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Climate Change | Conservation | Sustainability

Powering ahead:
how to put electric cars on Scotland's roads

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We're working to create solutions to the most serious environmental challenges facing our planet, for a future where people and nature thrive. WWF Scotland has produced this report to outline the steps that could be taken by the Scottish Government and local authorities to increase the number of electric vehicles and ensure the Scottish transport sector makes its full contribution to tackling climate change.

POWERING AHEAD

The Scottish Government has committed to establishing a mature market for low carbon cars by 2020 and an electric vehicle charging infrastructure in place in Scottish cities[1]. To achieve this transformation from our current petrol-dominated roads to an all electric future, the Scottish Government and local authorities across Scotland need to act now. Although there are sizable barriers to the mass use of electric cars, the Scottish Government has many of the necessary powers to address these and, with the right policies in place, could put Scotland at the forefront of a revolution in road transport.

Transport is the only part of the Scottish economy which has seen its contribution to climate change increase since 1990. The latest figures show that emissions from road transport increased by almost 8% by 2008, a trajectory that looks set to continue unless there is concerted action to reduce the total vehicle km driven in Scotland and increase the efficiency of our vehicles. Alongside significantly increased support for public transport, walking and cycling, electric vehicles will have a critical role to play in transforming our transport system and putting it on the path to a sustainable future.

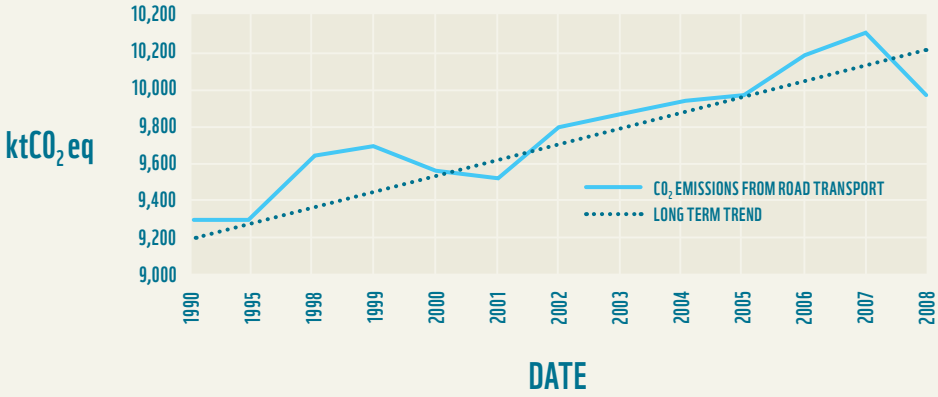
+8%

SCOTLAND'S ROAD TRANSPORT EMISSIONS INCREASED BY 8% FROM 1990 TO 2008

Growth in emissions from road transport[2]

In May 2010, WWF Scotland Published *Watt Car The role of electric vehicles in Scotland's low carbon future*[3]. Based on independent analysis provided by Element Energy, the report provided an assessment of the role EVs will have to play in our sustainable transport future. Its headline conclusion described how even if we successfully stabilise traffic levels at those seen in 2001,[4] we will still need to replace at least 300,000 conventional cars with electric cars[5] by 2020[6] if we are to be confident of hitting our climate targets.

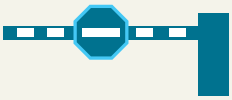
FIGURE 1. RISE IN ROAD TRANSPORT EMISSIONS



2500

IN 2011 ONLY 2,500 OUT OF 28 MILLION CARS IN THE UK WERE ELECTRIC

The scale of transformation required is significant and, despite the resurgent interest in electric vehicles from car manufacturers, it will require targeted intervention by both national and local government to kick start the market and establish the right regulatory framework to protect consumers and ensure EVs fit within a sustainable transport future. Based on analysis and stakeholder interviews by Atkins Consultants[7] for WWF Scotland, this report highlights the barriers to increased sales of EVs and provides details of the most effective policy options available to the Scottish Government and local authorities to overcome these hurdles and establish the electric car in sufficient scale on Scotland's roads.



Barriers to electric vehicle uptake

Barriers to EV uptake can be viewed as those limiting demand from consumers and those relating to supply in terms of availability of vehicles and supporting infrastructure. These barriers are of varying scale and importance and demand different levels of government response.

