

How the UK can lead the electric vehicle revolution



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Summary

Britain is falling behind in the global shift to electric vehicles (EVs). Government policy has helped to nearly double the EV stock, year on year, since 2012, and the UK has the largest EV battery manufacturing plant in Europe. But, in 2017, Germany overtook the UK for the first time in EV sales and China manufactured half of all EV's globally.^{1,2}

If the government wants to, as it says, “cement the UK’s position as a world leader in the low emission and electric vehicle industry”, its forthcoming ‘Road to zero’ strategy is a prime opportunity to shift gear.³

A strong market at home is critical to growing UK EV manufacturing. To support this, the ban on new fossil-fuelled vehicles should be brought forward ten years, from 2040 to 2030. Norway and India have set conventional car bans from 2025 and 2030 respectively. And competitors like China, California, and Germany are considering similarly ambitious EV sales targets.

Targets alone will not be enough. The UK has invested in battery innovation, but industrial leadership also means building things, not just inventing them.

Fleet vehicles, which make up over half of new vehicle sales in the UK, should be a top priority.⁴ Public fleet

procurement of EVs offers an immediate chance to raise domestic demand.

Tax incentives, emissions standards, production targets and new charging infrastructure will be needed to support large private EV fleets. These fleets would also help to grow the second-hand market, widening access to electric vehicles for lower income households.

Speeding up EV uptake with a comprehensive fleet-led strategy would have the following three benefits:

- 1.** EVs are already cheaper than conventional vehicles on a whole life basis and are estimated to reach upfront cost parity as early as 2022. More rapid EV adoption will cut costs more quickly.
- 2.** A 2030 target would reduce the current gap in meeting the UK’s carbon budgets by 60-85 per cent, underpinning the climate leadership that should be core to the UK’s trade strategy.⁵
- 3.** The UK has a £5 billion trade deficit in conventional vehicles.⁶ Going slow on EVs will only prolong this deficit. Getting ahead on EVs offers the prospect of the UK becoming a net vehicle exporter.

The UK is falling behind

EV sales are rising steadily but they are still less than one per cent of the UK's total vehicle fleet.

The government has committed to banning sales of new fossil-fuelled vehicles by 2040, joining the ranks of countries like Norway, India and France in setting a target. But we are far from leading the market in EV production and this target is not as ambitious as other countries' targets.

In the 2017 autumn budget, the government announced its intention to buy EVs for a quarter of its fleet by 2022 which roughly equates to buying 1,250 cars annually.⁷ This figure pales in significance compared to the plans of the Indian government, which plans to purchase more than 10,000 cars a year.⁸

EV development strategies around the world

Country	Phase out date	EV policy
China	2030 (to be confirmed)	In September 2017, China's vice-minister of industry and information technology stated that China would ban the production and sale of fossil fuel cars. No timeline was announced, but most expect implementation by 2030.
Germany	2030 (proposed)	In October 2016, the German Bundesrat (with support of VW, BMW and Daimler) passed a resolution to ban new sales of cars with internal combustion engines from 2030. The new coalition government in 2018 has laid out strong ambition on electric vehicles.
Netherlands	2025 (proposed)	In May 2016, Dutch politicians proposed banning all new petrol and diesel-powered models starting in 2025.
Norway	2025	In February 2017, Norway became the first nation to ban the internal combustion engine, with a sales ban by 2025.
France	2040	In July 2017, President Macron announced a conventional vehicles sales ban by 2040.
India	2030	In June 2017, India committed to selling only electric cars by 2030, and began a sizeable EV public procurement programme. The policy is currently under revision.
Scotland	2032	In September 2017, Scotland announced an end of petrol and diesel car sales by 2032, eight years ahead of the UK's deadline.
UK	2040	In July 2017, the UK announced a conventional vehicle ban.

