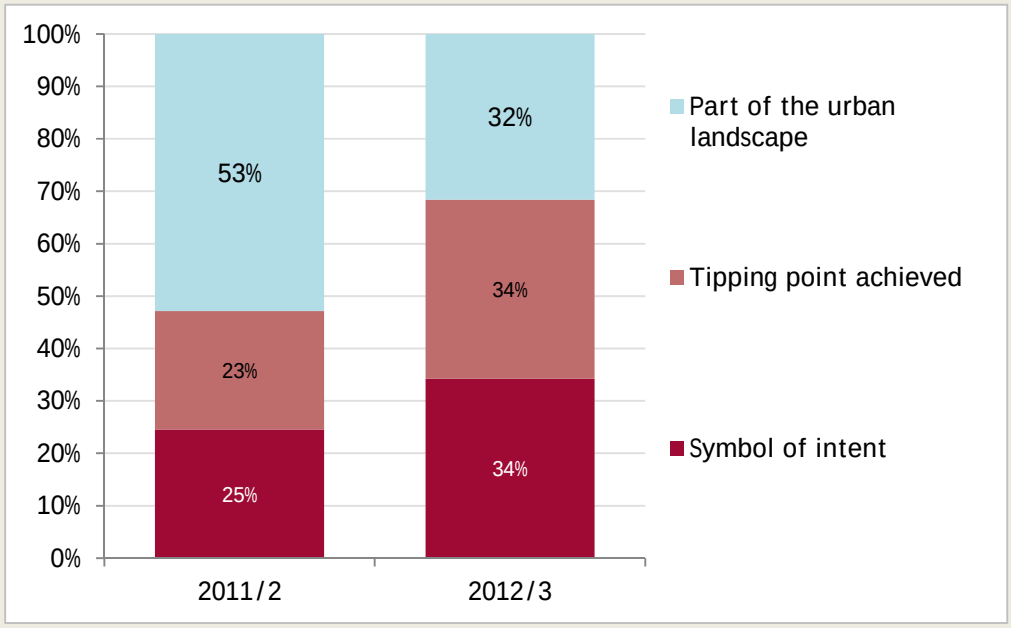
The future of electric vehicles

Almost every week there's a news item related to electric or low emission vehicles, including many new car launches. Yet sales of electric vehicles are increasing at a sluggish rate and some way off what is required to achieve the automotive industry's vision. So what is the latest future for electric and hybrid cars?

Towards the end of 2011 we invited transport professionals to complete a simple survey on our website voting the one of three visions for electric vehicles they thought would be most likely to reflect the reality by 2025. We then repeated the survey a year later to see how views have changed, and the headline result is shown in Figure 1. What is most noticeable is that the spread of opinion is even more evenly dispersed now showing that, if anything, the future of electric vehicles is less clear than a year ago. Within this, there is a greater number of professionals being sceptical over their future, and fewer seeing that electric vehicles will be "part of the urban landscape".

Figure 1: most likely scenario for the future of electric vehicles 2011/2 v 2012/13



The three visions are:

Vision A "Symbol of intent" – there is lots of talk about electric vehicles, but also confusion over different technologies with most waiting for a clear winning technology to emerge before taking the plunge. EV share of new car sales by 2025 = 5-10%