Based on an extensive literature review and stakeholder consultation Atkins ranked the barriers according to their significance and to allow the identification of effective policy solutions. Three barriers emerged as being highly significant. These were high purchase cost, limited range and lack of sufficient

charging infrastructure. Other significant barriers related to uncertainty regarding resale value and limited supply of vehicles.

The collective impact of these barriers and the scale of the challenge is neatly summed up by the fact that by the summer of 2011 only 2,500 out of the 28 million cars in the UK were electric, just 0.008% of the fleet[8]. Although there are already far more EV models available now, and more to come, their share of new car sales must increase to be close to 20% by 2020. Although this is a significant acceleration, it is backed by car manufactures leading the EV charge. For instance, GM, makers of the Volt, has said that "by the end of the decade, 20% of all car sales will be electric"[9].

Driving forward the electric revolution

If Scotland is to hit its climate targets, it needs to act now to address these barriers. The Central Scotland 'Plugged in Places'[10] pilot is an important test bed for EVs and the existing support for public sector procurement is welcome but, on their own, these initiatives fall well short of providing the policy framework needed to really accelerate EV uptake at the rate we must see. Car manufacturers are already carefully targeting the roll out of EVs to those countries and cities that have taken the steps needed to support the shift to this new transport technology. For instance, the battery swap company, Better Place is prioritising work in Denmark because of the tax incentives for EVs and, in the US, Ford has identified the 25 most electric-vehicle-ready cities and is now working with them to deliver its Focus electric car and other models[11]. By putting in place the policy opportunities described below, Scotland could address some of the key barriers to electric cars, build its own electric vehicle industry and attract investment from global players in the emerging electric vehicles sector. The imperative of tackling climate change and complying with the Climate Change Act leaves no time for delay in taking these steps to an electric transport future.

100%

THE SCOTTISH GOVERNMENT HAS CONSULTED ON A TARGET OF 100% OF THE PUBLIC SECTOR FLEET BE ALTERNATIVELY POWERED BY 2020

The analysis by Atkins concludes there are a various ways in which both national and local government can work now to increase the number of EVs in Scotland. From the almost 40 policy options reviewed by Atkins, the following 16 policy opportunities offer the most effective ways to increase the uptake of EVs. For a full description of these measures and a comprehensive review of many other options available to the Scottish Government, please see the full Atkins report to WWF. The priority measure must be to put

in place an EV Strategy and Action Plan for Scotland to provide clarity on policy priorities, describe support mechanisms, define the intended market model, identify R&D support and set out the route map for an established charging infrastructure.

Many of these policies are either already being implemented elsewhere in the world (e.g. scrappage scheme in Italy; Peugeot's 'Mu' initiative in France is an innovative new ownership model), are the subject of previous research and evidence (e.g work place parking levy) or reflect initial intentions of the Scottish Government (e.g. proposed target of 100% of the public sector fleet be alternatively powered by 2020[13]).

TABLE 1. PRIORITY MEASURES DESIGNED TO TACKLE THE MOST SIGNIFICANT BARRIERS AND INCREASE EV UPTAKE IN SCOTLAND

NO.	MEASURE TO INCREASE THE UPTAKE OF ELECTRIC CARS
1	Publish a high profile **EV Strategy and Action Plan for Scotland**, setting out a clear vision supported by targets for 2020, 2015 and 2030. This should be supported by an **EV Infrastructure Strategy for Scotland**, for the provision and roll out of appropriate recharging infrastructure, and describing how drivers will use the infrastructure.
2	Work with relevant stakeholders in Scotland, the rest of the UK, and across Europe, to **set technical standards, specifications and regulations for implementing recharging infrastructure**.
3	Commission a **review of market models for recharging infrastructure** in Scotland and implement the recommendations of the review. This would involve taking in to account the UK Plug-In Infrastructure Strategy[12], working with energy providers, electricity retailers, EV manufacturers, private infrastructure providers and the public sector, to ensure consistent and appropriate pricing and payment approaches.
4	Scottish Government and local authorities provide **funding for publicly accessible recharging points**.
5	Encourage manufacturers to offer **alternative ownership models** to consumers in Scotland by promoting Scotland as an attractive market for manufacturers, and engaging with manufacturers to understand and influence their decisions about where to focus their sales strategy. Scottish Government or other public sector bodies work with manufacturers to 'trial' alternative ownership models amongst employees or as part of the vehicle procurement process, and publicise benefits.
6	Scottish Government provides a **£10,000 subsidy*** for the first 25,000 EVs sold in Scotland (as recommended by the UK CCC), to 'kickstart' early uptake of EVs, **£5,000** for the second 25,000 EVs in Scotland, and reducing for subsequent 25,000 EV milestones. **£5,000 assumed to come from the UK Plug-In Grant for the first EVs in Scotland.*

