



THE FUTURE OF ROAD TRANSPORT EMISSIONS REGULATION IN THE UK AFTER BREXIT

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OCTOBER 2018

Commissioned by: The FIA Foundation, 60 Trafalgar Square, London WC2N 5DS, United Kingdom

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CONTENTS

SUMMARY	1
INTRODUCTION	2
FUTURE ENVIRONMENTAL POLICY IN THE UK	3
CURRENT STATE OF THE SECTOR	5
CONTROLLING ROAD VEHICLE EMISSIONS	6
DRIVERS FOR FUTURE EMISSION REDUCTIONS	8
POSSIBLE POST-BREXIT SCENARIOS	10
CONCLUSIONS	16
REFERENCES	17

SUMMARY

Air pollution and climate change are two of the most pressing environmental issues currently facing the UK. Road transport plays a significant role in both. The great majority of regulation addressing emissions from road transport derives from EU legislation and so will inevitably be impacted by Brexit. The UK's future position with regard to the EU and the UK's developing controls on road transport emissions will have significant implications both for human and environmental health, and for the future of the UK vehicle and parts manufacturing industry.

This report considers briefly the current state of the sector, the current policy landscape and then analyses three possible positions a future Government could adopt: strongly deregulatory, parity with EU legislation (and no more), and leadership on environmental protection. It concludes that the best outcome following Brexit, both for human and environmental health and for manufacturing industry, is to take a leadership position on transport emissions control. However, based on current evidence, one of the more likely outcomes is that UK regulations stand still as those in the EU develop, which, over time, results in similar outcomes to a deregulation scenario. Such a position would present a risk to both human and environmental health. In more detail:

- Strong deregulation post Brexit, or even a position where current standards do not develop further, is likely to result in harm to human health in the UK as a result of relatively worse air quality and a far lower chance of avoiding damaging climate change. It is also a severe threat to the UK based vehicle and parts manufacturing industry, currently worth £4.9bn to the UK economy. Regulatory inconsistency will remove the possibility of frictionless movement across the UK-EU border making UK products more expensive in a highly integrated and competitive market;
- A position of parity and no more would reduce risks to public health and industrial viability but the UK would have little or no influence over the development of such regulation. This could be mitigated by maintaining strong, cooperative links with the science and evidence base being developed in the EU;
- A leadership position, in terms of the strength, pace or form of regulation, could result in the stimulation of low emission research and manufacturing in the UK, provide greater certainty for industry and help accelerate the pace of improvement within the EU. This would be in addition to greater public health and environmental benefits.

INTRODUCTION

Anthropogenic climate change is increasingly seen as one of the leading existential threats to society over the long term. Climate change mitigation therefore remains, rightly, at the forefront of environmental concerns. Air quality has also received increased attention in recent years and the scale of health impacts - equivalent to tens of thousands of deaths per year in the UK alone - marks it out as "the largest environmental health risk in the UK."¹ Road transport is, and will remain, a key source of both greenhouse gas² and air pollution emissions and is already subject to a raft of legislative control measures in the UK, almost all of which derive either directly or indirectly from EU legislation and policy.

With the great majority of UK legislation on the environment deriving from EU Directives and Regulations, there is, understandably, widespread concern over the future of environment policy once the UK leaves the EU. Much has been written on what the future could hold and, given the uncertainty over the UK's future relationship with the EU, all outcomes are still possible.

The scenarios range from maintaining UK policy and legislation in lock step with the EU to completely scrapping the body of EU-derived law and developing something totally separate. The former would most

forcefully question the wisdom of leaving the EU and would certainly preclude many of the opportunities for self-determination upon which the case for Brexit was made to the public. However, the latter scenario carries the greatest uncertainty and prompts the fear that the UK's standards of environmental protection will fall behind those in the rest of Europe. It would also place at significant risk the UK's vehicle and parts manufacturing industry.

A number of reports have analysed different aspects of Brexit and its potential impact on this sector. The 2017 Environmental Industries Commission report, *Improving Air Quality After Brexit*³, highlighted some of the key issues and potential opportunities which Brexit could offer in relation to air quality control generally. More recently, Transport & Environment's report *Brexit & Cars*⁴ identified potential risks in terms of the supply of low emission vehicles to the UK market and additional costs for UK manufacturers in the case of a "no deal" Brexit. Manufacturers themselves have also warned about the potential consequences of a "no-deal" Brexit. In July, Jaguar Land Rover chief executive Ralf Speth said: "A bad Brexit deal would cost Jaguar Land Rover more than £1.2bn profit each year... We have spent around £50bn in the UK in the past five years - with plans for a further £80bn more in the next five. This would be in jeopardy should we be faced with the wrong outcome."⁵ BMW has moved their annual summer shutdown period at its Cowley plant in Oxford to April in 2019, to "minimise the risk of any possible short-term parts-supply disruption in the event of a no-deal Brexit."⁶

This report seeks to examine some of the potential outcomes for the regulation and control of emissions from road transport, both of greenhouse gasses and air pollutants. The report examines the current state of both the UK road transport fleet and the emissions regulation regime. It then considers three potential Brexit scenarios and what these might mean, both for the vehicles available for use in the UK and for the low emission vehicle manufacturers in the UK. To reduce the potential outcomes to just three may seem overly simplistic, but the intention is to use these to illustrate the broad risks and opportunities presented by Brexit in the field of road transport emissions control.

