Department
for Transport

Green Paper on a New Road Vehicle CO_2 Emissions Regulatory Framework for the United Kingdom

CP 499

July 2021

Green Paper on a New Road Vehicle CO_2 Emissions Regulatory Framework for the United Kingdom

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by the Secretary of State for Transport
by Command of Her Majesty

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Contents

Ministerial Foreword

In November, Britain will welcome more than 200 world leaders to Glasgow for COP26 - the biggest and most important climate change event in our history. Our task is to unite the international community and agree urgent action to speed up decarbonisation. Progress since the Paris Agreement in 2015 has been too slow, and we need far more global ambition if we're to achieve the commitments made six years ago and tackle rising temperatures.

But we can be proud that, as COP26 hosts, this country will be able to demonstrate genuine environmental leadership. After becoming the first G7 nation to enshrine a net zero target in law, we have now set out plans to phase out fossil fuel use across road transport, with sales of new petrol and diesel cars and vans ending as early as 2030, and all new cars and vans being zero emission by 2035.

The measures outlined in this document will ensure we can meet this challenging deadline, by establishing a new regulatory framework that supports the needs of both UK consumers and the car industry. They will also ensure that vehicle manufacturers, servicing and repair outlets, and road infrastructure are all ready for 2030, so that the changes can be implemented as seamlessly as possible.

The government has committed £2.8bn to support this transition to clean vehicles. This includes up to £1bn to build an internationally competitive electric vehicle supply chain. Our Automotive Transformation Fund will provide the first £500m over the next four years, securing investments in strategic technologies including battery cell manufacturing, electric drives and motors, power electronics and fuel cells. In parallel, £1.3bn is being invested by government to accelerate the roll out of infrastructure, and more than £580m for consumer grants to boost market demand.

That market is already growing fast, not just here in the UK, but around the world. But we need to address barriers, including certainty of vehicle supply. Outside of the EU regulatory framework, we can now deliver certainty for industry and confidence for consumers making the switch.

Regulatory certainty will drive investment and ensure the 2030 and 2035 phase out deadlines are delivered. This Green Paper will create a clear and robust framework for road vehicles, allowing us to slash emissions in the short term, and then decarbonise road transport altogether, moving us a significant step closer to addressing global warming - the biggest threat facing humanity today.

1. Introduction

1.1 The UK is committed to reaching net zero carbon emissions by 2050, delivering significant and sustained emissions reductions along the way under our carbon budgets. Transport remains the highest carbon emitting sector of the UK economy, but our 'greenprint' for change - our world leading plan, Decarbonising Transport: A Better, Greener Britain (published alongside this document) presents a step change in our approach and a credible plan for all forms of transport, and the system as a whole to achieve net zero emissions by 2050.

1.2 Removing all tailpipe emissions from road vehicles is fundamental to decarbonising transport. In total, road vehicles are responsible for 91% of the UK's annual domestic transport CO_2 emissions. Cars and vans alone are responsible for 70% of that total.

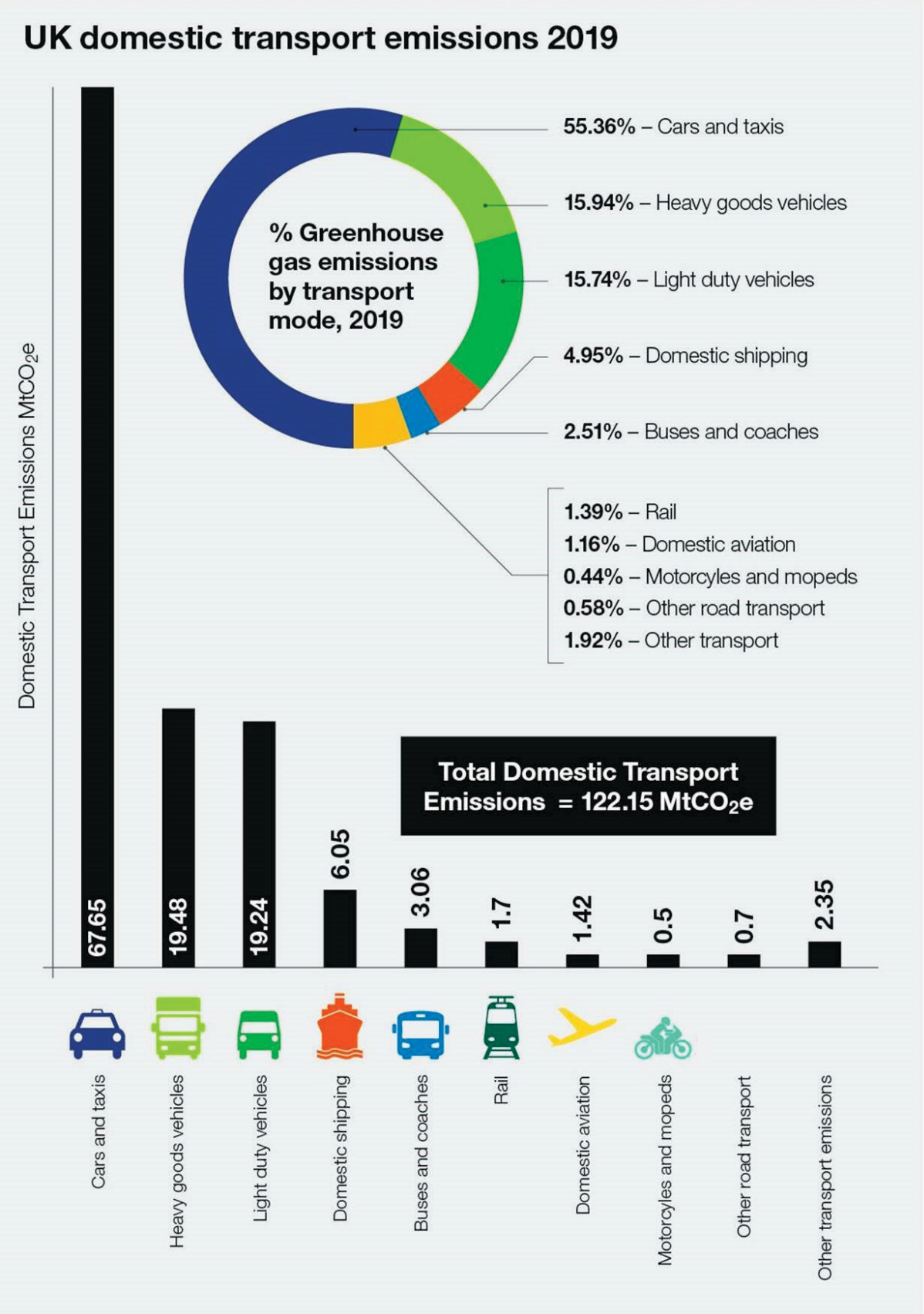

Figure 1 – UK Domestic Transport Emissions, 2019. Source – DfT Statistics

1.3 As announced in the Prime Minister's Ten Point Plan for a Green Industrial Revolution, from 2030 we will end the sale of new petrol and diesel cars and vans, 10 years earlier than previously planned, and from 2035 all new cars and vans must be zero emission at the tailpipe. Between 2030 and 2035, new cars and vans will only be able to be sold if they offer significant zero emission capability. Chapter 4 of this consultation considers how to define those vehicles. This approach provides consumers and our automotive sector the time and flexibility to make the transition to zero emissions.

1.4 In parallel to this consultation, we are consulting on the most appropriate date to end the sale of new non-zero emission heavy goods vehicles and have set out a credible and ambitious pathway to decarbonising the entire transport system, including road vehicles, in the Decarbonising Transport: A Better, Greener Britain plan.

Regulation fit for purpose and designed for UK needs

1.5 Until now, petrol and diesel car and van phase out dates have not been set in UK regulation as this was not possible under the conditions of membership of the EU. Prior to the UK withdrawing from the European Union, EU regulation had established CO_2 emissions targets for new cars, vans, and some heavy-duty vehicles (HDVs).

1.6 Following the end of the transition period, these targets were retained in UK law and now apply domestically. But, these legacy targets do not match our commitments and will not deliver on the 2030 commitment for cars and vans, the proposed phase out dates for the sale of new non-zero emission heavy goods vehicles (HGVs) and new non-zero emission buses, or capture other forms of road transport such as motorbikes.

1.7 Outside the EU, the UK is now free to set its own regulatory framework, one which is fit for purpose, drawing on the positive elements of similar schemes around the world, which have been proven to be effective, but tailored specifically to UK needs.

1.8 The future regulatory framework should have two overarching objectives. The framework must be aligned with the UK's world-leading ambition, allowing the 2030 and 2035 phase out dates to be enshrined in UK law whilst helping our automotive sector transition at pace, and allowing for phase out of other vehicles types to also be implemented, eventually allowing for decarbonisation of the entire road vehicle fleet.

1.9 The framework also needs to support carbon savings in the run up to 2030/35. The UK is required to meet legally binding carbon budgets, which place a cap on the total amount of greenhouse gases (GHGs) that the UK can emit over a five-year period.

1.10 The new regulatory framework must be able to deliver carbon savings from transport that provide significant contributions to meeting carbon budgets 4 (2023-2027), 5 (2028-2032) and 6 (2033-2037).

1.11 Over the coming months and years, we can create a single system that can apply to all road vehicles from motorcycles to the heaviest trucks, enshrining the phase out dates for the multiple vehicle types in UK law. This Green Paper sets out two options to achieve that:

- 'Tightening' the existing efficiency-based regulations, requiring the new vehicle fleet to become more efficient; and
- Deploying a Zero Emission Vehicle Mandate (ZEV Mandate) as recommended by the Climate Change Committee, alongside a CO_2 regulation.

1.12 In this document, we put forward the key aspects of regulatory design that need careful consideration, including, but not limited to, vehicle models in scope; whether derogations/small business provisions should be included; the levels of fines that could exist for failure to comply with the regime; and any review points.

1.13 This Green Paper consultation provides the opportunity for engagement and views on the overall new regime. This consultation marks the beginning of our engagement with stakeholders on this matter and will not consider the specific targets that should apply in the run up to 2030/2035. Subject to the decisions that will be made on wider considerations ahead of the new regime being deployed (see paragraph 5.50 onwards), different target levels may be required, and will therefore not be considered at this time.

1.14 Following the conclusion of this consultation, and publication of the government's response, we will bring forward specific proposals for the future regulation that is to apply to our new vehicle fleet. These will be the subject of future detailed consultations with all relevant stakeholders including industry, most likely starting in early 2022 with proposals for the regulation of new cars and vans.

1.15 This new regime will create regulatory certainty for the industry, driving UK investment in the low carbon technologies that will be needed in a global transition and helping to ensure the supply of vehicles needed to meet our commitments. The regime will be part of a wider policy framework that is critical to support its delivery.