NO.	MEASURE TO INCREASE THE UPTAKE OF ELECTRIC CARS (CONTINUED)
7	Scottish Government introduces a **scrappage scheme** to encourage consumers to purchase EVs, with subsidies reducing as EV uptake increases.
8	Scottish Government provides **grants for purchasing second hand EVs** from specified dealers with subsidies reducing as EV uptake increases.
9	National and local government work together to **incentivise businesses to install recharging points**. This would involve engaging directly with the largest businesses with employee car-parks to highlight the benefits of encouraging use of EVs rather than conventional vehicles; by providing free advice; and by providing match funding to 'innovator' and 'early adopter' businesses wishing to install recharging points in existing parking spaces. These measures would be most effective if linked to exemption from a Workplace Parking Levy.
10	Publish **advice for residents on home recharging and guidance for electricians on the type of facilities needed** (including issues to be considered in communal parking areas). Local authorities to disseminate information.
11	Publish **national planning guidance** on the provision of recharging bays and infrastructure as part of a parking strategy which supports wider sustainable transport objectives.
12	Update **building regulations** to set out minimum requirements regarding the provision of electrical infrastructure and recharging points in all new buildings.
13	Set up a **Working Group** co-chaired by the Transport and Energy Ministers of stakeholders from the energy and transport sectors and including consumer groups, tasked with addressing the electricity **generation and distribution requirements for EVs**.
14	Local authorities work with existing **car club** operators to introduce EVs into fleets and introduce EV-based car clubs in other cities.
15	Scottish Government, local authorities and other public sector organisations support an earlier than average switch to low carbon emissions vehicles for public sector fleet vehicles (cars and vans) through **procurement policies** (e.g. extending funding for the Low Carbon Vehicle Procurement Support Scheme); and a 2020 target for 100% of public sector fleets to be electric, where appropriate.
16	Scottish Government should lobby the EU to tighten the EU target for the emissions-intensity of new cars and vans produced by manufacturers.

Example 1
Peugeot 'Mu' initiative[14]

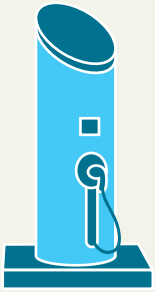
The scheme allows users to exchange credits (or 'points') for hire of a range of vehicles and accessories (including scooters, bikes, roof boxes and child seats) available from Peugeot dealerships. Following trials in a number of French cities, and in Berlin, Milan and Madrid, it launched in the UK in 2010 at two dealerships in London and Bristol. Users pay a membership fee of £10. Purchasers of the Peugeot iOn electric car (to be launched in 2011) will automatically become members of Mu and are then expected to receive credits that can be used to rent vehicles through Mu meaning they have full access to a range of transport modes.

Example 2
Preferred market model in the Netherlands[15]

In the Netherlands, EnergieNed, the Dutch organization for energy producers, traders and suppliers, and Netbeheer Nederland, the Dutch organization of grid operators, commissioned a study to design the market model for EV recharging infrastructure. Within the preferred market model, the charging point operator is responsible for operating the recharging point, for settlement, and for granting access to the recharging station. The electricity provider in turn is (as in the telecommunications industry) responsible for the customer. The provider has a contract with the customer offering full access to recharging spots, and is responsible for cost settlement with both the customer and the operator.

This package of measures has been selected for its effectiveness in tackling the most significant barriers to greater levels of EV use. The combination of fiscal measures, subsidies and alternative ownership models tackle the high purchase price barrier while the infrastructure and support services measures address the lack of charging points and range anxiety issues. Measures relating to awareness, information and training are unlikely to be effective measures in their own right. They should be seen as secondary, support measures which will be important in growing the EV market, once barriers relating to 'high purchase price',

'range anxiety', and 'lack of infrastructure' have been addressed. This does not mean that there is not a case for implementing or continuing to implement some of them now, as part of a strategy to shift mindsets, but it needs to be recognised that these measures on their own will not achieve the target of 300,000 EVs on Scottish roads by 2020.