In developing this report, a workshop was held with industry and NGO stakeholders to draw out the potential impact of these scenarios in June 2018. A report of the workshop is available on request.



FUTURE ENVIRONMENTAL POLICY IN THE UK

Predicting future Government policy beyond the next election cycle is, clearly, extremely difficult and even more so in the context of Brexit. It is therefore impossible to conclusively answer whether policy direction will tend towards greater environmental protection or towards dismantling those protections that currently exist.

On the positive (protection) side, The European Union (Withdrawal) Act 2018⁷, the primary legislation enacting the UK's withdrawal from the European Union, will transpose all the current body of EU legislation into UK law. This means that, the day after Brexit, the UK will have nearly the same set of legislation as it had immediately before Brexit, with two key differences. The first is that some of the core elements of recent environmental legislation, such as the polluter pays and precautionary principles, won't be transposed. These are contained in the EU Treaties as opposed to Directives or Regulations and so are not part of the body of legislation currently referred to in the Act. Secondly, all references to the European Commission (EC) and similar bodies will be removed, including the reporting and enforcement functions for which the EC is responsible. Both changes would have a massive impact on the enforcement of environmental regulation given their role in this function in the UK to date.

It should be noted however that amendments made to the Act later in its progress through Parliament require that that by 26 December 2018, the Secretary of State must publish draft legislation which sets out a list of environmental principles. The draft legislation must place a duty on the Secretary of State to publish a policy statement in relation to the application and interpretation of those principles which ministers must "have regard to in making and developing policy." The draft legislation must also define environmental law and establish an enforcement body able to take enforcement action where "the authority considers that a minister of the Crown is not complying with that environmental law."

In addition, the Government has made repeated commitments to maintain the highest standards of environmental protection in the UK post-Brexit. In his

forward to the Government's 25 Year Environment Plan, the Secretary of State for Environment, Food and Rural Affairs, Michael Gove, states his desire for the UK to be "recognised as the leading global champion of a greener, healthier, more sustainable future for the next generation." This is not an isolated statement and has been reiterated in speeches and statements to Select Committees numerous times since he took up office. The aim is repeated in the consultation document, published in May, on Environmental Principles and Governance after the United Kingdom leaves the European Union. Nor is that intention restricted to Defra. The Department for Transport's Road to Zero white paper, published in July 2018, states that the central aim is to "put the UK at the forefront of the design and manufacturing of zero emission vehicles, and for all new cars and vans to be effectively zero emission by 2040."⁸ The simple fact that 2018 has seen the publication of a greater volume of Government plans and strategies on the environment than at any other time in recent years might be interpreted as an indication of the emphasis being placed on this area.

Set against these rather reassuring notes are however a number of key pieces of evidence which give cause for concern:

1. A future Government will not be bound by any of the policies of the current Government, unless they are defined in some way in legislation, preferably primary legislation. While the EU (Withdrawal) Act will maintain the current body of EU legislation immediately after Brexit, it says nothing about strengthening or even maintaining that legislation. Future policy could be strongly deregulatory and result in the current protections being dismantled.
2. While the UK has in the past taken a leading position on climate change, evidenced by the Climate Change Act 2008 and its mandatory targets, it has been less active on air quality. Successive plans to meet the NO₂ limit values have been subject to successful legal challenge in the UK's High Court⁹. These have shown that Defra has not, apparently, carried sufficient weight within Government to force through stringent air

quality measures which impact other departments such as Transport¹⁰.

3. The current Government, and its immediate predecessors, has generally pursued a policy of minimum compliance with EU legislation and has followed a strongly deregulatory approach. In June, in a written statement to Parliament, it announced its intention to cut the burden of regulation on business by £9bn by May 2020¹¹. While this does not of itself indicate a reluctance to protect the environment, it is far easier to remove environmental regulation than it is to design an effective alternative.
4. Recent announcements by both Government ministers and ex-ministers show that the pro-environmental sentiment expressed by Michael Gove is not necessarily held by his colleagues. For example, Liz Truss, Chief Secretary to the Treasury, was recently quoted as saying that big projects in the UK are held back by "clunky

regulations" in a speech to the Cato Institute, who themselves recently advocated a light touch approach to environmental regulation¹². Former Foreign Secretary, Boris Johnson, supported the publication on 24 September of an Institute of Economic Affairs (IEA) report which described EU environmental protection legislation as "anti-competitive" and said that they were "disguised methods of protectionism."

On balance, while the EU (Withdrawal) Act would appear to ensure that the current environmental regulatory structure will remain in place for the immediate period post Brexit, it cannot be assumed that this will remain the case for the medium to long term. Nor can it be assumed that the UK will continue to develop this environmental protection framework to at least keep pace with developments in the EU, risking a "protection gap" between the UK and the EU. Finally, it remains to be seen what additional principles and enforcement structures will be established to replace the EC and European Court of Justice.



CURRENT STATE OF THE SECTOR

THE UK AUTOMOTIVE INDUSTRY

In 2017, the UK was the fourth largest assembler of vehicles in the EU-28, building 1.75 million vehicles. The majority of these were passenger cars (95.6%), but light commercial vehicles, heavy goods vehicles and buses and coaches are also manufactured at several sites across the UK. The UK also has a strong automotive parts manufacturing base. In 2017, 2.7 million engines were produced in the UK, and the wider automotive supply chain employed 82,000 people and generated £4.9bn in value added¹³.