2. The role of regulation

2.1 Climate change is the most pressing environmental challenge of our time. There is overwhelming scientific evidence that we need to take action and doing so is a clear priority for the government. Regulation has previously proved to be a necessary and effective lever in supporting industry to decarbonise, as shown by the success achieved by the current new car CO_2 regulations.

2.2 Outside the EU, the UK can, and will, go further in order to achieve more.

An Emissions Success Story so far – New Car CO_2 Regulations

2.3 Prior to 2009, no enforceable regulations of CO_2 emissions from cars or vans existed at either an EU or UK level.

2.4 In 1996, the European Commission published their first strategy on the reduction of CO_2 emissions from cars. As part of this strategy, the vehicle industry made a voluntary commitment to reduce CO_2 emissions to an average of 140g CO_2/km by 2008/2009, from a starting point of 186.4g CO_2/km.

2.5 As part of this commitment, the European Commission produced annual reports on the effectiveness of the strategy and voluntary commitment, with data being obtained through the European Automobile Manufacturers' Association (ACEA).

2.6 However, the voluntary agreement did not deliver the anticipated CO_2 savings. In order to meet the voluntary target, manufacturers were required to reduce average car emissions by roughly 2.3% per annum between 1995 and 2008/9.

2.7 By 2008, industry had delivered less than 1.5% per annum, missing the 140g target by nearly 14g CO_2/km[i]. As a result, the European Commission phased in mandatory targets, with the regulation being published in 2009, and being officially phased in from 2012. It applied to the entire new car fleet from 2015.

2.8 That legislation set CO_2 targets to apply from 2015 (130g CO_2/km) and 2020 (95g CO_2/km) on a fleet average basis. Manufacturers received individual targets based on a comparison of the weight of the vehicles that they sell - manufacturers registering heavier than average vehicles received targets above 130g, while those selling smaller/lighter vehicles received targets below 95g. The theory behind using

mass was that larger vehicle require more fuel to run, and therefore emit higher levels of CO_2.

2.9 Using a fleet average approach ensured that the regulation was technology neutral, as manufacturers were free to sell any vehicle they wished, provided the fleet averaged out, and allowed for the diversity of the EU vehicle fleet to be maintained. Significant fines applied to any manufacturer missing their individual target.

2.10 In 2020, as the significant reduction in the required CO_2 standard came into effect (from 130g CO_2/km to 95g CO_2/km), zero emission vehicles were introduced in the UK and EU markets in large numbers. The regulations enabled manufacturers to earn 'super' credits for zero emission vehicles to help them meet compliance targets for the tougher standards and avoid fines.

2.11 The regulations provided a clear direction to vehicle manufacturers on developing and bringing to market more efficient vehicles and incentivised them to deliver. They created a level playing field, with manufacturers all needing to adapt their plans to meet future regulatory requirements within the same time frame. Rather than being at a competitive disadvantage, the manufacturer who invested in cleaner, innovative technology positioned itself well to adapt to the future market, doing so in the knowledge that its competitors were needing to do the same.

2.12 The impact of these regulatory targets, and of the combined efforts of the automotive industry in meeting them, was striking.

2.13 While average car emissions dropped from 172.2g CO_2/km in 2000 to 153.6g in 2008 and 145.7g CO_2/km in 2009[ii] (a drop of 15.4% in 9 years), by 2015 (the first full year of the CO_2 regulations) average car emissions were 119.5g CO_2/km[iii], an 18% reduction in just 6 years, despite the already more efficient starting point.

2.14 However, due to the 5 year 'plateau' of the CO_2 target, rather than emissions steadily decreasing from 2015 towards the tougher 2020 target, average CO_2 emissions from new vehicles increased between 2016 and 2019[iv]. If a manufacturer hit their target in 2015, there was no incentive for them to improve their CO_2 emissions until the next target came into effect in 2020. Any CO_2 savings made by individual manufacturers during that period tended to be due to the development of incremental technologies, rather than wholesale shift to zero emission mobility.

2.15 Additionally, over that same time period, the gap between the lab-tested CO_2 emissions and real-world CO_2 emissions grew. Vehicles became more efficient at performing the CO_2 test procedure, leading to lower emissions on paper, without the same efficiency gains being reflected in real-world driving. Some vehicles were even capable of performing in different modes during the test procedure vs the real world, exacerbating the tested vs real-world emission gap.

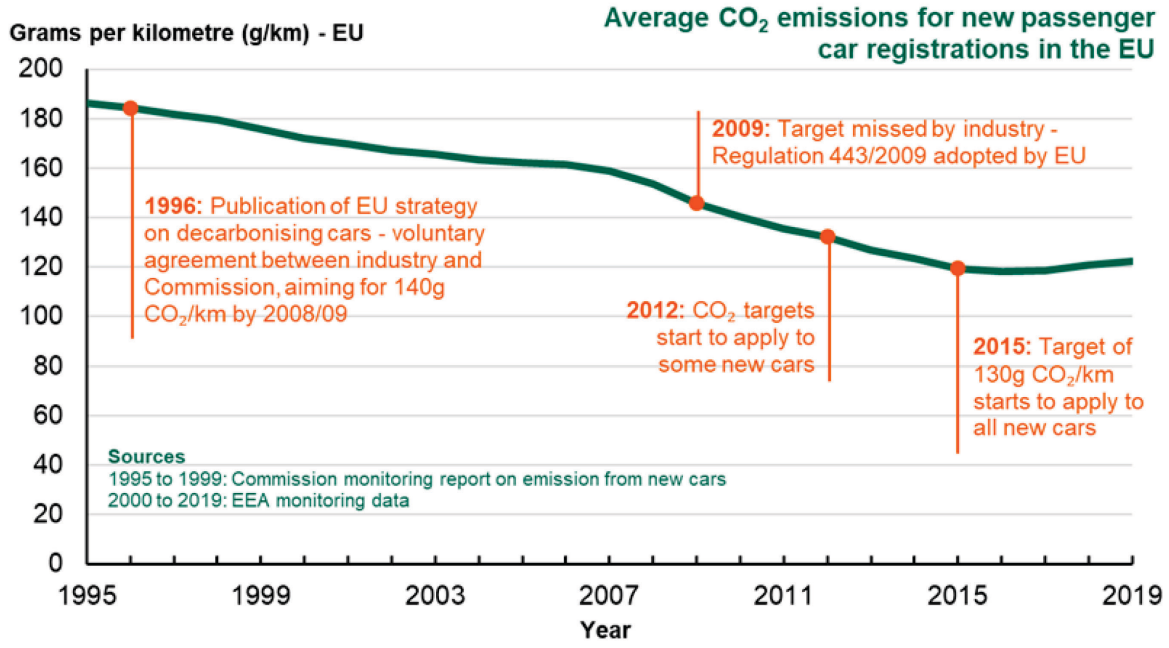

Figure 2 – EU Average Car CO_2, 1995-2019.

Going Further - Net Zero Emissions

2.16 Now that the UK has committed to phasing out new petrol and diesel cars and vans by 2030 and ensuring that all new cars and vans are zero emission at the tailpipe by 2035, regulation is required to set out a new, more ambitious pathway for delivering those commitments.

2.17 Establishing the pathway to 2035 will also be crucial in ensuring that the UK is able to meet its carbon reduction obligations under legally binding carbon budgets.

2.18 In sending the regulatory signal, manufacturers will be free to make the commercial decisions required to deliver on those commitments.

2.19 The automotive sector has already shown itself to be adept at rising to the challenge of decarbonisation within the correct regulatory framework: this new framework, alongside government support to decarbonise supply chains, will provide the right conditions to allow them to do this once again and deliver the commitment to decarbonise all new cars and vans by 2035.

3. Background and Current Regulation

3.1 Until 31 December 2020, vehicle CO_2 emissions regulation had been set at a European-wide level. Following the end of the transition period, these regulations were retained in UK law with minor technical adjustments. The headline targets, and their application, have so far been left unchanged in the domestic regulations.

3.2 This chapter explains our current regulatory regime and how the various regulations function; details the CO_2 savings that we expect to see as a result of current regulations; and highlights the gap between these savings and the UK's plans.

Cars and Vans

3.3 Since 2009, EU Regulations have established fleet-wide average CO_2 emissions targets that must be met by the entirety of the EU+Norway+Iceland new car fleet. Similar regulations were adopted for vans in 2011. Until the end of 2020, this included UK registered vehicles.

3.4 From 1 January 2021, following the end of the EU transition period, vehicles registered for use in Great Britain (GB) became subject to domestic fleet-wide CO_2 emissions targets that must be met by the entirety of the GB new car and new van fleet. Vehicles in Northern Ireland were due to continue to be subject to EU targets as a result of the Northern Ireland Protocol.

3.5 Following the removal of relevant provisions from the Northern Ireland Protocol last December, EU targets do not apply in Northern Ireland. New legislation will shortly apply the GB regime to vehicles in Northern Ireland.

3.6 In 2020, a fleet-wide average emissions target of 95g CO_2/km applied to the entirety of the EU/Iceland/Norway/UK new car fleet, down from 130g CO_2/km in 2019. For vans, the equivalent target was 147g CO_2/km, down from 175g CO_2/km in 2019.

3.7 The CO_2 values for each vehicle are taken from a lab-based test procedure that all new vehicles must undertake before they can be sold in the UK/EU. The original testing procedure has been replaced. The 95g and 147g targets are being converted, or 'translated', in 2021 into equivalent targets to reflect the new emissions test procedure.

3.8 Fleet-wide targets apply in future years, based on the new test procedure. By 2025, the new car and new van fleet will be required to reduce CO_2 emissions by an additional 15% compared to the 2021 baseline. By 2030, new cars will be required to reduce CO_2 emissions by 37.5%, and new vans by 31%, against the 2021 baseline. No additional targets or vehicle requirements currently apply beyond the 2030 targets.

3.9 Setting a fleet-wide, top-level target ensures that the vehicle fleet consistently reduces its CO_2 emissions over time, while also ensuring that the diversity of the fleet is maintained as no restrictions are placed on any individual vehicles.

3.10 Manufacturers receive individual targets, based on the weight of their fleet. Manufacturers registering heavier vehicles receive targets above the fleet-wide target; those with lighter vehicles receive lower targets. Fines apply for non-compliance with these individual targets.

3.11 A number of flexibilities apply with the legislation, including, but not limited to:

- Exemptions for certain vehicle types
- Derogations from the top-level CO_2 target for small and medium volume manufacturers;
- Super-credits for the most efficient vehicles;
- Pooling between manufacturers;
- Eco-Innovation credits for CO_2 reducing technologies.

3.12 Further information on exactly how the cars and vans regulation currently works can be found at Annex D, and at the Vehicle Certification Agency website (the enforcement authority for the domestic regulations).

