ALDERSGATE GROUP
LEADERS FOR A SUSTAINABLE ECONOMY

Driving ambition: accelerating the transition to zero emission vehicles

September 2018

Coinciding with the government's Zero Emission Vehicle Summit on 11 September, this briefing sets out the major barriers to decarbonising UK road transport and considers what further support is needed from government to ensure UK businesses are best placed to accelerate the transition to zero emission vehicles (ZEVs).

Summary of recommendations for policymakers

To support UK businesses in accelerating the transition to ZEVs and maximise the economic benefits of doing so, government should:

1. **Drive consumer uptake of the cleanest vehicles** through fiscal incentives, such as by extending government support until electric vehicles (EVs) reach cost parity with conventional vehicles.

2. **Put the UK at the forefront of global vehicle manufacturing** by providing greater detail on the UK's future regulatory approach to new car, van and HGV CO_2 targets after Brexit, considering regulatory measures to address supply issues (such as mandatory ZEV sales targets as a backstop).

3. **Deliver an affordable, efficient and reliable charging infrastructure** by accelerating roll out of charging infrastructure to support 100% electric new car and van sales by 2030, targeting funding where the market will not deliver such as rural areas, offer guarantees against the unknown cost of connecting the chargers to the electricity grid to lower investment risk, and introduce standards on smart charging.

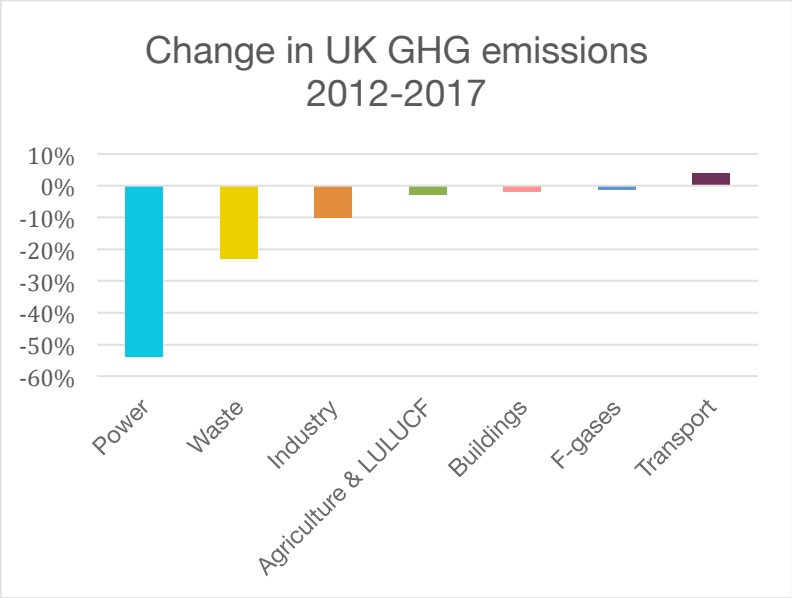
4. **Plan now for the future** by taking a systemic approach to decarbonising transport beyond just technological changes. This should include planning long-term improvements to the accessibility, affordability and reliability of public transport (including working with cities and local authorities), encouraging a shift from road freight to rail, preparing for connected and autonomous vehicles, as well as facilitating disruptor businesses such as car sharing services. This will also require developing a sustainable future road tax system.

BACKGROUND

Transport is key to future prosperity, unlocking new economic opportunities as it helps move goods and people around the country. However, these benefits have historically been accompanied by toxic air pollution and rising greenhouse gas (GHG) emissions. As a result, transport is now the largest-emitting sector of the UK economy, accounting for 28% of UK GHG emissions in 2017.[1] In contrast to other sectors, such as the positive progress in decarbonising electricity generation, **emissions from transport were flat in 2016 to 2017, after three consecutive years of emissions increases** – the only sector to see an increase. Now as the UK enters a new decade of action to meet our climate obligations, this pattern of transport emissions justifies urgent policy attention.

Road transport is the most significant form of transport emissions, accounting for 93% of total transport emissions in 2016.[2] This briefing focuses closely on electrification of cars and vans which, where supported by the continued decarbonisation and increased flexibility of the power grid, is a powerful solution to tackling climate change and air pollution, both of which are associated with our dependence on internal combustion engine (ICE) car usage.

