmark Shoe Dryer

- **7+** material types
- **ABS dominates** housing and air ducts
- Electronics + heater + wiring = **high-impact components**
- Multi-material assembly **limits recyclability**

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	**Product Name:**	Shoe Dryer											
2	**Functional Unit:**												
3	**Date / Version:**												
4	Table1												
5	Component	Part	Material	Quantity (n	Weight in g	Weight in kg	Total Weigh	Stage (Production / Tran	Notes	Process	End of Life	Energy (kW	Transport (
6	Case	Rotating Tube Connector	ABS Plastic	2	45	0.045	90	Production	Connects housing to drying tubes; allows rotation and airflow	Injection Moldir	Landfill	0	Truck 200
7	Case	Tube End Base	ABS Plastic	2	40	0.04	80	Production	Connects with outlet cap to form shoe nozzle	Injection Moldir	Landfill	0	Truck 200
8	Case	Air Outlet Cap	ABS Plastic	2	35	0.035	70	Production	Distributes airflow evenly into shoe interior	Injection Moldir	Recycling	0	Truck 200
9	Case	Upper Drying Tube	ABS Plastic	2	60	0.06	120	Production	Main air duct; directs hot air	Injection Moldir	Landfill	0	Truck 200
10	Case	Tube Joint	ABS Plastic	2	30	0.03	60	Production	Connects upper and lower tubes for adjustable height	Injection Moldir	Landfill	0	Truck 200
11	Case	Tube Support Ring	ABS Plastic	1	25	0.025	25	Production	Stabilizes tube and prevents leakage	Injection Moldir	Landfill	0	Truck 200
12	Case	Front Control Panel	ABS Plastic (Gl	1	80	0.08	80	Production	Houses timer dial, logo, and control knob	Injection Moldir	Landfill	0	Truck 200
13	Case	Main Housing Base	ABS Plastic	1	180	0.18	180	Production	Encloses fan, heater, and circuit board	Injection Moldir	Landfill	0	Truck 200
14	Case	Rear Vent Cover	ABS Plastic	1	30	0.03	30	Production	Covers rear ventilation and protects wiring	Injection Moldir	Recycling	0	Truck 200
15	Case	Screw Set	Steel	12	1.2	0.0012	14.4	Production	Secures housing and internal components	Screw Machinir	Recycling	0	Truck 200
16	Case	Circuit Board (PCB)	FR4 Epoxy + Co	1	35	0.035	35	Production	Controls power, timer, and heating functions	PCB Soldering	E-waste	0.01	Ship 8000
17	Case	Heating Element	Nichrome + Cer	1	50	0.05	50	Production	Generates heat for drying	Coiling + Assen	E-waste	0.08	Ship 8000
18	Case	Temperature Fuse / Sensor	Copper + Plasti	1	15	0.015	15	Production	Overheat protection	Thermal Bondir	E-waste	0	Ship 8000
19	Case	Wiring Assembly	PVC + Copper	1	25	0.025	25	Production	Internal connection between parts	Wire Extrusion	E-waste	0	Truck 200
20	Case	Power Cord	PVC + Copper	1	90	0.09	90	Production	External power cable	Wire Extrusion -	E-waste	0.02	Ship 8000
21	Case	Cooling Fan Unit	Aluminum + Pla	1	60	0.06	60	Production	Drives airflow through heater	Die Casting + A	Recycling	0.05	Ship 8000
22	Case	Aluminum Mounting Plate	Aluminum Alloy	2	40	0.04	80	Production	Supports fan and heater	Stamping + Ma	Recycling	0	Truck 200
23	Case	Rubber Foot Pads	Silicone	4	3	0.003	12	Production	Prevent slipping and vibration	Molding + Adhe	Landfill	0	Truck 200

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Why This Product Must Be Redesigned

60
Okala pts / FU

480
lbs CO_2e / FU

91%
from use phase

~5 yrs
lifespan

7+
material types

Analysis reveals three core problems:
short lifespan, material inefficiency, and high lifecycle impact.

