
E

Electric mobility

With France and Germany taking the initial lead roles, electric cars take off and form up to 10% of the world's vehicle fleet by 2020.

It is has been a long time coming, but thirteen years after the global launch of the Toyota Prius hybrid, a host of companies all have electric vehicles scheduled for introduction over the next few years. The alignment of technology development, targeted incentives and economies of scale together with a fundamental change in consumer sentiment has started the shift towards a future where electric mobility has a significant role to play in global transportation. By 2020, experts predict that nearly one-third of all cars being sold will be electric and that electric cars will form up to 10% of the world's vehicle fleet.

Electric mobility is not new: in the late 19th century, many of the first cars to be produced were electric. Before the internal combustion engine took over, electric cars were making a mark, breaking the 100 km/h barrier in 1899. A fleet of electric taxis first appeared in New York in 1897 and, despite their relatively slow speed, electric vehicles had a number of advantages over their competitors in the early 1900s: less vibration, less noise and less pollution. However, with increasing competition from the internal combustion engine and sizeable support from the oil industry, gasoline and diesel vehicles became more popular and sales of the first generation of electric cars peaked in 1912.

One hundred years later, a second wave of electric mobility is gaining momentum, driven by a number of leading manufacturers and a massive swing of public support for more sustainable transport solutions. This step change has taken some time to make an impact. In 1990, General Motors announced its intention to market electric cars and introduced the GM Impact, but, over the following two decades, little was achieved and most of the concept cars never made it into the showroom. However, the past couple of years have seen the arrival of some notable catalysts for change.

Although in many eyes electric cars are epitomised by the small, Indian made, G-Wizz and similar vehicles, high-speed electric sports cars have come out of the shadows, most notably those being produced by California-based Tesla. The notion of 125 mph electrically powered cars that can go for 240 miles or more between recharging has captured the imagination of many, resulting in a surge of investment. In comparison to traditional competitors, electric vehicles offer a number of advantages: they are quieter, accelerate faster, require less maintenance, cost less on a per-mile basis and in many ways are more sustainable because, in certain locations, they can run on clean energy. At the same time, they have the potential to be lighter.

However, while electrically powered transport for personal use dropped off the agenda for around one hundred years, public transport systems, particularly in cities, have often used electric mobility solutions.

Electrically powered trams, trains and metros running on fixed power supplies have long been part of many cities' transport infrastructure. In terms of independent road-based mobility, electric buses have been steadily introduced into many cities over the past twenty years or so and are now part of many a mayor's zero-emissions plans. Add in taxis and delivery trucks and the impetus for much technology development in electric mobility has come from public transport. Coupled with the success of early hybrids, a significant shift is taking place. Major advances have been made in efficiency, cost and weight in public transport, particularly for drive trains and battery technology. This knowledge is now being applied to personal transport. Although some, including several in a Shanghai workshop, question existing battery technology, many others are placing heavy bets on a breakthrough in the next few years.

In step with this burgeoning interest, over the past year or two, more manufacturers have made announcements about their plans for electric vehicles: in 2009, BMW did field trials of the electric version of its Mini, the Mini E, in Germany, the UK and the US, and these were followed by China and France in 2010. While GM has just launched the 2011 Chevrolet Volt/Opel Ampera electric hybrid, Nissan has gone a step further with the introduction of the Nissan Leaf, an all-electric vehicle, with full global rollout planned for 2012. In addition, companies like Better Place are earning attention for alternative solutions such as its battery swap system which allows batteries to be exchanged automatically for fully charged ones in less time than a traditional refill at a petrol station.

Although some question whether it will be in other regions where the early breakthroughs take place,

The German car industry has signed up to a government push to get a million electric cars on to the roads by 2020.

much of the debate on the future of electric mobility in the media has been focused on the US and China. In August 2009, an article in the *McKinsey Quarterly* argued that 'a global electric-car sector must start in China and the United States, and it must begin with the two countries creating an environment for automotive investors to scale their bets across both nations'. It suggested that, although private companies will compete to provide the technologies, charging stations and the vehicles, 'the two governments can no doubt create the conditions for them to succeed – for example, by setting standards, funding the rollout of infrastructure and sponsoring joint R&D initiatives'. This was supported by facts and figures that show that if penetration of electric vehicles rises above 45% by 2030, oil imports and CO_2 emissions would fall dramatically. To achieve this, China needs to spend $28 billion and build 700,000 charging stations; the corresponding figures for the US are $50 billion and 1.2 million respectively.

While this sounds promising, some workshop participants highlighted two issues that might mean this US/China leadership should be questioned. The first one concerns the fact that other countries have already made the necessary decisions and are acting on them. Electric car recharging networks are already being built in Denmark, Israel and, most significantly, France. We emphasise 'most significantly' for France because it is there where government, the car industry and the energy sector appear to be

most aligned: the Renault Fluence ZE, the world's first switchable battery electric car, is being launched early in 2011; at the same time, Renault and EDF are building a nationwide electric car-recharging network across France in 2011; and €400 million of initial state backing was guaranteed by President Sarkozy in October 2008. So, the alignment of significant market potential, the technology, regulation and finance required to establish a suitable environment for a breakthrough change seems to be coming together pretty well in France. Indeed, as many other manufacturers focus more on hybrids and hydrogen options, Renault is taking ambitious steps forward into full electric mobility. Carlos Ghosn, boss of both Renault and Nissan, sees that: 'By 2020, purely electric, zero-emission vehicles will take 10% of the global car market.' What is more, he wants such vehicles to account for 20% of Renault-Nissan's sales by then.

The second issue concerns the CO_2 reductions being claimed versus those being delivered. In many countries, the switch from hydrocarbons to electrons for transport is a diversion because they will still be largely relying on oil, gas and coal to generate the electricity in the first place. So, the point of CO_2 production shifts from the vehicle to the power station, but significant breakthroughs are still required before effective and economic carbon capture and storage (CCS) technologies are retro-fitted to the existing energy base. If electric mobility is going to have significant impact within the next decade, some argue that it needs to be aligned to major sources of renewable, clean energy. So, looking at the current leaders in this field, it is no surprise that Denmark (wind), Israel (solar) and France (nuclear) are seen as front-runners. These locations have high renewable supplies of electricity already installed or being installed and, as such, they will gain most from the associated carbon credits from the introduction of electric mobility.

Also of great significance is Germany, the global centre of automotive development in many people's eyes. The German car industry has signed up to a government push to get a million electric cars on to the roads by 2020. Industry commentators say that: 'If they manage it, we're talking about one in four new cars sold in that year being electric, which is a staggering change in just the next ten years.' In cooperation with E.On and other energy firms, who are building the charging infrastructure, the likes of VW, BMW and Mercedes-Benz are all planning a host of new electric car launches over the next couple of years. German government support and commitment to electric mobility is strong and growing.

Only 1% of the 50 million cars sold in 2009 were hybrids, the rest having petrol or diesel engines. By 2020, several predictions indicate that up to 20% of the world's car fleet will be hybrids but 10% will be electric powered. A century after the electric car gave way to the internal combustion engine, the combined action of many governments, companies, NGOs, investors and entrepreneurs is bringing about a renaissance that is on course to produce a major global shift in the way our mobility is powered.

Related insights


Page 95


Page 179


Page 205