Title The Road Vehicles (Authorised Weight) (Amendment) Regulations 2023 **Date: 14/12/22** **DMA No: DfTDMA272** **Lead department or agency:** Department for Transport	De Minimis Assessment (DMA) **Date: 14/12/22** **Stage: Final** **Source of intervention:Domestic** **Type of measure: Secondary Legislation** **Contact for enquiries:** freight@dft.gov.uk

Summary: Rationale and Options

Cost of Preferred (or more likely) Option (in 2019 prices)			
Total Net Present Social Value	**Business Net Present Value**	**Net cost to business per year**	**Business Impact Target Status**
£18.2m	£18.2m	£0.3m	Qualifying Provision

Summary of Impacts – Explanatory Memorandum Impact Section

DfT has not published an impact assessment for this measure as the direct impacts on business have been assessed at under £5m per year. Instead, a De Minimis Assessment (DMA) has been conducted, the findings of which are presented below.

There is no, or no significant, impact on business, charities or voluntary bodies. The market for these vehicles is still at an early stage, and the additional weight allowance of one to two tonnes is therefore very unlikely to be the main current barrier for businesses wanting to use zero emission vehicles (ZEVs) or alternatively fuelled vehicles (AFVs). The main current barriers are likely to be technology readiness, the affordability of these vehicles, and the lack of supporting infrastructure (particularly refuelling or recharging points), and in addition current evidence suggests that very few eligible vehicles would be in scope of this change. The legislation does not force businesses to do anything but allows them to make use of this weight allowance if they wish to do so and is therefore permissive in nature. This means that the legislation does not have any direct impacts to businesses apart from familiarisation costs (as the weight alone is not the main barrier for businesses wanting to switch to greener vehicles). The current benefits are the indirect efficiency gained from the additional weight allowance, emissions reductions, improved productivity of operators and reduced congestion on roads. The current indirect costs of this policy are expected to be the costs incurred in deciding whether the switch to a ZEV or AFV fleet is beneficial, potential indirect costs of purchasing new ZEVs or AFVs, impacts on infrastructure, potential changes in accident severity and any further training businesses might decide upon. Familiarisation costs for haulage businesses are the only direct cost but fall below the 'de minimis' threshold with a value of around £0.4m per year (2022 prices, 2023 present value).

The costs and benefits have been monetised where possible and concludes with an overall net benefit to society over 10 years, with a Net Present Value of £22m (within a range of £5.9 - £73.4m, 2022 prices and 2023 present value). We therefore expect there to be no, or no significant impact on the public sector.

As technology improves and the infrastructure adapts to these vehicles, a Post Implementation Review in five years' time will look at re-assessing the evidence and impacts of this legislation and determining whether these permissions are still required or having the intended effects.

Due to the impacts to business being low, and indirect, its impacts meet the 'de minimis' threshold of fewer than £5 million equivalent annual net direct costs (or benefit) to business. A De Minimis Assessment has therefore been prepared for this instrument.

Rationale for intervention and intended outcomes

Current AFVs and ZEVs have heavier powertrain[1] technology than traditionally fuelled internal combustion engine (ICE) vehicles. Due to current weight regulations, the heavier powertrains of AFVs and ZEVs decrease the amount of cargo they can carry compared to an equivalent ICE vehicle (as more of the weight allowance is taken up by the vehicle), acting as a payload penalty. AFVs and ZEVs produce significantly less carbon emissions than ICE vehicles. However, without Regulations allowing increased weight limits for AFVs and ZEVs to reduce or remove the payload penalty, the commercial appeal of AFVs and ZEVs could be reduced and with it, their potential to cut road freight carbon emissions.

The Regulation increases maximum weight limits for AFVs and ZEVs, with the intention of removing the payload penalty inflicted on these vehicles due to the heavier powertrain, and in turn improve the efficiency of AFVs and ZEVs in terms of cargo capacity. By doing so it would ensure uptake of AFVs and ZEVs is not hindered by concerns about cargo capacity and improve industry confidence, following the announced end of sale dates of new ICE vehicles. A consequence of the intended increased uptake of AFVs and ZEVs would be a reduction in the emissions (of both carbon and air quality related pollutants) produced by these vehicles, helping the UK to meet the 2050 net-zero target and interim carbon budgets, while also improving air quality. The harmonisation of weight limits with the EU (which has already put these allowances into effect) will make it simpler for vehicles produced in the EU to be sold in the UK (and vice versa) and reduce any difficulties caused by vehicles moving internationally being subject to varying weight limits when crossing a border.

Describe the policy options considered

1. **Option 0 – Do nothing –** This would result in the existing payload disparities being allowed to remain. The payload penalty for AFVs and ZEVs would continue to discourage operators from purchasing them due to their reduced commercial appeal.
2. **Option 1 – Preferred** – DfT to increase vehicle weight limits by the additional weight of the alternative fuel technology up to a maximum of 1 tonne for certain AFVs and by a flat 2 tonnes for certain ZEVs.

Rationale for DMA rating

The only direct cost of this policy is the familiarisation cost for businesses. The EANDCB is estimated to be £0.4m annually (2022 prices, 2023 present value), which is significantly below the £5m threshold. This policy is permissive in nature which means that all other costs and benefits identified are considered indirect. The policy does not force any businesses to invest in a ZEV/AFV fleet; it only makes them more likely to do so by removing the efficiency disbenefits caused by having heavier powertrains which means they are able to carry a lower weight of goods on their journeys.

Efficiency benefits are the only major monetised benefit considered. According to the analysis undertaken, even if efficiency benefits were direct, the EANDCB still falls below the £5m threshold in the central scenario.

Will the policy be reviewed? It **will** be reviewed. **If applicable, set review date:** By 5 years after introduction of the implementing Regulations (January 2028).

Are any of these organisations in scope?	Micro Yes	Small Yes	Medium Yes	Large Yes
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)		**Traded:** NQ	**Non-traded:** NQ	

Senior Policy Sign-off:	✓	Date:	**14/12/2022**
Peer Review Sign-off:	✓	Date:	**14/12/2022**
Better Regulation Unit Sign-off:	✓	Date:	**14/12/2022**

[1] The whole mechanism by which power is generated and transmitted to the road.

Summary: Analysis & Evidence

Policy Option 1

Description:

FULL ECONOMIC ASSESSMENT

Price Base Year 2022	PV Base Year 2023	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: 5.9	High: 73.4	Best Estimate: 22.0

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	2.6	10	0.0	**2.6**
High	4.0		0.0	**4.0**
Best Estimate	3.3		0.0	**3.3**

Description and scale of key monetised costs by 'main affected groups'

The policy is permissive in nature and most impacts are classified as indirect. The only key monetised cost identified would be the 'familiarisation cost'. It is assumed all heavy goods vehicle (HGV) operators and producers will want to review the Regulation and therefore they will face a familiarisation cost. Given the policy's simplicity, the estimated familiarisation cost is relatively low.

Other key non-monetised costs by 'main affected groups'

There are three unmonetised costs identified, all of which are considered indirect as they occur only to businesses through choice rather than being unavoidable and immediate costs. The costs are understood as unmonetised due to AFVs and ZEVs being in early phases of technological development and their uptake being unknown. The unmonetised costs include increased training costs (business), infrastructure impact (wider society), and accident severity (wider society).

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	0.0		1.3	**9.7**
High	0.0		9.8	**76.0**
Best Estimate	0.0		3.2	**25.2**

Description and scale of key monetised benefits by 'main affected groups'

The only key monetised benefit identified is the efficiency gains to businesses from the increase in weight allowance. The increased weight allowance would level up efficiency by ensuring the same amount of cargo could be loaded onto AFVs/ ZEVs and ICE vehicles. The increased weight limit would also make AFVs and ZEVs more commercially viable thus increasing usage.

Other key non-monetised benefits by 'main affected groups'

Due to AFVs and ZEVs being in early technological development and relatively few vehicles being classified as commercially viable (particularly ZEVs at higher weight ranges), some benefits of the policy are currently understood as indirect unmonetised benefits. The unmonetised benefits identified are the reduced greenhouse gases (GHG), improved productive efficiency and reduced congestion on the roads.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

There are no identified significant risks or unintended consequences regarding implementation of the policy. Increased weight allowance could impact braking distances which in turn could impact road safety through increasing severity of collisions. However, risk assessments for analogous policies indicate that weight increases of 1 to 4 tonnes are unlikely to have a significant impact on the severity of collisions. To combat the potential for increased severity, speed restrictions could also be put in place.

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target (qualifying provisions only) £m: 1.6
Costs: 0.4	**Benefits: 0.0**	**Net: 0.4**	

1.0 Policy Rationale

Interpretation (note these are not the strict legal definitions, but are intended to add clarity):

- Heavy goods vehicle: a goods vehicle (or vehicle combination) weighing over 3.5 tonnes.
- Public Service Vehicle: a vehicle adapted to carry passengers for hire or reward (typically a bus or coach).
- Zero-emission vehicle: a vehicle which does not produce harmful emissions from the tailpipe.
- Alternatively fuelled vehicle: a vehicle powered wholly or in part by an alternative fuel (for example biomethane).
- Battery electric vehicle: a vehicle powered by an on-board battery.
- Hydrogen fuel cell vehicle: a vehicle powered via an on-board hydrogen fuel cell, which produces electricity.
- Internal combustion engine vehicle: a vehicle powered by an on-board combustion engine (typically burning either petrol or diesel fuel).
- Articulated vehicle: a vehicle consisting of two or more sections which articulate relative to each other (for example a tractor unit and a trailer).
- Maximum authorised weight: the maximum weight a vehicle is permitted to operate at, comprising the vehicle itself and any cargo or passengers.
- Maximum payload: the maximum weight of cargo or passengers a vehicle is permitted to carry (the maximum authorised weight minus the weight of the vehicle).

Policy background

1. Transport is the highest emitting sector of the economy, accounting for 27% of domestic GHG emissions in 2019[1]. Freight transport is a significant contributor to total GHG emissions from domestic transport, with HGVs producing 18% of domestic transport emissions in 2020[2]. Government has committed to reaching net-zero emissions by 2050, with decreasing interim carbon budgets until that point. Government has also introduced phase out dates for the sale of new, non-zero emission HGVs[3], with sales of new, non-zero emission HGVs weighing below 26 tonnes to be phased out in 2035, and those over 26 tonnes by 2040. In order to achieve these commitments, more sustainable forms of freight transport need to be adopted.