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Research Insights

User:
Frequent short drying cycles → durability matters

System:
Long-term heat exposure → material choice is critical

Sustainability:
Lifespan > energy reduction

Design Intention

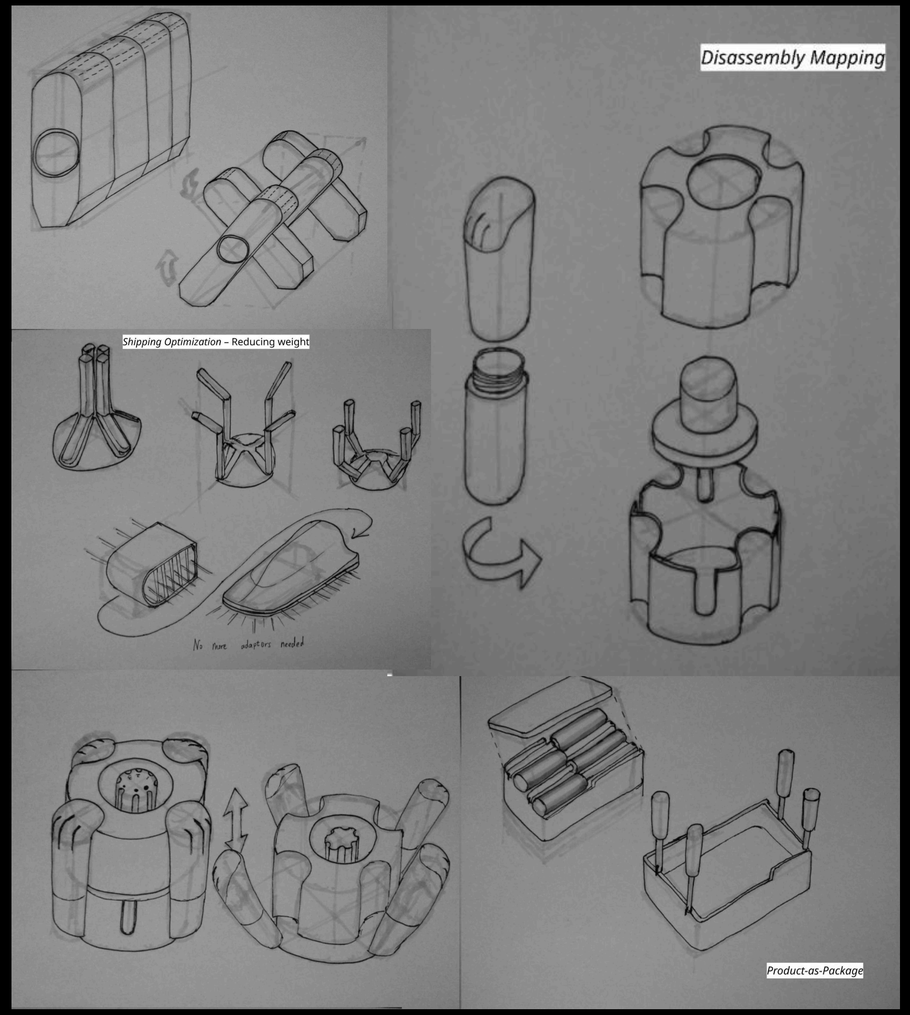
Design Goals

- Improve heat safety and material performance
- Reduce structural and material complexity
- Extend product lifespan

Design Principles

- Fewer materials, clearer structure
- Heat-appropriate materials
- Compact and intuitive use

Concept Evolution



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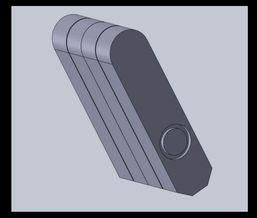
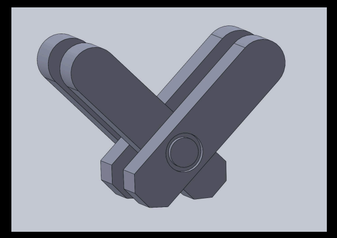
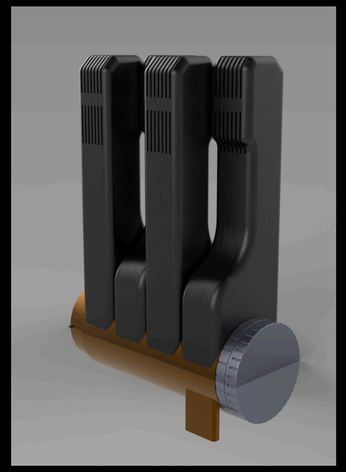
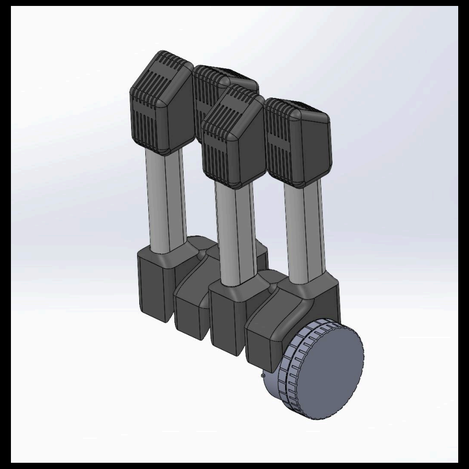
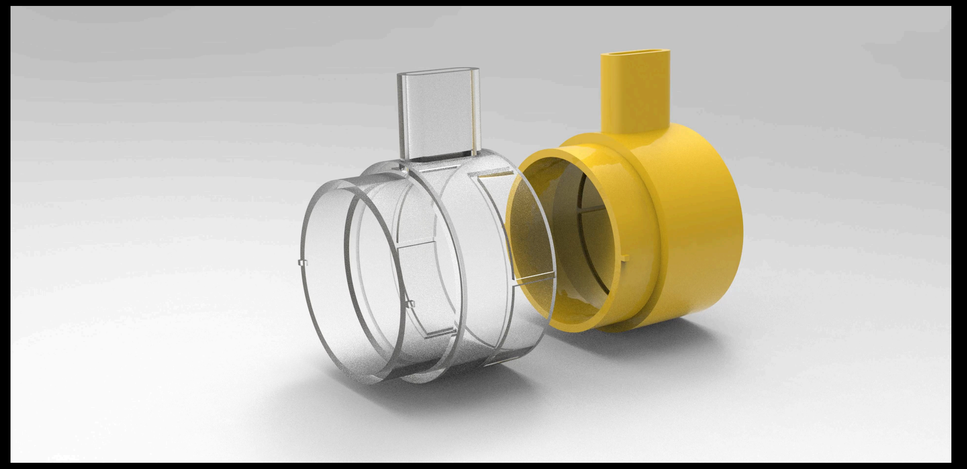
Concept Evolution