The UK automotive sector is deeply integrated into the wider EU market. In 2017, only around one-fifth of the cars and 37.5% of the commercial vehicles assembled in the UK were also sold here. Of those exported, over half of new passenger cars and almost all commercial vehicles went to EU countries, as well as 65% of UK-built components. Outside the EU, the US and China represent the next largest export markets for UK assembled cars, together accounting for 23.2% of exports in 2017. Equally, UK vehicle sales and manufacturing are strongly reliant on the EU; almost 7 out of 10 new cars registered in 2017 were imported from the EU, and components from the EU made up nearly half of the content of cars assembled in the UK. The EU automotive skills base is also deeply integrated, with over 10% of people employed in the UK automotive manufacturing sector originating from other EU-28 countries¹⁴.

This level of integration is heavily dependent on the free movement of goods (and workers) both between sites in the manufacturing process, and on products moving across the EU market. Automotive manufacturing is

extremely competitive so any additional costs incurred in the manufacturing or assembly process is likely to place the company concerned at a strong disadvantage.

THE UK VEHICLE FLEET

There are currently around 38.9 million vehicles registered in the UK, of which 32.2 million are passenger cars, 4 million are vans, 0.5 million are heavy goods vehicles, and just over 2 million are other types of vehicle¹⁵. The UK new vehicle sales market is one of the largest in the EU-28, making up around 17% of all EU-28 vehicle sales in 2017 with 2.9 million new registrations.

In 2016, compared with the EU-28 average, the UK's new passenger cars had slightly higher CO₂ emissions (120.1 versus 118.1 gCO₂/km which could be related to the fact that they were also slightly heavier; 1,411 kg versus 1,385 kg on average). CO₂ emissions from new light commercial vehicles in the UK were also slightly higher than the EU-28 average, at 172.9 versus 163.7 gCO₂/km¹⁶.

The make-up of the car fleet clearly has a significant impact on emissions. Increasing uptake of ultra-low emission vehicles (ULEV¹⁷) is one of the key approaches to reducing air pollution and meeting carbon reduction targets proposed in the Road to Zero white paper. In 2017, plug-in vehicles made up 2.1% of new passenger car registrations, which was above the EU 28 average of 1.4%¹⁸. The share of diesel vehicles in new car sales is relevant for NO_x emissions. In Great Britain, the share of diesels in new passenger car sales rose from 17.8% in 2001 to a maximum of 50.5% in 2012, but has since dropped to 41.7% in 2017, in the wake of 'dieselgate'.



CONTROLLING ROAD VEHICLE EMISSIONS

AIR POLLUTANTS

Over the last two decades, EU fuel quality regulations have eliminated lead emissions, as well as dramatically reducing sulphur emissions from road vehicles. Today, type-approval emissions standards for new vehicles registered in the EU (Euro standards) are the key regulatory mechanism to control emissions of NO_x, particulate matter (PM), hydrocarbons (HC) and carbon monoxide (CO). For the existing fleet, road worthiness tests (known as MOT tests in the UK) also help to remove vehicles emitting excessive levels of CO, HC or smoke from the road, although these tests are fairly crude and will only identify grossly excessive emitters.

Euro standards

Since the Euro 1 standards were introduced in 1992/3 for passenger cars, Euro standards have become progressively tighter and extended to include heavy-duty vehicles (lorries, buses and coaches). The current Euro 6/VI¹⁹ (for light-duty/heavy-duty vehicles respectively) set maximum emissions limits on a per vehicle basis in g/km driven (for light-duty vehicles) or g/kWh (for heavy-duty vehicles). These must be met under test conditions by a representative vehicle or engine for a new vehicle model to be approved for sale in the EU. Emissions are recorded during a laboratory test carried out by a certifying authority, which in the UK is the Vehicle Certification Agency (VCA).

The latest version of Euro 6/VI also require the emission standards to be met under "real world driving" (RDE) conditions in an attempt to remove the discrepancy between lab-based test results and emission levels observed when vehicles entered service. Real-world driving emissions (RDE) of GHGs and air pollutants can be significantly higher than measured during the New European Driving Cycle (NEDC) laboratory test previously used in type-approval. Work by the International Council on Clean Transportation (ICCT) showed that RDE tests indicate that Euro 6 vehicles emit 4.5 times the NO_x limit on average²⁰, findings consistent with more recent work by the TRUE (The Real Urban Emissions) Initiative²¹. To address this, the NEDC is being phased out in favour of the longer and more rigorous World Harmonized

Light-vehicle Testing Procedure (WLTP). In parallel, RDE tests are being introduced making use of portable emissions measurement systems (PEMS). The RDE tests specify a "conformity factor," indicating the maximum degree by which laboratory emissions can be exceeded.

Since September 2017, type approval of new car models has required use of RDE tests and the WLTP driving cycle. These requirements will be extended to all new car registrations during 2018-2019. Furthermore, the conformity factor for NO_x in RDE test is due to be reduced from January 2020 onwards, from 2.1 to 1.5. This last change will occur after the UK leaves the EU and it is not certain whether this reduction in conformity factors will be implemented in the UK.

By controlling emissions from new vehicles entering the fleet, over time fleet turnover should cause a progressive improvement in average emissions. In addition, Euro standards can also be used as a convenient marker in local air pollution control measures (for example in the London low emissions zone), by which more polluting vehicles can be selectively excluded or charged.

