



Department
for Transport

Consultation on a new CO₂ emissions regulatory framework for all newly sold road vehicles in the UK

UKPIA Response

Introduction

Thank you for responding to our consultation on establishing a new CO₂ emissions regulatory framework for all newly sold road vehicles in the UK.

The closing date for this consultation in 23:45 on is 22nd September 2021. Please send your completed response form to CO2RegulationGP@dft.gov.uk.

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

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

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

About this consultation

Background

Removing all tailpipe emissions from road vehicles is fundamental to de-carbonising transport. In total, road vehicles are responsible for 91% of the UK's annual domestic transport CO₂ emissions. Cars and vans alone are responsible for 70% of that total.

In November 2020 the Prime Minister announced that we would be publishing a Green Paper on the future CO₂ regulatory framework that is to apply to new road cars, vans, and other road vehicles. This Green Paper puts forward two potential frameworks that we feel could be deployed in order to legislate for our already agreed petrol and diesel phase out dates, and to set a regulatory pathway that will lead to net zero emissions from road transport.

This Green Paper also seeks to define 'significant zero emission capability' establishing the technical requirements that vehicles will need to meet between 2030 and 2035.

Consultation proposals

We are seeking views on two regulatory frameworks that could deliver on our petrol and diesel phase out commitments, while also supporting additional carbon reductions in the lead up to those dates

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- 'tightening' the existing efficiency-based regulations, requiring the new vehicle fleet to become more efficient; and
- Deploying a Zero Emission Vehicle Mandate (ZEV Mandate) as recommended by the Climate Change Committee, alongside a CO₂ regulation.

We are also seeking views on a number of regulatory aspects that will need to be considered when developing the future framework. This includes, but is not limited to –

- The vehicle models which should be in scope;
- Whether derogations/exemptions should apply in certain cases;
- The level of fines that should be issued for non-compliance.

Finally, we are also seeking views on the definition of 'significant zero emission capability' by asking questions on –

- Eligibility metrics
- Eligibility thresholds
- Other compliance considerations

Confidentiality and data protection

The Department for Transport (DfT) is carrying out this Green Paper consultation to engage and gather views and evidence on a New Road Vehicle CO₂ Emissions Regulatory Framework for the United Kingdom. This consultation and the processing of personal data that it entails is necessary for the exercise of our functions as a government department. If your answers contain any information that allows you to be identified, DfT will, under data protection law, be the Controller for this information.

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

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

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

Your details

1. Your name and email address:

Name:	Dominic Russell
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2. Are you responding: *

<input type="checkbox"/>	as an individual?
<input checked="" type="checkbox"/>	on behalf of an organisation?

Organisation details

3. Name of your organisation:

Please note sole traders are not required to provide this information.

Organisation name:	UKPIA
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3. Are you responding as:

Please note sole traders are not required to provide this information.

<input type="checkbox"/>	a representative of a business or firm?
<input checked="" type="checkbox"/>	a representative for a trade body?
<input type="checkbox"/>	a representative of an academic or research organisation?
<input type="checkbox"/>	a representative of a local authority or other public body?
<input type="checkbox"/>	from a community group?
<input type="checkbox"/>	another organisation?

Consultation Questions

Significant Zero Emission Capability

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

UKPIA does not believe significant zero emission capability (SZEC) should be defined by a tailpipe CO₂ emission metric alone, as this may inadvertently drive increased emissions elsewhere. For example, an arbitrary zero emission range requirement could encourage the use of bigger batteries, which may not be utilised or required in real world driving. The process to manufacture these batteries would have an unnecessary and detrimental sustainability impact (such as increased CO₂ emissions), with no real-world advantage. Also, use of larger batteries than required would inevitably lead to increased vehicle mass, lower efficiency and, potentially, increased non-tailpipe emissions, such as particulate emissions from brake, tyre and road surface wear.¹

It should also be highlighted that any level of SZEC does not guarantee a greenhouse gas (GHG) reduction alone. The metric should rather require holistic, cradle-to-gate lifecycle GHG emission reductions (see Figure 1 below) - requiring a minimum zero tailpipe emissions operation does not inherently result in overall GHG emissions reduction.