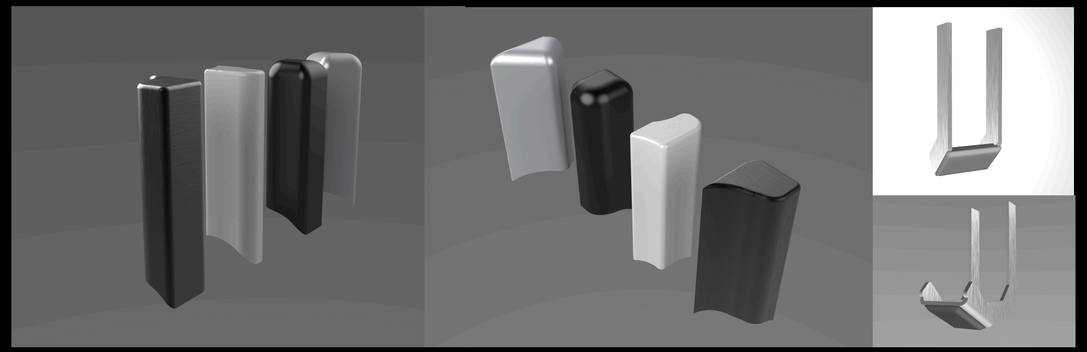


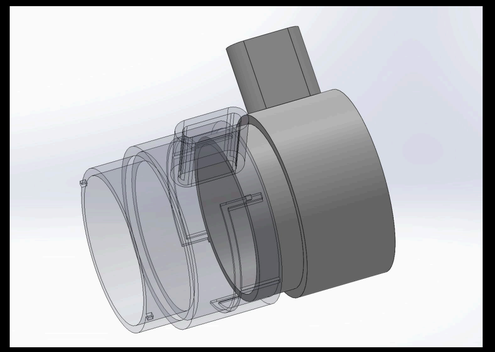


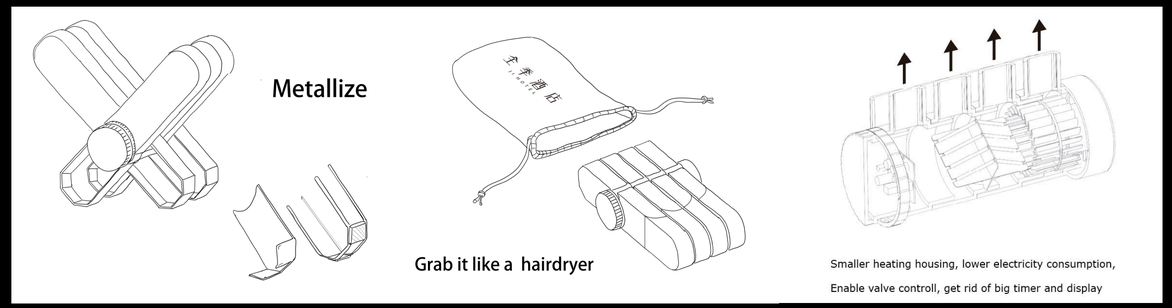


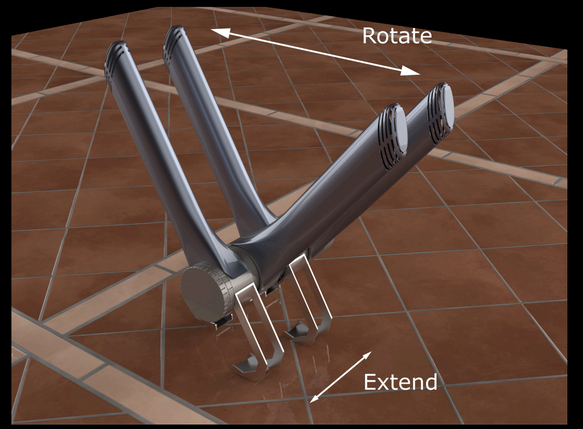












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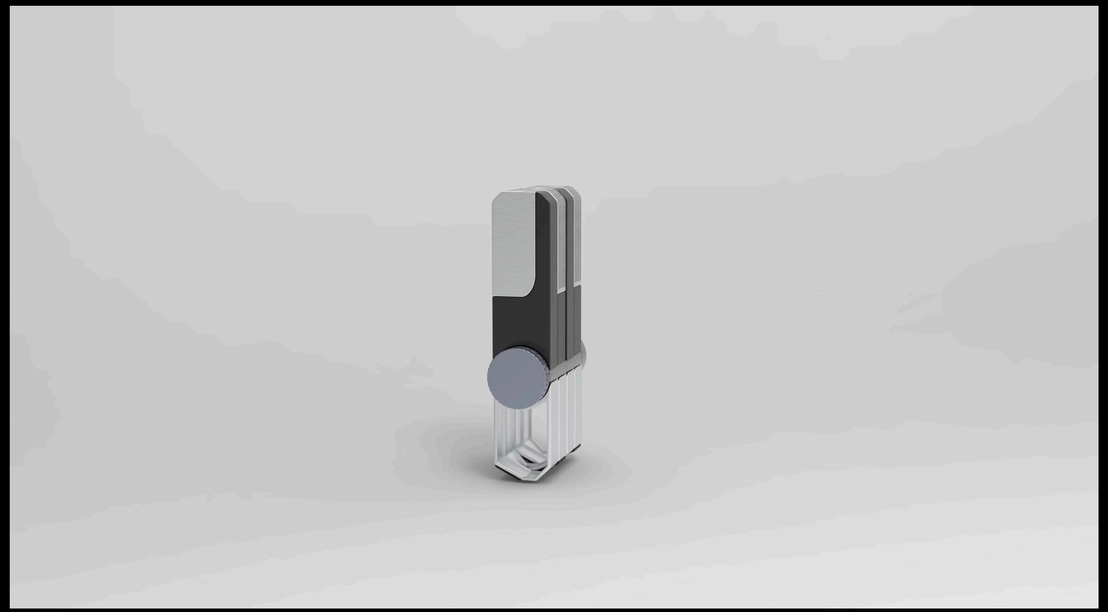