CO₂ emissions from transport are rising again

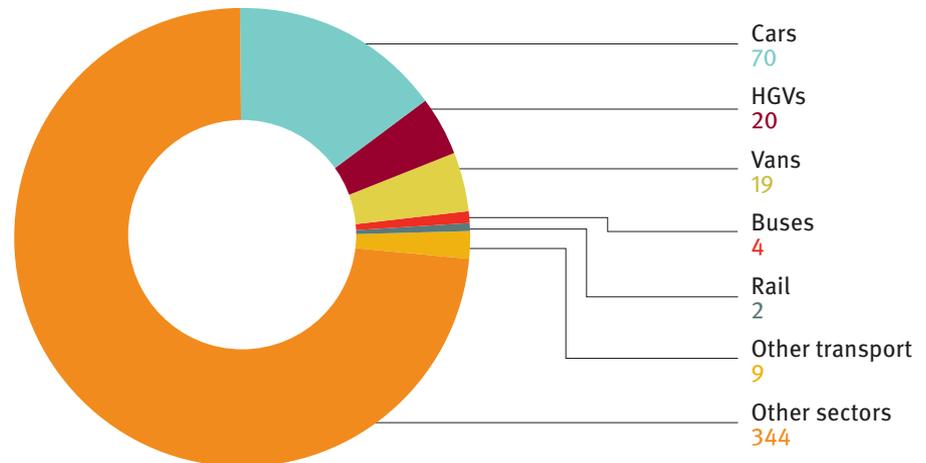
The transport sector is now the largest source of CO₂ in the country, accounting for over a quarter of emissions in 2017.⁹ Road transport makes up 85 per cent of this and, in 2017, vehicle emissions rose for the first time in 17 years.

The government's Clean Growth Strategy contains no significant measures to reduce transport emissions while, at the same time, showing that current policy will fail to meet both the fourth and fifth carbon budgets, which set UK carbon targets to 2032. But, if it were to bring forward the 2040 fossil-fuelled vehicles ban to 2030, the government could address a large part of this gap.

A 2030 ban will help to meet carbon targets

	Fourth carbon budget	Fifth carbon budget
Diesel and petrol vehicle ban by 2030	-42 MtCO ₂ e	-98 MtCO ₂ e
Reduction in projected carbon budget gap (based on BEIS emission projections, January 2018) ¹⁰	-66%	-85%

Sources of UK carbon emissions 2016 (in MtCO₂e)

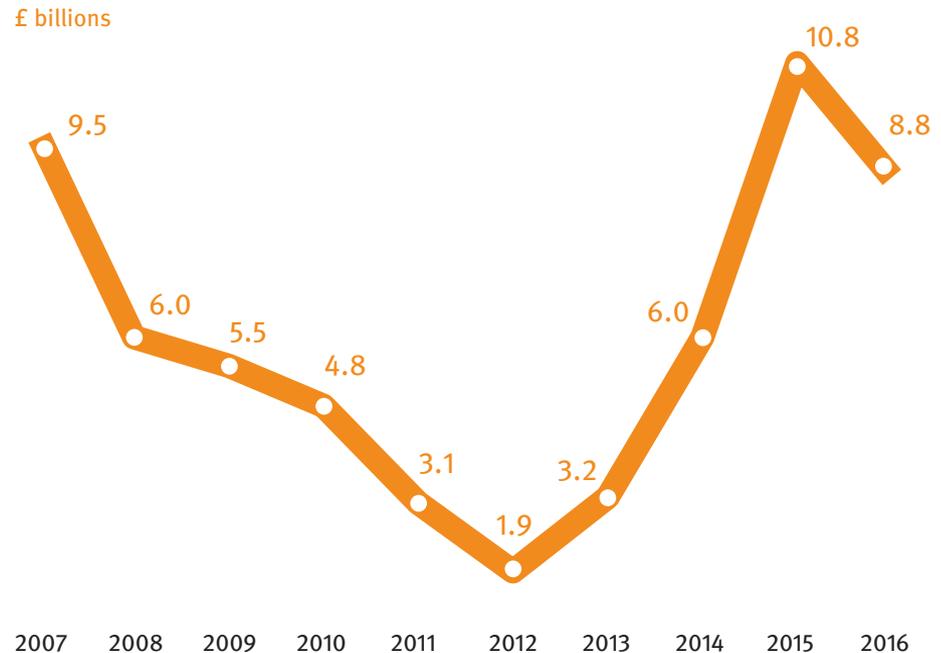


Reducing the UK's automotive trade deficit

Vehicle manufacturing is politically important because it generates significant economic activity outside the south east. However, although the UK has a highly efficient automotive sector, British consumers still spend more on imported vehicles than domestically produced ones. This is a consistent pattern: at no point in the past decade has the UK had a trade surplus in this sector, despite a doubling of exports since 2007.¹¹