2. All vehicles are subject to a gross vehicle weight limit and these vary depending on axle configurations. Current weight allowances are set out in the Road Vehicles (Authorised Weight) Regulations 1998 and the Road Vehicles (Construction and Use) Regulations 1986. Currently, AFVs and ZEVs require a heavier powertrain technology compared to conventionally fuelled ICE vehicles (running on diesel or petrol). The vehicle powertrain includes all components by which power is stored or generated and transmitted to the road, such as batteries, fuel tanks, driveshafts, gearboxes, motors and energy recovery systems. There are particular powertrain components in AFVs or ZEVs which are likely to be heavier than their equivalents in an ICE vehicle, most notably batteries, which are significantly heavier than a petrol or diesel fuel tank providing an equivalent vehicle range. Hybridised AFVs (for example using a diesel and gas dual fuel engine) may require extra engine components to allow the use of multiple fuels in combination. Fuel tanks for pressurised gaseous fuels such as biomethane or hydrogen are also likely to be heavier than ICE equivalents, due to the need to reinforce these to cope with high pressure. There may also be a need for larger

[1] https://www.gov.uk/government/statistics/transport-and-environment-statistics-autumn-2021/transport-and-environment-statistics-autumn-2021

[2] https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2020

[3] https://www.gov.uk/government/consultations/heavy-goods-vehicles-ending-the-sale-of-new-non-zero-emission-models/outcome/outcome-and-response-to-the-consultation-on-when-to-phase-out-the-sale-of-new-non-zero-emission-hgvs#:~:text=After%20hearing%20views%20from%20industry,UK%20must%20be%20zero%20emission.

fuel tanks, as the volumetric energy density of these fuels is lower than petrol or diesel. ZEVs also often have energy recovery systems, allowing braking energy to be recovered and used to charge a battery. Given that the braking components can in that case be considered to be part of the powertrain, they are included in determination of extra powertrain weight.

3. Currently, there are few ZEV HGVs or public service vehicles (PSVs) in the UK market. ZEVs accounted for 0.1% of licenced road using HGVs and 1.2% of PSVs in the UK in Q2 2022[4]. As the technology is still under development, the number of models available are very limited, especially at the higher weight categories (26 tonnes to 44 tonnes), and upfront costs are generally higher than for a conventionally fuelled equivalent ICE vehicle. There are increasing numbers of AFV HGVs (particularly those using methane as a fuel) but this increase is starting from a very low baseline and gas fuelled vehicles only represent a very small proportion of the UK HGV fleet- just 0.3% of licenced road using HGVs in Q2 2022[5]. Some AFVs are also a comparable weight to the equivalent diesel model (because they both use a combustion engine) and therefore would not receive a weight limit uplift, for example a Volvo tractor unit running on liquified natural gas (LNG)[5] has the same gross vehicle weight as the equivalent diesel model[6]. ZEVs are currently only sold in significant numbers in lower weight classes (such as cars or vans), and ZEV HGVs and PSVs are likely to continue to be sold in only very small numbers, even in the medium term. The Department has launched multi year demonstrations of ZEV HGVs [7], looking to gather evidence on the future refuelling and recharging infrastructure required for ZEV HGVs. Given that these demonstration trials will last for several years it may be the case that widespread take up of ZEV HGVs in the heaviest weight categories (where the trials are focussed) may not take place until the late 2020s at the earliest

4. Use of AFVs and ZEVs can aid the reduction of carbon emissions from transport (and air quality improvements), but the payload penalty they currently experience could contribute to a lowered uptake of the use of these vehicles. These vehicles are subject to weight limits, which include both the unladen weight of the vehicle and any cargo or passengers which they are carrying. If the unladen weight of the vehicle increases (as can be the case for AFVs and ZEVs) the remaining weight available is reduced, reducing the weight of cargo or number of passengers which can be carried (the payload penalty). Increasing the vehicle weight limit to offset the additional powertrain weight may offer a higher degree of certainty to freight operators of their commercial viability, by increasing cargo capacity and ensuring AFVs and ZEVs are able to transport the same load as ICE vehicles (meaning that a transition to ZEVs would not necessitate an increase in the number of vehicles required to move the same tonnage of goods). Businesses having sufficient confidence to invest in AFVs and ZEVs is crucial to meeting carbon emission reduction targets.

5. Compared to Light Goods Vehicles (LGVs) and cars, the commercial viability of alternatively fuelled (AF) and zero emission (ZE) heavy goods vehicles (HGVs) is at a significantly earlier stage (primarily because their development has been predominantly focussed on the car market, with the high cargo weights and ranges of HGVs posing a more significant engineering challenge). Whilst a growing number of AF and ZE HGVs are entering the market at the lower end of the vehicle weight range, there are significantly fewer higher weight AF or ZE HGVs becoming commercially viable (or even available at all). The upfront cost of the AF and ZE HGVs is often significantly higher than ICE equivalents and thus is a discouraging factor when businesses are looking to upgrade their fleets (particularly smaller businesses who are more likely to use cheaper second-hand vehicles). As models (especially at higher weight ranges) become more widely available and payload penalties are

[4] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1090498/veh1103.ods

[5] https://stpi.it.volvo.com/STPIFiles/Volvo/ModelRange/fh62ttla2_gbr_eng.pdf

[6] https://stpi.it.volvo.com/STPIFiles/Volvo/ModelRange/fh62tt3a_gbr_eng.pdf

[7] https://apply-for-innovation-funding.service.gov.uk/competition/1239/overview/a3dde705-ea27-43be-963f-c6b0012d554c

reduced, it is expected uptake of ZE and AF HGVs will notably increase, until ZEVs reach 100% of new sales by either 2035 (for HGVs weighing 26 tonnes or less) or 2040 (for HGVs weighing over 26 tonnes).

6. The higher vehicle weight limits for ZEVs and AFVs are already available to EU vehicles operating within the UK under the terms of the EU UK Trade and Cooperation Agreement (TCA), placing domestic operators at a disadvantage compared to EU operators. At present, the limited number of ZE or AF HGVs in use (particularly for international transport from the EU into the UK) means that the impact of this discrepancy is limited. However, as take up of these vehicle types increases and range improvements allow them to be used for international transport, this could become a bigger issue if unaddressed. The higher weight limits are also available to EU vehicles operating within the EU. Most HGVs bought in the UK are manufactured by manufacturers based in the EU and lower weight limits in the UK could act as a barrier to ZEVs being sold in the UK by these manufacturers.

Problem under consideration

7. AFVs and ZEVs can experience a payload disadvantage when compared to traditional ICE vehicles. This is due to the heavier powertrain technology of these vehicle types. The heavier powertrain reduces the amount of cargo or passengers the vehicle can carry, which in turn has an effect on the commercial appeal of the vehicles to businesses. The reduced load able to be transported on one vehicle may be a significant blocker to the uptake of ZEVs and AFVs by freight operators, as the amount of cargo carried is a factor in the amount they are paid. Similarly, the number of passengers is a factor in how PSV operators are paid.

8. For business owners to adopt a more sustainable freight fleet, AF and ZE HGVs need to become more commercially viable – removing the payload penalty by increasing weight allowances for ZEVs and AFV will aid this. If uptake of ZE and AF HGVs increases, carbon emissions will be reduced and thus meeting the 2050 net-zero goal becomes more likely. Strong uptake of ZE HGVs in particular also increases the feasibility of the proposed phase-out dates, as greater numbers of ZEVs may incentivise the provision of greater amounts of supporting infrastructure (such as charging points or hydrogen refuelled stations) which in turn improves business confidence to adopt ZEVs in a virtuous cycle.

9. In the TCA, it was agreed that EU based operators would be granted an additional weight limit of up to one tonne for AFVs and up to two tonnes ZEVs when undertaking journeys within the UK. This puts UK operators at a disadvantage relative to EU hauliers as they cannot utilise the additional weight allowances available for EU operators. At present there are likely to be very low numbers of HGVs making use of these additional weight limits, however as these vehicles become more common and range increases allow them to be used for international journeys this is likely to change. These higher weight limits are also available within the EU, creating a regulatory disparity that may increase costs for UK operators (as most HGVs sold in the UK are made by EU based manufacturers).

Rationale for intervention

10. Government intervention is necessary to correct the government failure of unintended consequences and to ensure that there is no unfair disadvantage of switching to a ZEV/AFV in terms of the weight of goods that these vehicles can carry.

11. Vehicle weight limit Regulations are set by government, and thus without intervention there would only be limited change as the weight of AFV and ZEV powertrains decreased, drawing them closer to being of equivalent weight to ICE vehicles that are currently widely used. Conversations with manufacturers (and evidence from the car market) also suggests that this problem is unlikely to resolve itself. This is because the weight of battery packs (or other ZEV powertrains) used is likely to remain the same, as the improving energy to weight ratio as technology develops (for example via the use of novel battery chemistries) would be used to increase the range of the vehicle, rather than allow the use of a lighter powertrain to achieve the same range. This is likely to be particularly relevant for HGVs and PSVs, given that they frequently travel long distances without stopping and therefore a long range is an attractive vehicle feature.

12. The discrepancy between EU operators working in the UK (and EU) and domestic operators would also not be resolved without government intervention. If weight limits remained unchanged, then domestic operators would be left at a permanent disadvantage (which would only be likely to increase as more ZEVs and AFVs become used for international traffic). This disadvantage would be due to domestic hauliers not being able to carry the same weight of cargo as international hauliers on the same vehicle, increasing the average cost per tonne moved and reducing the commercial viability of using these vehicles.

13. The change would be beneficial to the uptake of ZE and AF HGVs which in turn would increase feasibility of the proposed phase out dates and aid in reaching the 2050 net-zero goal. If this change is not introduced, switching to ZEVs and AFVs from diesel and petrol vehicles would be less attractive as those HGVs that utilise the maximum weight allowance in their journeys would be able to carry 1 or 2 fewer tonnes due to the heavier weight of the ZEV/ AFV powertrains.