Current CO_2 savings from cars and vans

3.13 As mentioned above, the UK has committed to phasing out new petrol and diesel cars and vans by 2030, with all new cars and vans being zero emission by 2035. The retained version of the EU regulations alone will not deliver this.

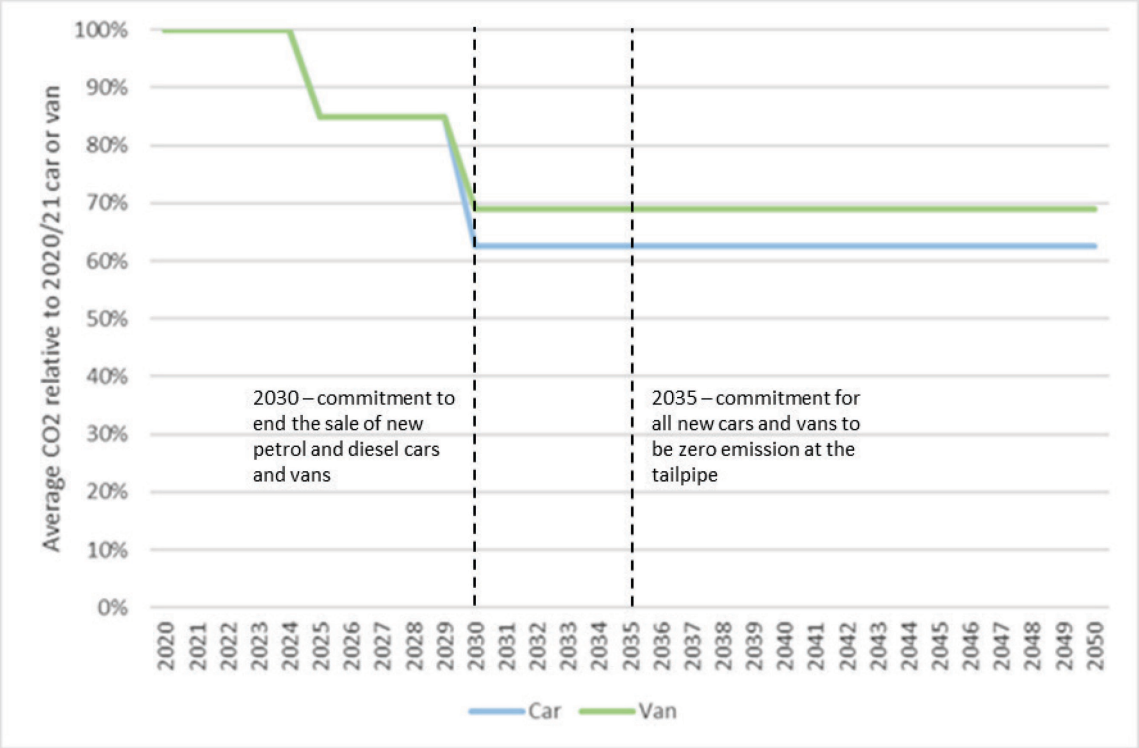

Figure 3 – Average new car and van CO_2 targets from retained EU regulation relative to 2020 baseline, set against UK phase out commitments for new cars and vans

Heavy Duty Vehicles

3.14 As with cars and vans, CO_2 targets for heavy duty vehicles adopted at EU level in 2019 were retained in UK law following the end of the transition period, and these same targets now apply to new heavy duty vehicles registered in the UK.

3.15 This is a relatively recent regulation and targets do not apply to the new vehicles yet. A 'baseline' was established based on vehicles registered in 2019-2020, also known as the 'reference CO_2 emissions'. CO_2 reduction targets of 15% by 2025, and 30% by 2030, against that reference data apply to manufacturers. No additional targets apply beyond the 30% reduction.

3.16 The UK left the EU partway through this 'baseline' reporting period and consulted in 2020 on whether to use EU values or UK values for the UK-specific reference CO_2 emissions. It was subsequently agreed that the baseline applying to vehicles registered in the UK will be the same baseline that is used in the EU.

3.17 This regulation only applies to certain categories of heavy-duty vehicles, collectively responsible for 65%-70% of all CO_2 emissions from new heavy-duty vehicles:

- Rigid lorries with an axle configuration of 4x2 and maximum laden mass >16t
- Rigid lorries with an axle configuration of 6x2
- Tractors with an axle configuration of 4x2 and maximum laden mass >16t
- Tractors with an axle configuration of 6x2

3.18 The regulation includes measures to extend the scope to cover all forms of heavy-duty vehicle in the future, as well as some flexibilities, including:

- CO_2 Credits and debits/'banking and borrowing'; and
- Zero and Low Emission Vehicle 'Factor' - target amendments reflecting deployment of the most efficient vehicles.

3.19 Further information on exactly how the HDV regulation currently works can be found at Annex D, and at the Vehicle Certification Agency website (the enforcement authority for the domestic regulations).

3.20 Heavy Duty Vehicles are an important segment of road transport, and it will be important they play their play part in meeting the decarbonisation challenge. The government will shortly be consulting on a phase out date for new non-zero emission HGVs - a subcategory of HDV.

Buses and Coaches

3.21 New buses and coaches in the UK are within scope of the new HDV CO_2 emissions regulation in the UK, but targets have not yet been defined or set.

3.22 As HDVs, new buses and coaches are still subject to stringent air quality standards which all vehicles must meet at an individual vehicle level, rather than a fleet-wide average level. These air quality standards have an indirect impact on CO_2 emissions, as some of the improvements made to vehicles to reduce particulate and pollutant emissions will also impact the vehicle's efficiency.

3.23 In the longer term we are committed to achieving a zero emission bus fleet. We will set a legal end date for the sale of new non-zero emission buses and an expectation for when the entire bus fleet will be zero emission.

3.24 The Confederation for Passenger Transport (the trade body for bus and coach operators) has also set a target in their recently published bus strategy for all newly purchased buses to be ultra-low or zero emission by 2025 (2023 in some urban areas).[v]

3.25 There have been multiple schemes to support the uptake of low/zero carbon buses, however to date there have been a minimal number of schemes for coaches. Therefore, no such target/commitment currently exists for coaches as it is anticipated that it will take longer for the coach sector to decarbonise than the bus sector.

L-Category vehicles (Motorbikes, Mopeds, Quad Bikes etc)

3.26 L-category vehicles are smaller vehicles that are used by no more than 2 people. These include mopeds, motorbikes (both with and without sidecars), quadbikes, and other small vehicles with 3 or 4 wheels.

3.27 There are currently no government targets regulating the CO_2 produced from L-category vehicles.

Total CO_2 savings from existing legislation

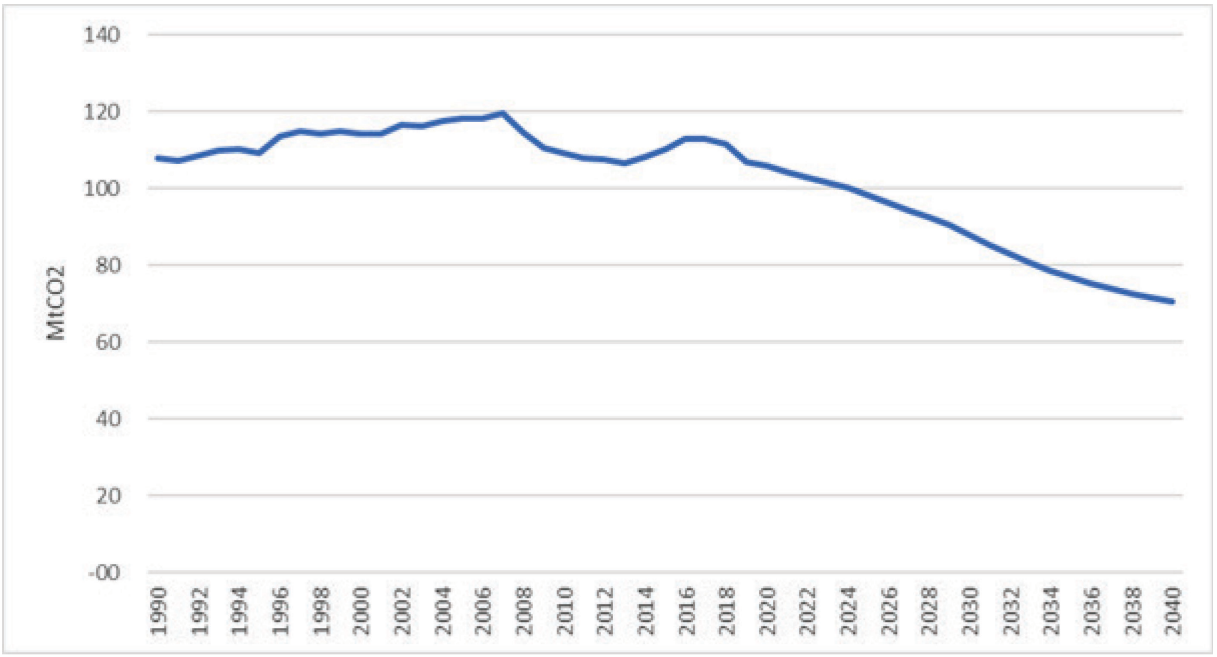

Figure 4 - Road transport CO_2 emissions from Energy and Emissions Projections 2019.

Regulation vs Commitments

3.28 As can be seen above, there is currently a disconnect between the legacy regulation that applies in the UK following our withdrawal from the European Union, and our overall transport decarbonisation commitments.

3.29 The UK has committed to phasing out new petrol and diesel cars and vans by 2030, and from 2035 all new cars and vans must be zero emission at the tailpipe. However, legacy regulation only requires a 37.5% CO_2 reduction for cars by 2030, and a 31% CO_2 reduction for vans.

3.30 On HDVs, legacy regulation requires a 30% CO_2 reduction for some sub-categories by 2030, however the regulation does not allow for a phase out of any type of HDV.

3.31 With buses, while we have committed to achieving a zero emission bus fleet in the long term, buses are unregulated in the retained EU regulation.

3.32 The legacy regulation therefore does not enforce our 2035 car and van decision, nor does it phase out new petrol and diesel cars and vans by 2030. It also does not enforce our decarbonisation commitments in other vehicle types. New regulations are therefore required in order to bring our plans into law.

3.33 The following sections will look at a number of key areas that need to be considered:

- Chapter 4 defines what is meant by 'significant zero emission capability';

- Chapter 5 sets out the regulatory frameworks that could be deployed in order to operationalise our car/van phase out dates, including asking questions on how wider considerations would apply under each option;
- Chapter 6 considers how these frameworks could be adapted in order to apply to all forms of road vehicle - HDVs, including HGVs, buses and coaches; and L-category vehicles such as motorcycles and mopeds.