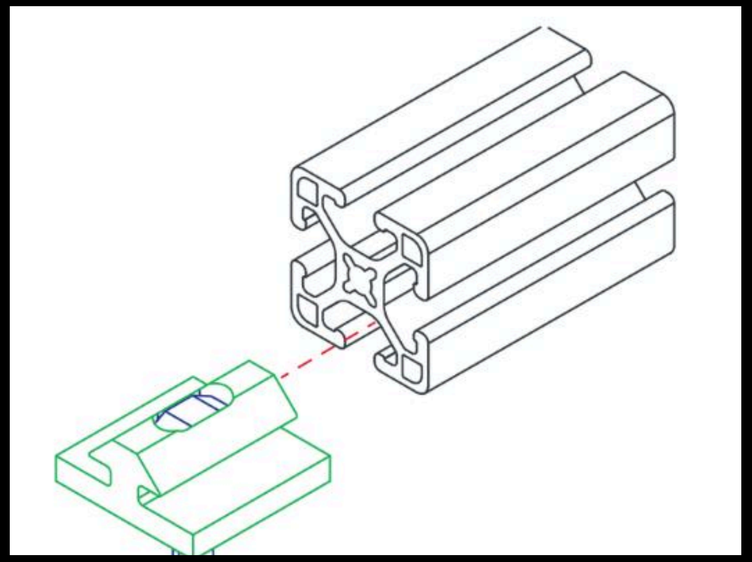

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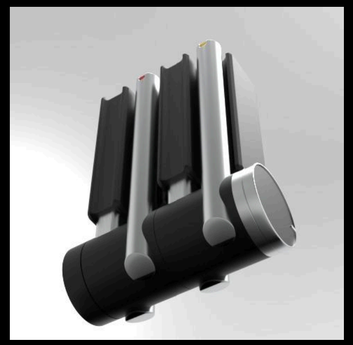
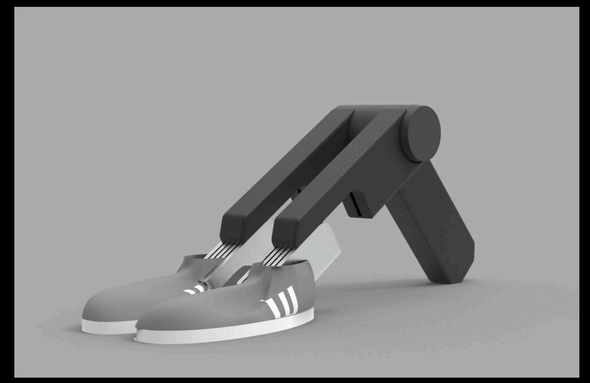
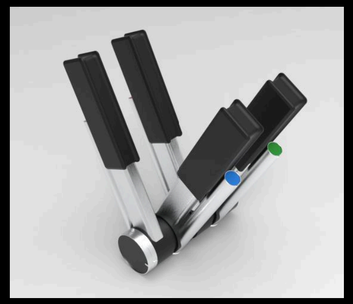
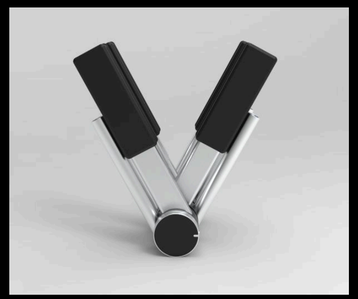
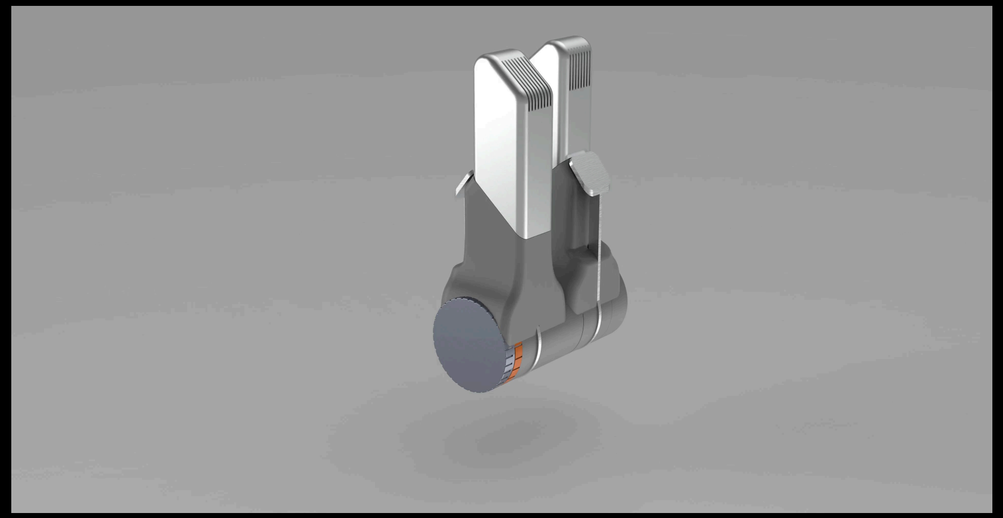
System