Policy objective

14. The policy aims to reduce carbon emissions from road freight transport, improve air quality and restore payload parity between UK HGVs and EU HGVs operating within the UK. It aims to achieve this by encouraging uptake of AF and ZE HGVs and by removing the existing payload discrepancy applying to EU based HGVs compared to those based in the UK.

15. The policy may not reach its full objective if it does not increase the use of AF and ZE HGVs. This may be because of other disincentives to using them outweighing their benefits, such as a lack of recharging or recharging infrastructure or the higher upfront purchasing costs. It is noteworthy though that this policy alone does not intend to overcome all the barriers to adopting these vehicle types, it is just part of the wider group of policies encouraging their use, along with purchasing incentives such as the Plug In Truck Grant[8] and restrictions like the end of sale dates for non-zero emission HGVs.

16. Sufficient levels of infrastructure to recharge or refuel ZEVs is key to their uptake and particularly so for HGVs, given that they have high power requirements and are often used on long daily duty cycles, limiting opportunities for long stops to recharge or refuel. This policy will not have a direct impact on levels of refuelling or recharging infrastructure for ZEVs (although if there are increased numbers of these vehicles on the road, the business case to invest in their supporting infrastructure is improved). Therefore, the policy may not fully realise its objectives, if lack of infrastructure reduces business confidence in investing in new ZEVs. Refuelling infrastructure for AF HGVs is also important for their uptake, although is further ahead in its development than infrastructure for ZE

[8] A scheme offering grants to reduce the cost of purchasing an ultra-low emission truck. More information is available here: https://www.gov.uk/government/publications/plug-in-van-grant

HGVs. It can also be easier for operators to install at their own depots, as it avoids the need for upgraded electricity supply, which can be expensive and difficult to arrange. Even with these advantages though, uptake of AFVs may be hindered by a lack of confidence in the refuelling network, meaning this policy does not achieve its aims.

17. Upfront costs for AFVs and ZEVs are currently usually higher than for ICE equivalents. They can be cheaper to run due to lower fuel costs, but the higher upfront cost still presents a barrier to their use, particularly by smaller operators who may rely on the second-hand market to purchase vehicles. While it is expected that this discrepancy in up-front cost will decrease as production volumes of ZEVs and AFVs increase, this may still present a barrier to uptake of these vehicles and therefore prevent this policy from fully realising its objective.

18. While increasing numbers of ZEVs and AFVs are entering the market, there is a risk that technology development could stall and prevent significant uptake of these vehicle types, for example if the range of vehicles currently available is not improved upon. This is unlikely, given the scale of development being undertaken by manufacturers and the clear market signals provided by phase out dates for non-zero-emission HGVs, but would hinder the uptake of ZEVs and AFVs and therefore prevent this policy reaching its objective. The extent to which improved technology affects the need for these Regulations will be a key area of investigation for the post-implementation review.

Options considered

19. **Option 0- Do nothing –** This would result in the existing anomalies being allowed to remain. The payload penalty for AFVs and ZEVs would continue to discourage operators from purchasing them. EU vehicles would continue to benefit from having higher weights, not addressing the disparity between UK and EU operators.

20. **Option 1 – Preferred – Increase weight limits for certain ZEVs and AFVs** - DfT to increase vehicle weight limits by the additional weight of the AF or ZE technology up to a maximum of 1 tonne for certain AFVs (a and b in the list below) and a flat 2 tonnes for certain ZEVs (a-e in the list below). This would remove some of the disincentives to purchase these more environmentally friendly vehicles. The vehicle categories having their weight limit increased where they are zero emission are below, in the first two cases an extra (up to) one tonne allowance for AFVs will also be introduced. For the latter three cases the (up to) one tonne allowance for AFVs has been permitted already.

    a. articulated lorries and road train combinations with 5 or 6 axles whose conventional technology weight limit is 40 tonnes;

    b. articulated lorries and road train combinations with 4 axles, normally limited to 36 or 38 tonnes;

    c. two axle motor vehicles (other than buses, which already have a higher limit), normally limited to 18 tonnes;

    d. three axle motor vehicles, normally limited to 25 to 26 tonnes; and

    e. three axle articulated buses, normally limited to 28 tonnes.

Table 1: Vehicle categories in scope

Vehicle categories (defined above)	AFVs included in this DMA	ZEVs included in this DMA
a	✔	✔
b	✔	✔
c	-	✔
d	-	✔
e	-	✔

- All included ZEVs get a 2-tonne increase in weight allowance.
- All included AFVs get an up to 1-tonne increase in weight allowance.
- All excluded AFVs already have an up to 1 tonne increase in weight allowance and are therefore not considered in the analysis for this DMA.

21. HGVs operating at the existing standard maximum weight of 44 tonnes are not subject to any weight limit changes via this Regulation. This is because 44 tonnes is the highest weight that vehicles in general circulation are able to operate at, due to infrastructure limitations (primarily weight limits on bridges).

Rationale for De Minimis Rating

22. This policy is permissive in nature with most impacts considered indirect, except familiarisation costs. The small difference in weight allowance is unlikely to be the main barrier for businesses wanting to use ZEVs or AFVs. The main current barriers are likely to be technology-related (such as cost, range and efficiency), affordability of these vehicles, and the lack of infrastructure (i.e. charging points) and it is expected these issues will remain over the appraisal period even as the technology improves. There would be no other immediate and unavoidable costs or benefits to businesses resulting from this policy given that it is permissive in nature and does not require businesses to take any action unless they choose to. Therefore, we expect several decisions would need to be made by businesses before any cost or benefit is realised. For these reasons, most impacts are expected to be indirect and would therefore have no bearing on the equivalent annual net direct cost to business (EANDCB).

23. The EANDCB (2022 prices, 2023 present value) is estimated to be £0.4m in the central scenario when compared to the counterfactual do-nothing scenario, which is well below the threshold of £5m, which determines the need for a full Impact Assessment.

24. Given the data, evidence and assumptions that have been used in the analysis, there is little risk of breaching the £5m threshold as the only direct and monetised cost is the familiarisation cost to businesses, which averages out to a £0.4m annual cost to businesses. The only monetised benefit to business is the efficiency gains from increasing the weight allowance of certain AFVs/ZEVs by 1/2 tonnes respectively and is indirect as they are not immediate and they are avoidable for the affected businesses. Businesses will not be forced to buy AFVs/ZEVs at any point during the 10-year appraisal period and this will only be the case after the government phase out dates for the sale of non-ZE HGVs, which are 2035 (for vehicles weighing below 26 tonnes) or 2040 (for vehicles weighing over 26 tonnes)[9] and the impact of this phase out date would be captured by its own Impact Assessment.

[9] https://www.gov.uk/government/consultations/heavy-goods-vehicles-ending-the-sale-of-new-non-zero-emission-models/outcome/outcome-and-response-to-the-consultation-on-when-to-phase-out-the-sale-of-new-non-zero-emission-hgvs

25. Even if the efficiency benefits had a direct impact on businesses, the EANDCB would be £-2.14m in the central scenario and this would reach £-7.20m in the high scenario, which has been considered optimistic and has a low probability of realisation. The high scenario assumes the highest ZEV rollout rate and it assumes that 100% of the modelled vehicles would be ZEVs rather than AFVs and therefore getting the highest 2 tonne increase in weight allowance. As demonstrated in the high scenario, for the EANDCB to break the £5m threshold, a significantly larger number of ZE/AF HGVs would need to be rolled out within the appraisal period, or there would need to be a fundamental change to the distribution of weights carried by HGVs, which is extremely unlikely.

26. To reach the threshold of £50m in efficiency gains over the appraisal period, there would need to be an uptake of approximately 505,000 articulated vehicles or 194,000 large rigids or 201,000 small rigids over the 10 years. The equivalent of those uptakes for the separate vehicle types is substantially more vehicles than the uptake that is predicted in the high ZEV uptake scenario with combined vehicle types. Given this and the fact that the high uptake scenario is already quite optimistic, it is quite unlikely that the total efficiency gains would breach the threshold. As explained previously, efficiency benefits are indirect and have no bearing on the EANDCB anyway, meaning that they do not affect the De Minimis Rating.

27. The formula for the number of vehicles needed to breach the threshold is as follows (using articulated vehicles as an example):

$$ZEV\ uptake = \frac{£5m\ EANDCB\ threshold \times 10}{average\ \%\ of\ vehicles\ in\ scope \times average\ efficiency\ gains\ per\ vehicle\ (2\ tonnes)} = \frac{50{,}000{,}000}{1.6\% \times 6{,}188} = 505{,}000$$

28. The low and high ZE/AF HGV rollout scenarios produced by DfT represent different states of the world. The low scenario is consistent with current firm and funded policy. In the low scenario, it is assumed that there is zero uptake of ZEVs and AFVs in the qualifying vehicle types for this proposal. In the high scenario, the rollout rates represent a scenario where there is rapid deployment of ZEVs and we reach our stated ambition that effectively all new HGVs sold are zero emission by 2040. Both the low and high scenarios are subject to revision in the future and should not be taken as a trajectory for the uptake the government is planning for, as various factors are likely to interact with these scenarios over the appraisal period used. For the central estimate, an average of the low and high scenarios was taken, which represents a mid-point between these two extreme states of the world. These sensitivities in the rollout scenarios have been used as sensitivities within the wider scenarios mentioned below and used to determine whether we expect the de-minimis threshold to be breached.

29. At this point in time, the percentage split of the vehicles in the rollout scenarios between battery electric vehicles (BEVs) and hydrogen vehicles is unknown. The low, central, and high scenarios are therefore technology agnostic and they have been constructed in a way to reflect this uncertainty in the total impacts.

30. In the analysis completed for the efficiency gains, only HGVs are considered as there was not enough data or evidence to account for PSVs. There was no data available on the loaded weight of PSVs per journey and no data on the rollout scenarios for ZE and AF PSVs. As PSV operators only account for 8.7% [10]of haulage and public service operators combined, and the increased weight

[10] Section 5.5 from Traffic Commissioner annual report 2020-2021, available at: https://www.gov.uk/government/publications/traffic-commissioners-annual-report-2020-to-2021/traffic-commissioners-for-great-britain-annual-report-2020-21

allowance for PSVs is unlikely to lead to efficiency benefits per journey as it is unlikely that they are operating at their maximum weight allowance, PSVs have been excluded from these calculations.