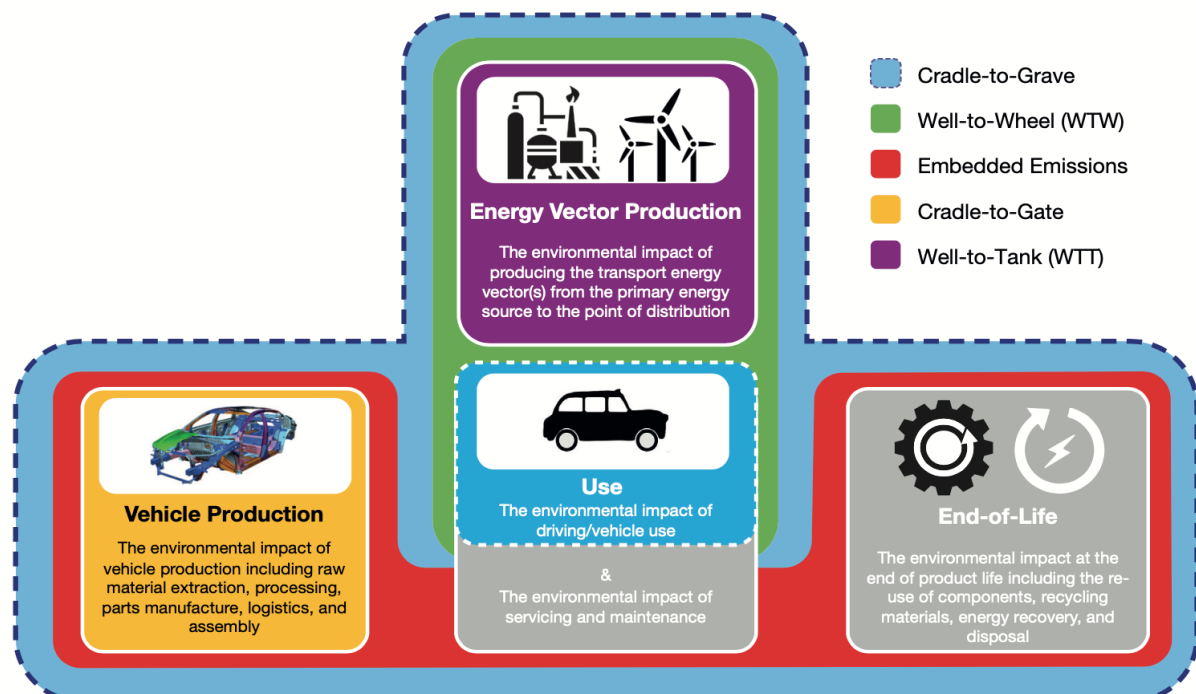


Figure 1: Schematic of cradle to grave lifecycle analysis and constituent analyses

¹ Non-exhaust Particulate Emissions from Road Transport: An Ignored Environmental Policy Challenge, OECD, 2020

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

UKPIA does not have a specific view on what threshold new cars and vans should be required to meet from 2030. However, as per the answer to Q1, any chosen metric should be carefully considered on a lifecycle GHG basis and provide a suitable framework to encourage the reduction of lifecycle GHG emissions – not just tailpipe emissions.

3. What other requirements could be introduced, if any, to maximise zero emission capability?

A cradle to gate lifecycle emission regulation would drive zero emission road transport development across all powertrain technologies and maximise CO₂ savings across all vehicles.

As mentioned in the response to Q1 and Q2, specific metrics that mandate the use of a particular type of technology or are not based on sound technical justification, such as an arbitrary zero emission range requirement, could inadvertently lead to an increased overall lifecycle carbon footprint.

All technologies should be pursued in parallel – under a holistic GHG emissions policy framework – and co-exist to decarbonise the UK swiftly, pragmatically, sustainably, and at the lowest societal cost.

4. What would the impact be on different sectors of industry and society in setting an SZEC requirements, using evidence where possible?

The proposed policy must not risk disadvantaging poorer demographics, which correlate with rural residence and heavy reliance on their sole private car.² Introducing a technology specific mandate without significant cost reductions in battery electric vehicles (BEV) and fuel cell electric vehicles (FCEV) technology, could result in compounding issues for the most financially disadvantaged and create real affordability challenges for those that need their vehicles the most.