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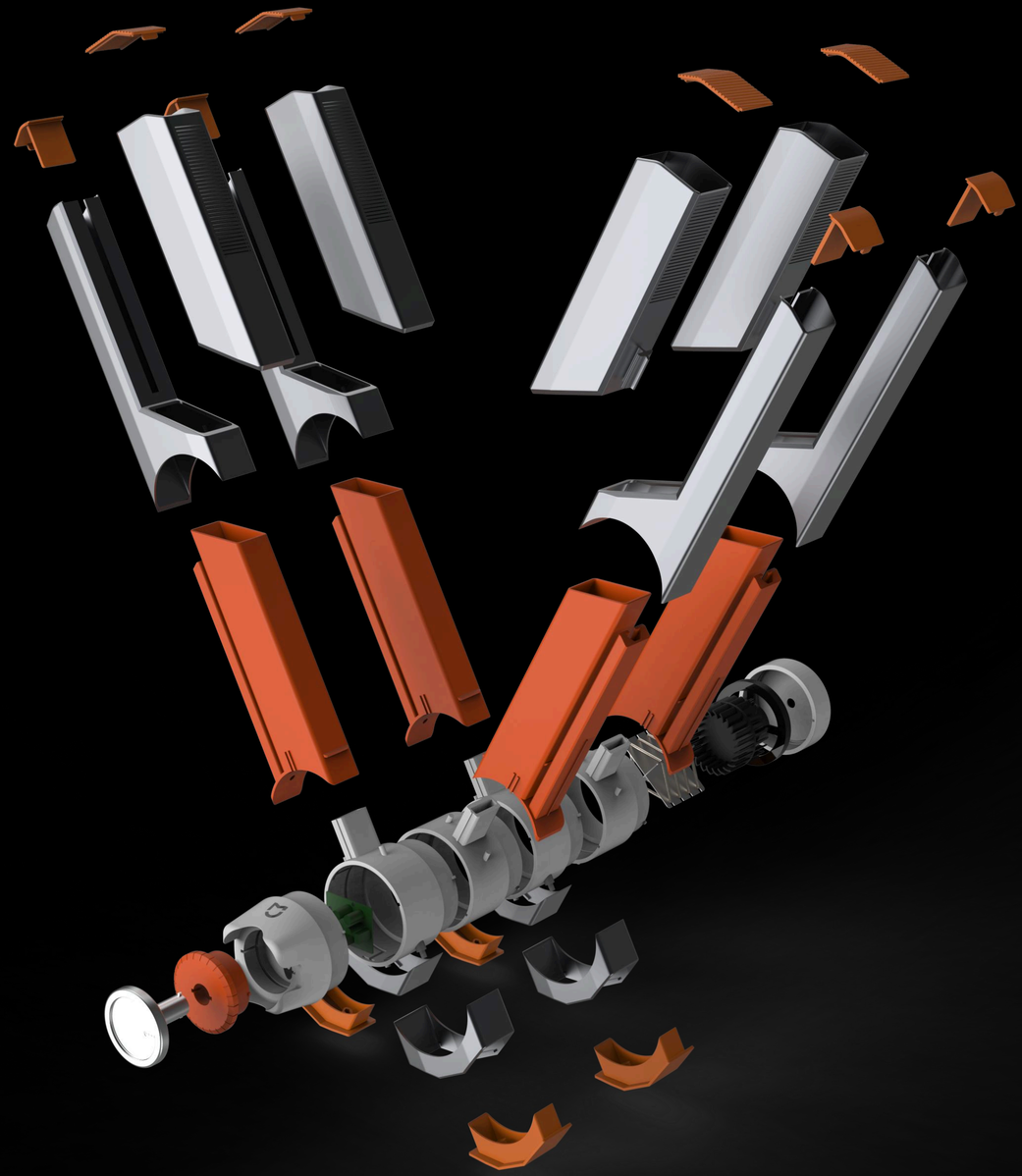
Final Design Overview



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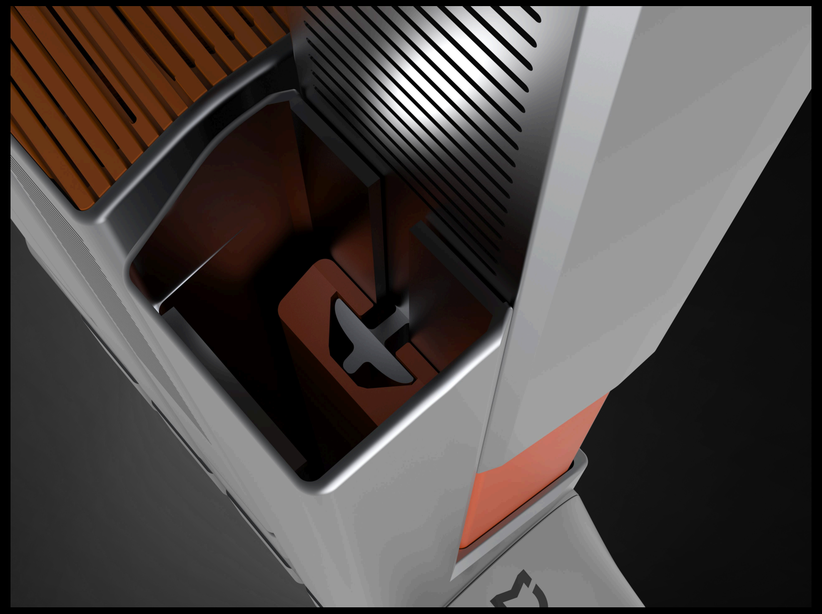
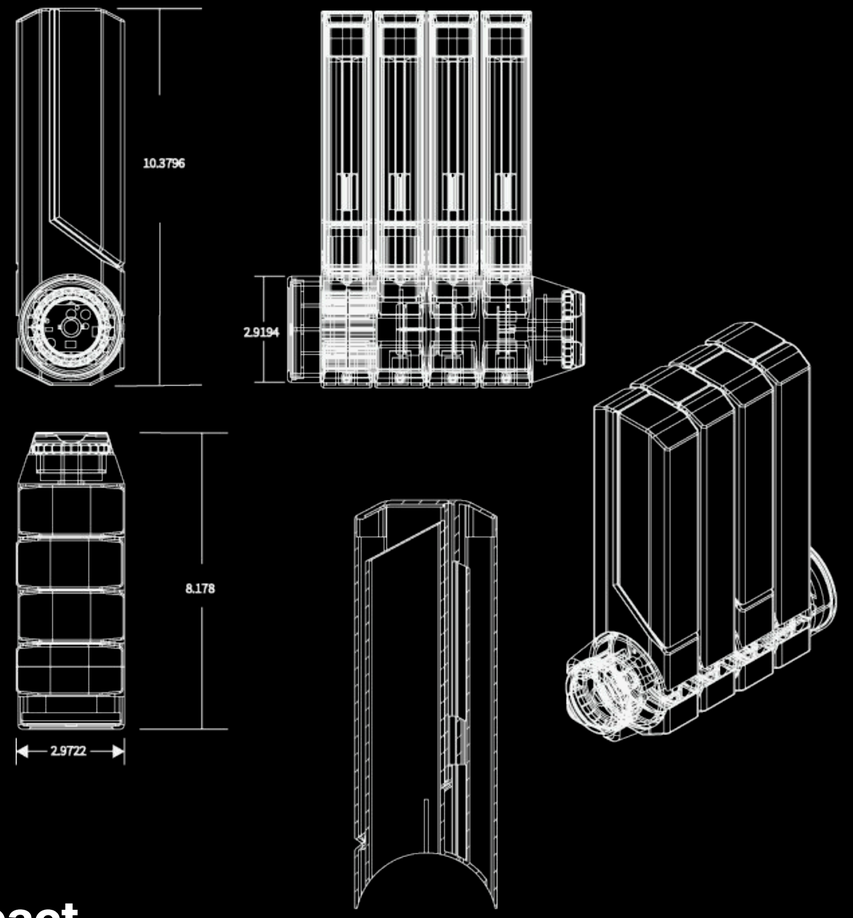
Final Design Overview