31. In addition, only two categories of PSVs are in scope for the changes proposed. These include:
    a. ZEV three axle motor buses, normally limited to 25 to 26 tonnes; and
    b. ZEV three axle articulated buses, normally limited to 28 tonnes.

    AF PSVs are not in scope for these changes (as they are already permitted up to one tonne of extra weight if they are alternatively fuelled).

32. For PSVs to reach the maximum allowance, they would need to significantly increase the number of passengers on board. Assuming these vehicles have limits to the number of people they can carry, and assuming the average weight of a person is around 70 kilograms[11] (based on an estimate for average weight of a woman in the UK), around 29 (2000/70) extra people would need to fit in a PSV for the total weight of the vehicle to increase by 2 tonnes (not accounting for the weight of clothes and other personal belongings). Since only ZE PSVs are in scope for the increase in weight allowance, all PSVs in scope would get a 2-tonne increase in weight allowance. 29 extra people are unlikely to fit in a PSV as there are likely to be capacity constraints for PSVs which are already at their weight limit– meaning the size of the PSV is the greater issue when compared to the weight, which this regulation seeks to exempt.

33. The forecasted direct cost of the regulation to business is a maximum of around £3.3m in the first year due to transition costs of £0.4m per year over 10 years – and significantly below the £5m threshold that would require a full impact assessment. For the reasons mentioned above, the efficiency benefits are indirect and therefore do not contribute to the EANDCB. Additionally, because of the permissive nature of the regulation there are: no significant distributional issues; no excessive burden on small business; no significant wider social, environmental, financial, or economic impacts.

34. The outcomes of this intervention will be reassessed in 5 years' time with the Post Implementation Review (PIR) once technology and infrastructure has had the time to develop, where a decision will be taken on whether this regulation is still achieving its objectives or not.

3.0 Costs and Benefits

35. This section provides a summary of the economic assessment undertaken for this stage. It provides an explanation of the methodology adopted together with the key assumptions applied and data sources utilised where appropriate. The overall aim of the economic assessment is to estimate the likely cost savings (or increased costs) that would accrue to the road freight transport industry, following the introduction of an increase in the total vehicle weight allowances for AF and ZE HGVs. Throughout some parts of the analysis (not including familiarisation costs), only HGVs are considered as there was not enough data or evidence to account for PSVs. There was no data available on the loaded weight of PSVs per journey, which made it difficult to monetise impacts. As of June 2022, HGVs represented 1.3% of all vehicles in the UK while buses and coaches represented a much smaller proportion, only 0.4% of all vehicles. There were approximately 146,300 buses compared to 538,600 HGVs registered in the same period.[12]

36. Throughout this section, unless otherwise stated, all figures are presented in 2021 prices with a 2022 present value year. Monetised impacts have been appraised over a 10-year appraisal period.

[11] https://www.bbc.co.uk/news/uk-11534042

[12] Vehicle licensing statistics data tables - GOV.UK (www.gov.uk)

Option 0 – Do Nothing

37. There are no direct costs or benefits associated with this option as this is the counterfactual and will be used to compare further options against. The payload penalty for AFVs and ZEVs will continue to be a discouragement for operators to purchase these vehicles, which would mean less environmentally friendly vehicles continue to be used. There will still be a disparity between EU and UK operators, as EU operators would continue to benefit from having a higher weight allowance for AF and ZE vehicles while UK operators will not.

38. Certain categories of AFVs already have permitted increased weight allowances of (up to) 1 tonne and are therefore excluded from certain calculations as they would not benefit from the proposed changes. The benefits for these vehicles are already accounted for in the do-nothing baseline scenario. These include:

- two axle motor vehicles, normally limited to 18 tonnes;
- three axle motor vehicles, normally limited to 25 to 26 tonnes; and
- three axle articulated buses, normally limited to 28 tonnes.

Option 1 – Increase weight limits for certain ZEVs and AFVs

Table 2: Summary of Cost and Benefits

Costs	**Benefits**
Monetised - Familiarisation Costs (direct) Unmonetised - Cost of exploring whether switching to ZEV/ AFV fleet is beneficial (indirect) - Cost of purchasing new ZEV/ AFV fleet (indirect) - Training costs (indirect) - Infrastructure Impact (indirect) - Accident severity Impact (indirect)	Monetised - Efficiency benefits (indirect) Unmonetised - Reduced GHG emissions (indirect) - Improved Productive Efficiency (indirect) - Reduced Congestion on Roads (indirect)

Summary

39. As explained within the 'rationale for DMA' section, this policy is permissive in nature and most impacts for this policy are classified as indirect, apart from familiarisation costs. There would be no other immediate and unavoidable costs or benefits to businesses resulting from this policy.

40. If the main barriers for these vehicles when compared to their current alternatives (technology, affordability of these vehicles, and infrastructure) disappeared, businesses would only decide to make use of ZEVs and AFVs if the benefits outweigh the costs, and therefore the overall impact of the policy after the familiarisation costs and efficiency benefits would be positive.

41. Monetised Costs
    a. Familiarisation Costs (direct - business)

42. Unmonetised Costs
    a. Cost of exploring whether switching to ZEV/ AFV fleet is beneficial (indirect – business)
    b. Cost of purchasing new ZEV/ AFV fleet (indirect – business)
    c. Training costs (indirect - business)
    d. Infrastructure Impact (indirect – wider society)
    e. Accident severity (indirect – wider society)

43. Monetised Benefits
    a. Increased efficiency of the AFVs and ZEVs in scope. Efficiency benefits have only been monetised for HGVs, due to the lack of data for PSVs (indirect – business)

44. Unmonetised Benefits
    a. Reduced GHG emissions from AF and ZE HGVs and PSVs (indirect – wider society)

Costs

Transition Costs

Familiarisation costs (direct – business)

45. It is assumed that all operators who operate HGVs and PSVs and producers who supply them will want to review the regulation to understand what has changed and how the changes affect their decision to operate them. All these operators and producers therefore face a familiarisation cost.

46. Given the simplicity of the regulation, it is assumed that operators will take up to two hours to familiarise with the intervention, given the time needed to read and interpret the changes and potential impacts on procurement or operations of businesses. There is likely to be additional indirect business costs to further explore whether switching to ZEVs/AFVs is beneficial to their business. Further costs will only be incurred if businesses decide that switching at any point in the appraisal period is beneficial. This is explained in more detail in the unmonetised costs section, paragraph 44.

47. The average hourly earnings of Transport and distribution clerks and assistants is £13.33[13] (2021 prices), which is uplifted by non-wage cost uplift factor[14] of 26.5% and then uplifted from 2021 prices to 2022 prices using the Transport Analysis Guidance (TAG) GDP deflator to give an hourly cost of £17.34 for interpreting the new regulation. This hourly cost is multiplied by the number of hours required (2) to interpret the regulation, equalling a per firm cost of £43.36 for familiarisation in the central scenario.

48. There are 69,500 haulage operators (companies, not individuals), and 6,600 PSV operators in scope within the UK and all will have to familiarise themselves with this new regulation. Thus, the 69,500 goods vehicle operators, as well as the 6,600 PSV operators[15] - the operators in scope of this legislation - will face a familiarisation cost of £43.36 each in the central scenario leading to a total familiarisation cost of £3.30m to businesses. It is assumed that the familiarisation time per operator is 2 hours in the low scenario, 2.5 hours in the central scenario and 3 hours in the high scenario. This is a one-off direct cost to business as they would have to understand the change before undertaking any further research into the viability of this permission. The cost would be incurred in the first year that this regulation is introduced. The tables below give a breakdown of the operators in scope and total familiarisation costs.

[13] https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/occupation4digitsoc2010ashetable14 ONS, Annual Survey of Hours and Earnings, provisional 2021 dataset – Transport and distribution clerks and assistants (code 4134).

[14] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1102783/tag-unit-A4.1-social-impact-appraisal.pdf TAG Unit A4.1 – Social Impact Appraisal

[15] https://www.gov.uk/government/publications/traffic-commissioners-annual-report-2020-to-2021/traffic-commissioners-for-great-britain-annual-report-2020-21 Traffic Commissioner Annual Report 2020 to 2021, section 5.5

Table 3: Operators in Scope

Type of operators in scope	Operator numbers
Goods vehicle operators	69,500
Public Service Vehicle operators	6,600
Total number of operators	76,100

Table 4: Total Familiarisation costs (2022 prices)

	(1)	(2)	(3)	(4)	(5) = (1) * (2) * (3) * (4)
Estimate	**Total Number of Operators (Goods Vehicles & PSVs)**	**Hours taken**	**Hourly Wage of transport & distribution clerks and assistants (2022 prices)**	**NWLU**	**Total costs, one-off, £m**
Low	76,100	2	£13.71	1.265	£2.64m
Central	76,100	2.5	£13.71		£3.30m
High	76,100	3	£13.71		£3.96m

Unmonetised Costs

49. The following costs are indirect, they only occur to businesses that make specific choices based on the new regulation, rather than direct (immediate and unavoidable). The costs are unmonetised, as the technology is in its early stages. The potential scale of them will depend on the future supply and demand for AFVs and ZEVs which will be reassessed in 5 years, once technology and infrastructure has developed further, as indicated within the PIR plan.

Cost of exploring whether switching to ZEV/ AFV fleet is beneficial (indirect – business)

50. In order for businesses to decide whether it would be beneficial to switch to a ZEV/ AFV fleet, they would need to undertake some cost benefit analysis to explore the potential net cost or benefit of switching. This cost is indirect as it is not immediate and it is not unavoidable. Choosing to undertake this cost would allow businesses to find out whether a ZEV/AFV fleet is worthwhile pursuing. If businesses decide that it is worth pursuing, other indirect costs would follow such as purchasing costs and potential training costs for the drivers.

Cost of purchasing new ZEV/ AFV fleet (indirect – business)

51. This legislation change may encourage more businesses to invest in new ZEV/ AFV fleet as they become more commercially available if the benefit of doing so outweighs the costs. The initial investment would be substantial due to the emerging technology of these vehicles. Businesses would

replace their current fleet as they see fit and in their own time periods. This may be done gradually over time as they transition their fleet to more environmentally friendly and cost-effective alternatives. This cost is indirect as businesses will not be forced to buy ZEV/AFV fleet at any point in the 10-year appraisal period. This cost is avoidable, and it is not immediate.