Rural areas also face significant barriers, as the current regulatory framework means distribution network operators (DNOs) can only spread the costs of grid strengthening if sufficient demand is demonstrated. As these areas have the lowest population density, greater reliance on their vehicles for commuting, and lower rates of new vehicle purchasing, such demand is unlikely to be easily demonstrated.

² Inequalities in Mobility and Access in the UK Transport System, Government Office for Science, March 2019

Possible Future Frameworks

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

Option 1, if extended to consider cradle-to-gate emissions, provides a technology neutral means of reaching the targets outlined in the consultation and allows manufacturers to meet their fleet CO₂ requirements in the most technically efficient manner and at the lowest societal cost. Even in its current form, without additional lifecycle considerations it maintains a level of consumer choice and access to mobility for all.

Additional incentives could be offered by the government within this framework which could direct consumers to purchase newer, more efficient vehicles. With the average age of cars in the UK the oldest on record at 8.4 years³, it is not too late for the government to consider such schemes and provide a much-needed incentive for consumers to replace older, more inefficient vehicles with newer and more efficient ones. Such incentives have existed previously, most well known as the “scrappage scheme” which accounted for close to 400,000 new car registrations between 2009 and 2010.⁴

In terms of tailpipe CO₂ emissions, the transition from using the New European Driving Cycle (NEDC) to the Worldwide Harmonised Light Vehicle Test Procedure (WLTP) as the official measurement procedure used to determine car CO₂ emissions has complicated the interpretation of recent trends. However, overall for 2020, new petrol cars had a decrease of 4.1% in CO₂ emissions compared to 2019 and diesels a 0.4% decrease.⁵ This demonstrates there is direct correlation between fleet CO₂ targets and average CO₂ emissions of new vehicles and the evident success of a CO₂-based policy.

Point 5.18 identifies disparity between WLTP and “real-world” emissions for ICE vehicles, stating that the real-world emissions are often higher than those measured in the tested environment. UKPIA has not found evidence to suggest that this disparity does not extend to zero emission vehicles (ZEV). In the case of a battery electric vehicle, the difference in real world performance manifests as reduced driving range and leads to more frequent recharging. Although not produced by the internal combustion engine (ICE) during the test cycle, should this additional energy demand not be met via renewables, power generation will need to be provided via higher carbon intensity sources. This would clearly undermine the policy objective and highlights the importance of looking past tailpipe emissions to deliver real-world lifecycle CO₂ savings.

³ <https://www.smmmt.co.uk/2021/05/britains-cars-getting-older-but-van-ownership-reaches-historic-highs/>

⁴ Recession, Scrappage and Sustainable Recovery, The University of Buckingham, April 2010

⁵ Vehicle Licensing Statistics: Annual 2020, DfT, May 2021

There is also no evidence to suggest that batteries and motor designs will not be optimised to meet the test cycle requirements or chosen SZEC definition, in the same way as presented in point 5.19. In fact, as it stands, the main incentive currently driving electric vehicle (EV) drivetrain efficiency is range anxiety from consumers rather than legislated efficiency targets for ZEVs. Therefore, the policy must be constructed carefully and avoid unnecessary zero emission range requirements or similar as this may 'open the door' to cycle optimisation of vehicles to meet unnecessary definitions at the expense of real-world CO₂ emission reductions across the lifecycle of the vehicle.

6. Do you have any comments regarding Option 2, to introduce a ZEV Mandate or sales target alongside a CO₂ regulation?

Road vehicle emissions regulation must be more holistic than tailpipe emissions of road vehicles to achieve Net Zero by 2050. Electrification is a key technology route to decarbonising UK transport and offers low lifecycle GHG emissions when recharged with a low carbon intensity electricity grid (such as the UK's is forecast to be). However, there are additional routes to low lifecycle GHG emissions for road vehicles which should form part of a mosaic of low carbon solutions rather than excluded.

Any new transport policy should focus on reducing the net GHG emissions of transport, including, well to wheel, cradle to gate, and well to tank and provide a pragmatic framework under which the lowest net GHG transport practically available at the time can be chosen by the consumer.

For example, in some cases, the lifecycle emission profiles of ZEVs could be equivalent to vehicles powered by low carbon liquid fuels, such as "drop in" fuels like hydrotreated vegetable oil (HVO), for which the technology is ready to be deployed today.⁶ These could deliver immediate carbon savings through existing infrastructure and with minimal change in consumer behaviour - allowing time for the sustainable deployment of the required infrastructure to facilitate the decarbonisation of transport technologies across the UK.

