

>> Back to the future

Electric cars – the vehicles of the future, right? You might be surprised to learn that they have been around for well over a century. **BRIAN COWAN** takes a trip back in time to the beginnings of the electric car.

Today electric cars are seen as the great hope for future motoring in these environmental and oil price-conscious times. But, surprisingly, electric cars have in fact been around far longer than internal combustion designs.

Crude electric carriages were experimented with in the 1830s, but they used non-rechargeable batteries – it wasn't until the 1860s when the lead-acid battery was invented that the concept flourished. By the end of the 19th Century, electric cars were ahead of their petrol and diesel competitors when it came to performance, with Belgian Camille Jenatzy's rocket-shaped Jamais Contente being the first car of any type to crack 100 kilometres per hour, in 1899.

By 1900 electric cars outsold all other types combined in the United States, but from there on it was all downhill for the electric car, with several factors contributing to its decline – and the rise of

the internal combustion engine – in the early 20th Century.

The tide was turning against electrics. Development of the electric starter in 1913 eliminated an inconvenient and potentially dangerous aspect of running a petrol car – starting them with a hand crank, which was

hard work, and, if not done correctly, could result in broken thumbs and even arms.

Making things even tougher for electrics was the arrival of the budget-priced Ford Model T, which sold for less than half a comparable electric. And internal combustion engines were much lighter and achieved much longer range than the electric cars, which were greatly limited by the need for frequent recharges of their heavy battery packs.

Electric vehicle technology stagnated, though it never disappeared – kept alive by golf carts, invalid scooters, forklifts and low-speed urban vehicles like British milk floats.

The major handicap limiting their wider use remained the lead-acid battery – heavy, expensive, with a limited life, with a range of barely 100km at modest city speeds, and a recharge time of 8-10 hours. Though the oil shocks of the late 1970s triggered a renewed round of electric drive development, still the cost and performance gap could not be bridged.

Then in the early 1990s concern about exhaust emissions led to the revival of the electric car as a passenger vehicle. The California Air Resources Board introduced regulations requiring car manufacturers to ensure that a certain proportion of the vehicles they made produced zero emissions. Effectively, they had to be electric.

A variety of models was produced in the

mid-1990s, including a Chrysler van, a Ford Ranger pickup truck, the GM EV1 sedan and S10 EV pickup, a Honda sedan, a Nissan lithium-battery mini-wagon and a conversion of the Toyota RAV4. But the US federal government and car makers claimed the legislation was unworkable and sued – CARB backed down. Most of the vehicles were returned to the manufacturers and scrapped.

The past decade has again seen resurgence in electric car development. Battery technology has improved significantly, while added pressure of climate change is prompting renewed investigation of electric cars. While electric vehicles to date have generally used conventional lead-acid batteries, the great hope for the future is lithium-ion – the type of battery used in cellphones and laptops.

Lithium-ion batteries weigh less and take up less than half the volume of comparable lead-acid batteries, have far longer life and can deliver ranges of up to 400km between recharges.

Several entrepreneurial companies have announced high-performance electric sports cars, including the Tesla Roadster and the Lightning GT, both of which can sprint to 100kph in about four seconds and reach a top speed of more than 200kph.

However, the real push will come from the major car companies, all of whom have serious electric development projects under way. Mitsubishi



leads the field with its MiEV range of concept cars. Begun with the Colt EV in 2005, it also includes the Lancer Evolution of the same year, the Concept-CT, Concept-EZ and i-car MiEVs of 2006, and the MiEV Sport displayed at the Tokyo Motor Show in 2007.

Mitsubishi Motors has joined forces with battery giant Yuasa to develop lithium ion batteries, initially producing 200,000 lithium cells a year, to be used in Mitsubishi's electric i-MiEV.

It is also undertaking field trials of the i-MiEV in conjunction with Japanese power companies to test the cars' driving performance and battery charging abilities in real life conditions. Similar trials are planned for the US.

The i-MiEV is expected to be offered as a production model in Japan in 2009, making Mitsubishi the first major company out of the blocks with the latest generation of electric cars. At present it achieves a range of 160km, its Li-ion batteries can be charged from a home outlet in about eight hours or a dedicated three-phase station in half an hour, and it reaches 100kph in around 14 seconds – just two seconds slower than its petrol counterpart.

So within the space of just a few years, instead of filling up, motorists could be plugging in. After a century and a half in the making, the electric car's time seems to have finally arrived. **E**

Mitsubishi's i-MiEV has been turning some pretty high-powered heads lately. Prime Minister Helen Clark was greatly impressed by the cutting-edge electric car when she checked it out during a recent visit to Japan. She says her Government aims for New Zealand to be one of the leading countries in the world to roll out electric car technology. "New Zealand is very willing and ready to pick up these kinds of cars because we've got so much renewable energy it makes sense for us to go the electric car way." Mitsubishi senior executive Masao Ohmichi presented the prime minister with a model version of the i-MiEV as a memento of her visit.

Register at: mmnz.co.nz/imiev for the latest news on Mitsubishi's electric car initiatives.

Cut-away illustration showing the internal placement of batteries and charging connectors on Mitsubishi's i-MiEV.



1830s

First experiments with "electric carriages"



1860s

Invention of the lead acid battery enables development of lighter electric cars



1899

Camille Jenatzy's rocket-shaped electric car achieves 100kph



1900

Electric cars outsell their internal combustion counterparts



1910-60s

Invention of the electric starter, followed by cheap mass-produced cars, hands the advantage back to internal combustion engines

1970s

Oil shocks spur renewed pursuit of electric car technology



1990s

US regulation, prompted by concern over vehicle emissions, forces major car makers to produce a number of electric cars



2000s

Lithium-ion battery technology allows the creation of better, faster electric cars



2009

Mitsubishi's i-MiEV electric car due to become available in Japan as a production car