GREENHOUSE GAS EMISSIONS

Unlike for air quality pollutants, there are no type-approval limits set on a per-vehicle basis for CO₂ emissions. In the UK, the two most important regulations affecting greenhouse gas emission from vehicles are the new passenger car and light-duty vehicle CO₂ regulation (EC 443/2009 and EC 510/2011 respectively), and the renewable transport fuel obligation (RTFO).

New passenger car and light-duty vehicle CO₂ regulation

The new passenger car and light-duty vehicle CO₂ regulations apply to the fleet-average emissions of new cars and vans sold in the European Economic Area. Each manufacturer is set a target maximum value for the average CO₂ emissions per km of new registrations, which depends on the share of different models sold into the fleet and their tested emission rates. The

current targets are set to decrease over time, by 27% from 2015 to 2020/21 (reducing from 130 to 95 gCO₂/km for cars and 175 to 147 gCO₂/km for vans), then by a further 30% by 2030. In the current regulation, low- and zero-emission vehicles are given extra weight in calculation of manufacturer averages, to encourage the development of these vehicles.

Individual EU member states do not have targets, so the effect of this regulation on UK CO₂ emissions depends on the range of vehicles offered by manufacturers and the consumer response to that offering. As with Euro standards, this regulation requires fleet-turnover to gradually improve the average CO₂ emissions of the entire vehicle fleet. Currently, there are no fleet-average regulations regarding CO₂ emissions from new heavy-duty vehicles, but such a regulation was been proposed by the European Commission in May 2018.

Renewable Transport Fuel Obligation

The RTFO requires transport fuel suppliers to ensure that a target proportion of the fuel they supply comes from renewable sources. Fuel feedstocks may include crops such as cereals, oil-seeds and oil-palm, or various types of waste (e.g. used cooking oil), the latter offering larger carbon savings and lower land use change impacts.

The RTFO has been one of the most effective contributors to reducing CO₂ emission from road vehicles, as it affects vehicles of all ages and body types. This is particularly important for heavy-duty vehicles, where the short-term opportunities for electrification are more limited. In 2017/18, 3% of transport fuel was from renewable sources²², but the UK Government is committed to increasing this share to 5.3% in 2020 and 6.7% in 2030⁸.



DRIVERS FOR FUTURE EMISSION REDUCTIONS

One of the defining characteristics of the entire Brexit process has been uncertainty, even at this late stage. However, there are some areas where the short term at least is clearer.

Firstly, legislation enacted by the UK Parliament will remain unchanged; the Climate Change Act 2008, which was not derived from EU legislation, will remain in place. With it will remain the overall target of achieving an 80% reduction in greenhouse gas emissions over 1990 levels by 2050 alongside all of the other elements, such as the Committee of Climate Change and the setting of 5-year national climate change budgets. This is also true of the Environment Act 1995 and its obligations both to set national air quality objectives and for local authorities to review, assess, and - where necessary - act on air quality in their area. Alongside legislation transposed into UK law by the European Union (Withdrawal) Act 2018 such as the RTFO, this should mean that the regulatory status quo largely remains. What is not clear is how fleet CO₂ emissions will be controlled in the UK if it remains outside the European Economic Area nor how failing to meet national commitments will be addressed. This latter question is part of the Government's consultation on environmental principles and governance, with the final position due to be set out in Draft legislation by the end of December.

The UK will also remain a signatory of key international agreements, such as the Paris Agreement on climate change emissions reductions and the UNECE Convention on Long Range Transboundary Air Pollution (CLRTAP) and its associated Protocols. The obligation on the UK to contribute towards international efforts on air pollution and climate will thus continue. However, by necessity such international agreement set the broad targets and not the detail of how they will be attained. There are also no hard enforcement procedures so if a country fails to meet its international obligations on national emissions, the impact is largely reputational and nothing more. The goals of the Paris Agreement and CLTRAP were given force in the EU through Directives translating them into EU law, enforceable through the European Court. In the event of Brexit, the UK will be leaving that jurisdiction.

Sitting in between these UK specific and international obligations is currently the body of legislation and regulation derived from EU Directives and other legislative instruments (regulations, implementing acts, reasoned decisions, etc). In reality, this makes up the largest body of legislation in the UK and, increasingly, environmental protection in the UK has mirrored that in other EU Member States. This has helped ensure a level playing field for the movement of goods and services across the Union but has also avoided a race to the bottom where states have degraded environmental protections to gain a perceived competitive advantage. The illustrative scenarios analysed later in this report will look at the potential outcomes should the UK decide to dismantle this body of regulation, develop and upgrade it alongside the EU, or push further and take up what could be described as a leadership role. However, it is useful to first look at the likely changes to emissions regulation based on current information and trends.