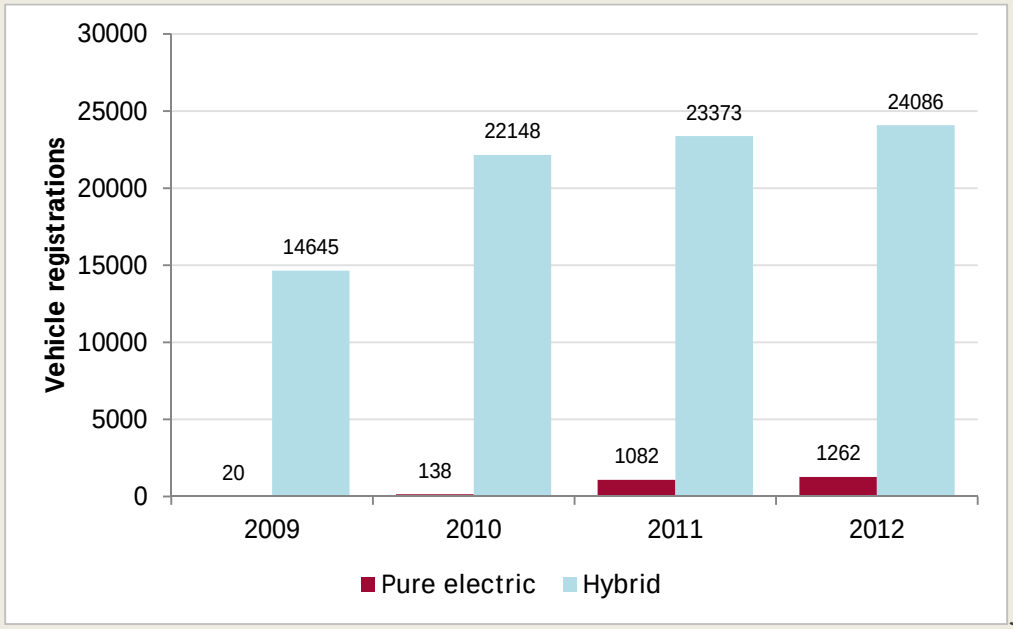
Vision B "Tipping point achieved" – the widespread availability of attractive and practical electric vehicles plus supporting infrastructure, and acceptance of the environmental benefits means that electric vehicles become a mainstream option. EV share of new car sales by 2025 = 20-30%

Vision C "Part of the urban landscape" – within urban areas all the necessary infrastructure becomes readily available, though this is not the case in other areas leading to an urban-rural divide in terms of EV adoption and acceptance. EV share of new car sales by 2025 = 10-20%

This dampening of optimism about the adoption of electric vehicles is matched by the data on new vehicle registrations (Figure 2) which shows only a marginal increase in 2012 over 2011. To put these new registration numbers in context, the total new car registrations in 2012 was 2,044,609, meaning that electric and hybrid vehicles represented just 1% of the total. Furthermore, if the rates of growth are

continued (and the number of conventionally fuelled sales remains static), by 2025 we only reach 2.2% for electric and hybrid vehicles.

Figure 2: new vehicle registrations for electric and hybrid vehicles

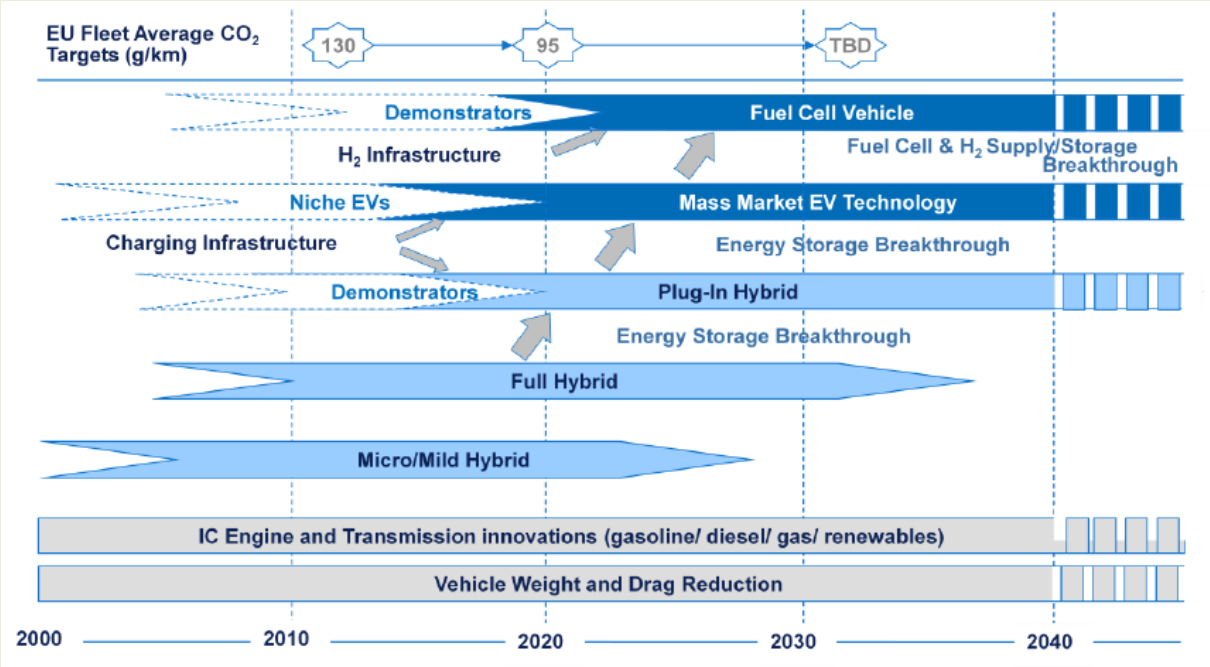


Source: SMMT

Two questions which follow are:

1. how realistic is the industry-accepted roadmap for technology and its adoption? (see Figure 3) which implies that EV technology achieves 'mass market' by 2020; and
2. what will it take to achieve this vision?