4. Defining Significant Zero Emission Capability

Introduction

4.1 We have set out our intention to phase out the sale of new petrol and diesel cars and vans by 2030, and for all new cars and vans to be 100% zero emission at the tailpipe by 2035.

4.2 The trend towards more affordable and convenient zero emission driving will only improve over the next decade. However, transitionary technologies have an important role to play in reducing emissions in the coming years, and in supporting consumers and industry in making the switch to zero emission vehicles.

4.3 That is why the Prime Minister's Ten Point Plan announced that all new cars and vans that emit from the tailpipe will be '*required to have a significant zero emissions capability*' by 2030, which would include some plug-in and full hybrids. Definitions of the different types of hybrid vehicle technology are listed in Figure 1.

4.4 We are now consulting on how 'significant zero emission capability' should be defined. In establishing which vehicles will qualify, we are seeking definitions that deliver our climate change and air quality goals, and enable a smooth transition for industry and consumers. Where possible, we are also seeking definitions that can be easily implemented and understood, and that are based on existing and recorded characteristics of vehicles.

4.5 We are interested in responses covering the following themes: a metric or combination of metrics to measure zero emission capability; eligibility thresholds for the metric(s); other compliance considerations; and the impact on the environment, industry, and consumers.

4.6 This requirement for new cars and vans will apply for five years between 2030 and 2035. We acknowledge that this period is relatively short, and that vehicle manufacturers will also consider the requirements of other jurisdictions, particularly the European market.

Technology	Definition
Plug in hybrid electric vehicle (PHEV)	PHEVs have a battery that can be plugged in and recharged, and an electric motor to deliver continuous zero emission mileage, as well as a conventional petrol or diesel engine to power the vehicle.
Range extender electric vehicle (REEV)	REEVs are a form of PHEV permanently driven using a battery and electric motor, but also have a small auxiliary power unit. This is usually a petrol or diesel engine (but could be gas or hydrogen), that powers an electric generator to charge the battery or provide power to the motor.
Full hybrid electric vehicle (HEV)	HEVs are conventional petrol or diesel vehicles with an electric propulsion system. When battery charge and driving conditions allow, the engine can switch off, and the vehicle can be propelled by the electric motor alone. They cannot be plugged in to take power from an external source so are charged from braking or energy recovery on board.
Mild hybrid electric vehicle (MHEV)	MHEVs are conventional petrol or diesel vehicles with a small electric propulsion system that can provide greater fuel economy. They have electric motors that support the engine only during acceleration and cruising. They have no plug to take power from an external source.

Figure 5: Different types of hybrid technology and definitions:

Eligibility metric

4.7 Establishing an appropriate metric to measure zero emission capability is crucial to provide a clear and measurable definition for the automotive industry and consumers.

4.8 The extent of vehicle technologies on offer, their differing ability to reduce emissions and the innovative and changing nature of the market makes defining a single applicable metric challenging.

4.9 There are a number of options that could be used to define zero emission capability. The options we are considering include:

- **grammes of CO_2 per kilometre (gCO_2/km)** – this is the established metric for measuring emissions from vehicles. It does not directly demonstrate zero emission capability, but it is correlated.

- **continuous zero emission range** – this is measured as part of the current testing process for PHEVs and battery electric vehicles and demonstrates zero emission performance. It is also referred to as the 'all-electric range'. This metric would not be applicable to non-plug in hybrids which do not demonstrate a consistent continuous zero emission range.

- **percentage of journey time spent in zero emission mode** – this metric has been used in independent studies to demonstrate the zero emission capability of non-plug in hybrids. It is not an established metric and it is not measured as part of the current testing regime.

4.10 The currently accepted, validated, and legislated for method of calculating GHG emissions from vehicles in the UK is gCO_2/km based on the Worldwide Harmonised Light Vehicle Test Procedure (WLTP)[vi]. Therefore, we intend to use this as the main basis to define eligibility from 2030 to 2035.

4.11 However, we recognise a gCO_2/km metric does not directly demonstrate the zero emission capability of vehicles. Full hybrids can accommodate substantial driving time and even mileage in zero emissions mode. Meanwhile, plug-in hybrids can drive significant number of miles propelled solely by battery power when they have been charged, but their fuel consumption and CO_2 emissions can be much higher than type-approval values if they are not regularly charged.

4.12 Therefore, we are interested in gathering evidence on alternative metrics, in addition to gCO_2/km, in order to capture the zero emission capability of these vehicles. This could include whether a combination of metrics may be needed, or whether metrics should differ for different types of technology.

Q1 - What metric, or combination of metrics should be used to set eligibility for cars and vans between 2030 and 2035?

Eligibility threshold

4.13 The eligibility threshold for new cars and vans is the standard that new cars and vans will have to meet between 2030 and 2035. There are a number of options for setting this eligibility threshold.

4.14 The vehicles sold between 2030 to 2035 will form part of the car and van parc for many years. Therefore, in setting the threshold for 2030, we want to understand the scope for improvement by 2030 to ensure the threshold is futureproof.

4.15 The emissions profile of vehicles is inherently linked to the size of the vehicle, amongst other factors. On average, vans are larger and can have higher CO_2 emissions than passenger cars when in 'real world' use. We are interested in whether cars and vans should be treated differently when determining the eligibility threshold.

Q2 – For your chosen metric, what threshold should new cars and vans be required to meet from 2030?

Other compliance considerations

4.16 A number of factors influence the emissions performance of a vehicle. In addition to setting the significant zero emission capability, we are interested in other requirements that could reduce the disparity between official emissions figures and real world performance. This could include, for example, measures to encourage environmentally sustainable user behaviour or the role of auxiliary technology, such as geofencing or onboard fuel monitoring devices.

Q3 - What other requirements could be introduced, if any, to maximise zero emission capability?

Impact

4.17 We are interested in different impacts across industry and society of setting the significant zero emission capability requirement in addition to the phase out dates.

Q4 – What would the impact be on different sectors of industry and society in setting an SZEC requirement, using evidence where possible?

5. New Regulation for Cars and Vans

5.1 Now the UK has left the European Union, we can set our own regulatory framework for road vehicle emissions to deliver the CO_2 reductions required to meet the UK's net zero commitments.

5.2 More than 1 in 10 cars sold in 2020 and nearly 1 in 7 so far in 2021 came with a plug. There are now over 500,000 zero and ultra-low emission vehicles on UK roads. Our ultimate commitment is to see 100% of new car and van sales be ZEVs by 2035. The new framework will therefore need to be able to enforce this requirement, and to support the increase in ZEV uptake up to 2030/2035.

5.3 Two approaches to deliver the government's commitments are being considered:

- Option 1 - base future UK CO_2 emissions regulations on the current framework, with more ambitious efficiency targets; and
- Option 2 - introduce a UK zero emission vehicle (ZEV) mandate alongside CO_2 regulations.

5.4 The options for the new framework set out in this chapter relate to emissions from cars and vans. However, in order to meet the government's ambition to fully decarbonise the road transport sector, the framework that is ultimately deployed in the UK must also be extendable to other forms of road vehicles and this is considered in Chapter 6 of this document.

5.5 Implementing the new regulatory framework will principally be a devolved issue. All nations in the UK should benefit from the accelerated shift to zero emission vehicles. We will therefore be working with the devolved administrations, as this work moves forward, to put the necessary arrangements in place to enable this to happen in a way that works for them.

Option 1 - Increased CO_2 targets

5.6 The first option would involve building on the existing framework that we already have in the UK and aligning the targets with both our wider carbon reduction commitments and with the 2030/35 phase out dates.

5.7 This would replicate the current UK regime as described in section 2, but with CO_2 targets being 'turned up' to the extent that the targets would need to be set at 0g CO_2/km by 2035, ensuring that all new cars and vans are zero emission at the tailpipe by 2035.

5.8 While based on a 'g CO_2/km' metric, the practical impact is that as the overall target gets tougher and tougher, manufacturers would be required to meet their individual target through the sale of increasing numbers of zero emission vehicles.

5.9 Even the most efficient non-zero emission vehicles still emit some carbon dioxide. Therefore, when the target is lowered to a certain level, beneath the emissions levels of efficient vehicles, the only way to meet the target will be to increase the number of zero emissions vehicles being sold. These will be needed to balance the residual CO_2 emissions, and the lower the CO_2 target gets, the higher the proportion of ZEVs that will be needed.

Primary Powers available

5.10 The Climate Change Act 2008 allows the government to establish standards and targets in order to regulate pollution-causing activities. In this instance, the Act permits the government to establish emissions targets in order to regulate emissions of CO_2.

5.11 The Climate Change Act requires a trading element. This means that manufacturers can meet their CO_2 targets either directly - by ensuring that the average emissions from their newly registered vehicles are beneath their CO_2 target - or by purchasing excess emissions credits/permits from manufacturers that have overachieved against their target. As the Climate Change Act requires a trading element, alternative powers would be used to introduce a 0g CO_2/km target.

5.12 This trading element is similar to provisions under the existing CO_2 regime. Manufacturers are able to 'pool' together and, for the purposes of meeting a CO_2 target, be given one joint CO_2 target. This means that any underperformance by a manufacturer within the pool may be balanced by overperformance by another manufacturer within the same pool.

5.13 In effect, CO_2 'credits' are traded within pools from manufacturers who have overperformed against their own CO_2 target, to manufacturers who may have exceeded their target. The forming of the pool may or may not be supported by commercial agreements between the manufacturers.

Advantages of Option 1

5.14 Replicating the current regime as closely as possible, albeit with tougher targets, would provide a degree of continuity to manufacturers and the wider industry.

5.15 Additionally, as the bulk of the framework already exists in UK law, it could be implemented quickly. This would allow the UK government to set out a pathway to 2030/2035 at the earliest possible opportunity and provide the certainty to

manufacturers that would allow them to make investment decisions on vehicle models well in advance.

5.16 As this framework would be based on fleet-wide average targets, it would allow manufacturers a period of flexibility in the short term as the fleet transitions to zero emission. It also guarantees that the fleet reduces its CO_2 emissions as a whole and that carbon reduction targets are met.

5.17 Finally, as the targets would be based on the Worldwide harmonised Light vehicle Test Procedure (WLTP), which is the emissions test procedure that all new vehicles must undertake, it ensures that the targets are based on an internationally recognised emissions standard, and that the targets and performance are based on an objective measure.

Disadvantages or Risks

5.18 However, WLTP does have its own shortcomings. While WLTP figures are comparable from one vehicle to the next, as all new vehicle types undergo the same procedure, they are not representative of real-world emissions, which are typically higher than those measured in the tested environment.

5.19 As a result, it is possible that over time, vehicles could become more efficient at completing the test procedure, thereby lowering their official CO_2 value, without these CO_2 improvements being reflected in the real world. This would also lead to a distorted image of tested CO_2 performance vs actual CO_2 performance.