The telescope isn't just for compact,
It fits those tricky spaces better.

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Materials & Sustainability Strategy

Material Strategy

- Replace ABS with bio-based PA11 for heat-critical components

Why PA11

- Bio-based (castor oil)
- Higher heat resistance than ABS
- Improved durability and lifespan
- Suitable for injection molding

Redesign

VS

Benchmark

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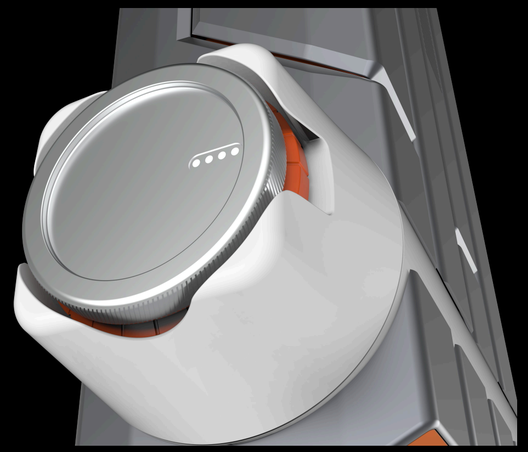
Benchmark vs Redesign Comparison

Main Structural Shell
Aluminum Alloy 6061-T6

Airflow Duct Modules
Bio-based PA11



Control Knob (Outer Cap)
Aluminum Alloy 5052-H32

Knob Base / Internal Support
PA11

Main Housing Shell
→ ABS
(Petroleum-based)

Airflow Arms & Ducts
→ ABS
(Mixed plastics)

Control Knob
→ ABS
(Painted / coated)

Internal Structural Parts
→ Mixed ABS +
Steel inserts

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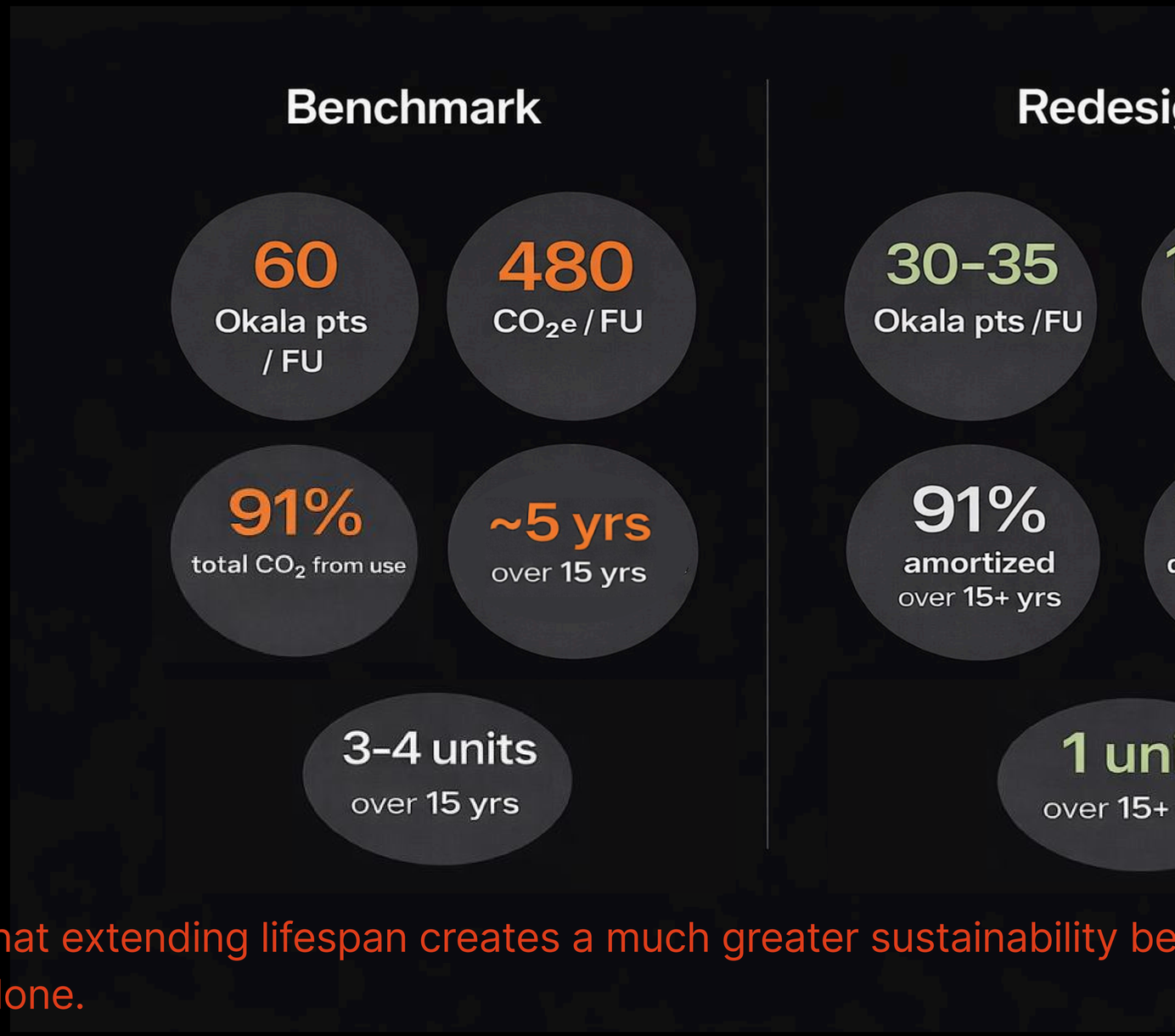
Benchmark vs Redesign Comparison



