

Honda is looking beyond the hybrid, reports John Arlidge in Tokyo

ON PAPER, Michio Shinohara has few reasons to be cheerful. He works in the car business, the manufacturing sector hardest hit by the downturn. His company, Honda, halted production at its plant in Swindon, southwest England, for four months this year and ditched plans for a sexy new NSX sports car. It pulled out of Formula One, only to see its driver, Jenson Button, win race after race for his new team, Brawn.

Yet on a muggy afternoon in Tokyo last month, Shinohara threw back his head and laughed: "It seems that we have been incredibly brilliant." The car he launched in February, the petrol-electric Insight, stole the title of best-selling hybrid in Japan from the Toyota Prius and became Japan's top-selling vehicle overall, the first time a hybrid had topped national sales rankings anywhere. More than 5,000 have been sold across Europe.

The Insight is so popular that Shinohara, Honda's head of environment planning, can't get one himself. "The factory can't make enough for the orders we already have."

Petrolheads may mock the Insight's basic interior and the anaemic performance of its small petrol and electric motors, but Shinohara's creation is proving to be an ideal product for its time. It's cheap and green — two qualities car buyers prize more than ever.

"We launched this vehicle at a very lucky time," he said. "It was not important to us to have the car with top performance. We wanted an eco-friendly car that is accessible to the greatest number of people. Price is key."

The Insight costs up to 18% less than the Prius, its main rival, and returns similar fuel economy of about 60mpg. The Prius has lower carbon emissions.

Shinohara's excitement is matched by a sense of relief. The Insight is a car that simply had to work. Although Honda led the way with hybrids — it launched the first, also called Insight, in the late 1990s — it

Jamie Lee Curtis: an early convert to Honda's new FCX Clarity



Hydrogen hot wheels

quickly fell behind its rival. Gawk styling — it looked like an upside-down bathtub — killed the first Insight. A hybrid Accord followed but it failed to sell and was soon scrapped. The hybrid Civic has been a moderate success but Toyota has become the green car brand de facto, thanks to the Prius.

Buoyed by the success of the Insight, Shinohara is leading Honda's new push into the hybrid market. Next will be a sports car, the CR-Z, due to go on sale next year. New hybrid versions of the Civic and the Jazz will follow.

In a decade, Honda expects to follow Toyota and become

the second car company to have a hybrid version of all its models. On sales, however, Honda has fallen so far behind Toyota that it cannot hope to match its rival soon. It expects to sell 250,000 hybrids a year by 2015 and double that by 2020, more than 10% of its current total output. Toyota already

sells 400,000 Priuses a year and that figure is expected to rise with the release of new models.

Given the Insight's success, you would expect Shinohara to be an evangelist for hybrid technology. He regards it, though, as a sticking plaster solution until someone — he hopes it will be him — perfects the

hydrogen fuel cell car. Honda is working up the technology in the FCX Clarity.

As Shinohara drove the car, he explained why it, not the Insight, is the future.

Electricity in the Insight comes from a battery that is charged by "recycling" excess energy normally lost during

driving, for example when braking. The battery powers an electric motor that works with the car's 1.3 litre petrol engine, giving it a range of 500 miles.

Carmakers have experimented with vehicles powered entirely by battery but Shinohara said they were "not very customer-friendly" because

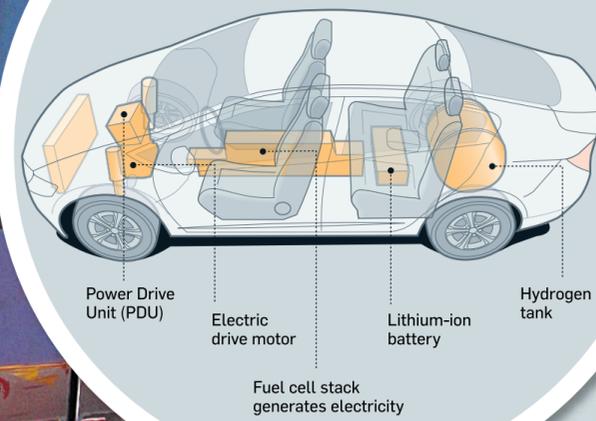
Honda's hydrogen hopes

Its Insight hybrid has been a success, but the Japanese giant thinks the FCX Clarity, its new hydrogen-powered car, will be even bigger

Michio Shinohara: green car boss



Hydrogen cars are silent and release water instead of CO2. Building a network of hydrogen fuelling stations will cost hundreds of billions



- 1 Fuel cells create electricity from an electrochemical reaction between hydrogen and oxygen
- 2 The electricity drives the motor. The Lithium battery provides back-up power
- 3 The sole by-product is water vapour

WE LAUNCHED THIS VEHICLE AT A VERY LUCKY TIME

their range is too short and the battery recharge time too long.

Hydrogen fuel cells are, he believes, the best green car technology because they have the potential to offer the power and range of a conventional petrol engine with water as the only byproduct.