Furthermore, a ZEV mandate does not incentivise decarbonisation of the grid and could unintentionally drive the continued use of fossil fuel, or other carbon emitting technologies to generate the increased energy demand required to charge these vehicles. This risk cannot be considered theoretical – only recently the National Grid required the reactivation of a coal-fired power station to meet demand as natural gas increased in cost and renewable generation load was insufficient to meet demand.⁷

Therefore, a ZEV mandate is not conclusively a technically robust or necessary

⁶UKPIA Response - DfT/OLEV Consultation on ending the sale of new petrol, diesel and hybrid cars and vans, UKPIA, July 2020

⁷ <https://www.bbc.co.uk/news/business-58469238>

regulatory mechanism for lowering lifecycle GHG emissions. UKPIA believes a cradle-to-lifecycle GHG emissions based policy is essential to meet a true Net Zero economy by 2050.

7. Do you have any views on the Government's initial preference for the regulatory approach set out in Option 2?

Looking past the excessive and potentially impractical complexity of the scheme, it is unclear what advantage this option has over option 1. A revision of the fleet CO₂ emission targets to accelerate the trajectory towards 0g CO₂/km would naturally increase the market share of low emission and zero emission vehicles to reduce overall fleet averages, without unnecessarily penalising individual technologies or vehicle configurations as already outlined in the answer to question 5.

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

To successfully deliver on its carbon budget, UKPIA's *Future of Mobility in the UK*⁸ report outlines that the government must take a technology neutral standpoint and focus on creating a systems-based approach to all energy vectors and uses, supported by a regulatory framework that ensures net GHG carbon savings are maximised. The DfT's Science Advisory Council (SAC) also highlighted in their 2020 position – regarding transport research and innovation requirements to support the decarbonisation of transport – that the challenge of decarbonisation must be viewed through the lens of energy vectors and the net GHG emissions impact of these energy vectors.⁹

If the UK is to successfully decarbonise the transport sector, low-carbon technologies should be deployed as quickly as possible, and wherever possible. Existing liquid fuel infrastructure can be used to rapidly decarbonise existing transport in parallel with SZEV and ZEV adoption (low carbon fuels offer opportunity to further decarbonise PHEVs). This provides cost effective and consumer friendly vehicle fleets with consumer demand and lifecycle GHG emissions driving uptake of the most appropriate powertrain technologies.

Vehicles operating low well-to-tank (WTT) GHG emission fuels such as waste-derived biodiesel or paraffinic fuel offer comparable or improved lifecycle GHG emission savings compared to BEVs¹⁰, which are not explored or utilised under the proposed framework.

The government must comprehensively outline how the approach, in the way

⁸ The Future of Mobility, UKPIA, March 2021

⁹ DfT Position statement on transport research and innovation requirements to support the decarbonisation of transport, June 2020

¹⁰ Vehicle lifecycle CO₂e emissions – integration into vehicle policy and automotive design, LowCVP, September 2019

as current proposed, would deliver their carbon budget commitments when considering cradle-to-gate/embedded emissions. Any future policy must look further than the tailpipe emissions vehicles and instead create a platform that captures the lifecycle emissions of the vehicle, with the overarching objective to achieve the biggest overall net reduction in GHG emissions.

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

Implementation of option 1 requires minimal changes to the current system and although not based on a lifecycle, cradle-to-gate GHG emission framework, does take a technology neutral approach.

Option 2, as discussed, seems overly complex and provides an uncertain real-world benefit for the reasons outlined above.

A combination of these two options seems unnecessary and may create further complexity – potentially leading to unforeseen loopholes and bigger lifecycle GHG emissions if consumers are forced to buy vehicles that are not suited to their individual requirements.

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

Vehicle Exercise Duty (VED)

The first phase of the new framework should be to curtail the unnecessary proliferation of oversized vehicles, which have resulted in an increase in GHG emissions in recent years. In 2019, vehicles producing 151+ g/km CO₂ increased to over 165% of the 2016 level, despite 350,000 fewer vehicles being sold.¹¹ UKPIA considers revision of the vehicle exercise duty (VED) scheme in 2017 as one possible explanation for this. The revised scheme effectively removed the incentive for consumers to purchase more efficient vehicles by applying a flat rate of VED to all vehicles that emit over 0g/km CO₂ after the first year.