Figure 3: UK Automotive industry technology roadmap



Source: Electric Car Guide 2011 (SMMT)

How realistic is the industry roadmap?

To understand the issue of adoption of electric vehicles (including hybrids) it is useful to replay the basic factors working for and against adoption (see Figure 4). Bearing the natural inertia amongst all but a few early adopters, the balance looks to be tipped against early adoption. This doesn't mean the vision can't be realised, but it does mean that pro-active action and leadership are required: natural forces won't be enough.

Figure 4: arguments for and against the adoption of electric vehicles

FOR	AGAINST
Ten[1] electric car models now available, with five imminent, including a MINI and a VW Golf. In addition there are 14[1] hybrid models available, including the 'range extended' Ampera.	The differing formats available and the promise of more to come (such as the hydrogen fuel cell powered car) can be confusing, with potential buyers reluctant to back the wrong option.
The CABLED trial has shown that users of EVs will charge their vehicle at home each night (however drained the battery is), so public charging points are rarely needed.	1,500 public charging points across the UK- but no definitive source available for their location and current availability. By way of comparison, there are around 9,000 petrol stations and complaints about their lack[1].
The cost is the same (or slightly less) over three years when compared with typical mid-sized car (and when allowing for the £5,000 government grant).	Behavioural Economics tells us that people are influenced by the short term more highly than the longer term, so in effect, if the up-front cost remains higher the total cost over three years would need to be significantly lower to be valued the same by people.
Once people try living with an electric vehicle they are usually converted (see, for example, the results of CABLED).	Encouraging people to trial an electric vehicle remains a major challenge.
The environmental credentials of electric vehicles are proven: the Committee on Climate Change has stated that although the CO2 benefits of EVs is modest in the short term, "the widespread uptake of EVs is necessary if carbon reduction targets beyond 2030 are to be met".	Scepticism remains, with a feeling that electric vehicles just shift the problem from the car to the power station. An even bigger challenge though is the improving environmental credentials of petrol and diesel vehicles (the average new car CO_2 emissions has fallen by around 4% per year each year since 2008): even if they still remain less green than an electric vehicle, there is a good excuse not to switch.

What will it take to achieve the vision?

The step change from electric vehicles being niche to mass market will not happen overnight and the immediate challenge is regaining the momentum seen a couple of years ago when electric vehicles were new and exciting (and there was a 680% increase in new registrations in one year!). As pointed out by our survey respondents the easiest target is the second car, so targeting this would be one strategy – ideally with a tax incentive in the form of a tax penalty on second cars which aren't ultra-low emission. It is acknowledged that this is unrealistic, but the reality is that incentives ('carrots') are far less effective than penalties ('sticks').

An alternative financial incentive would be to offer a discount on a road pricing scheme, including road and bridge tolls and urban congestion charging (the paradox here of course being that electric vehicles don't reduce congestion). This would only start to have an impact once such schemes are relatively common, and this looks to be quite a few years away.

In the mean-time, progress (albeit relatively slow) might still be made by overcoming the cost and trial barriers outlined in Figure 4. Car clubs offering electric vehicles are part of this solution, but an electric vehicle leasing scheme with an option to switch the vehicle to a petrol, diesel or hybrid alternative after a trial period could be attractive. One other important part of the solution is fleet vehicles: these are another way in which the technology can start to be normalised and fears over issues like range anxiety reduced.

All in all, it is looking like electric vehicles are likely to remain a niche product for some years to come, and in this context, the first priority is to ensure that interest doesn't fizzle away and there continues to be a steady if un-dramatic increase in their adoption.

Electric vehicles and the future of our cities

One reason to hope that electric vehicle are here to stay is the widespread perception that electric vehicles are, in fact, part of the future of our cities. In a recent survey of the general population we undertook using the Research Now on-line panel, electric vehicles were identified as being the most 'modern' and 'smart' of all transport modes, and second only to bicycle for sustainability (full results from this survey will be released on our website in May, followed by our Smarter Moving Cities publication).

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