Electric Vehicle technology also presents major economic opportunities, as the global market for low emission vehicles could be worth £1-2tn per year by 2030, and £3.6-7.6tn per year by 2050.[3] There is huge potential for UK businesses to lead this market, from automotive and battery manufacturers to companies with large fleets and freight transport needs. Zero emission technologies could also reduce operating costs for businesses and create high quality, well-paid jobs in EV manufacturing supply chains. However, further policy support is required to maximise the economic benefits for the UK.



Source: CCC (June 2018) *Reducing UK emissions, 2018 Progress Report to Parliament*

[1] CCC (June 2018) *Reducing UK emissions, 2018 Progress Report to Parliament*
[2] DfT (November 2017) *Transport Statistics Great Britain 2017*
[3] DfT (July 2018) *The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy*

This briefing first summarises the current policy landscape, before setting out our recommendations on how government can increase demand for cleaner vehicles through fiscal incentives, by tackling the limited supply and choice of EVs on the market, providing clarity on the future emission regulation regime in the UK after Brexit to drive the market, and accelerating the roll-out of charging infrastructure. Finally, it highlights some major issues that government must consider in light of rapid technological innovation to support a sustainable transport system fit for the future.

Beyond electrification of road vehicles, it will also be critical for government to take a holistic approach to higher travel demand and its close association with a growing economy and population, to fully decarbonise transport by 2050. A fundamental shift in focus is needed towards developing a sustainable and integrated transport system that minimises the need for car travel and ownership, improves public transport across the country, increases a shift towards rail travel and freight, facilitates technological innovation, and manages modern urban mobility. These issues are outside of the scope of this briefing, but **will be explored in greater detail in a forthcoming report from the Aldersgate Group**.

Zero emission vehicles and Ultra Low Emission Vehicles

Ultra low emissions vehicles (ULEVs) are cars or vans that emit less than 75 grams of CO_2 from the tailpipe per kilometre, and can deliver substantial GHG savings compared to conventional vehicles. These vehicles are generally known as hybrids or Plug-in Hybrid Electric Vehicles (PHEV). From 2021, government expects to define an ultra low emission vehicle as a car or van that emits less than 50 grams of CO_2 from the tailpipe per kilometre driven measured against the relevant test cycle.[4]

Electric vehicles (EVs), Fuel Cell Electric Vehicles (FCEVs) or hydrogen vehicles are forms of zero emissions technology (ZEVs) – vehicles that emit no GHG or air pollutant tailpipe emissions. EV technology is currently at a much more advanced stage of commercial development than other ZEVs, and offer much greater emission savings than PHEVs. The full decarbonisation of road transport will ultimately depend on the transition to ZEVs.

[4] DfT (July 2018) *The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy*

FROM A ROLLING START: THE POLICY LANDSCAPE

UK government has already taken steps to strengthen domestic consumer demand for ULEVs and ZEVs, and to support the development of the UK's manufacturing sector. This includes a range of financial incentives such as direct grants, changes to taxation and other financial support to encourage consumers and businesses to make the shift to low or zero emission vehicles.

The recent publication of the government's Road to Zero Strategy[5] sets out, for the first time, a comprehensive vision for a cleaner transport system and seeks to put the UK at the forefront of the design and manufacturing of ZEVs, including measures to address key financial and infrastructure barriers to the EV market. Central to the Strategy is its mission for all new cars and vans in the UK to be "effectively zero emissions by 2040". This includes an ambition to see at least 50-70% of new car sales and up to 40% of new van sales to be ultra low emission by 2030. Neither of these targets are legally binding.

Government's "technology neutral" approach – which does not speculate on specific technologies – risks not meeting the UK's fifth carbon budget wherein emissions from all forms of transport need to reduce by 46% by 2030.[6] This path to meeting future emission reduction is likely to be even greater when the UK adopts a net zero target in line with the Paris Agreement. Therefore, conscious of the dangers of picking winners, government must show greater policy leadership to give the market a clear signal to drive investment and innovation in the development of zero emission technologies. Where zero emission technologies do not yet exist, government should provide more direction and support for certain low emission technologies. For example, by producing guidance on preferred alternative fuel sources which will deliver the greatest reduction in HGV emissions to incentivise investment and commercialisation. This approach should be kept under regular review, as the market continues to develop at pace.

