

ELECTRIC VEHICLES

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Don't it make our green cars brown?

Electric cars are an axiom of clean transport planning - they produce no tailpipe emissions, little localised air pollution and, potentially, no greenhouse gas output. But as their critics point out, they are only as green as the electricity that they use.

A power supply dependent on fossil fuels will produce greenhouse gas emissions from electric vehicles that are less than - but still comparable to - those from automobiles fitted with internal combustion engines (ICE)

One recent study by environmental scientists at the International Council for Clean Transportation (ICCT) projected that by 2015, a fully-electrified Nissan Leaf would emit 20 grams of CO₂ (g/km) if driven in nuclear energy-reliant France, but 114 g/km in the decidedly less green fields of the UK.

A separate research paper by the European Association for Battery Electric Vehicles estimated CO₂ emissions from a plug-in vehicle charged in coal-dependent Poland or Luxembourg at approximately 130 g/km – the same as the EU standard for cars with ICE in 2015.

But in the US and China, the ICCT estimates that dirty fumes from a leaf would be even worse, at 136 g/km and 182



g/km respectively.

Such figures are not widely understood, said Greg Archer, the clean vehicles spokesman for the Transport and Environment pressure group.

“There has undoubtedly been some hype about the short-term potential of electric vehicles,” he said, “but that is not to say that in the longer term they will not prove to be a very successful technology.”

“If we want to have a European market for electric vehicles then for environmental consistency, we have to have a progressive decarbonisation of the grid across Europe,” he added.

Carbon intensity levels

At current levels of carbon intensity, a typical European electric car would generate around 80 g/km according to long-standing figures from Eurelectric,

Europe's electricity industry association.

This is around 55-60% below the average emissions from an internal combustion engine but still more than the standard for an average US car in 2025.

However, EurActiv understands that more up-to-date but so far internal back-of-the-envelope calculations by Eurelectric suggest that with technological advances, the current carbon intensity figure for European electric cars may be closer to 62 g/km.

“Obviously no car based on an internal combustion engine will beat this figure,” Gunnar Lorenz, head of Eurelectric's networks unit, told EurActiv.

“At the moment we only see a very few electric cars [on the roads] but the take off will come later, in 2020 and increase from there. By then, we will have an electricity sector 35% [powered by] renewables.”

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By 2030, assuming that renewables spur the EU's energy mix to a carbon intensity of 130 g/kWh, electric vehicles will be emitting less than 30 g/km, Eurelectric believes.

In the meantime, "even the most energy-efficient Opel Astra emits 100 g/km," said Sophie Tielemans, a policy officer at Eurelectric. "But it is tricky because it is theoretical and very much depends on real driving behaviour."

Driving in a 'sporty' style on a motorway will emit more carbon dioxide, she noted.

"Our key point is that in the long term, as the electricity mix increasingly decarbonises, electric vehicles will only be a win-win situation," Tielemans said.

Windmills in Barcelona

Last month, to try and bridge the gap between present and future decarbonisation, the first integrated wind-powered electric vehicle charging station

was launched in Barcelona.

Built using GE electric vehicle charging technology and UGE wind turbines, more 'Sanya Skypump's are expected to be installed in Australia and the United States later this year.

But some environmental scientists say that such schemes may be more successful in meeting marketing needs than environmental ones.

"It doesn't matter if the windmill is directly next to your charging station," the ICCT's Peter Mock told EurActiv. The origin of the electricity being used was more important, and that depended finally on the amount of renewables in the grid, he said.

From the ICCT's perspective, a more pressing priority is the EU's alleged bias against considering vehicle size in its carbon dioxide measurements, contrary to practice in the US.

Heavy fruit

As car manufacturers run out of

'low hanging fruit' to tighten their fuel efficiency standards on the way to 2025, size will increasingly loom as an issue, Mock argues, and the issue is pertinent for electric vehicles.

"Electric vehicles are heavier because of their batteries," he said. Heavier batteries increase energy consumption and, because the space for propulsion systems is limited, restrict the overall energy economy of electric vehicles.

This is exacerbated by a tendency among manufacturers to build heavier batteries as a counter-point to 'range anxiety' among electric car users – a fear that their cars may run out of electricity without the possibility of refuelling at a recharging station.

Because of this, Mock argues that the lobby against size-based measurement of CO₂ performance is "short-sighted".