Conclusions

The Climate Change (Scotland) Act 2009 requires the almost complete decarbonisation of the transport sector. This means that alongside a massive shift in investment away from roads and towards active travel, public transport and smarter measures[16], Scotland must replace its fossil fuelled cars with electric ones. In order to achieve this, the embryonic EV market needs to be supported and encouraged by effective government interventions. This report highlights a powerful package of measures that, if adopted by national and local government, would ensure Scotland was at the forefront of the EV revolution.

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300,000

WE WILL NEED TO REPLACE AT LEAST 300,000 CONVENTIONAL CARS WITH ELECTRIC CARS BY 2020

NOTES

1 See http://www.scotland.gov.uk/Resource/Doc/346760/0115345.pdf

2 Data is taken from http://uk-air.defra.gov.uk/reports/cat07/1009071019_DA_EndUsers_1990-2008_Issue_1.xls Greenhouse Gas Inventories for England, Scotland, Wales and Northern Island 1990 - 2008. Data is for passenger cars, light duty vehicles, buses, HGVs, mopeds and motorbikes.

3 See http://scotland.wwf.org.uk/what_we_do/tackling_climate_change/electric_vehicles/ for full report and supporting material.

4 See http://www.scotland.gov.uk/Resource/Doc/157751/0042649.pdf for the National Transport Strategy.

5 For the purposes of this study EV refers to plug-in hybrid electric cars such as the Chevrolet Volt and full electric vehicles such as the Nissan Leaf, it does not include hybrid vehicles such as the Toyota Prius as they remain powered by fossil fuels.

6 This level of ambition is reflected in the Scottish Government's Renewable Energy Routemap. See http://www.scotland.gov.uk/Resource/Doc/917/0118802.pdf

7 The full report provides detailed descriptions of each barrier and its relative impact on the public, corporate and private car fleets before setting out detailed policy analysis of the most effective policy measures to overcome these and increase the uptake of EVs. The full report can be found at http://scotland.wwf.org.uk/what_we_do/tackling_climate_change/electric_vehicles/

8 See http://www.racfoundation.org/media-centre/98375

9 See http://www.thisismoney.co.uk/money/markets/article-2023141/General-Motors-forecasts-4m-electric-vehicles-year-built-2020.html Nick Reilly, boss of Vauxhall Opel said,"I believe that by the end of the decade 20% of all car sales will be electric."

10 Edinburgh, Glasgow and the Central Belt will receive a grant of £1.45m as part of the 'Plugged In Places' scheme. The consortia, led by Transport Scotland, will install 375 charging points across the region: at home, in on-street locations and at public, workplace and retail car parks.

11 See http://green.autoblog.com/2011/04/21/ford-25-most-electric-vehicle-ready-cities/

12 See http://www.dft.gov.uk/publications/plug-in-vehicle-infrastructure-strategy

13 See http://www.scotland.gov.uk/Resource/Doc/277292/0083254.pdf

14 See www.mu.peugeot.co.uk

15 See http://www.accenture.com/nl-en/Pages/insight-changing-game-plug-in-electric-vehicle-pilots.aspx for full report from Accenture.

16 Smarter Travel Choices measures include: school and workplace travel plans that encourage the use of 'greener' transport modes like walking, cycling and buses, personalised travel planning, promotion of walking, cycling and public transport, car clubs and car sharing schemes, tele-working, teleconferencing and home shopping.

Electric vehicles in numbers

100% RECYCLED

+8%

Between 1990 and 2008 green house gas emissions from road transport rose by almost 8%

2020

The Scottish Government is committed to Scotland having a mature market for low carbon vehicles by 2020 and there being an electric vehicle charging infrastructure in place in Scottish cities

- 42%

Scotland has a legally binding target to reduce its greenhouse gas emissions by at least 42% by 2020

300,000

If Scotland is to meet its climate change targets it needs to replace at least 300,000 conventional cars with electric cars by 2020

WWF

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To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

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