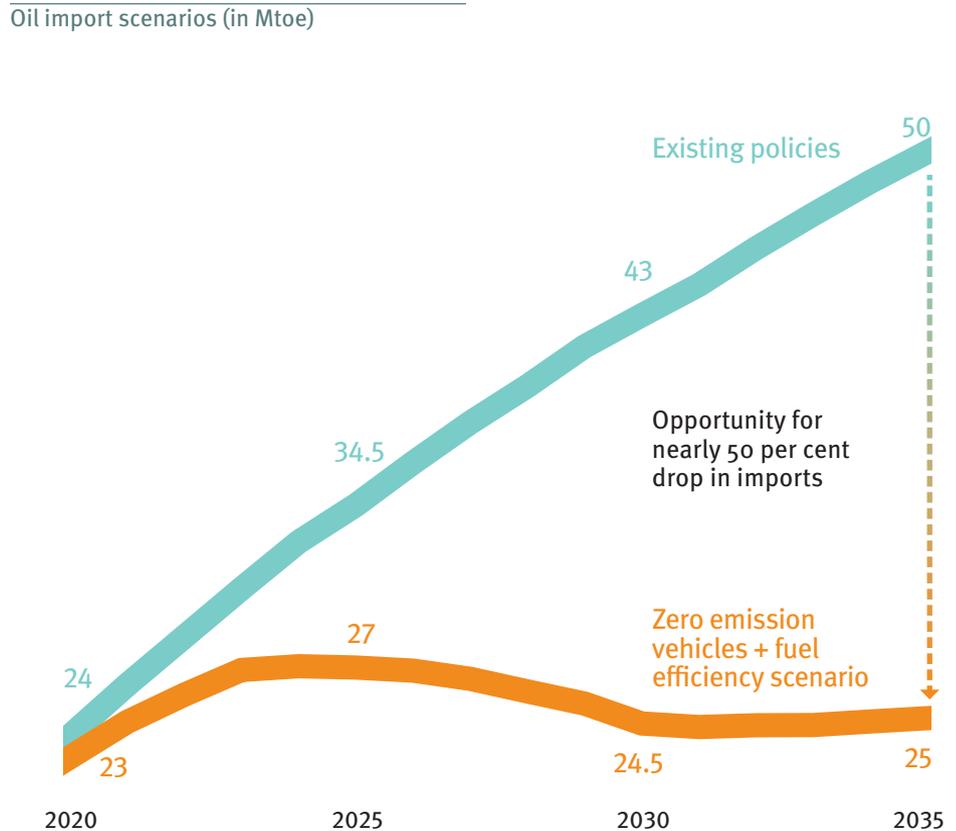
The automotive sector is contributing much less to the UK's economy than to foreign economies because of complex global supply chains. In gross value added (GVA) terms, £5 billion went to foreign economies from UK vehicle sales in 2016. This is because other countries, like Germany, have a significant lead in conventional vehicles. But this is not the case for EVs. In 2016, a fifth of all electric vehicles sold in Europe were produced at the Nissan plant in Sunderland.¹²

The UK's trade deficit in motor vehicles
(in gross terms)



Halving oil imports

Bringing forward the UK's 2040 fossil-fuelled vehicle sales ban to 2030, and continuing to improve fuel efficiency before that date, would reduce UK oil imports by almost 50 per cent by 2035. Estimated oil cost savings could be as high as £6.63 billion annually.¹³