"Reducing the weight of your vehicle would allow you to have a smaller battery - and they are the most expensive part of the current electric vehicle - so in the long run those companies would benefit," he said.

UK MPs call for more ambitious electric car grant scheme

Britain needs a more ambitious programme to encourage the uptake of low-carbon vehicles because sales of the cars have disappointed, a committee of British MPs said today (20 September).

As part of its aim to reduce carbon dioxide emissions to 80% less than 1990 levels by 2050, the government has offered 25% off the price of a plug-in electric car capped at £5,000 (€6,220).

Plug-in cars, such as the Chevrolet Volt, Nissan Leaf, Toyota Prius and Vauxhall Ampera, typically cost above £20,000 (€24,883).

The government expects to see tens of thousands of plug-in vehicles, which have a longer driving range than all-electric vehicles but which still need to be charged, on the roads by 2015. But demand has been weak, said a report by the Transport Select Committee.

In 2011, 1,052 vehicles eligible for the plug-in car grants were registered. The committee said consumer demand was lagging behind and that the subsidy was ineffective because the purchase price was still too high.

"So far, Department for Transport expenditure on plug-in cars - some £11 million (€13.7 million) - has benefited just a handful of motorists," said Louise Ellman, chair of the committee.

"Ministers should not sit back and hope that the government's policy on

plug-in cars will reduce transport carbon emissions. Far more work is required to ensure that this programme is a good use of public funds."

Emissions from domestic transport account for around a quarter of the UK's total carbon dioxide emissions, with car emissions accounting for over half of that amount.

There is also uncertainty over the number of charging points being installed across the country.

"It is unclear whether the provision of public charging infrastructure encourages demand for plug-in cars. Indeed, the government does not even have a register of all the charge points installed at public expense," Ellman said.

The government should set milestones for the number of plug-ins it expects to see on the roads so the success of its low-carbon vehicle strategy can be assessed, the report said.

US electric car industry poised to overtake Europe

A new US fuel efficiency standard finalised by the Obama administration last month will jolt America's nascent electric car industry to life, but could leave European auto manufacturers racing to catch up, analysts and industry sources say.

From 2025, American cars and light trucks will have to achieve a standard of at least 54.5 miles per gallon (mpg) under the new regulation, higher than can be achieved by any existing fuel-powered cars, according to the US Department of Energy.

The only cars on the US market which exceed the 54.5 mpg target (measured as mpg equivalent) are at least partly powered by plug-in electricity, the US Environmental Protection Agency says.

This could spell trouble for Europe's electric car industry as a 'thought experiment' by the International Council on Clean Transportation (ICCT) has found that the US target surpasses its EU equivalent by some distance.

A 54.5mpg standard would be roughly equal to a 70 grams of CO₂ per km (g/km) measurement, the ICCT believes, with air conditioning credits exemptions potentially taking the figure up to a maximum of 83 g/km.

The EU has only set a fuel savings target of 95 g/km for 2020, with the promise of a communication about consultations on a future 2025 targets later this year.

Matthias Abend, a clean energy executive for the German carmaker BMW, told EurActiv it was "absolutely true"



that European auto exports would not be able to compete with the US, if the fuel economy gap remained so wide.

Hard target

"But 70 grams is a very hard target," he added. "E-mobility will play an important role in this and in the electrifying of the drive frame but reaching those targets will depend on a mixture of the whole fleet – e-mobility, hybrid cars and a downsizing of the current combustion targets."

The European Automobile Manufacturers Association (ACEA) says that meeting a target of 95 g/km will require some electric vehicles in an automobile fleet, while there will be few alternatives to full electrification for targets beyond 65 g/km.

"The US companies have understood that if they want to sell their cars domestically and globally they have to pay attention to fuel economy and they have apparently accelerated the pace at which they're developing and deploying those

technologies," Peter Mock, the author of the ICCT paper, told EurActiv.

"It is more and more a competition issue," he added. "Most people still think that the US has very bad fuel economy and high emissions and the Europeans are much better - and that used to be the case - but it is changing."

Mock is a former environmental protection officer for the Daimler car company.

The new US rule – which could yet be junked if Republican Mitt Romney wins this year's presidential election – requires companies to make 5% year-on-year fuel savings, and has been broadly welcomed by the US auto industry.

As competition heats up in the global car market, the US also has put in place a fuel standard of 35 mpg for 2016.