DRIVING THE UPTAKE OF THE CLEANEST VEHICLES

One of the biggest barriers to market penetration of ULEVs and EVs is their high purchase price compared to ICE vehicles, despite lower service and maintenance costs, better fuel economy and lower taxes across the full vehicle life.[7] A recent survey for the Department for Transport (DfT) confirmed that 83% of driving license holders said that the retail cost was the most important factor when considering purchasing an EV.[8] **Clear fiscal incentives to address this price barrier in the short to medium term will therefore be vital to driving greater demand.**

Direct grant support

In spite of nearly a decade of grants offered by the Office of Low Emission Vehicles (OLEV) designed to bring the cost of cleaner vehicles closer to that of convention petrol and diesel vehicles,[9] the upfront cost of ULEVs and EVs in the UK is still higher than

[5] DfT (July 2018) *The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy*
[6] CCC (June 2018) *Reducing UK emissions, 2018 Progress Report to Parliament*
[7] Hagman,J., et al., 'Total cost of ownership and its potential implications for battery electric vehicle diffusion', *Research in Transportation Business & Management* (2016)
[8] DfT (8 September 2016) *Public attitudes towards electric vehicles: 2016 (Revised)*
[9] Currently a maximum of £4,500, or £8,000 for the cleanest van on the market. This grant also applies to hybrid vehicles. https://www.gov.uk/plug-in-car-van-grants

conventional equivalents. This is because falling battery costs have largely been offset by an increase in battery sizes, increasing vehicle range.[10]

Whilst it is welcome that government has reaffirmed that the plug-in car grant will continue to at least 2020, upfront cost parity between electric and conventional vehicles is not expected until the mid-2020s,[11] and the plug-in van grant will only continue at current rates until October 2018.

Government should therefore commit to extending direct grant support for vans and cars until EVs reach cost parity with conventional vehicles. This would provide greater security to manufacturers to continue investing in developing new models and encourage consumers and businesses to purchase EVs.

Tax incentives

1. **Low carbon company cars**

Fleet and business sales account for over half of the new car market,[12] and many large companies see the business case for increasingly moving towards zero emission road transport. The British Vehicle Rental increasingly moving towards zero emission road transport. The British Vehicle Rental and Leasing Association (BVRLA), which represents over 900 companies engaged in rental, leasing and fleet management, has launched an ambitious 'Plug-in Pledge' that will see its members' combined plug-in vehicle fleet size grow from 50,000 today to 720,000 by 2025.[13] However, to meet these ambitions business requires a supportive tax regime and support for purchasing EVs across their fleet and for their employees.

Government is planning to increase the Company Car Tax (CCT), which provides a lower tax rate to incentivise employers and employees to purchase ULEVs and zero emission company cars, including a surcharge for diesel vehicles, up to a rate of 16% in 2019/20 before falling to 2% in 2020/21. This creates artificial barriers in the short term and will result in deferred purchase for the nearly one million employees taxed as part of this regime[14] and may encourage employers and employees to leave the regime and finance their own car, emitting on average 12% - 22% more CO_2 than a company car.[15]

Case study: buying a new car

The VW 'e-golf' EV costs £28,230[16] even when including the plug-in car grant, whereas a diesel equivalent can cost less than £20,000.[17] The Nissan Leaf costs £26,890[18] while the Nissan Micra – the equivalent sized car with a petrol engine – starts from £12,750.[19]

[10] DfT (July 2018) *The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy*
[11] BNEF (2018) *Electric Vehicle Outlook*
[12] Fleet News (5 January 2018) 'Diesel new car registrations down and fleet registrations fall in 2017'
[13] BVLRA (16 July 2018) 'BVRLA pledges to rapidly increase plug-in vehicle take-up'
[14] Fleet News (9 July 2018) 'Fewer paying company car tax, but Treasury takes extra £360m'
[15] Grey Fleet is the name given to private vehicles which are used for business use. BVRLA (July 2018) *Getting to grips with Grey Fleet*
[16] VW e-Golf https://bit.ly/2wNXjbV [accessed August 2018]
[17] VW Golf S http://bit.ly/2wQfFJH [accessed August 2018]
[18] Nissan Leaf N-Connecta https://bit.ly/2M5NOtu [accessed August 2018]
[19] Nissan Micra https://bit.ly/2hEMt2n [accessed August 2018]

To make the most of this low hanging fruit, **we recommend that government should bring forward the planned reduction in CCT to April 2019**.

