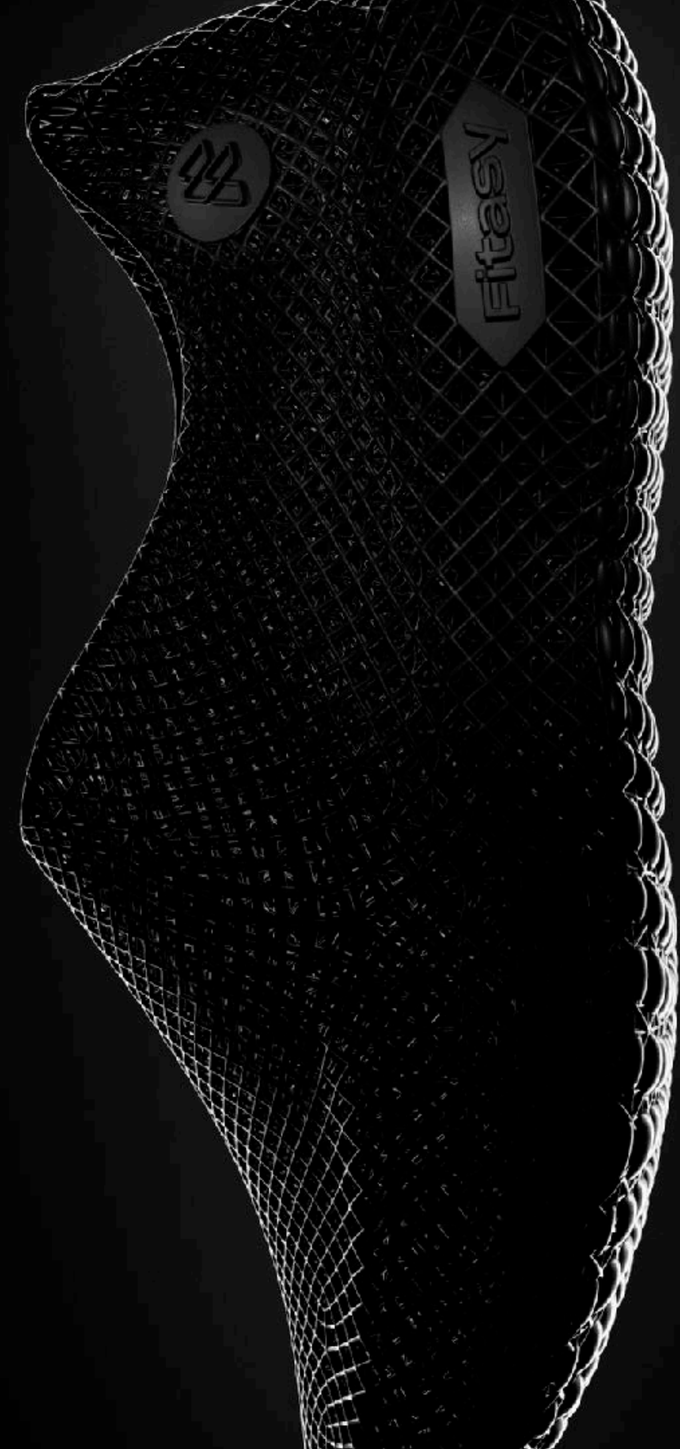

FITASY
SUSTAINABILITY

- A typical pair of running shoes emits **~13.6 kg CO_2e** cradle-to-gate; most impact comes from materials and manufacturing. [1]
- Global production was **~23.9B pairs in 2024; ~95%** of all shoes end up in landfill [2] [12]
- End-of-life is the industry's blind spot: **multi-material + glues** make disassembly and recycling nearly impossible [3] [4]
- **FITASY's approach:** 3D-printed, mono-material (single-family PU), tooling-free production to reduce waste and overproduction, plus take-back with both mechanical and chemical PU recycling pathways (upcycle to recovered polyols; downcycle to durable surfaces like sports flooring). [5] [6]



THE CURRENT FOOTWEAR SYSTEM

Carbon drivers (typical sneaker)

- B~13.6 kg CO_2e/pair, with 24 billion shoes produced every year, that's 326.4 million tonnes of emission. Within that process: [1] [7]
  - 68% is attributed to manufacturing
  - 29% is attributed to material processing

Manufacturing waste mechanisms

- In traditional footwear manufacturing, 25–35% of raw material input—including leather, textiles, EVA, and PU foams—is wasted through offcuts, trim, and rejected parts. [9]

  - Leather and textile cutting alone typically produces 20–30% waste, depending on pattern complexity and nesting efficiency.

