



Circular11

Intelligent Plastic Manufacturing,
Turning Co-mingled Waste into
Carbon-Negative Materials

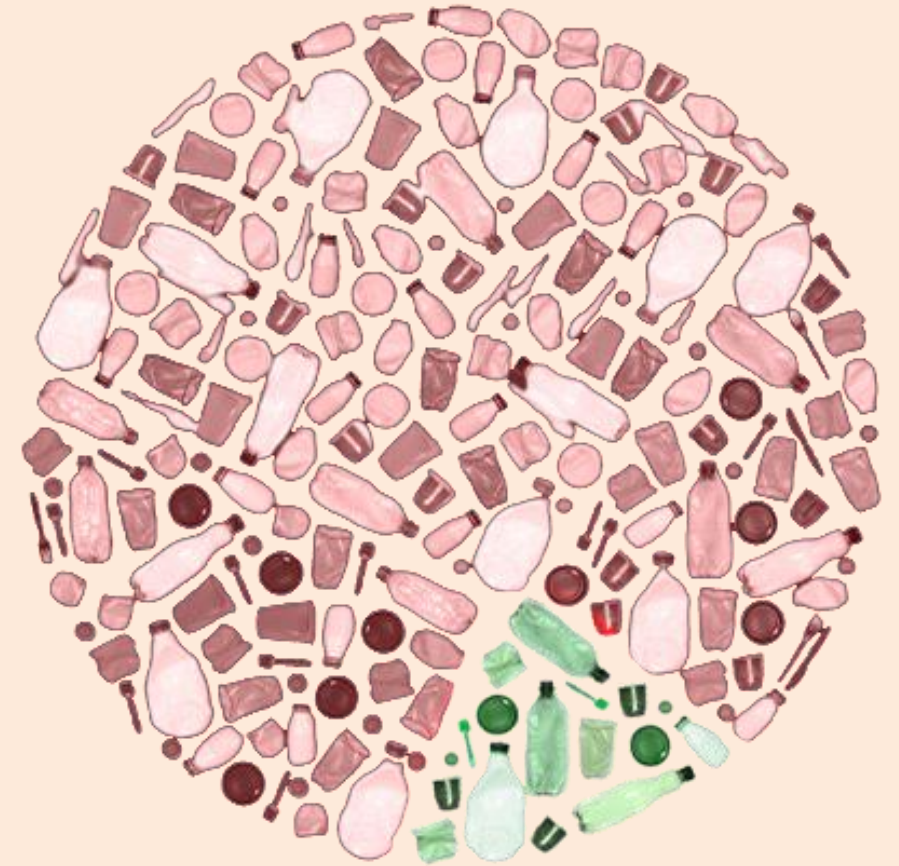
The problem of recycling plastics

Recyclers in Europe send 92% of household plastics to waste.

9.8 million tonnes are collected, but only 0.8 million tonnes are sold on. The rest is sent to incineration because it is inseparably mixed.

Separation technology can only sort 42% of plastics into types. Even these are further mixed with hundreds of grades, fillers & additives, further reducing recycling.

Sending these mixed streams to incineration costs recyclers \$6bn/year & emits 160 million tonnes of CO₂e



Data for PP and HDPE only.
Across all plastics, 88% goes to waste.