5.20 Another disadvantage is that, by having no reference to numbers of zero emission vehicles, it would provide lower assurance to support private sector investment in the wider zero emission vehicle eco-system, including by chargepoint providers and new entrant zero emission vehicle manufacturers.

5.21 A further disadvantage is that, by rewarding incremental improvements in petrol and diesel engine vehicles, this creates a risk that these come at the expense of faster development and deployment of zero emission vehicles.

Option 2 - Introduce a ZEV Mandate/sales target, alongside CO_2 regulations based on current framework

5.22 A second option is to introduce a zero emission vehicle mandate (ZEV mandate) setting targets requiring manufacturers' sales to meet a certain percentage of zero emission vehicles each year. Manufacturers could earn 'credits' for selling and registering qualifying vehicles and would be required to hold enough credits at the end of each calendar year to meet the target. For example, if the target was set at 20%, and a manufacturer sold 200,000 vehicles in a particular calendar year, they would be required to hold 40,000 credits at the end of the year.

5.23 While a ZEV mandate would guarantee a certain percentage of ZEVs or significant zero emission capable vehicles being sold, if implemented on its own it could have the unintended consequence of leaving a proportion of a manufacturer's fleet

effectively unregulated in CO_2 terms. Therefore, if introduced, a ZEV Mandate would need to be accompanied by a CO_2 regulatory framework to ensure a reduction in emissions in line with the UK's commitments.

Targets

5.24 Under option 2, manufacturer fleets would be set two targets per year. The first would be the sales target which would be a fixed percentage figure. This target would require manufacturers to hold a certain number of ZEV credits at the end of each calendar year, with the exact number required dependent on the total number of vehicles that they have sold. Alongside this target, manufacturers would also be required to meet a CO_2-based target as outlined in option 1.

5.25 This CO_2 target could be set in a number of ways. In terms of scope, it could either apply to the entirety of the manufacturer's fleet, including the portion of the fleet that has already been captured by the ZEV Mandate percentage target, or it could apply solely to the non-regulated portion of the fleet.

5.26 For example, if a ZEV Mandate target was set at 40% of the fleet, the CO_2-based target could apply to the other 60% of the fleet, or to 100% of the fleet, including the 40% ZEV fleet.

Credits

5.27 As discussed above, the credits that manufacturers would earn for registering certain vehicles could also be flexible in nature. The scheme could be designed in such a way that different vehicle types receive different levels of reward, and different levels of credit counting towards targets.

5.28 For example, while an internal combustion engine vehicle would receive 0 credits for being sold, and a zero emission vehicle could receive 1 credit, vehicles with some zero emission capability could receive anywhere between 0-1 credits subject to the specification of the vehicle.

5.29 Although the end goal for 2035 is total decarbonisation of new cars and vans, the government recognises that vehicles with significant zero emission capability will have a role to play in the run-up to 2035. Therefore, these vehicles could receive different levels of credit according to criteria such as the tested carbon emissions of the vehicle; the electric range of the vehicle, or the overall efficiency of either the battery installed in the vehicle, or the vehicle itself.

5.30 This will ensure that manufacturers can still receive an appropriate level of credit for vehicles that are not wholly zero emission, but that are cleaner than petrol and diesel cars and vans. Indeed, subject to policy goals, certain vehicles could also be 'over rewarded', and receive more than one credit for being sold.

5.31 'Supercredits' could be awarded to the cleanest vehicles being registered, particularly in earlier years. As an example, although a zero emission vehicle could receive 1 credit, a zero emission vehicle with a significantly longer zero emission range than

most, or that is significantly more efficient than most, could be rewarded with more than 1 credit. Minimum thresholds could be set that define the eligibility for supercredits.

Trading

5.32 As per option 1, this Option could be delivered under the primary powers set out in paragraph 5.10. Introducing a trading element would allow manufacturers that have not met their target through the sale of vehicles to 'buy' their way to the target, and would provide financial incentive to overachieve against targets. As the Climate Change Act requires a trading element, alternative powers would be used to introduce a 100% target.

Fines

5.33 Under both targets, any manufacturer that has not accumulated enough credits at the end of the calendar year, whether through earning credits via vehicle sales, or through the purchase of excess credits from others, would be required to pay a fine. The fine would be a fixed amount, multiplied by the number of credits still required.

5.34 As manufacturers effectively would have to buy additional credits or pay the fine if they do not have enough credits, the level of the fine effectively acts as a cap on the cost of credits that can be traded between manufacturers. If the cost of the credit rose above the level of the fine, manufacturers would instead choose to pay the fine.

Advantages

5.35 Moving to a ZEV mandate framework would guarantee the proportion of ZEVs being sold in the UK each year, increasing in line with our commitments and setting a clear pathway to the 2030 and 2035 phase out commitments.

5.36 As manufacturers would be required to hold a certain amount of credits at the end of each year, either by selling relevant vehicles or by buying credits from manufacturers that have overachieved against their target, it ensures that a certain number of ZEVs are deployed, rather than requiring a gradual reduction in CO_2 emissions/gradual improvement in efficiency.

5.37 The trading element ensures that the technological shift is performed in the most cost-efficient manner.

5.38 This means that the automotive market as a whole will deploy ZEVs in the most effective manner, as those manufacturers who can deploy ZEVs 'cheaply' will do so, while those for whom it is more difficult will purchase credits, until it becomes financially beneficial to move to ZEVs.

5.39 Pairing the sales target with an CO_2 -based target potentially offers a more complete approach by using both regulatory levers in tandem to drive change across the whole of the car and van market. Both types of target mentioned above also have separate benefits.

5.40 In order to ensure that the government's commitment to end the sale of new petrol and diesel cars and vans from 2030 could be enforced, an additional sales target could, hypothetically, also be deployed from 2030, requiring that 100% of all new vehicles sold meet the definition of 'significant zero emission capability'.

5.41 This will ensure that new petrol and diesel ICE vehicles cannot be sold (without a fine being levied) from 2030, while still allowing those vehicles that fall within the definition of 'significant zero emission capability' to continue to be sold.

5.42 Setting out clear numbers of ZEVs to be sold in the UK each year will deliver increased confidence to investors in the ZEV ecosystem. Having guaranteed numbers of ZEVs on the road will allow chargepoint operators to accelerate investment in the charge point network; it will allow energy companies to make the necessary improvements to the electric grid to allow for mass EV charging; and it will send a signal to encourage vehicle manufacturers to accelerate the shift to zero emission mobility. Altogether, a ZEV Mandate, coupled with EV ecosystem investment, has the potential to deliver significantly improved consumer choice and a better user experience.

5.43 Subject to the stringency of the CO_2 portion of the target, there are also separate considerations that could apply depending on whether the CO_2 target is of comparable stringency as the targets that already exist in the UK, or whether they are more ambitious. This is looked at in more detail in paragraph 5.51.

Disadvantages or Risks

5.44 Manufacturers will be required to essentially meet two separate targets under the regime, which could add additional burden and cost to compliance strategies and protocols, as well as to the design of the regime itself.

5.45 Establishing a secondary trading market for both ZEV Credits and CO_2 credits will also lead to additional administrative processes for manufacturer, so care would need to be taken to ensure that these do not impose unnecessary burdens.

5.46 Manufacturers will consider a range of factors as part of their plans to decarbonise their car and van ranges and invest in future technologies. Targets under an option combining CO_2 regulations with a ZEV mandate will need to be set in a way that facilitates a rapid transition whilst maintaining a robust supply of low and zero emission vehicles to the UK market.

Preferred option and Questions

5.47 Taking into account the considerations above, a ZEV Mandate, as recommended by the Climate Change Committee, combined with a CO_2 target is the government's preferred option.

5.48 Option 2 will allow the government to fully legislate for the phase out of new petrol and diesel cars and vans in 2030, and to legislate for all new cars and vans being zero emission at the tailpipe by 2035.

5.49 While both options would effectively regulate the CO_2 emissions from new vehicles, option 2 would also ensure that the deployment of new ZEVs could be guaranteed. A CO_2 target on its own does not guarantee that certain levels of ZEVs would be sold in the UK.

Questions on Possible Frameworks

Q5 - Do you have any comments regarding Option 1, to replicate the current regulatory framework, albeit with strengthened targets, to meet our wider carbon reduction targets and phase out dates?

Q6 - Do you have any comments regarding Option 2, to introduce a ZEV Mandate or sales target alongside a CO_2 regulation?

Q7 - Do you have any views on the government's initial preference for the regulatory approach set out in Option 2?

Q8 - Are there alternative approaches that could deliver on the government's carbon budget and 2030/2035 commitments?

Q9 - Do you have any views on how either, or both, of the options could be implemented?

Q10 - Do you have any further comments or evidence which could inform the development of the new framework?

Additional Issues for consideration

5.50 Within both potential frameworks, there are some key issues that need to be considered. This section sets these out and views and comments would be welcomed on all.

Stringency of the CO_2 Target

5.51 If combining a ZEV Mandate with a CO_2 regulation, the CO_2 aspect could be set in a number of ways. In one scenario, the CO_2 target could be set at a level that either mirrors, or is equivalent to, the CO_2 targets that are already in force in the UK.

5.52 This would prevent the emissions from vehicles that are not covered under the ZEV Mandate portion from rising but vehicles that still emit CO_2 emissions would not be required to reduce their emissions.

5.53 The focus in this scenario would be on increasing the number of ZEVs that are sold. Deploying such a target would mean that manufacturers will not be required to make incremental CO_2 improvements through the lifetime of the regulation. Instead, they would be able to focus all of their investment, research, and development on the shift to zero emission vehicles.

5.54 A second scenario would see the CO_2 target set at a level that requires continued CO_2 reductions alongside increased deployment of ZEVs. This would ensure that as the number of ZEVs being sold increases, the overall CO_2 emissions from new vehicles that are not ZEVs would also be required to fall - whether through efficiency improvements or changes to the vehicle types that are sold.

5.55 Requiring additional CO_2 reductions alongside increased ZEV deployment will provide the most certainty in terms of ensuring both ZEV deployment and CO_2 reductions from new vehicles, as both elements will be monitored and regulated by targets that become tougher over time.

5.56 However, as manufacturers would be required to reduce CO_2 emissions from their non-ZEV fleet, as well as deploy increasing numbers of ZEVs, it is possible that some investment that could have gone towards deploying ZEVs would instead be redirected toward incremental ICE improvements, or towards deploying different vehicle types that naturally have lower emissions.

Q11 - If deploying a combined ZEV Mandate and CO_2 regulatory framework, how should the CO_2 element be set?

Q12 - Should the focus be on delivering the largest possible CO_2 savings, or the quickest possible switch to zero emission mobility?

Q13 - How do we ensure that the target allows for sufficient supply of low and zero emission vehicles; supports investment in the UK; and delivers our carbon reduction commitments?

