

# Can grids cope with electric cars?

**Some say they are the green, clean and quiet answer to traffic pollution; others deride them for their slow speeds and limited range. One thing is certain, however: electric cars are beginning to sell; stay on the lookout and you will probably soon spot one on the street.**

But Dr Luis (Nando) Ochoa, Lecturer in Smart Distribution Networks in the School of Electrical and Electronic Engineering, is worried: "Electric cars may still be rare, but what if a cluster of owners all charge their cars at the same time off the same local electricity grid?"

A typical overnight charge for an electric car draws about 3 kW of power – twice the average power consumption of a domestic residence. So you only need to plug in few electric cars on the street to create a huge surge in consumption. No-one really knows how this might affect network performance.

## Network nuances

Dr Ochoa is set to provide his insights into this problem as part of a major project, My Electric Avenue, supported by Ofgem's Local Carbon Networks Fund. Groups of 10 neighbours will all be given subsidised Nissan LEAF cars to drive for 18 months; their charging patterns and the performance of their local electricity networks will be monitored during this period. The trial

will also test a system to allow direct control of charging of EVs that have been developed, called 'Esprit'.

The University of Manchester's expertise in network modelling stems from on-going research with electricity distributor Electricity North West. Dr Ochoa's research team has already created a powerful probabilistic model of local network performance, using information such as the geographic layout of the network, its construction, consumption patterns and consumer types.

"Our knowledge will help My Electric Avenue partners to develop cheap and affordable charging control systems," Dr Ochoa explains. "We already have one very simple solution: when power demand reaches safety thresholds we just switch off some charging points. Our modelling will help to refine this rather blunt approach. How many charge points should we switch off, and when do we turn them on again? Is it OK to turn off points at random when consumption peaks, or should we be

## Electric Car Sales in the UK

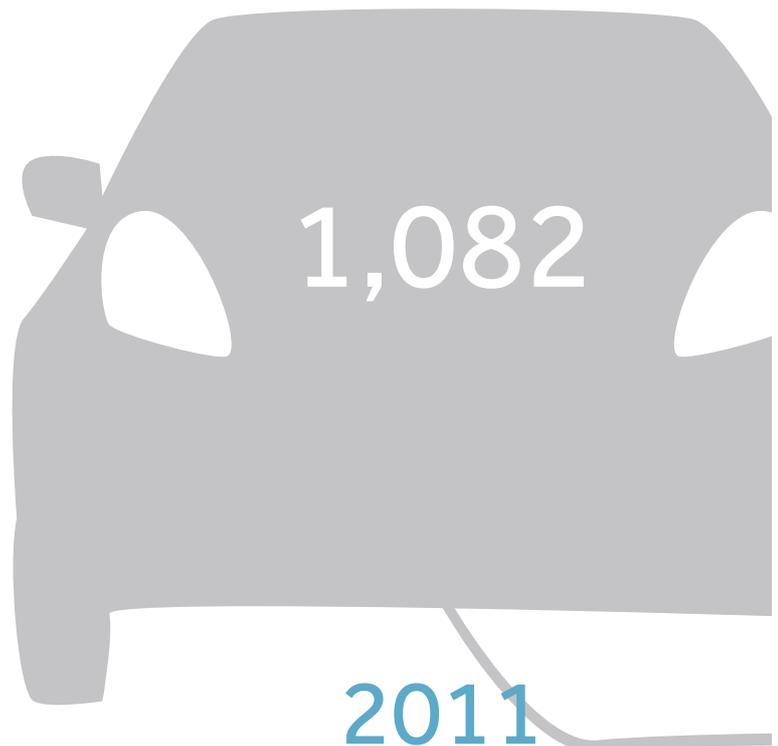
Source: SMMT.

*These figures are for pure electric cars only and exclude quadricycles.*

*In 2012 there were also 24,086 petrol-electric hybrids and 1,284 diesel-electric hybrids sold; these types of vehicle will increasingly include plug-in versions, which will also have an impact upon local electricity networks.*

*There are various forecasts for the future growth in electric car sales. An average figure is that there may be 1 million electric vehicles on our roads by 2020.*

Source: [www.green-car-guide.com](http://www.green-car-guide.com)



**“We need to find a solution that does not damage consumer confidence.”**

more systematic? Do we need to know how much each car's battery is charged? There are many different options to investigate; that's why modelling is so important.”

My Electric Avenue will try out Esprit as it cycles EV charging to manage and alleviate the stress on the network. “The key measure here is not really limited to the network performance – it is easy enough to switch off for more cars to cut demand,” Dr Ochoa continues. “Rather, we need to find a solution that does not damage consumer confidence. Imagine discovering one morning that your car is flat, but your neighbour's has full power! Our models should help us to identify a range of possible control methods for optimal network performance; the project will then find out which are best for consumer experience.”

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