The EU's proposal for a 95 g/km standard in 2020 includes a commitment to conduct an impact assessment and, if appropriate, set new targets for 2025 and 2030 by the end of December 2014.

Peugeot chief calls for Brussels to legislate on electric cars

The head of PSA Peugeot Citroën's electric vehicles and mobility projects has called for the European Commission to legislate common tax and regulatory measures for electric cars across the continent.



"I think the European Commission should design a series of measures which can promote the vision they have for a big growth of electric cars," Ayoul Grouvel said in an exclusive interview with EurActiv.

"It could be authorisation for a new tax level, or a more general electric vehicle policy for Europe," he added, noting that industry subsidies currently operated unevenly across the EU.

"I think there's a lot of work to be done," he said.

To play its part in limiting global warming to 2 degrees, the EU is committed to reducing carbon emissions by 80-95% on 1990 levels by 2050. In the transport sector, this means a 70% cut of greenhouse gas emissions, on 2008 figures.

Electric cars are the most cost-effective

way of reducing long-term transport CO₂ emissions and, if Europe's fast-growing market continues to double every year, the vehicles will make up 3-4% of overall car sales by 2020, Grouvel said.

But as with innovations like mobile phones and iPads, it would take at least 10 years for customers to get used them. In the meantime, the price tag for research into battery technology was being clipped to internal combustion engine (ICE) cars in an unsustainable way, he said.

"If you want to let the market grow, we have to offset that - not infinitely but for a period of time," he explained.

Speculation about an anti-dumping case being brought against South Korean car makers Hyundai and Kia Motors in Brussels was "not the issue today," Grouvel said. The focus should be kept on public acceptance of electric cars.

Montebourg's measures

Arnaud Montebourg, France's industry minister, recently announced a package of measures to help ailing French car manufacturers grab a hefty share of the budding electric car industry.

His measures, which followed news that PSA Peugeot Citroën was on the brink of axing 8,000 jobs due to recession, included:

- Increasing cash incentives to buy electric cars from €5,000 to €7,000
- Doubling subsidies on hybrid cars, such as those made by PSA Peugeot Citroën to €4,000
- Levying fines on polluting vehicles
- Introducing a public procurement obligation to replace 25% of the government's car fleet with electric vehicles
- A rapid expansion of electric charging stations across the country.

Grouvel said that the proposal ticked most of the car industry's boxes and, following its announcement, Peugeot's sales of hybrid cars – which mix battery and combustion engine technology – tripled in the month of August.

Montebourg's package was "one of the

most consistent efforts in Europe today", and second only to Norway's, Grouvel said. But Peugeot would still like to have seen a stronger commitment in it to zonal charging for cars emitting above 50 grams of CO₂ per km (g/km) in urban areas.

Oil-producing Norway has legislated for electric vehicles to be able to use bus lanes, and enjoy free city centre parking and recharging facilities. A combination of these and Montebourg's policies could form the basis for a Europe-wide regulation, Grouvel said.

"We have CO₂ legislation and pollution legislation at the European level [so] if we want to develop electric vehicles on the European level, why isn't there a [similar] policy there?" he asked.

Unions enthusiastic

In a reflection of the way that climate politics can sometimes cut across traditional social divisions, many car workers trades unions are as enthusiastic as their bosses about support for electric cars.

"We see an increase in jobs in the future automotive sector, mainly due to the increasing technology-mix to be produced and serviced and repaired," said Wolf Jäcklein, a policy advisor to the IndustriALL global union federation, which claims to represent 50 million workers.

"We know that the ICE technology alone would result in a decrease in employment (for the same number of cars produced) in the coming decade," he added.

Foundry jobs would decrease with electrification of the sector, but new electro-chemical positions would appear and high-voltage skills retraining for workers would be beneficial to them - and the industry - he said.

"Of course, we, trade unions, support the policies in favour of new technologies, and stand for investments into R&D to make this change happen," Jäcklein told EurActiv.

"This is for the good of the automotive industry and its sustainable future."

IEA: Government support 'crucial' for electric cars roll-out

Public subsidies, legislative innovations and consumer education are vital for the development of Europe's fledgling electric cars industry, an energy analyst at the International Energy Agency (IEA) has told EurActiv.

He was speaking as the European Commission issued a transport and technology communication calling for EU governments to "break away from conventional thinking" in the paradigm shift to alternative propulsion systems, and embrace "new financial instruments to increase the leverage of public budgets".