Other reasons to support clean vehicles

Air and noise pollution: The average UK vehicle is scrapped after around 14 years, meaning a 2040 sales ban on fossil-fuelled vehicles will continue to cause wide scale air pollution until after 2050.¹⁴ That is too long to clean up the UK's air and reduce the adverse health impacts of pollution. When Paris banned fossil-fuelled vehicles from the city centre, air pollution fell by 40 per cent and noise pollution halved.¹⁵

Better value over the long term: In 2017, used diesel cars lost up to 26 per cent of their value, due to concerns that air quality rules would restrict their use.¹⁶ EVs are both cleaner and more durable, so they should hold their value over the long term. Their batteries can also be upgraded: the first generation Renault Zoe battery update has doubled its range.¹⁷

EVs should be cost competitive with petrol and diesel cars by 2022: Their running costs are already lower. Upfront cost parity is expected as early as 2022 as

battery costs drop below £100/KWh.¹⁸ Economically, it will make sense for consumers to buy electric rather than anything else in under five years. But this will only happen if consumers have confidence in the market. To achieve that the government needs to show it is committed to EVs.

EVs could support the electricity grid: They can help locally to assist the grid at times of sudden spikes in demand or supply. Owners could sell access to their EV battery's power when prices are high (at times of system stress) and charge them cheaply when electricity prices are low. Nissan claims that, by 2030, widespread adoption of a Vehicle to Grid (V2G) service could save consumers up to £2.4 billion in reduced electricity costs.¹⁹ According to data from Cambridge Econometrics, the net benefit to consumers with a 7kW charger could be almost £600 per year by 2030, taking into account the cost of necessary hardware, electricity losses and battery degradation costs.²⁰

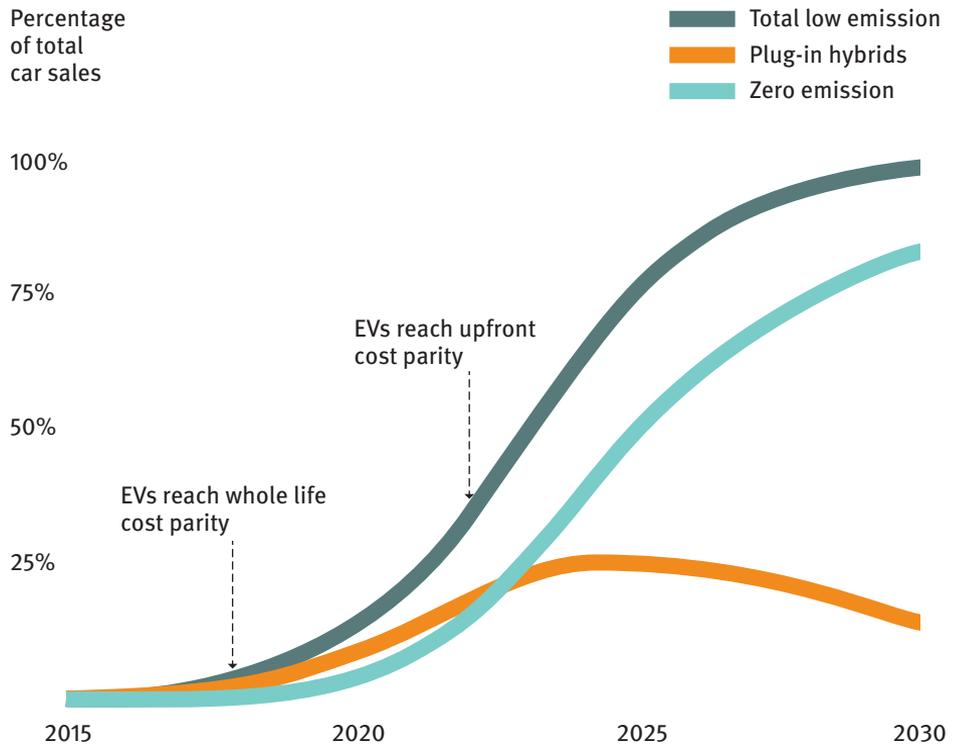
How to go 100 per cent electric by 2030

We propose a twin track strategy to achieve a 100 per cent plug-in electric vehicle sales target by 2030, building on two key cost points: whole life and upfront costs.