  - Foam molding adds another ~25% material loss, largely due to flash, sprues, and quality rejects from multi-component assemblies and trimming.

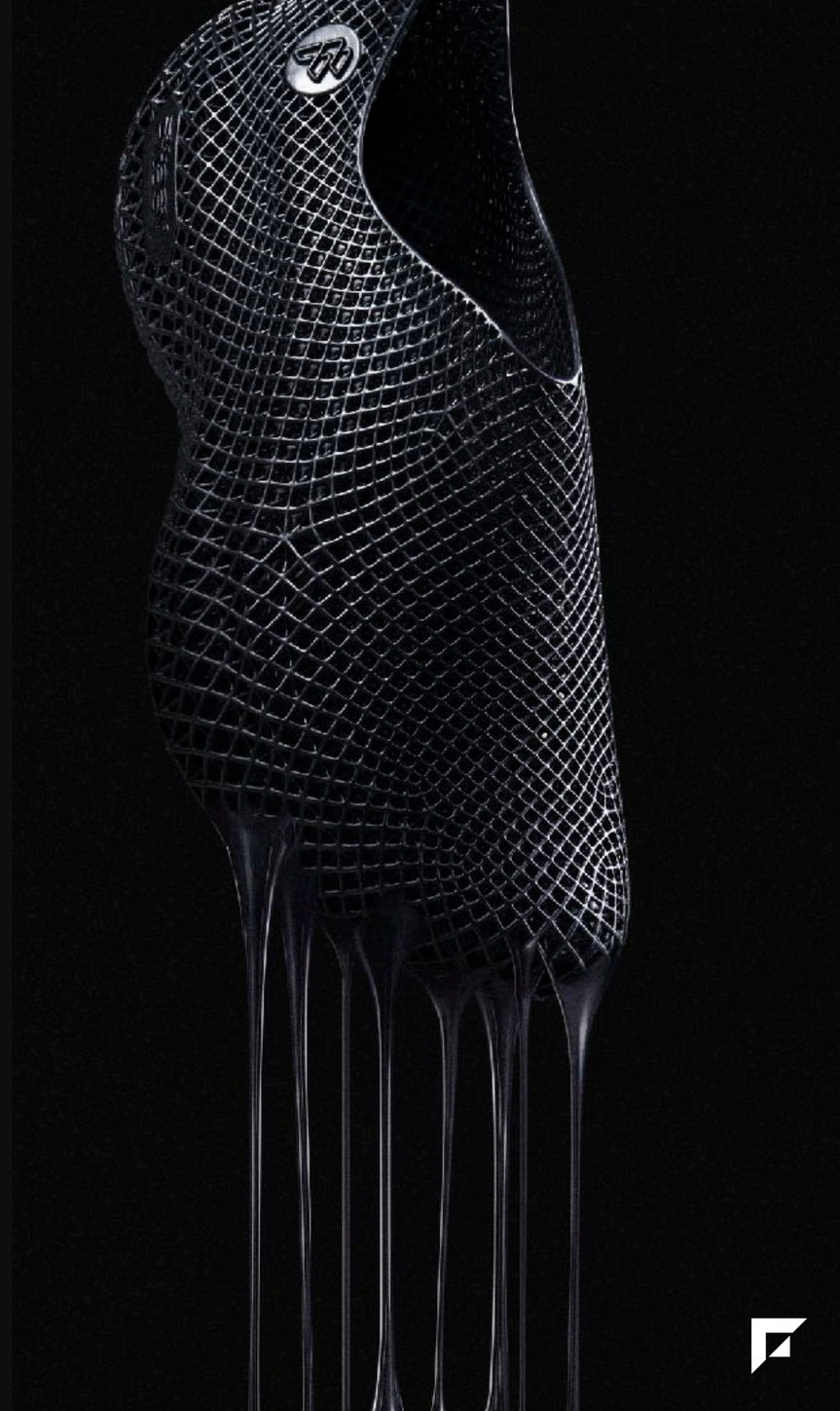
Design barriers to recycling

- Multi-material builds + adhesives hinder disassembly and lower recycling yields compared with mono-material constructions. [3]

- Collection exists, but a substantial proportion of shoes are not fit for reuse and are currently routed to landfill/energy recovery. [4]