Public intervention could take the form of regulations, standards to ensure interoperability, public procurement, intellectual property rights, financial services, politically-set industrial targets, and voluntary commitments, the document says.

"As a new technology, government support for electric cars is especially crucial over the next 10 years," Tali Trigg said over the phone from the IEA's Paris headquarters. "This is when subsidies and education are needed."

Clean technology subsidies are widely seen as a necessity in the electric cars sector – with France setting the pace – but they have been contested in other renewable energy fields such as solar, in which the EU is currently exploring an anti-dumping suit against China.

Green Cars Initiative



Brussels has pledged €5 billion for a European Green Cars Initiative, €4 billion in the form of loans from the European Investment Bank and the rest through support for research, some of which will come from the private sector.

By comparison, China has invested \$15 billion in electric vehicles and their infrastructure, while the US has stumped up \$2.4 billion.

But according to an EU memo released on 18 September, 90% of the €43 billion of investment in EU transport-related research and development has come from corporate groups.

As EU states purchase around 110,000 passenger cars, 110,000 light duty vehicles, 35,000 heavy duty vehicles, and 17,000 buses, the Commission believes that "the potential for innovation through public procurement is currently under-exploited in the EU."

The same principle applies in infrastructure where "capacity building on local, regional and national level is needed for both public authorities responsible for the provision of services and

transport operators," according to the new communication.

It says that EU roadmapping to begin this month will put "particular emphasis" on fields where the market has failed to deliver clean transport infrastructure, and "identifying where action at the European level can yield the biggest impact."

"We support any government that takes clear measures for the uptake of, or transition to electric vehicles," Gunnar Lorenz, the Networks head at the electricity industry association, Eurelectric, told EurActiv.

Policy options could cover pollution fees, congestion charges and tax breaks, as well direct aid, he said. Norway had "a really good spectrum" of policies in place, Eurelectric's Sophie Tielemans added.

Municipal car sharing schemes

So far, publicly-funded programmes have a good record of success. One municipal electric car sharing schemes

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called Autolib in Paris which benefitted from €235 million of funding has spurred imitators such as the Zen car system in Brussels, while an eco-tourism project offering drivers on Denmark's Bornholm island wind energy-powered electric vehicles has captured the Danish imagination.

Amsterdam now has the highest density of public electric charging stations in the world, with the introduction of 500 electric vehicles planned by 2015, and Berlin is considering electrifying its freight transport system.

Both cities are part of an ambitious scheme to unite the transport networks of 16 cities around the world, demonstrating the sort of public intervention that Trigg believes can make a real difference.

"You can do fast [battery] charging in shopping malls, offices or garages," he said. "You can have driving in special [electric car] lanes, access to municipal parking spots, parking or zoning ordinances demanding that you install electric vehicle charging stations, and this has happened in

Stockholm and Geneva."

"These are interesting ways that governments can promote electric vehicles at a very low cost," he added.

Trigg also pinpointed non-material factors in the uptake of electric vehicles. "There are not enough behavioural scientists, psychologists and organisational theorists working in this field, and right now that is a big part of this," he said.

"Only 12% of Americans drive over 100km a day, but 48% think they do," he added. "People are a bit more scared [of range anxiety] than they have reason to be".

Common European Standards

A lack of common European standards is also holding electric cars up at the lights, industry sources say, and Brussels has contributed to a €42 million green eMotion project to try to address this.

Inter-operability, or the connection of information flows between cars and charging infrastructure, is seen as a lightning conductor issue by many in the

battery electric car industry.

"Interoperability is essential for the long term success of electric cars, because in the longer term we need to have that fluid way of working so that they can cross borders and travel from city to city," said Alfons Westgeest, the secretary-general of EUROBAT, the Association of European Automotive and Industrial Battery Manufacturers.

In the short term though, the unpacking of recharging infrastructure is being most hampered by the lack of a standardised design for all plugs and charging equipment, as Germany and France continue to bicker over which country's design should become dominant.

"If you have a new technology, you need standards to secure your investment climate," Tielemans said. "This is a problem that [electric cars] infrastructure is facing: Without an agreed standard, investors are delaying their investments."

What will Europeans be driving in 2030?

Car manufacturers envision a mostly electrified European market by 2030, in which car sharing schemes will have taken off in city centres, new mobility operators will offer multiplatform transport packages, and the age of 'the prosumer' could be upon us.