This shows that extending lifespan creates a much greater sustainability benefit than reducing energy use alone.

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WHY XIAOMI?

Designed for everyday, long-term use

Not short-life disposable appliances

Minimal form, honest engineering

No unnecessary features or complexity

Sustainability at scale

Improving impact through mainstream products

Built for real living spaces

Compact, simple, frequent-use scenarios

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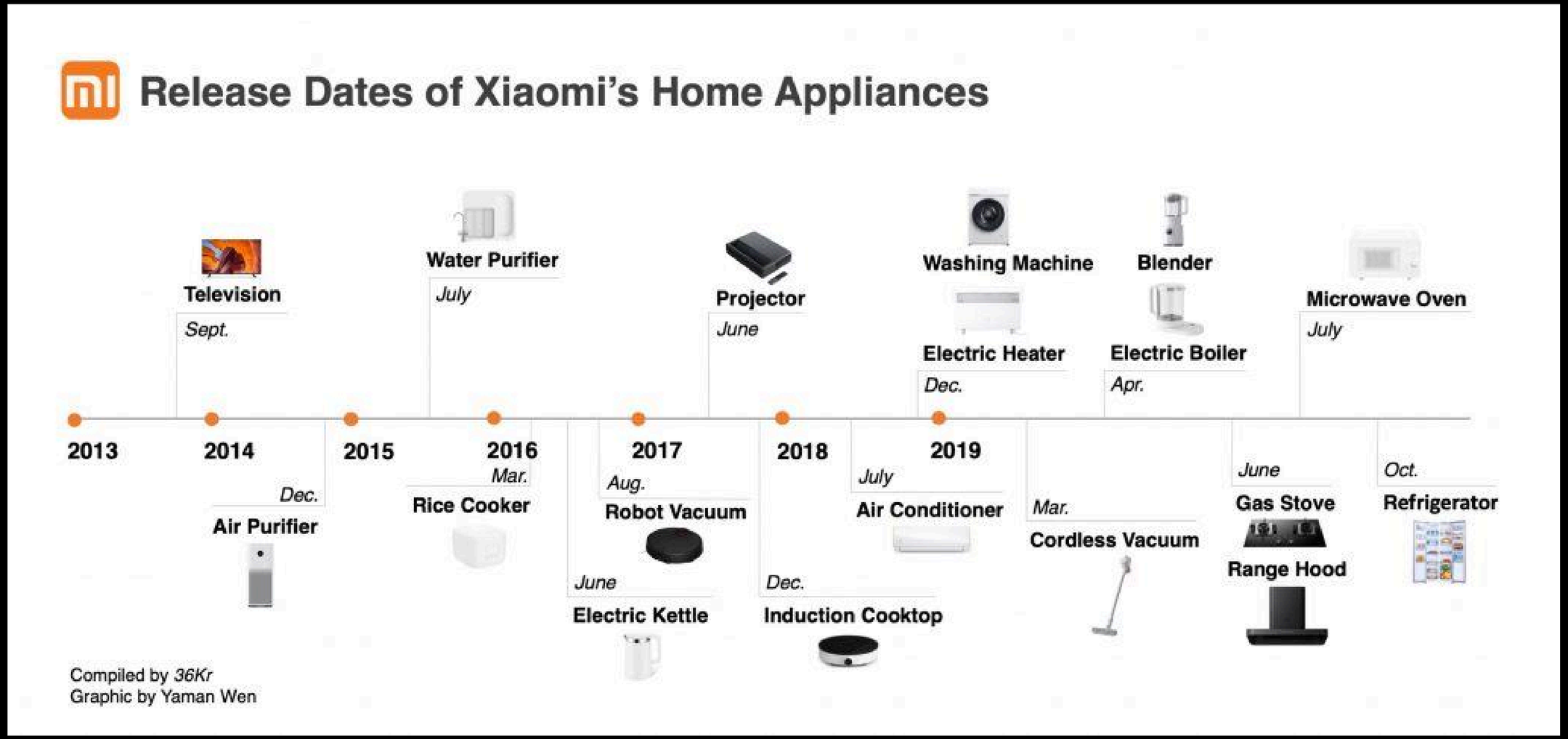
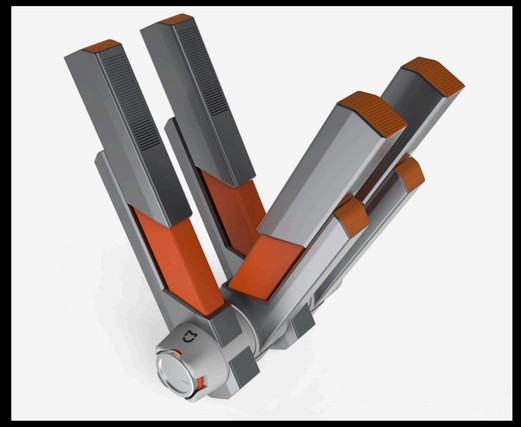
WHY XIAOMI?