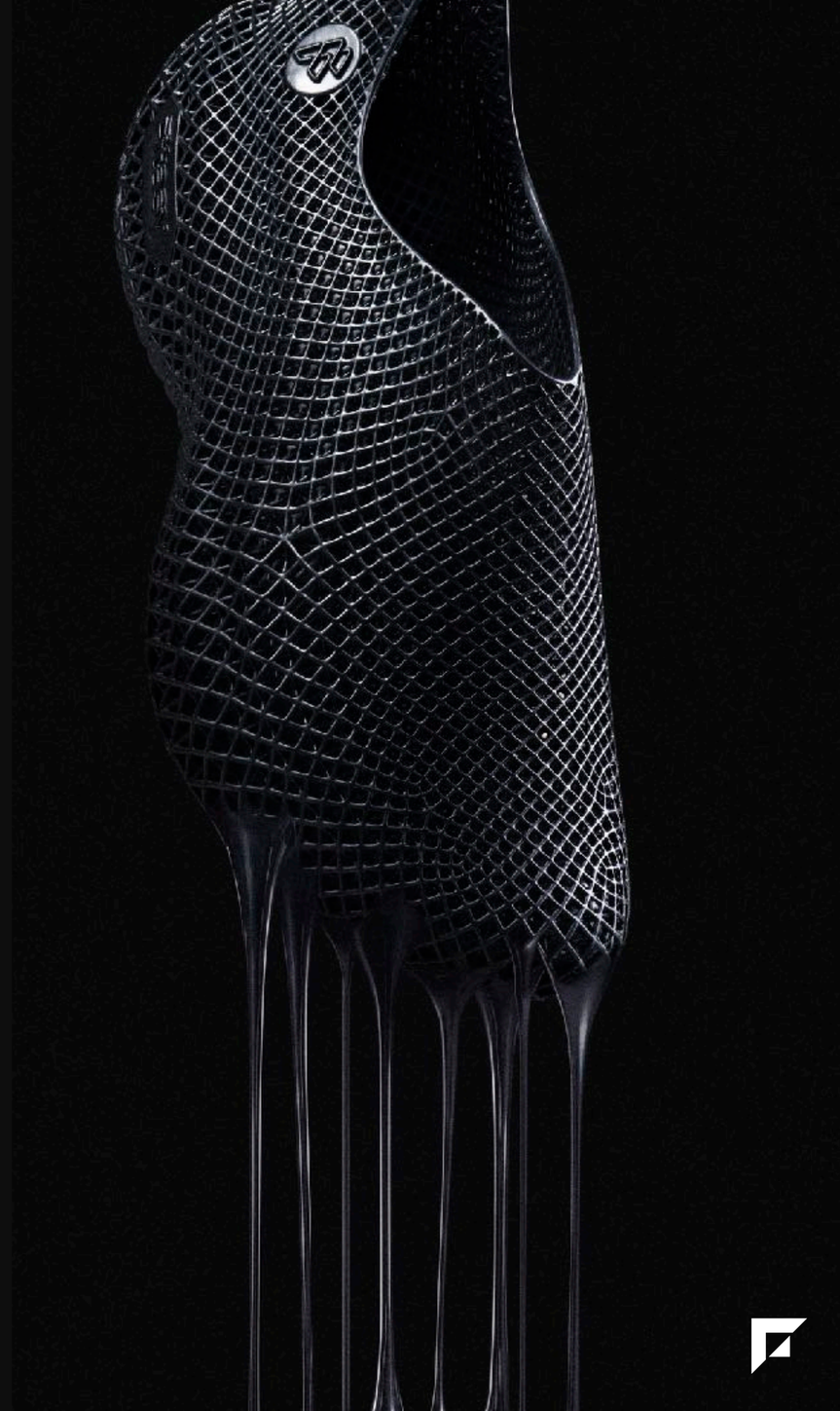
SUSTAINABILITY COMPARISON – 1

Category	**FITASY 3D-printed mono-material**	**Traditional Shoes (Multi-material, molded/ cut)**
Materials	Single polymer family (PU) designed for simple sorting and recycling	Mixed foams, rubbers, textiles, adhesives → hard to separate.
Process waste	**Only uses what's needed.** Case study has shows printing production reduces electrical energy consumption by over **64%**. [11]	~25%-35% of materials are wasted [9]
Molds & Overproduction	**Tooling-free**; on-demand batch sizes help align supply with demand	Requires tooling; economic MOQs → risk of overproduction.
Emission	3D Printed footwear is capable of reducing carbon emission by **48%**, and reducing water usage by **99%** [8]	Baseline ~13.6 kg CO_2e/pair