Derogations and Exemptions

5.57 Under the current UK regulations, a number of derogations exist both at manufacturer level and at individual vehicle level (see Annex D for further information).

5.58 At a manufacturer level, micro manufacturers (manufacturers registering <1,000 cars and vans per year) are classed as out of scope. Small volume and niche volume manufacturers (at EU level, these are manufacturers registering under 10,000 cars/22,000 vans or 300,000 cars per annum – at UK level a transitional approach is currently being used) do receive CO_2 targets but these are modified versions of the targets that major manufacturers receive.

5.59 At a vehicle level, there are currently exemptions for special purpose vehicles (such as wheelchair accessible vehicles, ambulances, and hearses) which are more challenging to decarbonise. Additional exemptions exist for emergency services vehicles and for military vehicles.

5.60 Going forward, we expect to consider a very limited range of derogations to the phase out dates for specialist vehicles, including military service and emergency vehicles, and for parts of the market which may need further time to transition, such as small volume manufacturers.

Q14 - Should the new regulatory framework include exemptions or modified targets for certain specialist vehicles and/or niche and small volume manufacturers?

Credit Levels

5.61 Within the framework, different amounts of credits could be awarded depending on the characteristics of the vehicle registered and on the criteria that the vehicles are required to meet.

5.62 As highlighted earlier, vehicles with significant zero emission capability (SZEC) will play an important role in the run up to 2035.

Q15 - Should credits be awarded to vehicles that meet the SZEC definition?

Q16 - If so, should this be a fixed number of credits, or should there be a sliding scale that recognises the difference in CO_2 efficiency of various SZEC-compliant vehicles?

Credit banking and trading

5.63 Under both a ZEV Mandate regulation and a CO_2-based regulation, it could be possible to offer manufacturers the ability to build up credits and debits that could subsequently be used to offset performance in future years.

Q17 - Should this be considered within the new framework?

Q18 - If so, over what timeframe should they remain usable and should credits and debits be treated the same or differently?

Q19 - Within the trading element of the new scheme, should there be limits on the number of certificates/grams of CO_2 that can be bought or sold?

Q20 - Should such a market cover the whole of road transport or should there be some constraints imposed on trading across manufacturing sectors (e.g. cars and Heavy Duty Vehicles)?

Levels of fines for non-compliance

5.64 Fines under the current car and van CO_2 regulatory regime are set at £86 x the grams of exceedance x the number of vehicles sold in that year. For HDVs, fines are set at £3830/gCO_2 /tkm x excess CO_2 emissions, rising to £6130/gCO_2 /tkm x excess CO_2 emissions in 2030.

5.65 Under a ZEV Mandate scheme, any fine would effectively act as a ‘cap’ for the price of the certificates that could be traded by manufacturers.

Q21 - How, and at what level, should fines be set in the new UK regulatory framework and should this vary for different vehicle types?

Target setting process

5.66 In the future UK regulatory regime, we have the opportunity to determine how far ahead we set the targets, the lead in time for any change in targets and whether the option to amend targets at shorter notice is required. We would welcome views on each of these.

Real-World Emissions

5.67 In the UK, from 1 January 2021 it has been a legal requirement to capture and store real-world emissions data from new vehicles. Specifically, the on-board fuel consumption monitor must now store information relating to the fuel or energy consumption of the vehicle; the miles driven by the vehicle; and in the case of hybrids the miles driven in either zero emission mode or ICE-mode.

5.68 Under current regulations, this data can then be used to monitor the representativeness of CO_2 emissions values, and the government is required to consider whether the CO_2 targets may be adjusted to reflect any changes to difference between tested and real-world CO_2 emissions.

Q22 - Would there be benefits in seeking to ensure any CO_2 targets in the new UK regulatory framework take into account real-world emissions data alongside the lab-tested WLTP CO_2 emissions figures? If so, how might the two be linked?

6. Extending the framework to all road vehicles

6.1 In order to meet the government's ambition to fully decarbonise the road transport sector, the regulatory framework that is deployed for cars and vans in the UK must also be extendable to other forms of road vehicles in due course, including heavy duty vehicles, such as HGVs, buses, and coaches, and L-category vehicles such as motorbikes, mopeds etc.

6.2 The following sections will look at each vehicle type in more detail; how each of the options could be applied; specific issues that exist and additional considerations that need to be considered.

Heavy Duty Vehicles

6.3 'Heavy Duty Vehicles' (HDVs) is a term for all vehicles weighing more than 3.5 tonnes. Vehicles falling under this category include, but are not limited to, Heavy Goods Vehicles (HGVs); buses; coaches; vocational vehicles, such as refuse trucks; and some agricultural vehicles.

6.4 The Department has published a consultation alongside this one on a phase out date for the sale of new non-zero emission HGVs. While that consultation only applies to HGVs, we would ultimately wish to ensure a regulatory framework was in place for the wider HDV market.

6.5 The government is also developing a consultation on a date for ending the sale of new non-zero emission buses. That consultation will include a call for evidence on phasing out non-zero emission coaches

6.6 The government considers that both options listed above could be adapted to regulate new HDVs in the UK. A CO_2-based framework already exists and targets within that could be toughened to align with any phase out dates. A ZEV mandate/sales target could be applied and would allow HDV manufacturers to earn tradable credits for the sale of vehicles that meet pre-determined criteria - for example having a particular zero emission range; the vehicle having CO_2 emissions below a certain target; and, when taking into account phase out dates, requiring all

relevant HDVs to be zero emission by a particular date by setting the target at 100% by that same date.

6.7 However, there are additional considerations that must be taken into account in extending either of the two options to all new HDVs.

6.8 One of the primary issues, particularly for a CO_2-based regulation, is that not all HDV types currently have a CO_2 emissions test procedure.

6.9 The existing CO_2 regulations in the UK only apply to those sub-categories of HDV (see Annex D) which are currently covered by the standardised HDV emissions test procedure known as VECTO. Extending a CO_2-based regulation to all new HDVs would therefore also require the extension of VECTO (or another standardised CO_2 test procedure) to the remaining sub-categories of HDV.

6.10 While a ZEV Mandate could be introduced, as zero emission vehicles can be identified by looking at the drive train that they use (i.e. electric or hydrogen rather than diesel/petrol/hybrid), a sales target could not yet be introduced based on CO_2 emissions.

6.11 The alternative would be to regulate specific CO_2 emissions only from those sub-categories that have a standardised CO_2 test, or to adapt a ZEV Mandate/sales target which uses a monitoring metric based on non-fossil fuel/non-diesel drive trains.

Q23 - For vehicle sub-categories that are not yet covered by VECTO, could a ZEV Mandate/sales target be extended before VECTO is adapted?

Q24 - Would there be any unintended consequences of establishing a ZEV Mandate for certain vehicle sub-categories before a CO_2-based regulation?

Q25 – Do you have any views on imposing a CO_2 regulation on vehicle types that are not yet covered by a CO_2 test procedure, or existing regulation, particularly in light of the planned future phase out consultation for new non-zero emission buses?

L-Category vehicles (Motorbikes, Mopeds, Quad Bikes etc)

6.12 Although this sector accounts for less than 1% of CO_2 emissions from road transport, the government's intent is to achieve zero CO_2 emissions, and we have committed to consulting on a future phase out date for the sale of new non-zero emission two and three wheelers, and other L-category vehicles.

6.13 Subject to the final agreed phase out date, a ZEV Mandate could be introduced for L-category vehicles, setting a 100% zero emission target in line with agreed date.

6.14 While new L-category vehicles are not currently subject to CO_2 emissions regulation, some are subject to a CO_2 test procedure, known as the World Motorcycle Test Cycle, and therefore CO_2 targets could also be developed.

Q26 - Should the preferred regulatory approach be extended to all L-category vehicles or should the diversity of the sector (motorbikes, mopeds, motorised tricycles, quadbikes, motorised quadricycles etc) necessitate different approaches?

Other vehicle types

6.15 Not all road transport vehicles fall into the above categories. Vehicle types such as off-road vehicles contribute toward CO_2 emissions from transport but are currently unregulated.

6.16 We expect that these vehicle types will need to be looked at individually, with decisions on whether, and how, to regulate CO_2 emissions taken on a case-by-case basis.

Additional issues for consideration

6.17 As the regulations develop, all potential aspects listed in chapter 5 will need to be considered for each vehicle type. Therefore, we would welcome any additional views on the application of the variables mentioned from paragraph 5.50 onwards, in respect of new HDVs (including the adaptations that should be made for different HDV types) and L-category vehicles.

Next Steps

This Green Paper, alongside the Decarbonising Transport: A Better, Greener Britain plan, marks the beginning of a process which will allow us to fully decarbonise our new vehicle fleet. It provides the opportunity for engagement and views on the overall regime.

A summary of responses to this consultation will be published within three months of the closing date on www.gov.uk. Paper copies will be available on request.

Following the conclusion of the consultation, and the publication of the government's response, we will bring forward specific proposals for the future regulation that is to apply to our new vehicle fleet. These will be the subject of future detailed consultations, most likely starting in early 2022 with proposals for the regulation of new cars and vans.

If you have any questions about this consultation, or on the next steps, please contact:

CO2RegulationGP@dft.gov.uk.

Due to remote working, we strongly encourage any questions to be sent by email. If you do not have access to email, we would invite you to please ask us any questions by asking someone to email on your behalf.

If none of the above is possible, then we invite you to send written questions to:

CO2 Regulation Green Paper consultation
Great Minister House
33 Horseferry Road
London
SW1P 4DR

Further background information can be found at www.gov.uk.

How to respond

The consultation period began on 14 July 2021 and will run until 22 September 2021. Please ensure that your response reaches us before the closing date. If you would like further copies of this consultation document, it can be found at https://www.gov.uk/dft#consultations or you can contact CO2 RegulationGP@dft.gov.uk if you need alternative formats (Braille, audio CD, etc.).

Please send consultation responses to:

CO2RegulationGP@dft.gov.uk

Due to remote working, we strongly encourage responses by email. If you are unable to respond by email, we would invite you to please let us know by asking someone to email on your behalf.

If none of the above is possible, then we invite you to send written responses to:

CO2 Regulation Green Paper consultation
Great Minister House
33 Horseferry Road
London
SW1P 4DR

When responding, please state whether you are responding as an individual or representing the views of an organisation. If responding on behalf of a larger organisation, please make it clear who the organisation represents and, where applicable, how the views of members were assembled.

Freedom of Information

Information provided in response to this consultation, including personal information, may be subject to publication or disclosure in accordance with the Freedom of Information Act 2000 (FOIA) or the Environmental Information Regulations 2004.

If you want information that you provide to be treated as confidential, please be aware that, under the FOIA, there is a statutory Code of Practice with which public authorities must comply and which deals, amongst other things, with obligations of confidence.

In view of this it would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information, we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding on the Department.