52. This cost has also not been monetised as the cost would be different for every business and it is impossible to predict how and when businesses would decide to invest in new ZEV/AFV fleet and whether that decision would be solely based off this increase in weight allowance.

Training Costs (indirect – business)

53. Due to the increased weight allowances some operators may wish to provide additional training to drivers that will be driving heavier vehicles. There is no mandatory requirement for this under the regulation as the classes of vehicle are not changing. As the training is discretionary, and the weight increase small, it is not proportionate to monetise at this stage; however, if the operators choose to do this, they will face indirect costs in doing so. The assumption is that training would only be conducted if businesses found it beneficial for their employees.

54. Drivers currently driving 40 tonne vehicles already have a license to drive 44 tonne vehicles (which are not in scope), which means they would already have the knowledge and skills necessary to drive a 42-tonne vehicle after the maximum increase in weight allowance is applied. Training would therefore most likely be unnecessary, which would result in zero training costs for most businesses.

55. If any training was required in rare circumstances, this would likely take the form of a one-day training course, similar to the abnormal loads courses that are included in the DCPC (Driver Certificate of Professional Competence) courses. The average 7-hour DCPC course costs about £50[16], and there would likely be an additional burden on businesses as drivers would need to take a day off from work to complete the course. Given that training costs will most likely not be required for most businesses for the reasons mentioned above, this cost has not been monetised.

Infrastructure Impact (indirect – wider society)

56. As a result of the policy there will be a heavier total vehicle weight to carry the same payload as AF and ZE HGV and PSVs are utilised alongside ICE vehicles. These new vehicles will have an increased impact on existing roads and structures due to their increased weight when compared with the ICE only fleet of the counterfactual. However, weight limits for individual axles (axle weight being the main determinant of road wear, with wear increasing in a four-power relationship with axle weight) and the overall weight limit of 44 tonnes for a six-axle HGV are not changing. It has not been deemed proportionate to monetise this cost due to the permissive nature of this regulation given the complexity of this calculation and the unknown impact this measure will have on the uptake of these vehicles. Even if this cost was monetised, it would be indirect and would have no bearing on the EANDCB.

Accident Severity (indirect – wider society)

57. The increase in the weight allowance for AF and ZE HGVs could also increase their braking distance, which we expect could in turn increase the risk of accidents if these braking distances were incorrectly judged by the driver. The greater weight could increase the accident severity from any collisions involving these vehicles, however given the unknown uptake and usage at this stage, the effect cannot be quantified, and given the small weight increases we anticipate the impact would be small. A risk assessment that was done by National Highways on another policy allowing for higher

[16] Policy assumption

HGV weights found that increases of between 1 and 4 tonnes were unlikely to have any significant impact on either the likelihood or severity of accidents. This data is sensitive and unpublished, which is why it has not been cited.

58. It has not been deemed proportionate to monetise this cost due to the permissive nature of this regulation, and due to there being low numbers of AF or ZE HGV on the market currently. The changes proposed include a marginal increase in weights which is not expected to affect accident rates or severity. In addition, the potential contributory factors including driver error/ reaction/ braking are a small component of HGV accidents. In 2019, driver/rider error or reaction for factors that would likely be affected by the weight of the HGV being driven only accounted for 14.5%[17] of total HGV accidents and factors related to behaviour or inexperience only accounted for 8.6%[18] of total HGV accidents. We therefore expect this impact to be small and it to be impossible to directly prove causality.

Benefits

Increase in efficiency of ZE and AF vehicles (indirect – business)

59. The increased weight allowance would allow for more goods to be carried by a single vehicle as there would be no payload penalty due to the increased weight of the ZEV/AFV powertrains. This would increase the efficiency of ZE and AF Vehicles to move freight relative to the counterfactual of doing nothing. This would cut down on the number of journeys required to move the same amount of goods, which would represent a benefit to businesses due to lower costs of transportation.

60. The annual efficiency benefits are calculated by taking the efficiency gains per vehicle and multiplying it by ZEV uptake scenarios for each type of vehicle and the percentage of vehicles that operate on the maximum weight allowance (and would therefore benefit from this increase in weight allowance). The data and calculations used for this are explained in more detail below.

$$\boldsymbol{Annual\ Efficiency\ Benefits} = \boldsymbol{ZEV, AFV\ uptake} * \boldsymbol{Proportion\ of\ Vehicles\ in\ Scope} * \boldsymbol{Efficiency\ gains\ per\ Vehicle}$$

The calculations are broken down into 3 components:

a. ZEV/AFV Uptake Scenarios
b. Efficiency Gains per Vehicle
c. Percentage of Vehicles in Scope

a. ZEV/ AFV uptake scenarios

61. To complete our analysis on the costs and benefits of this intervention, indicative ZEV uptake scenarios for the future were used. The low scenario is the ZEV uptake expected for the future if there is no change in legislation- it is the baseline scenario and therefore assumes zero ZEV HGVs will be in circulation. The low scenario was taken from the Energy and Emissions Projections: 2021-2040. These scenarios reflect HGV uptake only and do not account for PSVs/ buses for the reasons mentioned in the rationale for DMA section.

[17] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1106325/ras0702.ods (Junction overshoot, junction restart, poor turn or manoeuvre, sudden braking, swerved, loss of control)

[18] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1106325/ras0702.ods (Behaviour or inexperience, unfamiliar with model of vehicle)

62. The high scenario for indicative ZEV future uptake is an indicative pathway of zero emission HGV uptake which is consistent with our stated ambition only allowing the sale of zero emission HGVs by 2040, and rapid deployment of vehicles before then. The high scenario is consistent with the vehicle led decarbonisation scenario from the Common Analytical Scenarios[19]. Rapid deployment of zero-emission HGVs is going to be important to put us on a path to meeting the 6th Carbon Budget and net zero targets.

63. Both the low and high scenarios are subject to revision in the future and should not be taken as a trajectory for the uptake the government is planning for. The scenarios used in this analysis reflect HGV uptake only and do not account for PSVs/ buses for the reasons mentioned in the rationale for DMA section.

64. The central uptake scenario uses an average between the low and high scenarios for ZEV uptake – which represents a mid-point between the two extremes.

65. From the scenarios, Small Rigid, Large Rigid and Articulated BEVs/ hydrogen vehicles are used and the stock of vehicles in circulation for every year is used. Small rigid, large rigid and articulated vehicles have different weight allowances and different uptake scenarios which is why the underlying modelling separates them. The stock of vehicles for BEVs and hydrogen vehicles are combined in these projections. Both BEVs and hydrogen vehicles are considered ZEVs and would therefore be getting a 2-tonne increase in weight allowance.

66. No scenarios for AFVs have been used as these have not been forecasted; however, AFV uptake scenarios have been considered in the analysis as it is likely that there would be a combination of ZEVs/ AFVs on the road during the appraisal period. Unlike ZEVs, AFVs would only get a 1 tonne increase in weight allowance.

67. The ZEV uptake forecasts used have not been published yet and are sensitive, which is why the raw numbers have not been included in this DMA.

Table 5: ZEVs as a percentage of total HGV fleet- Net Zero Strategy[20]

2019	2025	2030	2035
0%	0%	9%	37%

68. In the net zero strategy, it is assumed that ZEVs will only start forming a percentage of the HGV fleet after 2025 to form 9% of all HGVs by 2030. The rate of increase in percentage uptake increases throughout the years and reaches 37% in 2035. Although the assumptions are not exactly the same as those used in the high and low scenarios, the pattern remains the same. The percentages shown in table 4 are not used in the analysis and are purely included to demonstrate the pattern of potential ZEV uptake in the next few years.

Current weights of vehicles

69. Lighter HGVs are more likely to be BEVs and heavier HGVs are equally likely to be hydrogen vehicles or BEVs. Vehicles above 40t are not in scope for this legislation. Current evidence from the licensed HGV registrations[21] tell us that vehicles between 18 and 31 tonnes account for 11.9% of the

[19] https://www.gov.uk/government/publications/common-analytical-scenarios-databook

[20] Table 10- pg. 326 - https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033990/net-zero-strategy-beis.pdf

[21] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1077417/veh0506.ods

total and vehicles between 31 and 41 tonnes account for 11.4% of the total HGVs registered, as seen in the table below. It is not known how these percentages will change over the appraisal period.

Table 6: Breakdown of HGV registrations by weight

Geography	Date	Units	Up to 7t	Over 7t to 8t	Over 8t to 18t	Over 18t to 31t	Over 31t to 41t	Over 41t	Total
United Kingdom	2021 Q4 (end December)	% of total	14.5	17.6	19.8	11.9	11.4	24.8	100.0[22]

Sensitivity Scenarios used

70. To reflect the uncertainty behind what percentage of HGVs in the rollout scenarios will be ZEVs and what percentage will be AFVs and to account for the highest possible scenario and lowest possible scenario for efficiency benefits, the following technology and uptake scenarios and sensitivities have been used in the analysis:

Table 7: Technology and Uptake Scenarios

	Technology Scenarios	Uptake Scenarios
High Scenario	100% ZEV (2 tonne increase)	High (given)
Central Scenario	75% ZEV (2 tonne increase), 25% AFV (1 tonne increase)	Central (constructed- uses all 3 uptake scenarios defined and averages out the benefits)
Low Scenario	25% ZEV (2 tonne increase), 75% AFV (1 tonne increase)	Low (constructed- uses 25% uptake from the high uptake scenario)

71. All vehicles in the freight decarbonisation scenarios are BEVs or hydrogen vehicles, which are both considered to be ZEVs. Most HGVs in the smaller weight categories are likely to be BEVs. Hydrogen HGVs are more likely to be in the higher weight categories. Hydrogen vehicles are zero emission if used in a fuel cell and are only considered AFVs when used in a hydrogen combustion engine. Most AFVs are likely to operate using methane or dual-fuel engines, but no forecasts are currently available for those types of vehicles. The hydrogen HGVs in these projections are hydrogen fuel cell HGVs (not combustion) and would therefore get a 2-tonne increase in weight allowance. However, given that there are no substantial forecasts available for AFVs and to allow for any potential uptake of ZEVs/ AFVs in the future, a potential uptake of AFVs is considered in the central and low scenarios.