SUSTAINABILITY COMPARISON – 2

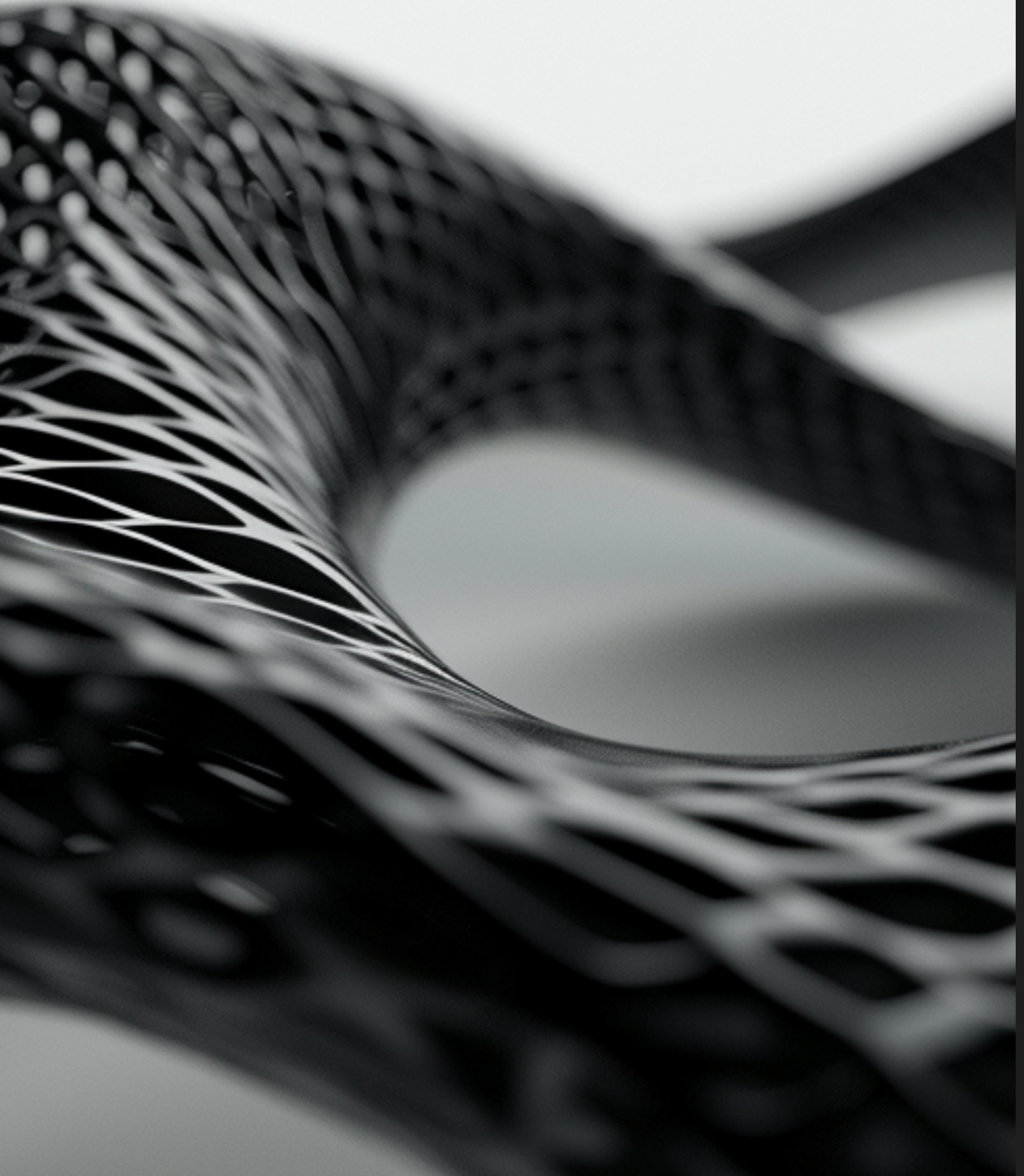
Category	**FITASY 3D-printed mono-material**	**Traditional Shoes (Multi-material, molded/ cut)**
Plastics / Bioplastics options	Up to **40%** of the resin can be bio-based	Largely fossil-based polymers.
Recyclability	**Mono-material** makes recycling simple: both upcycling or downcycling are available depending on intended usage	Low due to mixed materials and glues; almost all shoes end up in landfill.
Landfill risk	We ask every customer to ship back their shoes at the end of life for us to give them a second life.	High, because of poor disassembly and contamination.