First, we suggest focusing on fleets before upfront cost parity is reached (estimated to be in 2022). Because fleet owners pay for the vehicle and the fuel, the much lower operating costs of EVs can be factored into their cost analysis, meaning they are already cost effective for this sector on a whole life basis.

After 2022, when upfront cost parity with fossil-fuelled cars is reached, policy should focus on a managed phase out of petrol and diesel sales to 2030.

Market share of ultra low emission and zero emission cars to 2030



Policy to 2022

Government procurement

There are around 25,000 central government fleet vehicles in the UK and local councils manage almost 50,000 vehicles.^{21,22} The government committed to making a quarter of its central vehicle fleet electric by 2022, which amounts to just 1,250 vehicles a year. This pales in significance when compared to targets set in countries like India and China.

EVs are already cheaper on a whole life basis, so the UK should commit to a 100 per cent government EV fleet by 2022, including those run by local councils. This would mean buying around 15,000 EVs per year, or an average of just under five per cent of expected EV sales over the period.

Private fleets

Private fleets make up half of all new sales in the UK, and EVs could save company car drivers at least £7,400 over three years.

To encourage uptake, we propose two tax changes:

- 1.** Reduce company car tax (CCT) early to two per cent for vehicles with zero emission mileage of at least 130 miles. This rate should stay until at least 2022-23. (Currently, zero emission vehicles have a tax rate of nine per cent, which is due to rise to 16 per cent by 2019 before falling to two per cent in 2020).²³
- 2.** Commit to maintaining zero rated vehicle excise duty (VED) for zero emissions vehicles until 2022 and consider extending this to plug-in hybrids with emissions below 50gCO₂/km. This would help to tackle the 'range anxiety' some consumers have

about very long distance travel (over 400 kilometres per journey) in the earlier years of EV infrastructure development.

This could lead to almost 50 per cent of private fleet sales being electric and plug-in hybrids in the UK's private fleet by 2022.

Low carbon vehicle sales have seen a 162 per cent rise since 2012.²⁴ With sustained tax incentives, the development of longer range electric models and greater public sector procurement of electric vans, over 16 per cent of sales could be electric by 2022.

The wider market

Around 45 per cent of new vehicles are bought by private individuals. The government should continue its plug-in car grant scheme to 2022, as this is encouraging a strong uptake of electric vehicles. It should also plan to reduce the subsidy per electric vehicle as costs fall, according to a transparent formula. Hasty withdrawal of subsidies should be avoided. In Denmark a poorly designed subsidy withdrawal “completely killed the market,” with EV sales falling by 60 per cent.²⁵

Manufacturing

The UK exported 80 per cent of the 1.3 million cars it produced last year.²⁶ A growing demand for low carbon vehicles worldwide means there is potential for the UK to capture a significant part of the global market by 2030, contributing as much as £95 billion to the UK economy.²⁷

California and eight other North American states use zero emission vehicle (ZEV)

sales targets, under a credits trading system, to drive electric vehicle production. China recently adopted a similar approach with a robust credit trading mechanism, which is one of the reasons it now produces half of all EVs globally.²⁸ The EU had planned such an approach in its Clean Mobility Package, but has dropped it in face of industry lobbying.

A UK ZEV mandate would ensure that manufacturers are able to meet the growing domestic demand for electric vehicles. We recommend sales targets of 15 per cent by 2022, quickly rising to 45 per cent by 2025 and 85 per cent by 2030.

Setting these, under a credits scheme, will spur domestic manufacturing and competition between original equipment manufacturers (OEMs), provide a strong signal for market development, meet growing UK demand and guarantee a strong supply of electric vehicles for the European market.

Charging points

It is likely that the UK will have to spend around £1 billion per year on charging infrastructure by 2022, although most of this will be installed via private expenditure. To address ‘range anxiety’, the government should prioritise the roll-out of rapid charging infrastructure in large cities, where off street parking is less common.

Policy beyond 2022

At least 32 per cent of new vehicle sales in the UK should be EVs and plug-in hybrids by 2022. By comparison, in Norway, 52 per cent of vehicle sales were EVs in 2017.

