

# Electric Vehicles: Hybrid cars represent immediate future of electric vehicles

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## Abstracts

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### SUMMARY

Almost conclusively now, electric vehicles appear to have won the power train argument in the automotive industry and car manufacturers from all over the world have made significant promises to deliver only hybrid and electric vehicles in the future. From automotive shows to the world's cities, new models and ideas are being tested and the general public whilst being broadly reticent at first is now beginning to accept the idea of battery powered chargeable vehicles.

Whilst the industry waits for consumer adoption levels to really boom, manufacturers are gearing up for a serious fight to establish a position in what will undoubtedly become the main automotive market. The leaders of a few years ago now have significant new challengers and are having to fight harder for sales than ever before. Huge new challenges are becoming obvious as the world tries to establish exactly how it will power and build all these new vehicles.

There is a new heavy demand for the rare earth materials that electric vehicles need and some concerns about the environmental implications of replacing the global fleet with this technology. One country that is not being overly cautious about this change is China and it has ploughed ahead to the point where its manufacturers are now dominant in the electric vehicle industry. Within the next decade a point will arrive where electric vehicles will outsell traditional combustion engine vehicles, but in order for that to happen and it not be a charging and technical disaster many things must change.

### KEY HIGHLIGHTS

Advancements in internal combustion technology have caused a fair degree of revising time estimates of when fossil fuel powered cars will cease new sales; in contrast, although heralded as the future, a mass produced FEV that can compete with internal combustion on cost grounds appears to still be some way off. More efficient petrol engines - such as the Skyactiv X Mazda engine which the Japanese car maker claims will exceed 50% thermal efficiency, far beyond any road going engine currently on the market - will help the hybrid cause. For manufacturers this is potentially very important. Costs for FEVs remain very high, even when lucrative government subsidies are taken account of.

An advantage that the hybrid concept has over electric is the length of time road going models have been on sale. Toyota put the Prius on sale in 1997; now over 20 years old, the model is into a fourth generation. Plug-in technology first appeared on the Prius in early 2012, helping Toyota to achieve 10% improvement in fuel consumption with the launch of each new generation since the launch of the original. Development in plug-in charging times will help sales grow.

Even though the plug-in still requires charging, convenience is not impacted to anything like the same extent that is true for vehicles powered solely by electric. A BMW 330e will only last approximately 25 miles using the electric element of the drivetrain, but when combined with a small internal combustion engine will last 370 miles. Only three hours are required for re-charging, avoiding a significant problem still afflicting electric vehicles. Given few consumers are likely to want to travel further within the three hours it will take for the battery to charge again, this version of the EV idea encompasses much of the convenience available through internal combustion but also accesses some of the efficiencies promised by a fully electrified powertrain.

Advances in electric car technology are exciting in the potential to transform how the car fleet in many countries will be powered at some stage in the future, but the steps forward in hybrid technology taken by high-performance manufacturers suggest the hybrid concept has much potential still to be unlocked. Supercar manufacturers are now building entire cars around the hybrid powertrain idea. Companies such as McLaren have been using highly sophisticated energy recovery and deployment techniques on cars such as the P1 for a few years.

Although the hybrid systems are used as performance enhancers rather than to

extend range, that such companies are developing new means of reducing weight and size (as well as extracting more power) of hybrid systems with performance in mind shows the extent of future development that is possible with hybrid concept. Small production runs and the very deep pockets of the clientele mean that whilst the likes of McLaren are very small compared to mass producers, the technology contained within their cars is industry leading. Competition with other manufacturers seeking to attract the super-rich has already moved on the expected degree of performance such cars will produce. This environment is very important for the development of mass produced vehicles. Technology will trickle down, hence why what is taking place at the most expensive section of the market is important for progress towards the car of tomorrow.

## **SCOPE**

Examine who the main players are in the EV industry and who are the emerging new players

Look at the challenges faced by the industry and how likely these are to be overcome

See the countries that are really pushing ahead with the technology and why

Analyze the future of the industry, who the winners and losers are and what the competition looks like

## **REASONS TO BUY**

What are the most important EV models on sale?

What companies are going to become dominant?

Why are hybrids so important in EV tech?

What does the future of the industry look like?

What do governments need to do to encourage growth?

How far away are we from the expected EV boom?

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