2. Updating VAT rules

Government should continue to monitor the uptake of EVs in accordance with the sales trajectory as set out by the Committee on Climate Change (CCC). If sales continue to lag, government should consider, as the UK leaves the EU, a 100% VAT rebate for new zero emission vehicles and 50% for other ULEVs to incentivise purchase. This could be made cost neutral by introducing a small levy on non-ULEVs through Vehicle Excise Duty (VED).[20] For example, Norway – which has achieved the highest market share of EVs globally at 29%, compared to less than 1.5% in the UK[21] – has rolled out VAT exemption alongside a wider package of fiscal incentives, including reduced CCT and no annual road tax.[22]

BUILDING A WORLD LEADING VEHICLE MANUFACTURING BASE

The Aldersgate Group strongly supports government's ambition to put the UK at the forefront of the design and manufacturing of ZEVs. **The UK is home to one of Europe's leading automotive industries, manufacturing 1.67 million cars in 2017 and exporting 14.6% of the UK's total export goods worth £44bn.[23] It is a major part of the UK economy, accounting for roughly 4% of national GDP and providing 814,000 jobs across the UK**, 169,000 of which are directly employed in manufacturing.[24]

UK vehicle manufacturing also plays a major role for UK regions outside of London and the South East, employing over 30,000 people in the North East.[25] In 2016, a fifth of all EVs sold in Europe were produced at the Nissan plant in Sunderland.[26] There are strong government-industry partnerships in the UK automotive industry and the industry comprises: six commercial vehicle manufacturers, 13 Research and Development centres, nine engine manufacturers, six design centres, and some 2,500 suppliers.[27] Government has also pledged £246m to support the development of next generation batteries, through the Faraday Battery Challenge.

[20] WPI Economics (April 2018) *Helping people and business to move towards cleaner forms of transport: The potential role of fiscal policy*
[21] OECD/IEA (2017) *Global EV Outlook 2017: two million and counting*
[22] Norwegian EV policy https://elbil.no/english/norwegian-ev-policy/ [accessed August 2018]
[23] DfT (July 2018) *The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy*
[24] SMMT (2017) *UK Automotive Priorities: Securing the Strength of the UK Automotive Industry / 2017-22*
[25] North East Local Enterprise (January 2017) *More and better jobs: The North East Strategic Economic Plan*
[26] Green Alliance (March 2018) *How the UK can lead the electric vehicle revolution*
[27] BuroHappold Engineering (December 2017) *Help or Hindrance? Environmental Regulations and Competitiveness*

However, the UK is not alone in recognising the potential of this sector. Last year, Germany overtook the UK for the first time in EV sales and China manufactured half of all EVs sold globally.[28] Against this backdrop **the UK must act now to cement its position as a global leader and ensure the UK remains a strong manufacturing base for EVs.**

Tackling the limited supply of EVs

The uptake of ULEVs will depend on adequate supply. **Currently, demand for electric vehicles outstrips manufacturer supply**.[29] As a result, **there are only 38 cars and just eight van models eligible for the plug-in car grant, compared to hundreds of eligible conventional vehicle options**.[30] Moreover, in spite of healthy market demand, just 1.5% of advertising spend was on zero emission models and 1.4% on plug-in hybrid models in the EU's largest car markets in 2017, down from 2016.[31]

Whilst some manufacturers have made positive commitments to EVs, it is clear that carmakers' ambition lags behind the UK government's objectives and the pace of take-up required to meet the UK's climate objectives. Therefore, as suggested by the CCC, **government should investigate the UK EV market to establish whether carmakers and dealers are creating a barrier to EV sales[32] and if so, it should consider regulatory measures to address supply issues**, such as introducing mandatory sales targets as a backstop if supply does not increase.