Private fleets

After 2022, EVs and plug-in hybrids should make up the majority of sales for private fleets, at that point first year vehicle excise duty (VED) should be raised progressively on remaining new petrol and diesel sales.

The wider market

After 2022, plug-in grants should be phased out, with any additional support focused on expanding the network of charging points. This should ensure sufficient public charging infrastructure, including provisions for overnight charging for a majority of EV owners in the country.

Manufacturing

Zero emission vehicle (ZEV) targets will help to align domestic manufacturing to demand. To tackle pollution, these need to be coupled with strong emission targets so that remaining plug-in hybrids, diesel and petrol vehicles are not too polluting. We recommend a national fleet-wide emissions target of below 60gCO₂/km by 2025 for passenger vehicles and below 80gCO₂/km for light commercial vehicles, under real world emissions testing.

Clean air zones

Creating clean air zones in the UK's large cities will have the twin benefit of reducing local air pollution and encouraging EV uptake. Local councils and mayors should introduce a £10 per day fixed charge on vehicles that are not ultra low emission from 2025. The experience of London's congestion charge shows that this type of policy significantly increases the purchase of EVs.

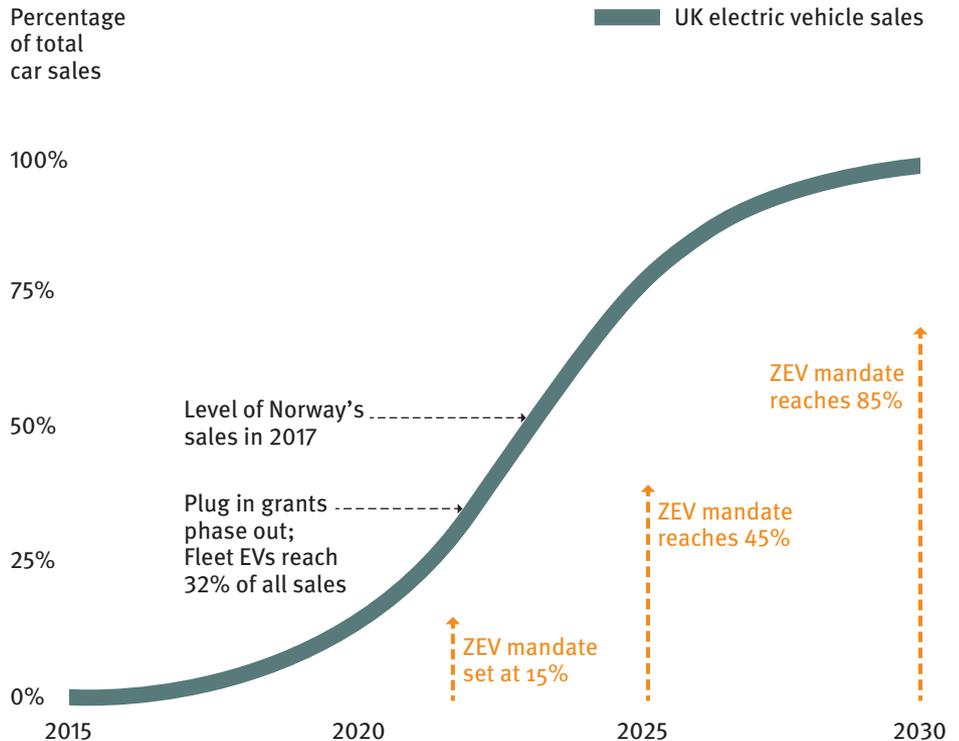
A roadmap for 100 per cent EV sales by 2030

This graph summarises how the UK's overall deployment strategy could look.

Plug-in grants are phased out at the point at which EVs reach upfront price parity, ensuring taxpayers don't over-subsidise the industry. The UK's ZEV mandate helps to ensure that manufacturers are incentivised to produce EVs to meet domestic demand.

Overall, this strategy would put the UK on a similar trajectory to Norway, the current world leader in EVs.