THE UK'S COMMITMENT TO REDUCING VEHICLE EMISSIONS

In its recent white paper *The Road to Zero*, the UK Department for Transport set out its strategy to improve local air quality, to meet its carbon reduction commitments according to the Climate Change Act, and to develop the consumer market and manufacturing base for zero-emissions vehicles in the UK^{viii}. Specifically, the Government has committed to a range of measures, including:

- Ending the sale of new petrol or diesel-only combustion engine vehicles by 2040
- Support the uptake of ULEV by means of:
 - grants, tax incentives and non-financial local incentives (e.g. free parking) to reduce the cost of ULEV purchase and ownership
 - improving guidance for dealers and consumers, to develop the second-hand market for ULEVs
- Maintaining support for charging infrastructure through a range of grants and regulations
- Investing in R&D to support the development of UK design and manufacturing, for example through the £246 million Faraday Battery Challenge
- As part of its support of local NO₂ plans, providing funding for retrofitting of older vehicles (buses in particular) with pollution control technology
- A commitment to reduce CO₂ emissions from existing vehicles by increasing the share of renewable fuels in transport

Where EU legislation will no longer apply to the UK after Brexit, the Government has committed to pursuing an approach “at least as ambitious as current arrangements.” While this statement is somewhat open to interpretation, in the case of targets for consumer uptake of ULEVs, the UK proposals appear more ambitious than EU regulation. By 2030, the UK Government is aiming for 50-70% of new cars to be ULEV by 2030, compared with the targets of 30% proposed by the EU for manufacturers’ fleets by 2030. However, it is also true to say that some other EU member states have more ambitious plans. For example, Germany has resolved to ban the sale of new cars with internal combustion engines by 2030, 10 years ahead of the UK. Norway, an EEA member, plans such a ban from 2025.

ATTRACTIVENESS AND AFFORDABILITY OF LOW EMISSION VEHICLES, AND CHANGES IN MOBILITY

Aside from government regulation and incentives, other factors will drive increased uptake of ULEVs: improvements in the manufacturing efficiency and performance of electric vehicles (particularly with regard to vehicle range and charging speed) and an increasing range of available models as the market matures. Currently, government plug-in grants aim to offset the high purchase price of electric and hybrid vehicles, primarily caused by the high cost of the battery. However, per unit of energy delivered, battery prices have fallen by almost 80% since 2010⁸, and are expected to continue to fall over near future. Eventually this could result in purchase price parity with conventional combustion engine vehicles – potentially by 2022 according to Green Alliance²³. But even before that point the total cost of ownership (TCO) for ULEVs will be lower due to lower running costs and likely increasing resale values as the second-hand market develops, whilst the attractiveness of diesel cars due to the many recent exposures on pollution and health impacts is clearly falling²⁴. Fleet owners are likely to focus less on purchase price and more on TCO than private consumers, so may take a lead in ULEV uptake.

Over the longer term, with the advent of car- and ride-sharing platforms and connected and autonomous vehicles, mobility-as-a-service models may begin to replace private vehicle ownership as the dominant road transport model. A consequence of this may be that the owners of fleets providing these services choose ULEVs preferentially due to their lower TCO, as well as reducing the demand for high-emitting vehicle segments such as SUVs which offer no practical advantage in most use cases.



POST-BREXIT SCENARIOS

In this section, the report looks at three post-Brexit scenarios which take all of this evidence into account and speculates on their impact on the UK road vehicle fleet and on the UK vehicle and parts manufacturing sector. These scenarios are illustrative and qualitative and cannot address all the potential nuances of the UK’s as yet undefined future relationship with the EU. Nevertheless, the analysis provides a broad indication of both the risks and opportunities offered by Brexit in terms of emissions control for the UK road transport sector. These three scenarios are:

- Strong deregulation
- Environmental compliance
- Leadership

SCENARIO 1: STRONG DEREGULATION

As has been set out above, the body of EU legislation applying to the UK before exit day will be transposed into UK law automatically. Moreover, the Government has given repeated commitments to maintain the highest environmental standards in the UK post-Brexit. However, a future Government, faced by difficult trading conditions, may take a strongly de-regulatory stance as a possible way of improving UK competitiveness. They may also not be convinced of the need for Government to intervene to protect the environment and may pursue a programme of deconstructing the EU derived regulatory regime. This would only apply to a situation where the UK is not tied to maintaining environmental standards to preserve the free movement of good and services, as is the case for EU and EEA members. It would be a stretch, even under a hypothetical scenario, for the UK to have no emissions control legislation – the consequences of uncontrolled vehicle emissions are apparent from cities all over the world and even the most short-sighted Government would not miss these examples – but the assumption is that any regulation is significantly weaker than that applying in the EU.

In fact, this would not necessarily require de-regulation but instead simply a freezing of the current regulations in the UK while those in the EU move on. Over time, a significant environmental protection gap would develop. In this case, the gap would take longer to appear and would thus be further into the future. The impact on emissions of improved full EVs, autonomous

vehicles, etc. over such a timescale is more difficult to gauge, in other words, how great the gap would be in practice between a more tightly regulated EU and the UK. It could also be assumed that civil society in the form of environmental NGOs would step in and seek to prevent such a gap forming. Client Earth’s actions in challenging the legality of the UK’s recent air quality plans might clearly be seen as a precedent. However, up to that point, the UK’s major environmental NGOs had not been especially active or vocal on air quality, despite deadlines for compliance with EU targets being missed and despite clear evidence (much of which was published by Government advisory groups such as COMEAP) of significant health impacts.

The UK market accounts for a significant proportion of new car sales in Europe and is therefore very attractive to vehicle manufacturers. However, the vehicle manufacturing sector is highly integrated across Europe. This is part of a global trend towards model streamlining and the ideal scenario for a vehicle manufacturer is a single, global regulatory regime, which would allow for a far more streamlined model range. In this way, a model sold in the USA would be exactly the same as a model sold on Europe or China, greatly reducing manufacturing costs. However, while there has been some convergence, there are significant differences between markets and so manufacturers will seek to maximise the coverage for a single model, reducing the variations which increase costs.