Life after Brexit: designing a new UK vehicle emissions regime?

Despite the well-established shortcomings of its previous testing methodology, the EU's emissions standards regime is an effective policy framework which provides certainty, scale and clear targets. Introduced in 2008, the EU set out legally binding CO_2 standards requiring carmakers to produce more efficient vehicles. There are stiff penalties for failure to meet these targets, incentivising carmakers to introduce ULEVs.[33]

A recent report commissioned by the Aldersgate Group found that the automotive industry generally has a positive view of the regulation, which has generated cumulative design and innovation improvements, including in lightweighting, tyre compounds, aerodynamics and transmission, greatly diversifying the value chain leading to an increase in direct and indirect jobs.[34] The steady increase in ambition of these EU standards (coupled with the UK government's approach to a sliding scale of VED linked to emissions standards) has led engine manufacturers and car designers to invest billions in research and development.[35]

[28] Green Alliance (March 2018) *How the UK can lead the electric vehicle revolution*
[29] CCC (June 2018) *Reducing UK emissions, 2018 Progress Report to Parliament*
[30] DfT (July 2018) *The Last Mile: A Call for Evidence on the opportunities available to deliver goods more sustainably*
[31] Transport & Environment (June 2018) *Carmakers STILL failing to hit their own goals for sales of electric cars*
[32] CCC (June 2018) *Reducing UK emissions, 2018 Progress Report to Parliament*
[33] In the aftermath of 'Dieselgate', where Volkswagen cars sold in America were found to have a 'defeat device' – software that could detect when they were being tested, changing the performance accordingly to improve results, the European Commission proposed tougher CO_2 emissions targets and a new testing regime.
[34] BuroHappold Engineering (December 2017) *Help or Hindrance? Environmental Regulations and Competitiveness*
[35] Aldersgate Group (January 2017) *Amplifying Action on Resource Efficiency: UK edition*

In the context of the UK's departure from the EU, the Aldersgate Group welcomes government's approach to pursue new car and van CO_2 targets that are at least as ambitious as current arrangements for vehicle emissions regulation**. This should include detail on how manufacturers who do not comply with existing emissions standards set for 2020/2021 will be penalised, reinforced by a tough real-world testing regime, and how continued emission reductions will be incentivised in the future.** Beyond this, the UK automotive sector rapidly needs clarity as to whether the UK will remain part of the EU framework or continue to introduce at least as strong a set of regulations at the national level.

Incentivising low emission HGV manufacturing

Road freight is an essential and growing part of the UK economy, contributing £11.9bn in 2015 and employing around 248,000 people.[36] However, HGVs are a major source of air pollution as well as accounting for 17% of emissions from road transport, despite making up just 5% of vehicle miles.[37]

One of the major barriers to decarbonising HGVs is that technological solutions for larger HGVs, such as battery electric and hydrogen vehicles are at a relatively early stage of development and not yet available for deployment across the HGV fleet. One of the causes for the current lack of technologies is that emissions from HGVs are currently not regulated at the EU level in the same way as cars and vans.

Therefore, manufacturers selling new HGVs into the EU market are not incentivised to innovate and develop low or zero emission technologies.

In response, the European Commission has recently published proposals that manufacturers selling new HGVs into the EU market will face regulatory limits on their fleet average CO_2 emissions.[38] This proposal sets an overall CO_2 emission reduction target for the new heavy-duty vehicles fleet of 15% by 2025 compared to the 2019 emission levels, and an aspirational target of 30% by 2030. **To ensure that low and zero emission technologies continue to develop for HGVs and become commercially available for the UK, government must set out a regulatory approach that is at least as ambitious as the EU's proposals and one which is in line with the UK's carbon budgets.**

Decarbonising the UK freight industry

Another major barrier to decarbonising HGVs is the complex nature of the road freight sector which comprises a diverse mix of vehicle configurations, vehicle weights and sizes, meaning there is not a single decarbonisation solution for the sector. To address this, the Road to Zero Strategy confirmed a new industry-wide voluntary commitment to reduce HGV greenhouse gas emissions by 15% by 2025. However, given that average CO_2 intensity of the HGV fleet is increasing due entirely to decreased fleet efficiency,[39] this non-binding proposal to reduce emissions from HGVs does not go far enough.