Although the first year VED rate is calculated using a sliding scale based on the vehicles CO₂ emissions, there is no deterrent past this first registration charge for the less efficient vehicle. Put simply – if list price is ignored, vehicles emitting 1g/km of CO₂ are charged the same £155 annual rate as vehicles producing over 255 g/km CO₂. Such an approach gives little reason for the consumer to consider vehicle efficiency as part of longer-term ownership costs.

This trend can be reversed by disincentivising less efficient vehicles, rather than mandating the sale of ZEVs. Vehicle costs could be scaled based on efficiency

¹¹ Cars registered for the first time by CO₂ emission and current VED band, DfT, 2021.

variables such as weight, drag coefficient, tailpipe and lifecycle emissions rather than purchase price.

Other Considerations

There are several other barriers with compelling evidence and technical justification to a 'hard-transition', such as a ZEV sales mandate as proposed in the consultation, that must be addressed. These barriers come in the form of; renewable power generation, car and van ownership models and duty cycles, EV infrastructure, manufacturing (both UK based on overall volume) to name only but a few.¹² More details for each of these areas can be found in the [UKPIA response](#) to the DfT/OLEV Consultation on ending the sale of new petrol, diesel and hybrid cars and vans.

At a high level, if ZEV sales targets become mandated the vehicle market will no longer be driven by consumer demand. Consumers could instead be forced to buy from a limited pool of vehicles, which are likely to be higher margin and carry a costly premium. With cost of EVs as one of the current barriers for their uptake, and although battery costs were projected to decrease, there remains significant uncertainty in to what extent savings through economies of scale will be offset by the increase in costs of essential input raw materials.¹³

On a broader scale, whilst electric vehicle sales are increasing, their penetration of the UK vehicle parc has only reached 0.6% as of 2020¹⁴ with a sales share of 6.6% in 2020. It is obvious that there will be accelerated growth in the EV sector over the coming decade, but electric vehicles will likely remain a minor segment of the total UK vehicle parc through the 2020s. The scale and pace of the fleet renewal challenge, combined with multi-year product lifecycles, presents a significant challenge that blurs the link between mandating the sales of a specific powertrain technology and overall realised light duty transport GHG emissions savings.

Therefore, prompt, ends-focused, and stable policy is needed to simultaneously encourage swift and targeted fleet renewal and low carbon fuel deployment. Encouraging the replacement of light duty vehicles with the highest fuel consumption and lowest Euro emissions standards, with vehicles offering the best balance of consumer affordability and low GHG emissions should be the consistent approach.

¹² UKPIA Response - DfT/OLEV Consultation on ending the sale of new petrol, diesel and hybrid cars and vans, UKPIA, July 2020

¹³ <https://www.statista.com/statistics/606350/battery-grade-lithium-carbonate-price>

¹⁴ Licensed cars by propulsion or fuel type: Great Britain and United Kingdom (DfT), 2021

Additional Issues for Consideration

Stringency of CO₂ Target

11. If deploying a combined ZEV Mandate and CO₂ regulatory framework, how should the CO₂ element be set?

A combined ZEV mandate and CO₂ regulatory framework should not be deployed, for the reasons shared in the answers to Q1-Q10.

12. Should the focus be on delivering the largest possible CO₂ savings, or the quickest possible switch to zero emission mobility?

Given the government's target to reach net zero GHG emissions by 2050, the answer to this question is intuitive - the focus must be on delivering the largest possible net GHG savings across the entirety of the vehicle's life. A switch to zero tailpipe emission mobility as quickly as possible under a mandate which prohibits specific technologies does not guarantee delivery of sustainable net zero emission road transport.

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

UK Manufacturing

Automotive manufacturing in the UK turned over £60.2 billion, added £11.9 billion in value to the UK economy, and provided over 8000 jobs in UK light vehicle engine production alone during 2020.¹⁵ Mandating the use of a single technology will stifle investment in other credible technologies that offer comparable levels of overall lifecycle GHG emission savings and significantly impact the UK's vehicle manufacturing sector. Furthermore, under a technology specific framework investment will not be automatically redirected, given vehicle product cycles are multi-year, with many products targeted for sale in the early 2030s already under development.

