

News - General News

Forty electric vehicles in three years



Pioneer: The 200km/h electric-powered Tesla S is expected to be joined by up to 40 new electric models from the world's car-makers in the next three years.

What is green?

Car-makers rush EVs to market as electricity strides ahead of hydrogen

23 November 2009

By RON HAMMERTON

UP TO 40 plug-in electric vehicles – either full electric or hybrid – are being developed by the world's motor manufacturers for launch within three years, propelling electricity to the forefront of alternative transport, according to a leading Australian authority on sustainable transport.

Dr Andrew Simpson told the 2009 Intelligent Transport Systems Summit in Melbourne that electricity had already won the battle against hydrogen as the next big force in motoring, with car-makers deciding that electric vehicles (EVs) would help them to "get to zero emissions much faster".

"I think the stream of press releases about hydrogen will stop quite soon," he said.

Dr Simpson, a senior research fellow at Western Australia's Curtin University of Technology, told the conference that electric vehicle sales would accelerate from almost scratch today to at least one million electric vehicles globally – about five per cent of world car production – by 2013, and become the dominant form of car

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propulsion by 2030.

He said 10 EV new models were due to be launched in Australia in the next three years, starting with Mitsubishi's i-MiEV next year.



Left: Dr Andrew Simpson of Curtin University of Technology addresses the Melbourne ITS Summit. Below: Mazda RX-8 HRE, BMW Hydrogen 7 and Mitsubishi i-MiEV.



"The ramp-up of this technology is the most impressive thing," he said. "Starting today, they (the motor manufacturers) expect to be producing up to a million electric vehicles by 2013, but in the next decade is where it really begins to take off.



"Depending on who you listen to, there will be at least three million electric vehicles produced annually or about five per cent of the global market by 2020.



"If you talk to Nissan-Renault, they will tell you that the industry will be building six or seven million electric vehicles, or about 10 per cent of the market, in the next decade.

"And then in the next decade, by 2030, we are seeing signs that this could be the

predominant technology sold in the market.

"So it is going to happen very, very fast, and we need to start thinking about how

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we handle this wave of new technology and new products.”

Dr Simpson’s predictions for high-speed growth of EVs in the market place were echoed last week by a high-powered coalition of international business leaders – including Renault-Nissan CEO Carlos Ghosn – who released an ‘Electrification Roadmap’ for the United States, stating that EVs should represent 90 per cent of new car and light-truck sales by 2030, taking the number of electric and plug-in hybrid vehicles on the road in the US to more than 120 million by that year.

BMW, Mazda and Honda seem to among the few car-makers clinging to hydrogen as a credible potential alternative to petrol, with BMW announcing it will have hydrogen-powered vehicles alongside EVs in London to provide transport during the 2012 Olympic Games.

Honda is leasing a small fleet of its FCX Clarity hydrogen fuel-cell cars in the US and Japan, while Mazda is running a handful of hydrogen-fuelled internal-combustion engine cars in Japan and Norway as part of its hydrogen development program.

Dr Simpson, who once worked with America’s leading EV maker, Tesla, said the explosion in EV growth around the world was being driven by technology that had delivered an eight-fold “bang for the buck” improvement in battery efficiency and cost, making the electric alternative cost effective and practical.

“It is all about batteries – batteries have become really, really good,” he said. “We have become used to lithium ion batteries in our devices – our phones and laptops.

“But just in the past few years people have worked out how to make automotive-grade lithium ion batteries that don’t have any of the problems that you may have heard about with your laptops.

“Lithium ion energy density has doubled in the past 10 years, which is pretty phenomenal, but at the same time, the cost of lithium ion technology has fallen by

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a factor of four.

“That’s an eight-fold improvement in bang for buck from this technology, and there is no sign of this really slowing to any extent, particularly now that the automotive industry is now spending billions of dollars in development of automotive-grade batteries.”

Dr Simpson said batteries also now had greater longevity, with scientists achieving up to 7000 charge-discharge cycles out of the latest lithium ion chemistry.

He said that presuming an electric car could achieve 100km on each charge, the vehicle could cover 700,000km, lasting 20 years.

