

# Carmakers change direction on use of recycled materials

When passengers settle into the back seat of the new Ford Bronco Sport, little do they know that parts of the car just inches away were once discarded fishing nets, bobbing about in the world's oceans.

The US carmaker, which has experimented in the past with using recycled plastics, has refashioned this netting into wire holders weighing just 5 grammes for the sport utility vehicle.

"While these clips are small, they are an important first step in our explorations to use recycled ocean plastics for additional parts in the future," says Jim Buczkowski, one of Ford's research and development directors.

And, for carmakers looking to reduce their carbon footprint, retrieving waste from the sea will need to be one of several tactics.

McKinsey, the consultancy, estimates that 60 per cent of auto industry emissions by 2040 will come from the materials used in production – unless there is further action to improve sustainability in manufacturing.

Right now, roughly half the cost of a vehicle is spent on materials that will not be recycled, according to calculations by the Circular Cars Initiative, a grouping of businesses set up by the World Economic Forum to increase the use of renewable materials.

So, while carmakers continue to seek ways to cut emissions during driving, a simultaneous push is under way to cut them in the supply chain, and then to increase the material that is recycled at the end of a car's life.

The ultimate goal is a "circular car": one that uses materials retrieved from older models in its components or bodywork in an attempt to change the linear take-make-dispose production model. The ultimate ambition may be a "closed-loop" system, in which materials are reused for the same purpose.

"We are looking at using recycled content, at recyclability, and looking into the batteries," says Fredrika Klarén, head of sustainability at Polestar, the electric brand spun out of Sweden's Volvo. "If we can't make them 'circular', then we can't do electrification in a sustainable way."

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"The fossil fuel car is the perfect example of a linear product, because the fuel in it combusts and literally disappears," she explains. "But electric cars can be more circular, because you recharge them."

Using recycled material is a key way to lower emissions in the supply chain, while avoiding waste from products that reach the end of their useful life. Yet it is a daunting task.

Modern cars typically incorporate between 8,000 and 10,000 different materials within them, says BMW, the German carmaker. But, while recycling

has become relatively common in other industries, the quality needed for automotive parts and car body materials has ruled out using recycled materials.

However, newer recycling technologies – which can, for instance, filter out automotive aluminium from other metals – allow carmakers to consider seriously, for the first time, making large parts of their vehicles out of second-hand material.

"Automotive grade quality is not a given for recycled material," says Thomas Becker, head of sustainability at BMW. Even a trace of copper makes second-hand aluminium more corrosive, and so useless to carmakers.

Nevertheless, BMW has introduced a "secondary first" principle, where suppliers must justify on cost or quality grounds the use of brand new material, rather than recycled parts.

"The burden of proof has been turned around, as a principle," says Becker.

To try to demonstrate the potential for recycled parts, BMW built a bespoke model – the i Vision Circular – made entirely from recycled materials.

On display at the COP26 climate summit in November 2021, it set out to demonstrate the potential of recycling in a vehicle, even if only one vehicle has been made.

"Steel, aluminium, plastics and glass are all the materials with the highest environmental impact, and that is where we can lower our carbon footprint," says BMW's Daniela Bohlinger, who designed the vehicle.

In fact, several carmakers have now produced "vision cars" designed to show the potential of recycled



**Driving force: BMW's i Vision concept car on display in 2021** — Jan Helfleisch/Getty Images

materials. Bentley's EXP 100 GT coupé, unveiled at the VW-owned brand's centenary celebration in 2019, contained reclaimed wood around its seats, and was coated in paint made from recycled rice husks.

But Volvo's Polestar has gone a step further. It intends to sell a completely carbon-free model – currently called the Polestar Zero – by the end of the decade. "That car needs to be produced with renewable energy but it also needs to be 'circular'," says Klarén. "We can reuse components or produce components with recycled content."

At the heart of the conundrum of making a truly "circular" electric car is the battery.

Several carmaker brands have already taken batteries from used vehicles to make static power storage – the Johan Cruyff arena in Amsterdam has its back-up power provided via a bank of batteries taken from old Nissan Leaf cars. "If we put batteries on the market, we need to ensure they can be taken back or used for [a] second life," says Polestar's Klarén.

Being able to reuse parts in this way – or recycle them in new cars – will also

require a new approach to taking vehicles apart at the end of their lives.

Under the door in the prototype BMW is a single button that dismantles the car – allowing each part to be taken off individually for reuse in the future.

"My personal guess is that the recycling business for cars in 20 years is going to be very different from today's recycling businesses," says BMW's Becker. "Today's business is based on the legislative framework that was created in the year 2000," he explains. "But it was all about 'can you recycle it?' It was not about closing loops."