The lifecycle GHG benefits of BEVs compared to ICE operating vehicles operating on fossil-derived fuels highlight that the maximum GHG emission saving is realised when the BEV is manufactured domestically.¹⁶ This is principally derived from reduced cradle-to-gate emissions of the vehicle resulting from supply chain efficiencies and an increasingly decarbonising grid in the UK.

¹⁵ Motor Industry Facts, SMMT, September 2021

¹⁶ Vehicle lifecycle CO_{2e} emissions – integration into vehicle policy and automotive design, LowCVP, September 2019

Satisfying increasing EV demand with a domestic EV manufacturing presence offers significant economic and GHG emissions saving opportunities for the UK. However, such a presence does not yet exist, and requires a suitable policy and investment framework to realise. Mandating the sale of ZEVs is unlikely to achieve this, as a technology-specific restriction at the point of retail does not directly translate to investor certainty with respect to domestic manufacturing.

Without a sufficient domestic manufacturing presence, EVs will predominantly need to be imported – increasing reliance on other markets and reducing the GHG emissions benefit as manufacturing may be conducted in higher carbon intensity markets and the logistics emissions increase associated with transporting these vehicles to the UK.

Vehicle Supply

In 2019, many leading scientists in the UK sent a letter to the Committee on Climate Change highlighting that complete electrification of the UK's cars and vans – even with the most resource-frugal NMC 811 batteries – would require double the current global production of cobalt, and three quarters of the world's lithium production.¹⁷ Whilst domestic/EU supply chains are growing to meet battery demand, lithium demand is forecast to outstrip all projects that are operational, planned, unfinanced and recycling initiatives.¹⁸

Although efforts are underway to develop batteries less reliant on cobalt, and European supply chains are seeking to improve their resilience to elemental exposure, what is clear is that in even the most optimistic scenarios, European countries will be exposed to lithium and neodymium supply chain volatility.¹⁹ Even optimistic estimates of extracted raw material supply (rather than theoretical reserves in the Earth), concede that temporary supply chain disruption cannot be ruled out²⁰, with possible resulting consequences on EV supply resilience and cost.

The key message is that whilst progress is being made in safeguarding the supply chain of these elements, a ZEV sales mandate leaves the UK's vehicle parc significantly exposed to price volatility of these elements and places even further strain on the EV supply chain.

Delivery of the Carbon Commitments

It has been demonstrated above that the introduction of a ZEV mandate does not guarantee UK investment, ZEV supply, or an overall reduction in GHG emissions. UKPIA believes that delivery of the carbon commitments must be

¹⁷ <https://www.nhm.ac.uk/press-office/press-releases/leading-scientists-set-out-resource-challenge-of-meeting-net-zero.html>

¹⁸ Sustainable Supply Chains, Benchmark Mineral Intelligence, July 2020

¹⁹ Assessment of potential bottlenecks along the materials supply chain for the future deployment of low-carbon energy and transport technologies in the EU, EC JRC Science for Policy Report, 2016

²⁰ Ensuring a Sustainable Supply of Raw Materials for Electric Vehicles, Agora Verkehrswende, March 2018

done by moving the focus away from just tailpipe emissions and towards a more holistic recognition of the climate contribution through a lifecycle CO₂-focused vehicle policy, most likely achieved by incorporating well-practised cradle-to-gate, well-to-tank, tailpipe, and end-of-life emissions models.

Derogations and Exemptions

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

Yes, exemptions must be permitted for the emergency services to ensure they have the most resilient and readily accessible transport energy supply that fits their unique demands. This does not necessarily mean such supply will be fossil-derived, but the emergency services will need maximum flexibility in their approach.

Credit Levels

15. Should credits be awarded to vehicles that meet the SZEC definition?

	Yes
✓	No – There should not be a SZEC definition
	Don't know

Please explain your answer.

UKPIA does not support credits being awarded on tailpipe emissions – instead credits should be based on lifecycle CO₂ emissions.

16. If so, should this be a fixed number of credits, or should there be a sliding scale that recognises the difference in CO₂ efficiency of various SZEC-compliant vehicles?

UKPIA has no response on this question – see response to Q15.

Credit Banking and Trading

17. Should this be considered within the new framework?

	Yes
	No
✓	Don't know

Please explain your answer.

UKPIA has no response to this question.