[36] DfT (February 2017) *Freight Carbon Review 2017*
[37] Ibid
[38] European Commission 'Reducing CO2 emissions from heavy-duty vehicles' https://bit.ly/2qSJuYT [accessed August 2018]
[39] CCC (June 2018) *Reducing UK emissions, 2018 Progress Report to Parliament*

This proposal should therefore be closely monitored in line with the UK's climate change commitments, with an option to introduce tougher mandatory measures in the freight sector if progress does not get on track.

To accelerate zero emission technologies in the HGV and freight sector, government should also develop a supportive policy framework to drive innovation. **This includes further R&D investment towards accelerating the commercialisation** and **roll-out of zero and ultra-low emission technologies and producing guidance on preferred alternative fuel sources** which will deliver the greatest reduction in HGV emissions to incentivise investment into commercialisation.

DELIVERING AN AFFORDABLE, EFFICIENT AND RELIABLE CHARGING INFRASTRUCTURE

The availability of reliable charging infrastructure is key to building consumer and business confidence in the EV market. **In a survey of 507 fleet managers, 82% cited 'better charging infrastructure' as making them more likely to incorporate EVs within their fleet.**[40] Government should therefore bring together industry, regulators and local authorities to enable the roll out of charging infrastructure sufficient to allow consumer demand to reach close to 100% of electric new car and van sales by 2030, as set out below.[41]

Funding a national network of charging points

Research conducted for the CCC indicated that **1,200 rapid chargers near major roads may be required by 2030 just to meet current service levels, as well as 27,000 chargers around local towns and regions.**[42] **The CCC estimate this would cost £530m, given current charge point costs,**[43] as well as additional costs in connecting the chargers to the electricity system and grid reinforcement.[44]

The Aldersgate Group commends government's commitment to improve the availability of charging infrastructure for EVs and welcomes funding available in the form of grants for home charge points. However, the Workplace Charging Scheme[45] grant is restricted to a maximum of 20 EV charge points across all sites per applicant, and therefore may be limited in its effectiveness. **Government should therefore remove or extend the cap on the maximum number of EV charge points for businesses** with many employees that operate across multiple sites in the UK, and keep this cap under review as EV uptake increases.

The £400m Charging Infrastructure Investment Fund[46] is designed to catalyse the rollout of electric vehicle charging infrastructure across the UK, to drive the uptake of EVs and address perceptions of limited battery range, or 'range anxiety', frequently cited as a barrier to the uptake of EVs.[47]

[40] BT Fleet Solutions (2017) *Operational Fleet Insight: The 2017/18 Report*
[41] National Infrastructure Commission (July 2018) *National Infrastructure Assessment*
[42] Cenex, Next Green Car and Systra (January 2018) *Plugging the gap: An assessment of future demand for Britain's electric vehicle public charging network*
[43] To accommodate uptake in the absence of smart technology and network management, expensive grid reinforcements will be needed. See more: National Infrastructure Commission (July 2018) *National Infrastructure Assessment*
[44] CCC (19 January 2018) 'Plugging the gap: What next for Britain's EV public charging network?'
[45] OLEV (July 2018) *Workplace Charging Scheme – Guidance Document for Applicants, Chargepoint Installers and Manufacturers*
[46] Gov.uk (23 July 2018) 'Management of £400 million electric vehicles charge fund opens to bidders'
[47] Fleet News (4 July 2017) '61% of motorists deterred by EV's limited battery range, study shows'

However, the Fund has been designed to deliver a commercial return, which is at odds with investment needs. **Government must ensure that public funding doesn't crowd-out private sector investment and that it is instead targeted at areas where the market is not delivering and where it can reduce investment risk**. In particular, public funding should support roll-out in rural and remote areas, using a mix of slow and rapid charge points[48] to create a visible core network, and offer guarantees against the unknown cost of connecting the chargers to the electricity grid to lower uncertainty.