The Department will process your personal data in accordance with the Data Protection Act (DPA) and in the majority of circumstances this will mean that your personal data will not be disclosed to third parties.

Confidentiality and data protection

The Department for Transport (DfT) is carrying out this Green Paper consultation to engage and gather views and evidence on a New Road Vehicle CO_2 Emissions Regulatory Framework for the United Kingdom. This consultation and the processing of personal data that it entails is necessary for the exercise of our functions as a government department. If your answers contain any information that allows you to be identified, DfT will, under data protection law, be the Controller for this information.

As part of this consultation we're asking for your name, email address and organisation. This is in case we need to ask you follow-up questions about any of your responses. You do not have to give us this personal information. If you do provide it, we will use it only for the purpose of asking follow-up questions. We will not use your name or other personal details that could identify you when we report the results of the consultation.

DfT's privacy policy has more information about your rights in relation to your personal data, how to complain and how to contact the Data Protection Officer.

Your information will be kept securely on a secure IT system within DfT and destroyed within 12 months after the consultation has been completed.

Annex A: Full list of consultation questions

Significant Zero Emission Capability

Q1 - What metric, or combination of metrics should be used to set eligibility for cars and vans between 2030 and 2035?

Q2 – For your chosen metric, what threshold should new cars and vans be required to meet from 2030?

Q3 - What other requirements could be introduced, if any, to maximise zero emission capability?

Q4 – What would the impact be on different sectors of industry and society in setting an SZEC requirement, using evidence where possible?

Possible Future Frameworks

Q5 - Do you have any comments regarding Option 1, to replicate the current regulatory framework, albeit with strengthened targets, to meet our wider carbon reduction targets and phase out dates?

Q6 - Do you have any comments regarding Option 2, to introduce a ZEV Mandate or sales target alongside a CO_2 regulation?

Q7 - Do you have any views on the government's initial preference for the regulatory approach set out in Option 2?

Q8 - Are there alternative approaches that could deliver on the government's carbon budget and 2030/2035 commitments?

Q9 - Do you have any views on how either, or both, of the options could be implemented?

Q10 - Do you have any further comments or evidence which could inform the development of the new framework?

Additional Issues for Consideration

Stringency of CO_2 Target

Q11 - If deploying a combined ZEV Mandate and CO_2 regulatory framework, how should the CO_2 element be set?

Q12 - Should the focus be on delivering the largest possible CO_2 savings, or the quickest possible switch to zero emission mobility?

Q13 - How do we ensure that the target allows for sufficient supply of low and zero emission vehicles; supports investment in the UK; and delivers our carbon reduction commitments?

Derogations and Exemptions

Q14 - Should the new regulatory framework include exemptions or modified targets for certain specialist vehicles and/or niche and small volume manufacturers?

Credit Levels

Q15 - Should credits be awarded to vehicles that meet the SZEC definition?

Q16 - If so, should this be a fixed number of credits, or should there be a sliding scale that recognises the difference in CO_2 efficiency of various SZEC-compliant vehicles?

Credit banking and trading

Q17 - Should this be considered within the new framework?

Q18 - If so, over what timeframe should they remain usable and should credits and debits be treated the same or differently?

Q19 - Within the trading element of the new scheme, should there be limits on the number of certificates/grams of CO_2 that can be bought or sold?

Q20 - Should such a market cover the whole of road transport or should there be some constraints imposed on trading across manufacturing sectors (e.g. cars and Heavy Duty Vehicles)?

Levels of fines for non-compliance

Q21 - How, and at what level, should fines be set in the new UK regulatory framework and should this vary for different vehicle types?

Target setting process

In the future UK regulatory regime, we have the opportunity to determine how far ahead we set the targets, the lead in time for any change in targets and whether the option to amend targets at shorter notice is required. We would welcome views on each of these.

Real-World Emissions

Q22 - Would there be benefits in seeking to ensure any CO_2 targets in the new UK regulatory framework take into account real-world emissions data alongside the lab-tested WLTP CO_2 emissions figures? If so, how might the two be linked?

Extending the Framework to All Road Vehicles

Heavy Duty Vehicles

Q23 - For vehicle sub-categories that are not yet covered by VECTO, could a ZEV Mandate/sales target be extended before VECTO is adapted?

Q24 - Would there be any unintended consequences of establishing a ZEV Mandate for certain vehicle sub-categories before a CO_2-based regulation?

Q25 – Do you have any views on imposing a CO_2 regulation on vehicle types that are not yet covered by a CO_2 test procedure, or existing regulation, particularly in light of the planned future phase out consultation for new non-zero emission buses?

L-Category vehicles (Motorbikes, Mopeds, Quad Bikes etc)

Q26 - Should the preferred regulatory approach be extended to all L-category vehicles or should the diversity of the sector (motorbikes, mopeds, motorised tricycles, quadbikes, motorised quadricycles etc) necessitate different approaches?

Additional issues for consideration

As the regulations develop, all potential aspects listed in chapter 5 will need to be considered for each vehicle type. Therefore, we would welcome any additional views on the application of the variables mentioned from paragraph 5.50 onwards, in respect of new HDVs (including the adaptations that should be made for different HDV types) and L-category vehicles.

Annex B: Consultation principles

The consultation is being conducted in line with the government's key consultation principles which are listed below. Further information is available at https://www.gov.uk/government/publications/consultation-principles-guidance

If you have any comments about the consultation process, please contact:

Consultation Co-ordinator
Department for Transport
Zone 1/29 Great Minster House
London SW1P 4DR
Email consultation@dft.gsi.gov.uk

Annex C: Glossary of Terms

GHG - Greenhouse Gas - a collective term for a number of gases that contribute toward climate change. Example gases include carbon dioxide (CO_2) and methane.

HDV - Heavy Duty Vehicle - any road-based vehicle weighing >3.5T (or >4T if using an electric/hydrogen drive train). Includes HGVs, buses, coaches, vocational vehicles such as refuse trucks etc.

HEV - Full Hybrid Electric Vehicle - HEVs are conventional petrol or diesel vehicles with an electric propulsion system. When battery charge and driving conditions allow, the engine can switch off, and the vehicle can be propelled by the electric motor alone. They cannot be plugged in to take power from an external source so are charged from braking or energy recovery on board.

HGV - Heavy Goods Vehicle - road based vehicles weighing >3.5T (or >4T if using an electric/hydrogen drive train), designed for the movement of goods/products.

ICE - Internal Combustion Engine - an engine that uses fossil fuels (petrol/diesel) in order to propel the vehicle.

LPG - Liquefied Petroleum Gas - generally a by-product of refining crude oil, it is a gaseous fuel that can be used in a range of applications, including in vehicles. Obtained primarily as propane, butane, or a mixture of the two.

MHEV - Mild Hybrid Electric Vehicle - MHEVs are conventional petrol or diesel vehicles with a small electric propulsion system that can provide greater fuel economy. They have electric motors that support the engine only during acceleration and cruising. They have no plug to take power from an external source.

PHEV - Plug-in Hybrid Electric Vehicle - PHEVs have a battery that can be plugged in and recharged, and an electric motor to deliver continuous zero emission mileage, as well as a conventional petrol or diesel engine to power the vehicle.

REEV - Range Extended Electric Vehicle - REEVs are a form of PHEV permanently driven using a battery and electric motor, but also have a small auxiliary power unit. This is usually a petrol or diesel engine (but could be gas or hydrogen), that powers an electric generator to charge the battery or provide power to the motor.

SZEC - Significant Zero Emission Capability - cars and vans that can be sold between 2030 and 2035 are required to have significant zero emission capability. Defining this term is the subject of chapter 4.

ZEV - Zero Emission Vehicle - a vehicle that is produces zero GHG emissions through its use i.e. that runs either on electric energy, hydrogen, or any other energy source that produces zero GHG emissions.

Annex D: Current Vehicle CO_2 Regulation in the UK

Cars and Vans

Overall Fleet Targets

D.1 As mentioned in chapter 2, a fleet wide target applies to the entirety of the new vehicle fleet.

D.2 In 2020, a fleet-wide average emissions target of 95g CO_2/km applied to the entirety of the EU + UK new car fleet, down from 130g CO_2/km in 2019. For vans, the equivalent target was 147g CO_2/km, down from 175g CO_2/km in 2019.

D.3 These 95g & 147g targets are being converted, or 'translated', this year into targets of comparable toughness to reflect a new emissions test procedure.

D.4 Additional fleet-wide targets apply in future years. By 2025, the new car and new van fleet will be required to reduce CO_2 emissions by any additional 15% compared to the 2021 baseline. By 2030, new cars will be required to reduce CO_2 emissions by 37.5%, and new vans by 31%, against the 2021 baseline.

Individual Manufacturer Targets

D.5 While a fleet-wide target establishes the emissions trajectory of the entire fleet, individual manufacturers receive targets based on the mass of the new vehicles that they have sold.

D.6 In theory, heavier vehicles emit more CO_2 as they require more energy to move the vehicle. Therefore, the regulation compares the average mass of a manufacturer's new vehicle fleet against the average mass of all vehicles sold in that particular calendar year. Manufacturers with heavier than average fleets receive CO_2 targets above the 95g/147g target, while those with lighter than average fleets receive targets below 95g/147g.

D.7 All of these individual manufacturer targets, when averaged out, equate to either the 95g or 147g fleet-wide target.

D.8 As the individual manufacturer targets also work on a fleet average basis, manufacturers are free to sell any vehicle that they would like, provided that the emissions of their entire new vehicle fleet balance out to meet their respective individual target.

D.9 The regulations work 'retrospectively' in the sense that the CO_2 targets are calculated based on the vehicles that were sold in the previous calendar year e.g. performance for vehicles registered in 2020 will be calculated in 2021.

D.10 As the regulations work on a calendar year basis, these targets and CO_2 calculations reset each year.

D.11 The 'average vehicle' mass figure that all manufacturer fleets are compared against is updated every 3 years. This ensures that, should the UK vehicle fleet change over time and get heavier, the regulation can account for this change and ensure that weaker targets do not apply simply because heavier vehicles are being sold.

Vehicles in Scope of the Regulations

D.12 The regulations only capture those vehicles that have been manufactured at volume and subject to the full EU/UK vehicle Type Approval procedure[vii]. Specifically, vehicles that have been categorised as M1 (passenger vehicle) or N1 and under a certain weight limit (light commercial vehicle with a mass <2610kg).

D.13 Vehicles certified through the National Small Series Type Approval and Individual Vehicle Approval procedures are out of scope of the regulation, and therefore are not counted toward emissions targets/compliance.

D.14 Additionally, vehicles that certified according the full type approval procedure, but that are classified as 'special purpose' under the procedure are also out of scope and not counted toward compliance. These are set out in Type Approval legislation and include vehicles such as ambulances, wheelchair-accessible vehicles, and armoured vehicles.