72. Given that ZEVs would get a 2-tonne increase in weight allowance and AFVs would get a 1 tonne increase in weight allowance, we have assessed a range of scenarios on uptake of vehicles and which technology are used to explore the potential range of impact. The scenarios are summarised in Table 7, but broadly the central reflects the current likely scenario (which we have deemed the most likely), while the low and high explore a situation where the uptake is lower or higher than the central case, and how different technologies may affect the weight allowances. Therefore, this range covers the lowest and highest possible direct benefits to business that could be acquired by the efficiency gains. While both the low and high scenarios are quite unlikely, this will allow the potential range of impacts to be explored.

[22] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1077417/veh0506.ods

73. The scenarios used in this analysis are not in line with other pieces of analysis conducted by the Freight Decarbonisation team within DfT and cover both extremes in the sensitivities to account for any possible outcomes and percentage uptakes.

b. Efficiency Gains per Vehicle

74. To be able to calculate efficiency benefits, getting an approximation for the maximum payloads of the different types of vehicles and their weight limits was essential. The figures below were provided by the Society of Motor Manufacturers and Traders Limited (SMMT) and are a broadly indicative guide. They assume that the trucks have a dry freight curtain side body with no tail lift. A number of variables could affect these payload figures in terms of both the 'base vehicle' used, the body type fitted, and then any ancillary equipment (i.e., cranes, pumps etc).

Table 8: Approximate maximum payload of varying vehicle types

Type of vehicle	weight limit (tonnes)	Total unladen weight (or maximum load weight)
1.Articulated lorries and road trains with 5 or 6 axles (2+3)	40	15t (25t)
2.Articulated lorries and road trains with 4 axles	38	14t (24t)
3.Two axle motor vehicles – small rigid	18	7.5t (10.5t)
4. Three axle motor vehicles- large rigid	25-26	9t (17t)

75. Vehicles with a 44 tonne limit are not in scope for this regulation due to infrastructure limitations and are therefore excluded from the analysis and table 8.

76. To get the total running costs of running ZEVs and AFVs, an assumption that operating costs for ICE vehicles are similar to ZEVs and AFVs is used. Operator costs were taken from the Transport Engineer Report [23] in 2021 prices and those were uplifted to 2022 prices.

Table 9: Running costs by vehicle type

Vehicle type	16 to 18 tonnes	3-axle rigid vehicle 26 tonnes	38-tonne artic	40-tonne artic
Total running costs (2021 prices)	61,315	69,980	90,881	89,500
Total running costs (2022 prices - uplifted)	£63,062	£71,974	£93,470	£92,050

77. The maximum efficiency gains per vehicle from a 2-tonne increase in weight allowance in the high scenario were calculated in the following way:

Table 10: Maximum efficiency gains per vehicle from a 2-tonne increase in weight allowance

[23] http://www.transportengineer.org.uk/article-images/233497/Operator%20costs.pdf

High Estimate	(1)	(2)	(3)	(4)= (((2)/((2)-2)-1) * (3)
Type of vehicle	**Weight allowance Increase (tonnes)**	**Max payload**	**Total Running Costs (2022 prices)**	**Maximum efficiency gains per vehicle**
Small Rigid- 16 to 18 tonnes	2	10.5	£63,062	£14,838
Large Rigid- 26 tonnes		17	£71,974	£9,597
Artic- 38 tonnes		24	£93,470	£8,497
Artic- 40 tonnes		25	£92,050	£8,004

78. To calculate the maximum efficiency gains from a 1 tonne increase in weight allowance, the calculations mentioned above were repeated and then multiplied by 0.5.

79. The sensitivities were done by taking a percentage of the maximum efficiency gains. The maximum efficiency gains represent the high scenario. In the central scenario, the high scenario values were multiplied by 0.75 to get a 25% decrease. In the low scenario, the central scenario values were multiplied by 0.75 to get a 25% decrease again.

c. Percentage of Vehicles in Scope

80. To calculate the number of vehicles that would be affected by this 1/2 tonne increase in weight allowance, bespoke Road Freight Statistics were used on the weight of goods carried by HGVs on their journeys in 2019 to estimate the number of HGVs that are operating on the maximum weight allowance and would therefore benefit from this increase in weight allowance. This data is unpublished but is based on the Continuing Survey of Roads Goods Transport (CSRGT).

81. Only data from 2019 was used as 2022 and 2021 data would have been affected by the covid-19 pandemic. It is assumed that the pattern of weight carried on HGV journeys remains the same as it was in 2019 throughout the appraisal period. In reality, this may not be the case as patterns of weight carried by HGVs may change over time. The data used was taken from a survey of UK-registered hauliers operating in the UK (CSRGT). The data only covers hauliers that responded to the survey and is therefore may not be fully representative. In addition, some of the responses from the survey were suggesting a payload that is not feasible. For example, they suggested that a vehicle with a weight limit of 40 tonnes would be carrying goods weighing 40 tonnes. This is not feasible as the substantial weight of the unloaded vehicles were not accounted for. Such responses were naturally excluded from the calculations through the process outlined below. There may be additional erroneous data points within this dataset that have not been identified or excluded because they fall within the acceptable weight range (equal to or below the maximum load weight for each weight category- table 7). If this is the case, the percentage of vehicles in scope would be slightly different.

82. Despite the caveats mentioned, the survey is the only source we have on weight of goods carried by HGVs and it underpins published DfT statistics. It is therefore considered somewhat robust.

83. The hauliers that responded provided information on the number of journeys undertaken by their HGVs and the weight of goods carried for each of the journeys. Only responses for the vehicles in scope for this legislation were used- these include small rigids with a maximum weight limit of 18 tonnes, large rigids with a maximum weight of 26 tonnes, and articulated (artic) vehicles with maximum weights of 38 and 40 tonnes.

84. These responses were then used to estimate the percentage of vehicles in scope for a 1 tonne and 2 tonne increase in weight allowance for each type of vehicle. The process was as follows:

1. The maximum payloads were calculated by subtracting the indicative weight of unloaded vehicles from the weight limit.
2. The total trips in scope for each category of vehicles was then found by counting the number of journeys in each weight category that was equal to or below the maximum payload.
3. The empty trips that carried zero goods were then filtered out to get the total number of loaded trips for each weight category.
4. To get the number of vehicles in scope, the number of journeys carrying goods weighing within the maximum 2 tonnes of the maximum payload for each weight category were counted. For example, for articulated (artic) vehicles with a maximum weight allowance of 40 tonnes, with an indicative unloaded weight of 15 tonnes and with a maximum payload of 25 tonnes (40-15= 25), all journeys carrying goods weighing between 23 and 25 tonnes were counted.
    - Artic with 40t weight limit
    - Unloaded weight of vehicle of 15 tonnes
    - Therefore, maximum payload of 25 tonnes (40-15= 25)
    - For a 2 tonne weight increase of those vehicles, all journeys carrying anything between 23 and 25 tonnes were counted to get the vehicles in scope for the efficiency benefits of the weight increase
5. This number was then divided by the total number of loaded trips to get the percentage of loaded trips in scope. 38 tonne and 40 tonne vehicle percentages were combined to get the percentage of articulated vehicles in scope.
6. To then calculate the sensitivities, that percentage was multiplied by 0.75 for the low scenario and by 1.25 for the high scenario.
7. This whole process was repeated to get the percentage of vehicles in scope for a 1 tonne increase in weight allowance but instead of counting the number of journeys carrying goods weighing between the maximum 2 tonnes of the maximum payload for each weight category in stage 4, the number of journeys carrying goods weighing between the maximum 1 tonne was counted.

Formula:

$$Percentage\ of\ loaded\ trips\ in\ scope = \frac{Number\ of\ trips\ with\ a\ payload\ weight\ within\ the\ maximum\ 2t\ (ZEVs)\ or\ 1t\ (AFVs)\ of\ maximum\ payload}{Total\ number\ of\ loaded\ trips}$$

$$Percentage\ of\ loaded\ trips\ in\ scope = Percentage\ of\ vehicles\ in\ scope$$

Table 11: Percentage of vehicles in scope for a 2-tonne increase in weight allowance

Types of vehicles	Central Scenario	Low Scenario- 25% sensitivity	High Scenario- 25% sensitivity
Small Rigid (18 tonnes)	2.24%	1.68%	2.80%
Large Rigid (26 tonnes)	3.59%	2.69%	4.48%
Artic (38 & 40 tonnes)	1.60%	1.20%	2.00%

Table 12: Percentage of vehicles in scope for a 1 tonne increase in weight allowance

Types of vehicles	Central Scenario	Low Scenario- 25% sensitivity	High Scenario- 25% sensitivity
Small Rigid	1.07%	0.80%	1.34%
Large Rigid	0.83%	0.63%	1.04%
Artic	1.27%	0.95%	1.58%

Calculating Annual Efficiency Benefits

$$Annual\ Efficiency\ Benefits = ZEV, AFV\ uptake * Proportion\ of\ Vehicles\ in\ Scope * Efficiency\ gains\ per\ Vehicle$$

85. Annual efficiency benefits were then calculated for each type of vehicle by multiplying the BEV/ hydrogen vehicles uptake scenarios by the percentage of vehicles in scope and the efficiency gains of increasing the maximum weight allowance by 1 or 2 tonnes. These benefits were then summed for each year to get the total annual benefits regardless of vehicle type or weight.

86. In the high scenario, a 100% BEV uptake is assumed with the high uptake scenario, in the central scenario, a 75%/25% split between ZEVs and AFVs is assumed with the averaged uptake scenario and in the low scenario, a 25%/75% split between ZEVs and AFVs is assumed with an uptake scenario equivalent to 25% of the high uptake scenario. These assumptions give the most representative and realistic outcomes.