Thus, the cars currently sold in the UK are exactly the same as the equivalent model sold anywhere else in the EEA, aside from the driving position. But this latter point is a key one – if manufacturers are willing and able to make right hand drive cars for the UK market, could they produce models without the emissions control equipment fitted and, therefore, without the additional cost of that equipment? The answer lies in the degree to which emissions controls are integral to the operation of the vehicle. If, by removing emissions controls, engine software needs to be remapped and other components redesigned, that removal implies costs with no obvious benefit. Unlike changing the driving position, which is largely cosmetic and requires the same components, just in reverse, emissions control is an integral part of the engine management system. Its removal is likely to require significant work and cost and so it is unlikely that UK specific models will be produced.

Impact on the UK vehicle fleet

While individual models offered in the UK are unlikely to differ significantly from those in the EU, the range of models a manufacturer offers may change. Freed of manufacturer level obligations on CO₂ emissions, marketing strategies could shift towards higher emitting, larger engine vehicles. Certainly, in the absence of targets or uptake incentives for low emission vehicles in the UK, manufacturers may wish to withdraw such models from sale in the UK. Demand for such vehicles exceeds supply and, if sales in the UK do not count towards manufacturers' CO₂ targets and a removal of incentives suppresses demand, the offering may simply be withdrawn. This is the point made in Transport and Environment's Brexit and Cars report, which identifies a threat to the UK's ability to meet the commitments of its carbon budgeting process (which derives from wholly UK legislation, the Climate Change Act 2008). However, it is only likely to come about if targets and incentives are removed in the UK - if a market exists for larger, and therefore more polluting cars, the industry will try to supply it.

Impact on industry

If individual models do not vary between the UK and EU regardless of the regulatory environment in the UK, manufacturing could continue in the UK as before. However, the vehicle manufacturing sector is highly integrated and streamlined to reduce costs. Any additional cost resulting from manufacture in the UK as opposed to within an EU member state is likely

to result in either manufacturing or assembly being moved into the EU or parts being sourced from EU based suppliers. Such costs are likely to come from one of two sources: increased transport costs, including transport time, and increased unit price.

If the environmental standards in operation on the UK are significantly lower than those in effect in the EU, the free movement of goods between the UK and EU is unlikely to be possible (this point is one at the heart of the negotiations between the EU and UK over the final Brexit deal). The implication is some form of border check to ensure that components or vehicles crossing into the EU are compliant with EU law. This further implies increased time at border crossings and if some predictions are in any way accurate, very significantly increased time. Thus, transport costs will increase. Secondly, under a "no-deal Brexit" (which is becoming increasingly likely), WTO rules will come into effect and import tariffs may be required, increasing unit costs.

Conclusion

A significant reduction in emissions control regulation in the UK when compared to the EU post-Brexit may have a strongly negative impact on health, on the competitiveness of UK vehicle and parts manufacturing. In addition, if the demand for low emission vehicles falls in the UK in the absence of regulatory drivers, the position of the UK as a leading manufacturer of low emission vehicles will be placed in jeopardy.



SCENARIO 2: ENVIRONMENTAL COMPLIANCE

Under this scenario, the UK maintains parity with EU legislation, much in the same way that countries like Norway, Iceland and, to an extent, Switzerland already do, in order to facilitate free movement of good across borders and the avoidance of tariffs. While Norway and Iceland do not manufacture cars, they do supply raw materials and Switzerland has some important manufacturers in the HGV and off-road machinery sectors. This would mean that the UK could no longer enter into formal negotiations with the European Commission or other Member States about forthcoming regulation, nor participate in the EU legislative process. However, it could participate in the preparatory stages, helping to set the direction of legislation by contributing to discussions and to the development of the evidence base (as Norway does). This position has been recognised by the current Government.

In its white paper The Future Relationship Between the United Kingdom and the European Union²⁵, more usually referred to as the Chequers agreement, the Government recognises the need for frictionless trade in order to "protect the uniquely integrated supply chains and 'just-in-time' processes that have developed across the UK and the EU over the last 40 years, and will remain important given our geographical proximity, and the jobs and livelihoods dependent on them." To facilitate this, it proposes developing a common rule book with the EU for goods but only insofar as this is necessary for frictionless trade. This would include the environmental performance of goods and thus would include the emissions performance of vehicles produced in the UK. While there is some doubt as to whether the Government can achieve agreement with the European Union (or indeed within the UK) on the facilitated custom arrangement it proposes, the principle of using a common rulebook to facilitate frictionless trade has precedent. For the purpose of this scenario, it is assumed that some form of agreement is found which maintains UK emissions control at the same level as that in the EU and thus the free movement of goods is preserved.

Impact on the UK vehicle fleet

None. Models and fleet mix in the UK are likely to remain in step with those offered in the EU.

Impact on industry

Again, the impact is likely to be small, at least in the short term: that is ultimately the purpose of having

such an arrangement. However, the UK's inability to engage with the legislative process to which it is ultimately subject means that it cannot argue for the particular needs of UK based industry. In the past, the UK has achieved concessions or derogations to allow UK based industry more time to adapt to EU legislation, or at least has ensured that those needs are taken into account. It will no longer be able to do this other than through informal lobbying. This means that legislation is more likely to be tailored towards the needs of manufacturers primarily based within the EU, such as in France, Germany or Italy and thus placing UK based manufacturers at a disadvantage. However, it is not clear whether this would represent a significant worsening of the UK industry's position in the long term.