UK market share of electric vehicles to 2030



Endnotes

- ¹ Department for Transport, 14 April 2016 (last updated: 8 February 2018), *Statistical data set: all vehicles*
- ² Nissan, 21 January 2016, 'Nissan announces future generation electric vehicle batteries for UK production'
- ³ Prime Minister's Office, 12 December 2017, 'PM announces new measures to tackle effects and causes of climate change'
- ⁴ SMMT, January 2018, *Car registrations*, www.smmt.co.uk/vehicle-data/car-registrations/
- ⁵ Green Alliance, March 2018, *Two simple solutions to the UK's carbon gap*
- ⁶ Green Alliance, November 2017, *UK trade in a decarbonising world*, www.green-alliance.org.uk/resources/UK_trade_in_a_decarbonising_world.pdf
- ⁷ HM Treasury, 22 November 2017, *Autumn budget 2017 policy paper*
- ⁸ Cartoq, 20 February 2018, 'Government backed EESL will order 10,000 more electric cars in India', www.cartoq.com/government-backed-eesl-will-order-10000-more-electric-cars-in-india/
- ⁹ Department for Business, Energy and Industrial Strategy, 6 February 2018, *Final greenhouse gas emissions national statistics*
- ¹⁰ Analysis from Vivid economics estimates a reduction in gap of 53 per cent in the 5th carbon budget. This significant difference in outcomes is down to various factors: particularly on the speed of EV uptake where our analysis assumes an early rapid uptake alongside modest improvements in conventional fleet efficiency.
Statistical Source: Department for Business, Energy and Industrial Strategy, January 2018, *Updated energy and emissions projections 2017*
- ¹¹ House of Commons, 11 April 2017, Briefing paper 060011
- ¹² HM Government, October 2017, *Clean Growth Strategy, footnote 109*
- ¹³ Green Alliance, November 2017, *UK trade in a decarbonising world*. Analysis based on the assumption that the average price of a barrel of oil will be \$50.
- ¹⁴ SMMT, 2017, *Average vehicle age*, www.smmt.co.uk/industry-topics/sustainability/average-vehicle-age/
- ¹⁵ *The Guardian*, 22 September 2016, 'Paris is banning traffic from half the city. Why can't London have a car-free day?'
- ¹⁶ *The Telegraph*, 11 September 2017, 'Used diesel cars have used up to a quarter of their value since the start of 2017'
- ¹⁷ Renault Zoe News, 6 June 2017, 'Renault Zoe electric car uses can upgrade leased batteries'
- ¹⁸ *The Guardian*, 25 February 2016, 'Electric cars 'will be cheaper than conventional vehicles by 2022'
- ¹⁹ Nissan, 10 May 2016, 'Nissan and Enel launch groundbreaking vehicle-to-grid project in the UK'
- ²⁰ European Climate Foundation, February 2018, *Fuelling Europe's future: how the transition from oil strengthens the economy*
- ²¹ *The Telegraph*, 17 July 2014, 'Government cars go electric'
- ²² *Fleet news*, 9 February 2015, 'UK council fleet drops below 50,000 vehicles'
- ²³ Office for low emission vehicles, 21 December 2017, *Tax benefits for ultra-low emission vehicles*, www.gov.uk/government/uploads/system/uploads/attachment_data/file/670515/ultra-low-emission-vehicles-tax-benefits.pdf
- ²⁴ Hitachi, December 2017, *Future of fuel report*
- ²⁵ Bloomberg, 2 June 2017, 'Denmark is killing Tesla (and other electric cars)'
- ²⁶ SMMT, 'Key exports data', www.smmt.co.uk/industry-topics/brexit/key-exports-data/
- ²⁷ Green Alliance, February 2018, *Britain's trading future: a post-Brexit export strategy led by clean growth*
- ²⁸ Bloomberg, 21 November 2017, 'Global electric car sales jump 63 per cent'

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Green Alliance

Green Alliance is a charity and independent think tank focused on ambitious leadership for the environment. We have a track record of over 35 years, working with the most influential leaders from the NGO, business and political communities. Our work generates new thinking and dialogue, and has increased political action and support for environmental solutions in the UK.

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