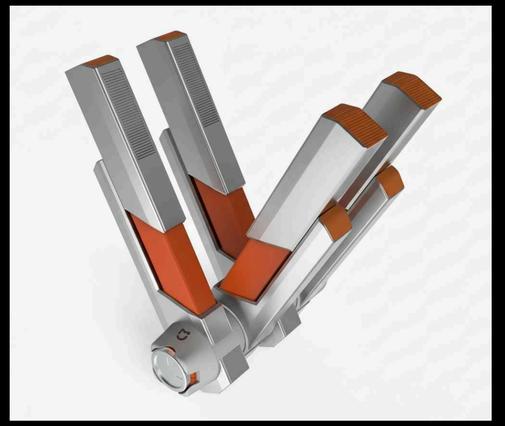

Release Dates of Xiaomi's Home Appliances
2013
2014
2015
2016
2017
2018
2019
Television
Sept.
Dec.
Air Purifier
Water Purifier
July
Mar.
Rice Cooker
Projector
June
Aug.
Robot Vacuum
June
Electric Kettle
Dec.
Induction Cooktop
July
Air Conditioner
Washing Machine
Electric Heater
Dec.
Blender
Electric Boiler
Apr.
Mar.
Cordless Vacuum
Microwave Oven
July
June
Gas Stove
Range Hood
Oct.
Refrigerator
Compiled by 36Kr
Graphic by Yaman Wen

COLOR WAY







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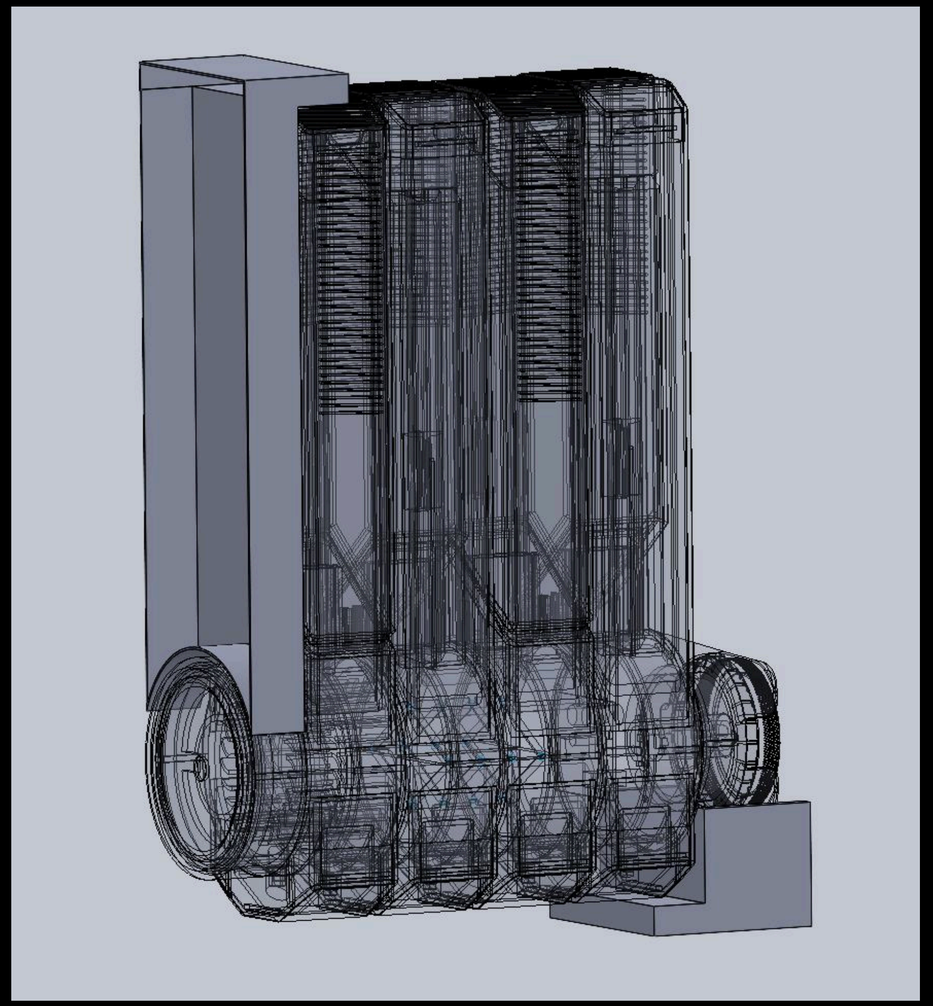
PACKAGING



Reflection

Did the design meet its goals?

Yes. The redesign improves safety, durability, and sustainability while maintaining a compact, user-friendly form.

Key Learnings

- **Material decisions strongly shape product lifespan**
- **Simplifying structure reduces environmental impact**

Future Improvements

- **Further airflow optimization**
- **Modular repair components**

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