Conclusion

No significant initial change but the UK would have greatly diminished influence over future regulation, as it could only contribute to discussions prior to formal proposals from the European Commission, it would not be able to take part in the subsequent official negotiation, nor would it have a seat on the Council of Ministers.



SCENARIO 3: LEADERSHIP

As noted in the section Future Environmental Policy in the UK, above, the Government has repeatedly stated its desire for the UK to take a world leading position on environmental protection post-Brexit. The implication of that in terms of road transport emissions control is examined under this scenario: what are the opportunities for world leadership and what are the constraints? There are essentially three areas where the UK could work to attain a position as a ‘world leader’:

- Research and development of low emission vehicle technology, and its subsequent manufacture
- Uptake of low emission transport technologies by the public and businesses
- Environmental standards and regulation

The Road to Zero white paper sets out a series of measures which, it says, “will put the UK at the forefront of the design and manufacturing of zero emission vehicles.” However, the UK, is free to support and stimulate research and development on low emission vehicles both as a member of the EU and outside it. Brexit need not have an impact here and support of R&D is neither a cost nor a dividend of Brexit in this context²⁶. In the same vein, measures to incentivise the uptake of low emission vehicles neither require nor are necessarily hampered by Brexit. As a recent report for the European Environment Agency²⁷ showed, there exists a wide range of incentive programmes across the EU and EEA and a correspondingly wide range of uptake rates. The highest proportion of electric vehicles in the fleet of any developed nation is in Norway, where a huge incentive programme has massively increased EV uptake rates. But the incentives that Norway provides for EV uptake could also be provided by EU Members, should they so wish.

Post-Brexit, the UK may be freer to support and incentivise manufacturing in the UK, either through direct support or by charging for imported products. However, any action which is perceived to distort market conditions is likely to be swiftly met with reciprocal action by the EU. If the UK wishes to maintain frictionless trade with the EU, it will have to play by essentially the same trade and industrial support rules as EU Member States or, indeed, EEA members.

Thus, regulation may offer the most likely opportunity for the UK to adopt a “leadership” position. In addition to providing greater health protection for the UK population and furthering our global position as a positive actor on climate change, tighter regulation could potentially play a part in our industrial strategy, supporting and

incentivising the production of low emission vehicles in the UK and providing a market for them. As Michael Gove was recently quoted as saying of the Climate Change Act, “critics at the time argued that it could harm economic growth... what it has done is actually make the UK a leader in developing some renewable technologies.”²⁸

While the broad aim of being “world leading” on environmental protection has been repeatedly stated by the Government, this does not necessarily mean having the world’s tightest regulation. The current Government has strongly de-regulatory instincts and will always prefer market-based mechanisms if they are available. Moreover, a number of statements indicate a lack of appetite for tighter regulation. For example, the Road to Zero commits the UK to pursuing “a future approach [after Brexit] that is at least as ambitious as the current arrangements for vehicle emissions regulation.” This gives no commitments to meeting EU standards in the future if and when they become tighter. Likewise, the Brexit white paper proposes that “the UK and the EU should commit to the non-regression of environmental standards”, i.e. commit to not going backwards, which is not the same as committing to go forwards.

Under scenario 1, it was suggested that while the UK is an important market for vehicle manufacturers in Europe, it is not big enough to warrant the production of dedicated models should the UK’s environmental standard fall behind those of the EU. If the situation were reversed, i.e. if the UK had tighter standards than the EU, would the UK Government simply be restricting the availability of vehicles for the UK market, thereby increasing costs for consumers? As the example of California shows this may not necessarily be the case.

In the 1960s, permission was granted for Californian vehicle emissions standards to become more stringent than U.S. federal standards. Since the 1990s, 13 other states with similar air pollution issues have been allowed to follow the California standards. Historically, car manufacturers have produced so-called “50-state” vehicles which are compliant with California standards (and automatically the less stringent EPA ones), and “49-state” vehicles which are only compliant with federal standards. However, over time the federal standards for the main air pollutants have progressively converged on California standards, and from the 2016 model year have been the same.

From the perspective of the automotive industry, the anticipated future tightening of federal emissions standards to follow the California standards has been a major incentive for the development of “50-state” vehicles. The additional cost and effort to develop vehicles complying with California standards as well

as federal standards is comparatively small, given the benefits of increased market access; California alone accounted for 12% of U.S. light-duty vehicle sales in 2017, and together with the other 13 states account for around one-third of the U.S. market.

It is not entirely safe to take an example from one area and assume that it transposes perfectly into another; the parallels with the UK following Brexit are not exact. Nevertheless, the UK could introduce its own standards, e.g. a Euro 6 without the RDE conformity factors or an even tighter ‘UK 7’ standard. There is also the potential to introduce more intelligent regulation – the Euro Standards are a fairly blunt instrument and the wide range of performance against them shows that not all manufacturers are equally committed to meet them. The ‘one size fits all’ approach of the Euro Standards could be replaced by something which encourages faster progress. Regulatory innovation is equally possible for CO₂ emissions, once freed of the need to coordinate with 27 other countries, each with its own national interest. However, such an approach would need to be very carefully handled:

- Tighter standards in the UK could act as a barrier to trade and thus breach any frictionless trade agreement reached with the EU. It might be awkward for the EU to impose trade sanctions for a partner being more protective of the environment but there is clearly a risk.
- Manufacturers would strongly oppose the need to comply with multiple testing regimes. Testing to meet the current standards is not without costs and currently, vehicles or engines tested and passed in one EU state can be sold in all of them. In the USA, vehicles meeting the California standard automatically pass the federal standard and a similar arrangement would be needed in Europe, although this may be resisted by the EU.
- Meeting tighter standard requires a significant commitment in terms of research and development on the part of the manufacturers. Currently, R&D plans for most manufacturers are on providing ultra-low or zero emission vehicles over the medium to long term. Meeting a tighter interim standard may divert development efforts and effectively lock in internal combustion engines for longer than might otherwise be the case.