Excess Emissions Premiums

D.15 Should the average actual emissions of CO_2 from a manufacturer exceed that manufacturer's CO_2 emissions target, then the manufacturer is fined - officially known as an 'excess emissions premium' in the legislation.

D.16 The fine is set according to a formula - £86 x by the grams of exceedance x the number of vehicles sold in that calendar year.

D.17 As an example, if manufacturer A registers 250,000 vehicles in a year, and misses their CO_2 target by 2g CO_2/km, the excess emissions premium would be £86 x 250,000 x 2 = £43m.

Flexibilities

D.18 There are a number of flexibilities that manufacturers can apply for to change the way in which they may meet their CO_2 targets.

D.19 **Derogations** - in the EU regime, manufacturers registering <300,000 cars, or <22,000 vans per calendar year, may apply for a derogation from the top level 95g/147g CO_2/km target, instead receiving an adapted CO_2 target. The exact target is determined according to the below -

Manufacturer Category	Registrations per calendar year	CO_2 target - Cars	CO_2 target - Vans
Out of scope	<1,000 cars or vans		
Small Volume	1,000-9,999 cars 1,000-21,999 vans	Negotiate bespoke CO_2 target with enforcement authority	Negotiate bespoke CO_2 target with enforcement authority
Niche Volume	10,000-300,000 cars	From 2020, a fixed 45% CO_2 reduction against their 2007 baseline	N/A - niche volume does not apply to van manufacturers
Major Volume	>300,000 cars >22,000 vans	Target as set out above against a 95g CO_2/km fleet-wide target	Target as set out above against a 147g CO_2/km fleet-wide target

D.20 These targets ensure that small/medium vehicle manufacturers receive CO_2 targets that are achievable and sustainable when taking into account the technical and economic ability of the manufacturer to deploy CO_2 reducing technologies.

D.21 The UK regime uses a modified version of these derogations, whereby manufacturers receive individual derogation thresholds based on the percentage of EU sales occurring in the UK in 2017.

D.22 For example, a manufacturer with 200,000 EU car sales (thus qualifying for a niche volume derogation) with 100,000 occurring in the UK in 2017, would receive thresholds of 5,000 for the small/niche volume derogation, and 150,000 for the niche/major volume derogation.

D.23 This approach was adopted to ensure that manufacturers continued to qualify for the same type of derogation in the UK in 2021, and to ensure that no manufacturer was the subject of additional burdens as a result of the EU Exit process.

D.24 Currently, this individual approach is subject to review by 2025, at which point the UK will move to fixed thresholds.

D.25 **Pooling -** under the UK regime, manufacturers have the ability to 'pool' their vehicles together and, for the purposes of the regulation, be considered as one manufacturer.

D.26 This provision is usually used by manufacturers falling under the same umbrella company that already share manufacturing facilities, technical data etc.

D.27 However, competing manufacturers may also form pools and be considered as one manufacturer, subject to fair competition rules.

D.28 In this instance, the pool receives one CO_2 target, and has one joint CO_2 calculation at the end of the year.

D.29 A pool may also apply for a derogation according to the same criteria listed above.

D.30 **Eco-Innovations -** Manufacturers and parts suppliers may create technologies, such as LED lightbulbs in place of filament ones, that lead to CO_2 emissions reductions but that are not captured during the test procedure.

D.31 In such cases, the manufacturer or parts supplier can apply to the VCA to have this part approved as an eco-innovation, with a legally binding testing methodology against which it can be tested to prove the CO_2 emissions saving.

D.32 **ZLEV Factor** - Manufacturers can also meet a secondary optional target in respect of zero and low emissions vehicles.

D.33 A ZLEV is defined as any vehicle with CO_2 emissions <50g CO_2/km. Manufacturers meeting a ZLEV target of 15% by 2025, or 35% by 2030, will see their CO_2 target increased/relaxed by up to 5%. Formulae in the Annex to the regulation define the procedure and how much a CO_2 target is to be relaxed by, if at all.

D.34 This acts as an incentive to deploy the most efficient vehicles on the market as quickly as possible, albeit at the expense of being less strict on the rest of the manufacturer's fleet.

Multi-Stage Vehicles

D.35 While most vans are generally 'complete' when leaving the manufacturing facility, others are built using a 'multi-stage' process.

D.36 A multi-stage process is where a 'base' vehicle is created by a manufacturer, before being sold on to a bodybuilder in order to be 'completed', usually to meet a specific purpose.

D.37 For example, a manufacturer may produce a van chassis, before selling this chassis on to a bodybuilder in order to be converted into a specialist vehicle, such as a refrigerated van, or a motorised advertising board.

D.38 When the base vehicle is passed on to a bodybuilder, the original manufacturer does not have control of what the 'completed' vehicle will look like, and thus also does not have control of the final vehicle's emissions either.

D.39 A process is therefore used where the base vehicle manufacturer stipulates maximum thresholds for a number of variables that a completed vehicle must abide by. Example variables include the weight of the vehicle, and the aerodynamic cross-section of the vehicle.

D.40 If the completed vehicle stays within these thresholds, the CO_2 emissions of the completed vehicle are simulated using a computer tool provided by the base vehicle manufacturer, and are attributed to that manufacturer.

D.41 If the completed vehicle exceeds these thresholds, the Type Approval certification is not valid for that vehicle, and it must undergo Individual Vehicle Approval. Vehicles with IVA certification are out of scope of the CO_2 regulations.

Heavy Duty Vehicles - HDVs

Individual Manufacturer Targets

D.42 Due to the wide variety of heavy duty vehicles that are registered each year, CO_2 targets for individual manufacturers are established in a different manner to those for cars and vans.

D.43 Heavy duty vehicles are categorised into a number of different vehicle sub-groups, with ten different groups existing in legislation. These sub-groups take into account the usage of the vehicle (specifically whether it is for long haul, regional delivery, or urban delivery); the weight of the vehicle; and the technology used in the drive train.

D.44 Each of these sub-groups is given a reference CO_2 emission value, based on the data collected during the first reporting period in 2019-20.

D.45 Individual targets are then calculated by taking the manufacturer's share of vehicles in each sub-group, multiplied by industry average annual mileage and payload weighting factors for each sub-group, multiplied by the CO_2 emissions reduction target (e.g. 15%), multiplied by the reference CO_2 emissions for the sub-group.

D.46 The sum of these calculations is then assessed for each manufacturer in order to derive a target in g CO_2/tkm (ton kilometre).

D.47 Each new HDV in the sub-categories listed above is required to undertake a standardised CO_2 emission test.

D.48 Unlike with cars and vans, it is not possible to physically test these vehicles in a lab-based environment due to their size and weight. As a result, all new HDVs in the relevant sub-categories must instead undertake a standardised CO_2 test simulation, using software called the Vehicle Energy Consumption calculation Tool - VECTO.

D.49 Performance against the aforementioned targets is then assessed on an annual basis in a similar manner, using the CO_2 emissions performance values calculated via VECTO. As with cars and vans, the targets and performance are assessed on a fleet-wide basis.

D.50 There are a number of flexibilities that are also taken into account when calculating performance against the targets.

Credits and Debts

D.51 Manufacturers can earn emissions credits and debts, or banking and borrowing, allowing them to under or overperform, and being able to transfer this over- or under-performance into subsequent years.

D.52 In order to accumulate credits and debts, manufacturers have an 'emissions reduction trajectory' calculated, describing how their individual target changes over time due to the changing industry-wide reduction targets.

D.53 Credits and debts are based on a calculation of how much a manufacturer has under- or overperformed against their emissions reduction trajectory each year, rather than against their specific target.

D.54 Until 2024, only credits can be accumulated. Any credits accumulated by manufacturers in this time period may only be used to offset performance against their target in 2025.

D.55 From 2025, both credits and debts can be accumulated. Any credits and debits may only be carried over for 1 reporting period.

D.56 Any debts accumulated must not exceed 5% of the manufacturer's CO_2 emissions target in 2025, multiplied by the number of HDVs registered by that manufacturer in that reporting period.

Zero and Low Emission Vehicle Factor

D.57 The number of, and CO_2 emissions of, zero and low emission vehicles (ZLEVs) registered by manufacturers is also taken into account.

D.58 As new HDVs are sub-categorised, there is no fixed threshold defining a ZLEV. Instead, a table in the regulation specifies the low-emission threshold for each sub-category.

D.59 Until 2025, any vehicle classified as a ZEV shall be double-counted, with a cap of 3% limiting the overall reduction that may apply to a manufacturer's average CO_2 emissions purely as a result of the ZLEVs being registered.

D.60 From 2025, rather than double counting, manufacturers will instead receive a ZLEV Factor. This is a calculation based on the percentage of the fleet that is zero or low emissions, and also takes into account the actual emissions of the specific vehicles, weighting that vehicle accordingly e.g. a zero emission vehicle will be weighted more heavily (whole vehicle is a ZLEV) than a low-emission vehicle (vehicle shall be classed as between 0 and 1 of a ZLEV, depending on emissions).

D.61 Manufacturers will be required to pass a ZLEV Factor target of 2% of their fleet being classed as ZLEVs (taking into account the vehicle weighting) in order to receive any benefit, and the actual benefit shall be capped at 3% as per the limit mentioned in paragraph 5.59.

Fines

D.62 Given the multiple facets to the target calculation within the regulation, there are multiple ways in which a manufacturer can be classed as having missed their target/not being in compliance with the regulation:

- From 2025 to 2028, if a manufacturer's emissions debts, reduced by their emission credits, exceeds the emission debt limit;
- In 2029, if a manufacturer's emissions debts, reduced by their emission credits, is positive;
- From 2030, where a manufacturer's average CO_2 emissions exceed their CO_2 emissions target.

D.63 Any manufacturer not in compliance according to the above criteria is required to pay an excess emissions premium.

D.64 From 2025 to 2029, this amount shall be £3830/gCO_2/tkm x excess CO_2 emissions.

D.65 From 2030, this amount rises to £6130/gCO_2/tkm x excess CO_2 emissions.

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[i] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010DC0655&from=EN
[ii] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010DC0655&from=EN
[iii] https://www.eea.europa.eu/data-and-maps/daviz/average-emissions-for-new-cars-7#tab-chart_1
[iv] https://www.eea.europa.eu/data-and-maps/daviz/average-emissions-for-new-cars-7#tab-chart_1
[v] https://www.cpt-uk.org/media/p20h0lxf/movingforwardtogether-3.pdf
[vi] Laboratory test used to measure fuel consumption and CO_2 emissions from vehicles.
[vii] Type Approval is a testing procedure that all new vehicle types must undergo in order to be certified for sale in the EU/UK markets. The procedure involves ensuring that vehicles meet a large number of regulations relating to emissions/safety/production/conformity of production among other aspects.

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