Back 'smart charging' technology

The transition to electric vehicles can provide additional, low cost flexibility for the energy system. National Grid's latest Future Energy Scenarios concluded that 36 million EVs by 2040 could be supported by the Grid with only an 8GW increase in peak demand, provided smart charging and other technologies (including vehicle-to-grid (V2G) technology) and storage are part of the system.[49]

Smart charge points must be supported by regulatory incentives, as they will play a vital role in managing the additional demand on the grid, balancing power flows, managing data sharing between sectors, and lowering costs for EV owners. The National Infrastructure Commission estimates that not rolling out smart charging could increase power system costs by £2bn per year on average (2030-50), adding up to £30 per year on average to consumer bills over the same period.[50] However, as smart charging is still nascent, **government should bring forward technical standards on smart charging equipment to ensure that consumers needs are met, at lowest possible cost**. Standards should be performance based, technology neutral, respond to dynamic pricing signals, and be flexible enough to allow for future charging innovations including V2G, Vehicle to Everything (V2X) and wireless charging.[51]

PLANNING NOW FOR THE FUTURE

Transportation is already in the midst of profound change. **The rapid pace of technological development and innovation is driving new business opportunities which could take traffic off road and reduce emissions in road transport.**

As government has acknowledged in its Future of Mobility Grand Challenge (part of the Industrial Strategy) and Automotive Sector Deal, there are important areas that could benefit from innovation support and cross-departmental cooperation.

Government must work with industry now to build a modern, reliable and low carbon transport system fit for the future. Major issues to consider include:

- **Taking a systemic approach to decarbonising transport.** Joining up public transport and delivering infrastructure that encourages a consumer shift away from motor vehicle use is vital to achieving carbon reduction targets. Government must implement policies to encourage walking and cycling, and deliver an affordable and accessible public transport system.

[48] Rapid charge points, of 43kW or above, can charge an electric vehicle battery in 20-30 minutes. Some 'fast' chargers, of 22kW, can charge current models of electric vehicle in about an hour.
[49] National Grid (July 2018) *Future Energy Scenarios*
[50] National Infrastructure Commission (July 2018) *National Infrastructure Assessment*
[51] Energy UK (March 2018) *Developing standards for electric vehicle smart charging*

Such forms of transport are highly cost-effective for individuals and governments. This will require planning new developments with sustainable travel as a priority, as well as investment in new infrastructure, and a public behaviour change campaign. The government is also right to focus on urban mobility, as the number of people living in predominantly urban areas of England is projected to increase by 18% between 2014 and 2039.[52]

- **Shifting freight from road to rail.** Arup has estimated that modal shift reduces carbon emissions by an estimated 76% as each freight train removes the equivalent of 25-76 HGVs from the British road network.[53] Government should therefore continue to work with Network Rail to facilitate the growing demand for rail freight along the UK's core routes.

- **Encouraging disruptor businesses.** Government should remove unnecessary barriers and ensure that regulations are sufficiently flexible to support innovative new business models such as car sharing services and V2G technology.

- **Preparing for connected and autonomous vehicles.** Government has estimated that the connected and autonomous vehicle (CAV) UK market could be worth £28 - 52bn by 2035.[54] CAVs will transform infrastructure design, capacity, demand, travel patterns, land use, and interactions between transport modes. Government should ensure that enabling telecoms infrastructure is ready to adapt, and that the growth of CAVs does not increase the number of cars on the road.

- **Consider a sustainable future road tax system.** Looking ahead, government will have to rethink the UK road tax regime, as decarbonisation will erode the existing tax base, given ULEVs and ZEVs pay far less in fuel tax and VED than ICEs. Government should work with the sector to develop a sustainable, long-term tax regime which incentivises ZEVs and takes a systematic approach to transport.

A full report to be published in early 2019 will explore these issues in further detail and set out the solutions available to deliver a low carbon, efficient and flexible transport system fit for the 21st century.

[52] DfT (July 2018) *Future of Mobility: Call for Evidence*
[53] Arup (September 2016) *Future potential for modal shift in the UK rail freight market*
[54] Transport Systems Catapult (July 2017) *Market forecast for Connected and Autonomous Vehicles*