Impact on the UK vehicle fleet

Potentially positive, as cleaner vehicles are increasingly incentivised. However, the extent to which this reflects a “Brexit dividend” remains to be seen. However, the UK

does have a good track record in developing smarter regulation and so compliance costs could, potentially, be reduced although at this stage there is no indication of how that could be done. There is also the potential to incentivise, through regulation, the faster uptake of cleaner vehicles into the UK market. This would be beneficial for air quality (and thus public health) and climate change, although may result in some manufacturers being excluded from the UK market.

Impact on industry

Positive, although once again, many of the benefits could be achieved regardless of Brexit. Nevertheless, a well-designed programme of R&D and industrial support, incentives for low emission vehicle uptake and progressive regulation could act as a strong stimulus for UK manufacturing. Brexit allows greater latitude for the latter element. This assumes that frictionless trade can be maintained alongside such a strategy.

Conclusion

There are clear opportunities to take up a leadership position in terms of direct support for low emission vehicles (which could be seen as independent of Brexit) and in the strength, pace or form of regulation. It is difficult, at this stage, to predict the UK’s direction post Brexit given the mixed signals from different parts of Government but it seems likely that positive action in this area offers the best outcome for public health, the environment and industry.





CONCLUSIONS

Any analysis of what the post-Brexit landscape may look like in the UK, even at this late point in proceedings, is hampered by the continued uncertainty surrounding the outcome. The UK will be in the unprecedented position of leaving the most harmonised multinational free trade area the world has ever seen. What is clear is that the impacts of Brexit on the UK and the EU will take a long time to resolve.

The analysis presented in this report is, clearly, limited by these constraints. Nevertheless, some broad conclusions can be drawn:

1. Strong deregulation, or even a position where current standards do not develop further, is likely to result in harm to human health in the UK as a result of relatively worse air quality, a far lower chance of avoiding damaging climate change. It is also a severe threat to the UK based vehicle and parts manufacturing industry, currently worth £4.9bn to the UK economy. Regulatory inconsistency will remove the possibility of frictionless movement across the UK-EU border making UK products more expensive in a highly integrated and competitive market. It would have a negative effect on consumers and especially industry in the UK, as well as failing to meet commitments on environmental and human health protection, putting lives of the public at risk. The important role which the European court has played in enforcement would also no longer be available.
2. Simply following EU regulation to ensure harmonisation offers the opportunity to undertake frictionless trade with the EU, as the UK does now. However, there would appear to be little additional benefit (the so-called 'Brexit dividend') and the UK would have little or no influence over the development of such regulation. If such a course were pursued, the UK should develop and maintain the strongest possible links with the evidence and development processes which feed into EU regulation to ensure that its knowledge and circumstances are reflected in such regulation. This would help a little to mitigate - but not fully counter - the UK's loss of influence in transport emissions regulation.
3. A leadership position, in terms of the strength, pace or form of regulation, could result in the stimulation of low emission research and manufacturing in the UK, provide greater certainty for industry and help accelerate the pace of improvement within the EU. This would be in addition to greater public health and environmental benefits. There are opportunities to review the current regulatory regime, applying smarter regulation principles and, potentially, reducing costs, alongside

a well-designed strategy of stimulation for both the development and uptake of low emission vehicles. However, such a process would need to provide strong evidence that the levels of environmental protection are at least as strong as those currently in operation in the EU if a frictionless trade arrangement were to be established and maintained.

4. The UK should observe closely examples from around the world of where a leading position has been taken, such as in Norway on EVs and California on emissions control and seek to apply the lessons from those examples in the UK.
5. In order to maintain the assurances given by the Government to seek a world leading position on environmental protection, clear commitments should be transposed into UK legislation, following the example of the Climate Change Act 2008, to avoid future policy positions being reversed. Aside from the environmental benefits this offers, it would provide long term certainty for businesses in the UK to continue to research and develop low emission solutions thus maintaining the UK's high-class manufacturing base.

The UK leaving the EU represents a significant risk that the progress made to date in reducing GHG and air quality emissions from road transport could at least be stalled and, potentially, reversed. While this risk is not confined to the UK, it is greatest here in a post-Brexit environment. This risk would take some time to realise: a regulatory gap between the UK and EU would not appear in the days or even months after Brexit. Even a concerted deregulatory effort would take some time to organise and pass through the UK's Parliamentary system. Under a "marking time" approach, whereby controls are left in their current state, such a regulatory gap might take years to become apparent. However, unless the UK's regulatory regime is developed and updated, a gap will appear over time.

This is not an abstract issue: failure to continue those improvements risks the health of the public in the short term and increases the risk of damaging climate change in the longer term. Committing the UK to not just matching but surpassing the levels of control exercised in the EU would appear to offer the most beneficial outcome to Brexit, in terms of public and environmental health and in stimulating the UK research and manufacturing base to stealing a march on their competitors in the EU, while at the same time allowing the trade which ensures such businesses remain viable.

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