Table 13: Annual Efficiency Benefits (discounted) (£ millions)

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
High Scenario	0.2	0.4	0.7	1.9	3.8	6.3	9.4	12.9	17.4	22.9
Central Scenario	0.1	0.1	0.2	0.6	1.2	2.1	3.1	4.2	5.7	7.4
Low Scenario	0.0	0.0	0.0	0.1	0.2	0.4	0.6	0.8	1.1	1.4

87. As explained above, the annual efficiency benefits are avoidable and are not immediate throughout the appraisal period; and although they have an impact on business, they are indirect, so these benefits are not reflected in the EANDCB calculation.

Unmonetised Benefits

88. The following benefit is indirect and would only occur if ZEV/AFV uptake was significantly realised. The potential scale of the impact will depend on the future supply and demand for AFVs and ZEVs which will be reassessed in 5 years, once technology and infrastructure has developed further, as indicated within the PIR plan.

<u>Reduced GHG (and other) Emissions (indirect – wider society)</u>

89. The policy measure of increased weight allowances for AFVs and ZEVs could make them more commercially viable. This could lead to an increase in the use of AFVs and ZEVs and in turn could lead to a significant reduction in the level of greenhouse gas and air quality related (e.g. oxides of nitrogen) emissions from road freight and passenger transport compared to the option of doing nothing. Given the industry is only at its early stages with these newer vehicles and also due to the permissive nature of this legislation, it has not been deemed proportionate to quantify or monetise this benefit.

90. As of 2020, HGVs accounted for 18.6%[24] of domestic transport greenhouse gas emissions (GHG) and the equivalent percentage for buses was 2.2%. The current CO2e emissions estimate for an average laden HGV is 107.5g per tonne kilometre[25]. As ZEVs/ AFVs become more widely used and their uptake increases, HGV GHG emissions are expected to decrease substantially, leading to greater benefits to the public sector, the environment, and the wider society.

Improved Productive Efficiency (indirect – wider society)

91. As seen earlier, a very small percentage of HGVs currently operate at their maximum weight allowance, making them productively inefficient (they do not operate at the lowest marginal cost). If this policy encourages increased ZEV/ AFV uptake for HGVs and PSVs, the wider economy could benefit from improved productive efficiency. More goods would be able to be transported per mile travelled and operators would be using less resources to produce the same output at a lower cost. For this benefit to be realised, HGVs would need to operate at their maximum weight allowance or at a weight higher that they currently operate at. This would provide wider welfare benefits to society as businesses would be more efficient, have lower costs and would be able to invest their funds elsewhere ensuring greater social and economic development of the economy. This impact has not been monetised as this benefit to the wider society cannot be quantitively separated.

Reduced Congestion on Roads (indirect – wider society)

92. Being able to carry greater loads on HGVs leads to fewer journeys necessary to transport the same amount of goods. With this policy HGVs will be able to carry greater loads on their journeys compared to the counterfactual. Assuming businesses take advantage of this increase in weight allowance and use their maximum load capacities for transporting goods where possible, congestion on the roads is likely to decrease over the appraisal period. This is an external benefit to other road users. This impact is expected to be fairly low, especially in the initial years, given that very few ZEVs/AFVs are currently on the market and the take up is expected to be slower in the initial years. As long as the uptake increases and businesses take advantage of the maximum load weight available to them, this benefit will become more prominent. This has not been quantified as it cannot be estimated to what extent congestion would improve, especially given the low current uptake.

Business Impact Target Calculations

93. The only direct cost to business is the familiarisation cost. The only other monetised impact included in the BIT calculations is the indirect annual efficiency benefits. These two impacts have been included in the BIT score, the EANDCB, the Total Net Present Social Value and the Business Net Present Value shown in the table below.

Table 14: Cost of option, 2019 prices, 2020 present value

[24] https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2020

[25] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1085917/future-of-freight-plan.pdf

Total Net Present Social Value	Business Net Present Value	Net direct cost to business per year	BIT Score
18.2	18.2	0.3	1.6

94. Other indirect costs mentioned earlier, which are associated with investment decisions that are required to realise the efficiency benefits, have not been monetised as the technology is in its early stages and are therefore not included in the BIT calculations. This may lead to skewed final numbers.

3.0 Risks and unintended consequences

95. As mentioned in the costs and benefits section, the heavier weight allowance could impact breaking distances and therefore increase the likelihood of accidents and possibly the severity of these for the other vehicles involved in collisions, however a risk assessment for a policy regarding other heavier vehicles concluded that increases of between 1 and 4 tonnes were unlikely to have any significant impact on either the likelihood or severity of accidents. If that is the case, and use of this weight allowance becomes the standard and more accidents do happen, then there could be additional speed limit changes or other related measures to deal with this unintended consequence.

96. It is not anticipated that this policy will add any enforcement costs given the existing infrastructure to regulate vehicle weights, via the initial type-approval process (where new vehicle types produced by manufacturers are assessed for compliance with rules governing their construction by the Vehicle Certification Agency (VCA)) and similarly on the road by the Driver and Vehicle Standards Agency (DVSA) and the police.

97. The policy impacts are reliant upon these changes making AFVs or ZEVs commercially viable for operators. The payload penalty of these vehicles may have been one of several factors contributing to the lack of supply to and demand from the UK market and giving rise to the disadvantage compared to EU operators. This regulation aims to address the payload issue, however other issues may remain unresolved for the use of AFVs and ZEVs, such as confidence in adequate refuelling or recharging infrastructure, the exact technology to be utilised and the generally higher upfront costs of these vehicles.

98. If take up of AFVs or ZEVs is significantly higher or lower than anticipated, the scale of the benefits will increase or decrease accordingly. Changes in levels of take up could be due to changing in technology development (such as improvements in battery density) or varied roll out of refuelling or recharging infrastructure.

99. Given their higher upfront purchase price, it is likely that initially larger companies with greater liquidity will be able to afford ZEVs. This could present these companies with an advantage, once sales of new non-zero emission HGVs are phased out in either 2035 or 2040, as they would already have the infrastructure to operate these vehicles in place. However, any decision by a company to purchase a ZEV is likely to be down to a range of factors, rather than being exclusively due to the extra weight allowance provided for by these Regulations.

100. Data used in the analysis come with many assumptions and caveats and these are explained more clearly in the costs and benefits section. The forecasts for ZEV uptakes in the future are subject to revision, which can have an impact on the efficiency benefits per vehicle of the increase weight limits. Road Freight Statistics that were used in the analysis to calculate the percentage of vehicles in scope were paired with assumptions that may change over time. It was assumed that the pattern of weight of goods carried by HGVs remains the same over the appraisal period, although, several factors may affect this pattern over time. These statistics were only used to calculate annual efficiency benefits resulting from the increase in weight allowance compared to the do-nothing option. As the efficiency benefits are indirect, the EANDCB is not affected, even if these statistics and assumptions do change over time.

4.0 Wider impacts

Equalities Impact Assessment

101. An equalities impact assessment has not been completed as this policy will not have a disproportionate impact on any protected group. It is a technical policy related to vehicle standards.

Trade Impact

102. Under the requirements of carrying out a trade test as part of the DMA process, a short explanation has been undertaken to highlight the possible impacts on the value of imports or exports, impacts on investments and trade flows and impacts on domestic and foreign businesses.

103. There may be an impact on the value of imports to the UK if foreign HGV and PSV suppliers view this regulation as a reason to supply the market with AFVs or ZEVs. The additional weight allowance may reduce some of the barriers to entry for foreign HGV or PSV producers to supply the UK market, due to the harmonisation of Regulations between the UK and EU. There are currently very few domestic producers of these vehicles, so the effect on the value of exports is unclear. However, if there is one it is likely to be positive, as vehicles produced in the UK will be able to take advantage of the same additional weight allowance as vehicles produced in the EU and therefore would offer a similar payload capacity. Maintaining harmonisation with EU rules also avoids a familiarisation cost for UK manufacturers exporting vehicles to the EU in a counterfactual scenario (and a cost for EU businesses considering purchasing them).

104. This regulation enables domestic businesses to operate under the same rules as EU operators, who already have been granted these additional weights for operating AFVs and ZEVs in the UK under the TCA. These new weight allowances will level the playing field, ensuring that UK operators will not be penalised relative to EU operators. This might increase the number of exports as the same weights can be carried on both in the UK and EU legs of journeys, avoiding a possible scenario in which cargo has to be removed when a vehicle moves internationally due to varying weight limits. A possible scenario in which EU operators are used to move goods within the UK because they are able to carry higher cargo weights is also avoided.

Innovation Test

105. It is considered that this is likely to be a suitable weight increase, even for future innovations, as increases beyond those proposed are likely to be impossible to implement without increases in axle weight limits. The Department has no plans to increase weight limits for individual axles, due to the consequential increase in road wear. Given this, if batteries or other zero emission powertrain technologies become heavier, operators would need to find other ways of reducing the overall vehicle weight to accommodate them without losing payload. However, current indications are that battery density is only going to increase, so this is unlikely to be a significant issue. This will be considered in the Post Implementation Review (along with the reverse scenario, in which technology improvements are significant enough to remove the requirement for weight increases).

106. If other technologies (particularly hydrogen fuel cells) become predominant as HGV powertrains, the weight increase is still relevant, as high-pressure tankers are required to store the hydrogen, which have a significant weight impact. At worse, the business case for these technologies would be improved, which should help to speed up adoption. Hydrogen and electric powertrains are expected to be the predominant powertrain types used in AFVs or ZEVs during the appraisal period, but this will be reviewed in five years' time, as alternatives may emerge.

Small and Micro Business Assessment

107. The Business Population estimates from 2022 provide a breakdown on the number of businesses, employees, and turnover of businesses by different sizes in the road freight transport

industry, with the table below giving a detailed breakdown[26]. This section looks at how this policy would affect businesses with up to 499 employees.

Table 15: Breakdown of business size within the road freight transport industry

Size of businesses	Number of businesses	Employment (thousands)	Turnover (£ million)	Business share (%)	Employment share (%)	Turnover share (%)
Micro (1 - 9 employees)	21,940	81	6,827	81.9	28.6	22.2
Small (10 - 49 employees)	4,215	77	8,452	15.7	27.2	27.4
Medium (50 - 249 employees)	575	53	7,004	2.1	18.7	22.7
Large (250 or more employees)	70	72	8,525	0.3	25.4	27.7
Total	26,800	283	30,808	100	100	100

108. The road haulage industry is made up primarily of small and micro businesses, which make up 97.6% of the businesses within the industry. It could be assumed that due to the nature of emerging technology, when these vehicles do start becoming more widely available that they will cost more, and therefore only the larger businesses would be able to afford ZEVs/AFVs and therefore make use of these regulation changes. The potential benefits of the policy of increasing the weight allowances, would therefore likely mostly fall onto larger businesses as smaller operators may have less revenue to invest in newer fleets.