But for now, they are staying focused on the bottom line. "We can imagine a world [by 2030] where the majority of cars will be plugged in, and some form of hybridisation will be the dominant



technology," Ayoul Grouvel, head of Peugeot electric vehicles projects, told EurActiv.

Peter Mock, an environmental scientist at the International Council for Clean Transportation, agreed. "By 2030 we'll all be driving hybrids," he said. "We will already be in the phase where you go one step further, [with] an increasing number of electric cars in Europe."

"The advantages of hybrids are obvious," Grouvel said. "You can go where

you want with zero emissions in city centre. It is the best of both worlds but the drawback is cost. We have 10 years to reduce that."

Within 20 years, emerging markets in India and Africa are expected to be driving major growth in the world's car industry, while new mobility operators in megacities will sprout, offering multiplatform transport packages that utilise electric cars,

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bikes and public transport.

Today's electric vehicles can only run at top speed for short periods of time before over-heating, but a European Commission report last year predicted that their performance - and range - would soon increase.

Smaller, lighter, more heterogeneous

After 2015, electric vehicles chassis will become lighter than today's cars, the report by the consultants CE Delft said.

There will also be "a trend towards smaller cars" and a more "heterogeneous" fleet with electrified city cruisers, pedelucs, racing and off-road motorbikes, trucks and vans.

"When you're bringing out new products, you have the advantage of being the first mover," said Gunnar Lorenz, the head of Networks at Europe's electricity association Eurelectric.

"But you have to do it the hard way," he added. "Some companies are more laid back and say once all the mistakes are done, we'll come up with a better product and take the market, so you have different strategies."

Auto-manufacturers are already racing to market new electric products like the crossover Renault two-seated Twizy and Peugeot Metropolis, which they believe will create new possibilities for car sharing.

Car sharing

"It is not a threat for the industry because the people who will be sharing cars tomorrow are not using them today," Grouvel said.

Peugeot sees potential for such schemes at the top and bottom ends of the market - among harried professionals and those who can't afford to buy a car.

Several young environmental and energy researchers working in the electric vehicles field told EurActiv that they were already using car sharing schemes. "It's a generation thing," one said. "I don't think

my father will ever change his view."

Industry associations privately estimate that a change in social attitudes will hike car pooling rates in cities to as much as 50% by 2030, but caution that public authorities will need to incentivise this.

Certainly, a transfer to electrified transport is unlikely to brown out the grid. Figures from Eurelectric suggest that even if all EU citizens switched to electric cars tomorrow, it would only increase electricity consumption by 15%.

Electric 'prosumers'

Ninety two percent of cars are parked at any one time, and futuristic-minded policymakers often wax lyrical about how electric vehicle-owning 'prosumers' (a mix of producers and consumers) could one day level out grid peaks and troughs by keeping their vehicles plugged in to a super-grid.

More prosaically, car owners could turn a profit by charging their vehicles overnight, when electricity rates are low, and selling back unused energy to the grid at peak times. Grouvel said that it was an interesting issue for Peugeot, but "still quite far away as a business model".

"It would increase your battery cost and charging points cost," he said. "The technology for the charger in the car would become more expensive because you'd need a two-way charger so the economics should be seen just not from the point of view of energy companies which have an interest, but from the car manufacturers [side]."

Without this "phase one" of creating an electric vehicles market, there would be no smart grid market, Grouvel argued. "We're not dreaming of electric vehicles, we are selling them, and that makes us realistic," he expanded.

Wolf Jäcklein, a policy advisor for the IndustriALL union said that efforts by EU countries and employers to reskill auto-workers for the shift to electric cars so far were "not sufficient".

Vehicles-to-grid

But the vehicles-to-grid model will

"certainly need to happen for electric vehicles to be optimally integrated into a clean energy system," Tali Trigg, an analyst at the International Energy Agency, told EurActiv. "Some cities and countries are doing trials to gather data and see how it works right now."

Over the next decade, such trials would continue, he said. Clusters of renewable energy-rich infrastructure for electric cars would be "a good idea" - and so would greater stakeholder coordination and planning.

"If you look at targets that countries and manufacturers have set for each other and stack them together, you have a huge gap that starts appearing after 2014," he said.

"National governments have set targets much higher than manufacturers believe [possible] right now so there is a need to manage expectations, and decrease what is missing," he added.

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