How We Recycle Our Polyurethane Shoes

At FITASY, our shoes are made from a special flexible material called polyurethane elastomer — it's strong, springy, and perfect for cushioning your feet. And the best part? We can give this material a second life instead of letting it end up in landfills.

To make that happen, we run two recycling programs.



1. Downcycling Program
(turn old shoes into useful new products)

Think of down cycling like turning an old t-shirt into a cleaning rag — it's still useful, just in a different form.Here's how it works:

1. You send your worn FITASY shoes back
2. We clean them
3. We grind them into tiny pieces
4. Those pieces are mixed and pressed into new products — like running tracks, court flooring, playground surfaces, or shock-absorbing mats

This keeps the material out of landfills and gives it a long second life in community and sports environments.

Your old shoes → sports & wellness surfaces for the world

HOW WE RECYCLE OUR POLYURETHANE SHOES

2. Upcycling Program
(turn old shoes into raw material)

Upcycling means upgrading — taking the old material and re-making it into something just as premium. This is the **circular dream**: old shoes become new shoes.

For up cycling, we take an extra step:

1. You return your shoes
2. They are shredded into small pieces
3. The shredded material goes into a high-temperature reactor
4. Inside, heat + special catalysts unlock the chemistry
5. The shoe material separates back into its raw liquid components
6. We filter & purify those ingredients

WHY THIS MATTERS

FMost shoes today end up as trash — they're made from many materials glued together, so recycling is nearly impossible. FITASY shoes are different:

- **One advanced material**
- **No glue**
- **No mixed plastics**
- **Designed from day one to be recyclable**

This is how we move from "wear and waste" to wear and renew.You get great shoes. The planet gets less waste. Everyone wins.

FITASY

info@fitasy.ai

www.fitasy.com

@fitasy_official

REFERENCE

[1] Massachusetts Institute of Technology (MIT) News. (2013, May 22). "What's a sneaker's carbon footprint?" Retrieved from

https://news.mit.edu/2013/footwear-carbon-footprint-0522

[2] World Footwear / APICCAPS. (2024, February 9). "Footwear production rebounds in 2024." Retrieved from

https://www.worldfootwear.com/news/footwear-production-rebounds-in-2024/10835.html

[3] Pineda-Lozano, J., et al. (2023). "Sustainable footwear: challenges and prospects." Journal of Cleaner Production, 414, 137674.

https://www.sciencedirect.com/science/article/pii/S0264127523006391

[4] Centre for Smart, University of Huddersfield. (2023, March 1). "Recycling Footwear – Waste Framework 0123." Retrieved from.

https://www.centreforsmart.co.uk/ckeditor_assets/attachments/49/recycling_footwear_wf0123_-_01_03_23.pdf

[5] Zhou, Y., et al. (2024). "Recycling and reuse of polyurethane waste: recent advances and future prospects." Frontiers in Sustainability, 5, PMC11433504.

https://pmc.ncbi.nlm.nih.gov/articles/PMC11433504/

[6] Liu, Q., et al. (2023). "Chemical recycling of polyurethane via catalytic glycolysis: toward a circular economy." ACS Sustainable Chemistry & Engineering, 11 (31), 11387–11397.

https://pubs.acs.org/doi/10.1021/acssuschemeng.3c02311

[7] BBC Culture. (2020, March 3). "The nasty truth about trainers." Retrieved from

https://www.bbc.com/culture/article/20200303-the-nasty-truth-about-trainers

[8] Additive Manufacturing Technologies (AMT). (2023). The first environmental evaluation of 3D-printed footwear.

https://amtechnologies.com/resources/case-studies/the-first-environmental-evaluation-of-3d-printed-footwear/

REFERENCE

[9] Hengstmann, E. (2010). "Waste management in the footwear industry." AFIRM Group Technical Report. Retrieved from

https://afirm-group.com/wp-content/uploads/2022/04/17-Hengstmann-Waste-2010.pdf

[10] United Nations Industrial Development Organization (UNIDO). (2010). "Waste management in the leather and footwear industry." Retrieved from

https://www.unido.org/publications/ot/9656424

[11] Stratasys Ltd. (2023, August 8). "Study shows that additive manufacturing reduces emissions and waste." Retrieved from

https://investors.stratasys.com/news-events/press-releases/detail/862/study-shows-that-additive-manufacturing-reduces-emissions

[12] Circular Online. (2023, July 14). "Circular trainers: how consumption became culture." Retrieved from

https://www.circularonline.co.uk/features/circular-trainers-how-consumption-became-culture/