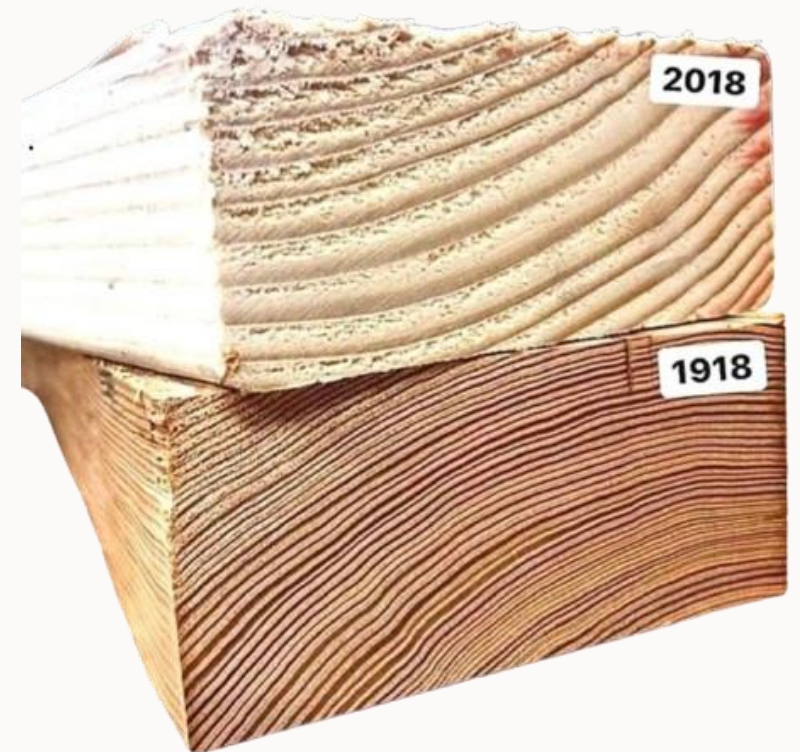
The problem of short-lived materials.

Timber lifespans are collapsing by 75%, whilst the market faces a supply crisis.

In 2023, timber preservatives like creosote were banned for all commercial uses, reducing expected lifespans from 30 years to an average of 7.

This will drive an unprecedented need for longer-lasting materials as these assets rot over the next few years.

This compounds an underlying deterioration in timber quality, as demand outstrips supply by 80%.



Our technology: dynamic processing

Our system adapts material & manufacturing parameters to real-time shifts in post-consumer content.

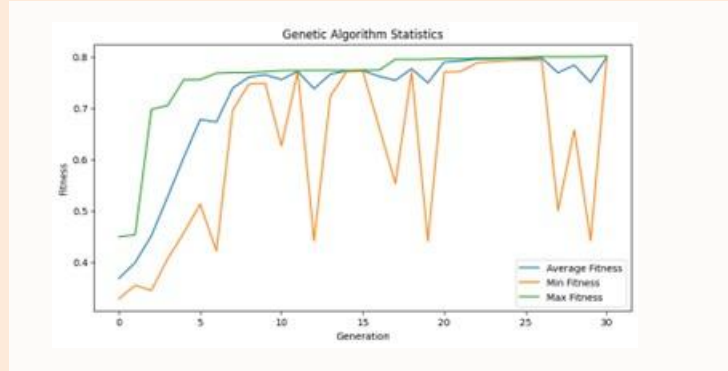
1 Real-Time Characterisation

We triangulate chemical and physical signatures to detect compositional changes.



2 Multi-Polymer Blending

We blend these plastics according to input mix, outputting composites of consistent quality.



3 Dynamic Optimisation

We ingest all data into AI models that optimise the line to compensate for variation

A screenshot of a software interface displaying "Optimal Parameters" for "Formulation" and "Extrusion". The interface includes a sidebar with icons for home, search, settings, and other functions. The main content area shows a table with the following data:

Material	Percentage
HDPE	19.04%
pp	20.96%
Wernsley	26.57%
Exeter	21.43%
Barium Sulphate	5.36%
Chalk	1.64%
Talc	3.00%

Our product

We use this to create lumber that lasts longer than timber, mitigates more carbon, and rivals it for price.

Our system can currently standardise materials at a thickness of <25mm. Lumber alternatives are a venture-scale opportunity that allows us to mature our technology within an already-profitable business.



Long Lasting

3-5x longer lifespan than timber



Price Competitive

76% cheaper than timber over 30 years














Carbon Negative

Mitigates 0.52 tonnes CO₂e per tonne

Competitor differentiation

Our composites are gaining rapid market traction by making durability affordable & sustainable.