The Clarity has several hundred fuel cells, which create energy from an electrochemical reaction between hydrogen and oxygen. The car's 171-litre hydrogen tank gives it a range of 300 miles. A conventional battery-powered car would require a battery weighing two tons to match the range and performance of the Clarity, and it would take hours to charge fully.

The Clarity is undergoing testing in Japan, Europe and America. A few have been released to customers in locations where there are hydrogen refuelling stations, notably California. The actress Jamie Lee Curtis drives one.

Shinohara admitted that the hydrogen technology has problems. The Clarity is so expensive to make that it is, for now, sold at a colossal loss. Consumers are "scared" of hydrogen, he said, because it is explosive. It is, at present, expensive to produce and, most importantly, persuading energy firms and governments to construct a network of hydrogen refuelling stations will be a big challenge.

Shinohara is undeterred. Honda is experimenting with installing domestic hydrogen stations at homes in California. Natural gas, supplied to the homes using existing pipelines, runs into a converter where it is separated into its various elements, one of which is hydrogen, which can be stored and used as necessary.

Shinohara's dream is that one day motorists will fill the Clarity with hydrogen at home, drive to their remote country cabin emitting no carbon, use the car as a clean generator to power the house, and use the water it produces to make a cappuccino. Truly a car for life.

Where there's muck, there's a green machine

It may look like rocket science, but Debbie Boyd has a simple way to tackle waste. By Sandra O'Connell

WHEN Debbie Boyd talks rubbish, people listen. The Northern Ireland-based self-styled "environmental entrepreneur" is the founder of Re3, a firm that claims to have found the holy grail in terms of sustainable waste management.

By using a combination of modern computer technology and old-fashioned steam engineering — the kind that powered the industrial revolution — Boyd is hoping to pull off a revolution of her own.

At its newly built facility in Limerick, Re3 is perfecting an alchemy that can transform high volumes of household and commercial waste into biomass fibre, which is a clean, green alternative to fossil fuels.

At the heart of the plant are two enormous autoclaves, of the kind originally developed to sterilise surgical equipment.

These were designed by Tom Wilson, a British steam engineer and Boyd's partner in Re3, who pioneered the energy recovery process.

Although they work like pressure cookers, what the machines most resemble are Nasa space rockets lying on their side.

The autoclaves "cook" waste in a matter of hours, sterilising recyclables such as cans, glass and plastics, and turning organic matter into a brown biomass fibre, which is then ready to be turned into pellets or logs. What remains is odourless, clean and not unlike peat.

"In many ways, what we are doing is producing a speeded up version of how peat is laid down and pressure-cooked over millennia," said Boyd.

As a fuel or power generation source, the end product is about half as efficient as coal-based fossil fuels and 1½ times as effective as wood pellets.

The autoclave process is energy-efficient and capable of handling all

non-hazardous municipal, commercial, industrial and agricultural waste.

In doing so, it can cut the volumes of waste destined for landfill by 80%.

What's more, autoclaving opens up the prospect of going back to existing landfill sites and mining them as a resource for biomass fuel.

For Boyd, a down-to-earth northerner, getting to the point where she has an industrial scale demonstration model of her vision has been the culmination of more than a decade of research and fundraising.

Yet in many ways, her journey has just begun. The Galvone plant in Limerick is, she says, a research and development facility meant to prove to investors and prospective customers that the system works.

"Getting to this point has been a hard slog," said Boyd, whose career began in a Portadown scrap metal merchants and ended up as chairwoman of the Waste Management Advisory Board of Northern Ireland. "I realised very early on that the environment was going to be big business," said Boyd, who also holds an honorary professorship from the University of Ulster.

The average Irish household generates 1.5 tons of waste each year and despite sustained efforts, less than one-third of that is recycled, the rest going to landfill.

It is only as landfill costs increased, and the adverse effects of global warming became more apparent, that her ideas for autoclaving alternatives gained traction. To date, she has raised €15m from Irish, British and American investors. Mark Ennis, an Aitriccity millionaire, has invested €2m in the company and Brian Shanley, a Waterford engineering entrepreneur, has invested more than €1.2m. The Limerick plant, which has a



The autoclaves 'cook' waste, sterilising recyclables and turning organic matter into a biomass fibre



Boyd raised €15m investment

permit to treat 50,000 tons of waste a year, is a joint venture with Greyhound Recycling and Recovery.

Proving the technology was a doddle compared to getting the funding. "I found it incredibly difficult," said Boyd.

"Government agencies couldn't support something that wasn't already in place and succeeding and, unfortunately, I went looking for bank finance just when the American subprime lending disaster was hitting, which of course slid into the credit crunch. I realised that private-sector funding was really the only way to go."

One of her first backers was Brendan Hughes, a US-based property developer originally from Tyrone.

Having built her plant, the real work is getting under way. "You can't introduce process efficiencies until you have a process and a product in place," she said. "You have to build a demo in order

to find the optimum operating conditions and what we have here is the first industrial scale plant of its kind in the world. Tom Wilson, our engineer, had previously built a five-ton autoclave system in Wales. This one has a 20-ton capacity."