109. This change in regulation in itself does not put any barriers in the way of smaller businesses or discriminate against them. The affordability of ZEVs/ AFVs is what would give larger, more liquid companies an advantage in benefiting from the potential efficiency benefits. Familiarisation costs are fixed for all firms regardless of their size, making them disproportionately greater for the smallest firms. Given most firms within the road freight transport industry are small, this is not a big issue in terms of competition as most of them would face the same costs proportionally. Firms, regardless of their size, would adopt ZEVs/AFVs when the benefits of doing so outweigh the costs.

110. However, there could be other measures implemented before that time, such as subsidies to try and help the industry move towards greener technology, which could help smaller businesses to get access to these vehicles. For the reasons discussed, smaller businesses might be less likely to be able to take advantage of this policy in the earlier stages of this technology. In the long run, these technologies should become cheaper and become more accessible to all sizes of businesses. Smaller businesses could also acquire these vehicles when they become available in the second-hand market at more affordable prices.

111. This change in regulation does not put any barriers on larger firms between 250 and 499 employees. Larger firms may however have an advantage over smaller firms in terms of being able to afford new ZEV fleets more easily.

Justice Impact Test

112. This policy will have no impact on the justice system. Existing enforcement mechanisms for any operator breaking vehicle weight limits will remain unchanged and no new offences are created.

[26] Table 7, Code 494, https://www.gov.uk/government/statistics/business-population-estimates-2022

5.0 Post implementation review

1. **Review status:** Please classify with an 'x' and provide any explanations below.

	Sunset clause	X	Other review clause		Political commitment		Other reason		No plan to review

Regulations to be reviewed every five years to ensure continued suitability.

2. **Expected review date** (month and year, xx/xx):

02		/	28	

Five years from when the Regulations come into force

3. **Rationale for PIR approach:**

The level of evidence and resourcing that will be adopted for this PIR: Low

- **Will the level of evidence and resourcing be low, medium or high?**

The level of evidence and resourcing required for this PIR will be low. This measure falls beneath the *de minimis* threshold and it is likely that even in five years' time, many of the impacts of this measure may not have been realised. Further reasoning for a low level of resourcing is provided below.

The government has introduced phase out dates for the sales of new non-zero emission HGVs of 2035 (for vehicles weighing below 26 tonnes) or 2040 (for vehicles weighing over 26 tonnes). Therefore, even by the expected review date new non-zero emission HGVs will still be able to be sold for another 7-12 years and are likely to remain a significant proportion of new HGVs sold.

In addition, DfT are funding a five-year research programme into ZEV HGV technology, starting in 2022 (with vehicles expected to be on the road in 2045/25), which will look to provide more clarity on what technology or split of technologies will be used to decarbonise the logistics industry. The Zero Emission Road Freight Demonstrator Programme will trial BEVs, hydrogen fuel cell vehicles and potentially other powertrain technologies. Given that the Demonstrator Programme will only be completed in 2030 and it is likely to take several more years for the results to have a significant effect on the types of HGVs that are purchased, it is likely that by 2028 the market for AFV and ZEV HGVs will still be at an early stage and therefore a review of this measure may have limited data to work with when considering the impact of these Regulations on HGVs. There may however be greater take up of ZEVs in lower weight categories, as these vehicles are typically simpler to electrify. While at a slightly more advanced stage, it is likely that the market for AF or ZE PSVs will follow similar trends to the HGV market and therefore a PIR in 2028 may have a limited amount of information to work with. A review closer to the phase out dates for sales of new non-zero emission HGVs (2035 or 2040 depending on weight) may have more representative information available. However, statistics are available measuring the number of registrations of vehicles by powertrain type, allowing for a baseline to measure against.

It is also clear that there are several other significant barriers that face operators when choosing whether to adopt AFVs or ZEVs (either HGVs or PSVs). The technology readiness level, upfront cost and availability of refuelling infrastructure are all likely to be considered by the operator before making a decision to purchase a ZEV or AFV. It is probable that the changes in these factors will be more significant in an operator's purchasing decisions than the marginally higher weight provided for in these regulations. Therefore, it may be very difficult in the PIR to consider the impact of these Regulations in isolation from developments on issues such as upfront cost. Interviews with hauliers or their representative organisations could improve understanding of how purchasing decisions have been affected by these Regulations.

Finally, one reason for the introduction of these Regulations is to provide for regulatory consistency between EU operators working in the UK (who are permitted to use these extra weights via the TCA) and UK operators working domestically. Therefore, unless there are changes to the allowances in the TCA

(which is not anticipated) the rescinding of these Regulations would disadvantage UK based operators and result in regulatory inconsistency. Given that, there is limited scope for Government to change approach on this issue.

- **What forms of monitoring data will be collected?**

The number of new vehicle registrations, disaggregated by vehicle weight class and the fuel type of those registrations are already tracked at a national level by DfT. Therefore, it will be possible to track how the number of new registrations of AF and ZE PSVs and HGVs has changed over time. Survey data (the Continuing Survey of Road Goods Transport) captures the weight of load carried by HGVs, so could be used to determine whether the extra weight allowance is required.

It is also possible to roughly determine the number of models of ZE HGV on the market, via applications for the Plug-in Truck Grant, which is provided to help offset the high initial cost of these vehicles. These applications allow the Office for Zero Emission Vehicles (OZEV) to track how many models are available on the market and could therefore give an indication of how manufacturers are responding to the changes made in these Regulations.

- **What evaluation approaches will be used? (e.g. impact, process, economic)**

The primary evaluation approach will be impact evaluation, looking at the numbers of AF and ZE PSVs and HGVs that are newly registered over the evaluation period, and therefore the scale of the impact of the measure. The main objective being the increased uptake of ZE and AF PSVs and HGVs compared to ICE vehicles. Impact evaluation could also consider whether there have been any unintended effects (such as distorting vehicle sales in favour of certain types eligible for the weight increase), particularly related to the varying way in which the weight increase will be applied to AFVs and ZEVs and if this has affected uptake in different ways. These numbers will also give us an understanding of what proportion of vehicle uptakes are ZEV and what proportion are AFVs.

Process evaluation could consider how the weight limit increases have affected vehicle type approval processes at the VCA. In order to ensure that the extra weight limit is applied correctly to AFVs, VCA staff will require information from vehicle manufacturers and checking that this process is working as anticipated may be part of the PIR. This is particularly relevant given that a key rationale for the varying approach in applying extra weight limits to AFVs and ZEVs is due to the difficulty in verifying the extra weight that should be permitted for ZEVs. Process evaluation could also be used during engagement with vehicle manufacturers, to check that they have fully understood how to take advantage of the higher weight limits.

Given that the direct costs of this intervention are limited to familiarisation costs and these falls below the *De Minimis* threshold, the amount of economic evaluation required is likely to be minimal, unless further direct costs or benefits emerge during the review period. Therefore, we are not recommending the need for an economic evaluation within this PIR.

- **How will stakeholder views be collected? (e.g. feedback mechanisms, consultations, research)**

Given the low level of resourcing required, only informal consultations with stakeholders to collect primary data will likely be justified. Monitoring of vehicle registrations already carried out is likely to be sufficient. The Department has strong working relationships with freight trade bodies (which represent both larger operators and SMEs), manufacturers, and other industry groups. Informal consultation with these bodies and the VCA is likely to be sufficient when conducting the PIR.

Key research questions for the PIR are likely to be:

- What is the level of adoption of ZEV and AFV HGVs and PSVs and how is this broken down by vehicle class?
    - Suggested method of analysis: Information could be sought from the OZEV, DfT & annual Driver and Vehicle Licencing Agency (DVLA) vehicle statistics & licensing data.[27] A counterfactual scenario could be baselined against periods prior to the Regulations coming into force.

[27] https://www.gov.uk/government/collections/vehicles-statistics

- How has the pattern of weight carried by HGVs changed over time, if at all?
    - Suggested method of analysis: This could be tested via CSRGT data and road freight statistics[28], baselined against 2019 data.

- Are further measures necessary to support the adoption of these vehicle types and if so, are amendments to these regulations a suitable way to do that?
    - Suggested method of analysis: Assessment could be made via discussions with stakeholders to determine if further regulatory changes are required to increase adoption.

- Have new or improved powertrain technologies entered the market (for example novel fuels or significant changes in battery density), which either do not require the extra weight limits, or require alternative allowances in order to be adopted?
    - Suggested method of analysis: Discussions with manufacturers and their representative organisations will be used to inform this question.

- Are there other factors still blocking or hindering the uptake of these vehicles and has the introduction of these changes helped to reduce these barriers?
    - Suggested method of analysis: Informal consultations with operators and manufacturers can help to answer this.

- Has the practical implementation of the higher weight limit presented any problems, in particular for manufacturers or the VCA?
    - Suggested method of analysis: Informal consultations with these groups can be used to answer this question.

- Have there been any unintended consequences as a result of these Regulations, including the ones mentioned in this DMA- such as larger, more liquid companies being able to more easily afford ZEVs/AFVs given the high upfront costs, distorting vehicle sales.
    - Suggested method of analysis: Baselined against licensing data in the pre-policy years and against uptake forecasts for ZEVs. Further information could be sought via discussions with stakeholders (particularly freight operator representative organisation). Licensing data for each weight category and type of vehicle (ZEV/AFV) will help determine whether vehicle uptakes in each category are significantly different to those forecasted. Informal consultations with operators can help determine whether larger companies are more likely to purchase ZEVs/AFVs compared to smaller companies.

If the PIR identifies potential changes to the policy that would either improve its implementation or help in achieving the aims of increased adoption of ZE and AF vehicles, a further public consultation may be required to gauge the level of support for these changes.

[28] https://www.gov.uk/government/collections/road-freight-domestic-and-international-statistics