	Timber	Plastic Lumber		
	 Travis Perkins	Circular11		 <small>A Berry Global Product</small>
 Price / 4'x2' Beam	£4.65	£6.25	£7.00	£9.20
 Carbon Mitigation (CO ₂ /Kg)	- 0.20	- 0.52	N/A	N/A
 Lifespan (Years)	8	30	30	30
 Compliant for Infrastructure				

Making the fencing and barrier network carbon-negative, cost-effective, & circular from cradle to cradle.



We won £110,000 as part of the National Highways ‘Accelerating Low-Carbon Innovation Programme’ to trial road-waste derived fencing.

“

Our timber assets are meant to last 30 years; now they last 5. We need alternative materials as fast as we can get them.

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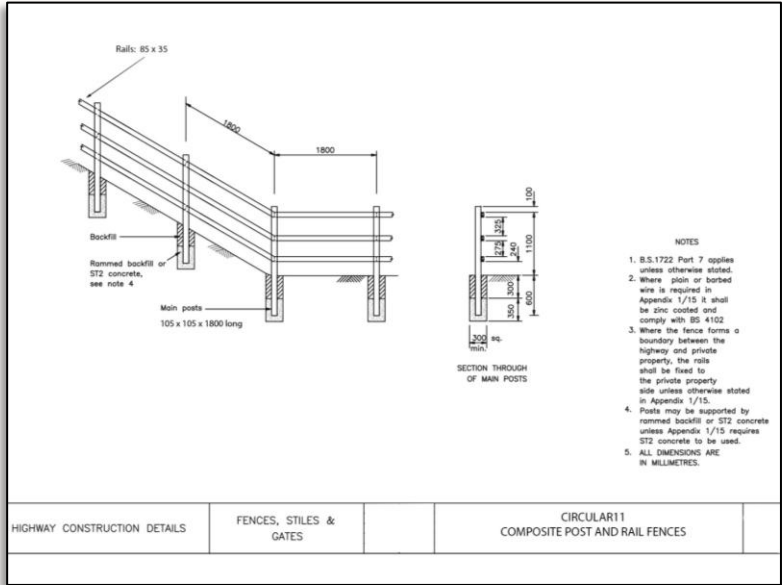
- National Highways Sustainability Lead

Products have a 6.1% reduction in balance sheet spend from year 1, and 68% savings over 30 years.

We have passed extensive screening by the National Highways Safety, Engineering, & Standards Team.

Composition: 70-85% post-consumer polyethylene/polystyrene mix.
Standard: ASTM D7568 – 17 (“Standard Specification for Polyethylene- Based Structural-Grade Plastic Lumber for Outdoor Applications”)
Flexural Strength: 25-32 Mpa

Basis for Carbon-Negative Emissions:
Our claims are verified through an independent EPD-verifier, and mitigates carbon because of the percentage of our feedstock that is made up of incineration bound materials, diverting downstream carbon emissions. We can evidence that the materials we process are waste, rather than commodities.



Mandatory impact category indicators – EN 15804+A2, PEF 3.0												
Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	1.2E+01	9.7E-01	1.2E+01	2.5E+01	1.6E+00	1.9E-01	0.0E+00	1.6E+00	1.1E+01	0.0E+00	-

Scaled to per kg of product
A1 – C4: 1.050 kg CO₂e
D: - 1.573 kg/kg
Net Impact: 0.523 kg mitigated/kg

We also sell acoustic barriers, products, and raw lumber supply for maintenance teams.



We have also designed and piloted an **acoustic barrier** (B3 acoustic performance, complaint with with BS EN 14388, and net-carbon zero).

Product strategy

We started by commercialising outdoor products, and are scaling as a material supplier in fencing & decking.



We also designed and piloted an **acoustic barrier** for National Highways (B3 acoustic performance, BS EN 14388); and agreed **wholesale distribution of planks** with national timber wholesaler Travis Perkins.

Our raise

We are on a mission to make plastic a force,
& a feedstock, for good.



We're expanding quickly through 2025,
and would love you to be part of the
journey to a world without incineration
or landfill. Contact us today:



Email ben@circular11.com

Visit www.circular11.com