She is aware of intense interest in what she is doing. Autoclaving has become a hot topic in Britain with Glasgow city council recently announcing plans to invest £135m (€157m) in three autoclave waste facilities. FLI Environmental, the owner of 3NRG in Waterford, plans to build a commercial scale waste autoclave facility in Wales.

"Interest in the environment generally is growing rapidly," said Boyd. "Enterprise Ireland estimates the green energy sector to be worth four times the global software sector."

But as long as it was cheap to send to landfill, investment in alternative green energy solutions was minimal. Moves to reduce the amount sent to landfill, in line with EU directives, plus the possibility of raising taxes on landfill, have changed matters.

"With climate change becoming more apparent there is a huge opportunity to create the kind of clean, green efficient technologies that the world is demanding and, although we know we have competitors in autoclaving watching what we are doing closely, we are the only ones up and running and we intend to take advantage of that," said Boyd.

Such has been the interest in Re3's system that the company has shifted its strategic focus.

Originally it intended to position itself as a standalone waste management company. Instead, it has posi-

tioned itself as a technology company that will generate revenues from licensing its technology and providing a turnkey installation service for waste companies — or local authorities — who want to buy in. As such, the ease with which the process can be scaled up or down in size is one of its biggest advantages.

The company is also looking at developing commercial products such as pellets and fire logs.

With her Limerick autoclaves which have, in the best steam-engineering tradition, been given names — Zoe and Julie — busy turning muck into brass, the big task facing Boyd is telling people about it.

"Our main challenge is to develop a strong international sales team. Unfortunately, the response I most often encounter is 'it sounds too good to be true'. Now, with the Limerick facility up and running, people can see it for themselves," said Boyd. "There is also a misperception that autoclaving has something to do with incineration. It doesn't, there isn't a single flame involved."

Overall, she is more optimistic than ever. "For years, I felt like John the Baptist crying in the wilderness. Then, suddenly, waste has become the most pressing issue facing every boardroom from Bill Gates to your local authority," she said.

And to all her mates who teased her as Steptoe and Son, "when I started all those years ago", she's set to have the last, potentially very lucrative, laugh.

Introducing the green bottle that's made from paper

GREEN PIONEERS

IT looked like an ordinary milk bottle. In fact, Martin Myerscough's briefcase — for a presentation to Asda, the supermarket giant — contained the world's first milk bottle made almost completely from recycled and recyclable paper.

Myerscough had done away with plastic, the necessary evil favoured by the packaging industry that is cost-effective, light and durable but takes centuries to decompose.

While British households consumed more than half a million plastic bottles last year, only 35% were collected for recycling. The rest were added to the 130,000 tonnes of landfill occupied by plastic.

The idea of reusing and remoulding pulped paper came to Myerscough, a 52-year-old inventor and engineer from Framlingham, Suffolk, after his son came home from school with a papier-mâché balloon. He devised the GreenBottle, an outer shell made of recycled office wastepaper, moulded like an egg box with a loose plastic bag inside that holds the milk.

In a carton, the bag can be recycled. If it isn't, it takes up considerably less space than a plastic bottle would and the cardboard around it decomposes within weeks. It takes only a third of the energy needed to make a plastic bottle and is credited with having a carbon footprint 48% lower than plastic, says Myerscough.

He approached Marybelle, a local dairy farm, which was convinced the project could work. What appealed most to the dairy was that the design for the package fitted existing filling lines. "Dairies don't have to make any changes in order to switch from plastic bottles to ours," explains Myerscough.

He then set up the meeting with Asda, one of Marybelle's customers, in 2006, to see whether a large retailer would take the product. The meeting was a success and the GreenBottle firm was formed.

UK retailers have been under pressure from the European Union and the Department for Environment, Food and Rural Affairs to cut the

amount of packaging and, in turn, waste they produce. "We are doing a lot to reduce packaging," says Chris Brown, Asda's head of ethical and sustainable sourcing. "Milk bottles are a huge volume line for us — we sell 500m litres of milk a year."

Asda agreed to put 250 bottles on trial in its Lowestoft store. The 50 bottles put on the shelves on the first day were sold in an hour.

Now GreenBottle produces about 1,000 bottles a week, supplying Marybelle's semi-skimmed milk to three Asda stores in East Anglia. "It's not forcing customers to make compromises," says Brown. "It looks like the plastic bottle that they are used to."



Myerscough with his bottle

And selling at £1.41 (€1.64) per two-litre bottle, consumers can afford to make a greener choice.

There are other advantages. GreenBottle is manufactured from stationery wastepaper and can be further recycled. "We had some good contacts like Charles Dunstone at The Carphone Warehouse, who is ecologically minded and agreed to provide waste paper," says Myerscough.

GreenBottle is now talking to one of Australia's leading dairy firms. "We have the demand; it is a question of getting our new production on stream," adds Myerscough. "The machinery that we are ordering will be capable of making about 1.5m two-litre bottles a month by next year."