“I am being a little optimistic here, because you need to consider some degradation problems, but if your starting point is almost a million kilometres for the battery life, then you have plenty of room to manoeuvre around some of those degradation problems,” he said.

Dr Simpson predicted the initial median price of EVs would be about \$42,000 – more than conventional petrol vehicles but comparable with a hybrid vehicle.

“History tells us that these products come down in price very quickly with economies of scale,” he said.

Dr Simpson said the belief that electric vehicles would cause a net gain in greenhouse gases in Australia’s coal-based power system were unfounded according to his research.

“No matter what assumptions you use to assess electric vehicles against petrol vehicles, electric vehicles are better, except maybe here in Victoria where they use brown coal,” he said.

“That’s not as good as hybrids today, but we are assuming they (the EVs) are using grid power. Consumers can elect to use green power at a pretty low incremental

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cost.

“What we also know is that our grid is improving over time. We are spending billions of dollars investing in de-carbonising our grid.”

Dr Simpson said initially, basic EVs would cost about an extra \$1000 a year to buy and run over a petrol car.

“It is only going to get better over the next 10 years,” he said.

Dr Simpson said 'smart' electricity grids would enable the charging of EVs with minimal impact on the network.

He said smart grids had been developed mainly to handle air-conditioning loads and the growth of peak demand, but would suit electric car charging.

“Smart grids and electric cars will go together very well to manage impacts on the network,” he said.

“There is a huge amount of excess capacity in the grid today, and studies have shown that we could electrify pretty much the whole vehicle fleet using that excess energy capacity.

“We might have to increase electricity generation by maybe five per cent.

“It is the power demand – the instantaneous power demand – that is going to be an issue, particularly for power distribution networks, and particularly the low voltage stuff between the sub-station and the vehicle.”

Dr Simpson said Tesla's experience with several hundred customers in the US showed that the cars tended to be charged with off-peak power – at night – and out of phase with peak demand.

This meant power companies could run more optimum generation around the clock.

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Dr Simpson said car-makers were working on a range of ways to allow their EVs to communicate with the network to permit smart charging, with General Motors looking at adapting its OnStar system – which uses the cellular phone network – to control power flow.

He said he did not subscribe to the view that EVs would become a power supply for the grid at times of high demand, with utility companies downloading power from the car batteries.

Rather, he said, power companies would adjust the charge rate to suit their levels of demand across network, but the cars would always be charging while plugged in.

“For me vehicle-to-grid is about interaction, not direction of power flow,” he said.

To prove his point, Dr Simpson showed a power supply graph of an electric Tesla Roadster being charged.

“The vehicle is always charging, not giving power back, but the grid is regulating the delivery,” he said. “It provides the utility of a way of stabilising their grid while the car gets charged.

“The owner doesn’t know any difference because they are off having coffee.”

Dr Simpson said he believed Australian power companies trailed their overseas counterparts in developing networks capable of charging large fleets of EVs in a smart manner.

However, he said companies that developed public charging points were already active in Australia, developing plans for the roll-out of charging points and battery exchange networks.

Of six such charging service companies around the world named by Dr Simpson, two have announced local roll out of batteries charging infrastructure – ChargePoint Australia and Better Place.

Local company ChargePoint is planning to install street-level electric vehicle charging systems from American firm Coulomb Technologies in Australia, starting in 2010.

The company is reported to be in negotiation with authorities in Melbourne, Perth and Sydney.

Better Place, an international company founded by Israeli entrepreneur Shai Agassi, has announced plans to begin its Australian rollout in the Australian Capital Territory in 2012.

Better Place specialises in battery swap stations, where motorists can swap a depleted battery for a fully charged one, accelerating the turn-around for customers to just five minutes.

However, the EV needs to be designed for this service, and only partners Renault and Nissan – which have a business arrangement with Better Place – have announced such quick-swap technologies in their production electric cars, the Nissan Leaf and Renault Fluence.

But Better Place and its partner, ACT electricity provider ActewAGL, will also cover the installation of plug-in “charge spots” in homes, offices and shopping centres, as well as provision of the lithium-ion batteries that will power the vehicles.