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

UKPIA has no response to this question.

19. Within the trading element of the new scheme, should there be limits on the number of certificates/grams of CO₂ that can be bought or sold?

	Yes
	No
✓	Don't know

Please explain your answer.

UKPIA has no response to this question.

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

An intelligently deployed cradle-to-grave lifecycle CO₂ emission framework could cover all of road transport.

Credit Banking and Trading

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

UKPIA has no response on this question.

Target setting process

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

UKPIA has no response on this question.

Real-World Emissions

22. Would there be benefits in seeking to ensure any CO₂ targets in the new UK regulatory framework take into account real-world emissions data alongside the lab-tested WLTP CO₂ emissions figures? If so, how might the two be linked?

	Yes
✓	No
	Don't know

Please explain your answer.

The recently introduced WLTP test is much more representative than the NEDC and lab tests allow for a standardised, repeatable testing model which enables a comparison of one cars emissions with the next.²¹ On a vehicle chassis dyno, the vehicle can be driven by a robot or trained professional and factors like ambient temperature and humidity can be precisely controlled to reduce test to test variation. In the *real-world* driving is dependent on several variables, with some studies showing that an *aggressive* driving style can double fuel consumption compared to a *relaxed* driving style on the same urban route.²²

²¹ Motor Industry Facts, SMMT, September 2021

²² https://afdc.energy.gov/files/u/publication/fuel_consumption_sensitivity_style.pdf

Given how significantly fuel consumption, and subsequently CO₂ emissions are exposed to just this one of many variables, it is not clear what benefit a system that attempts to link real world and tested CO₂ emissions offers.

From 2017 the EU's emission type-approval procedure for passenger cars included the Real Driving Emissions (RDE) test conducted using on-board portable emission measurement systems. The introduction of the RDE test is a good step to improving local air quality and monitoring the production of harmful toxins, such as nitrogen oxide (NO_x), while a car is driven on public roads. The RDE test supplements the WLTP test and is, in principle, less vulnerable to defeat devices and "narrow" emission aftertreatment calibrations, because it is a realistic on-road test with several uncontrolled random elements (e.g., traffic or weather conditions).

Extending the Framework to all Road Vehicles

Heavy Duty Vehicles

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

	Yes
	No
✓	Don't know

Please explain your answer.

UKPIA has no response on this question.

- 24. Would there be any unintended consequences of establishing a ZEV Mandate for certain vehicle sub-categories before a CO₂-based regulation?**

UKPIA has no response on this question.

26. Do you have any views on imposing a CO₂ regulation on vehicle types that are not yet covered by a CO₂ test procedure, or existing regulation, particularly in light of the planned future phase out consultation for new non-zero emission buses?

	Yes
	No
✓	Don't know

Please explain your answer.

UKPIA has no response on this question.

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

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

	Yes
✓	No
	Don't know

Please explain your answer.

Technology neutrality is needed independent of vehicle type. It may be that L-cat vehicles are technically better suited to battery electrification due to their duty cycle and range requirements²³, but the uptake of these should vehicles be driven through consumer demand.

²³ The Future of Mobility, UKPIA, March 2021

Additional Issues for Consideration

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

UKPIA has no response on this question.

Final comments

Any other comments?

UKPIA highlights that any future targets and regulatory regimes should be set on a sustainable development pathway, centred around maximising overall GHG reductions through a lifecycle emission framework.

A viable roadmap for road transport decarbonisation starts with vehicle rightsizing. Vehicles with excessive mass, high drag coefficients and inefficient engines should be disincentivised and ICE containing vehicles with a broad range of fuel compatibility encouraged. This would facilitate increased deployment of low carbon fuels - renewable oxygenates in petrol and biodiesel in diesel and deliver significant CO₂ savings in multitude of vehicle configurations. Commercialisation of “low hanging fruit” (e.g. HVO) should be supported so further blending can be achieved and CO₂ savings realised from these products.

Following this, a market-led roll-out of electrification infrastructure and decarbonised power generation would ensure energy vectors are bought to net zero and consumer concerns can be alleviated, whilst also improving in-use GHG emissions of all partially and fully electrified vehicles. Consumers can be incentivised to replace the least efficient and most polluting ICE vehicles with modern vehicles, whilst OEMs and government provide the clear assurances that used battery life need not be a concern to help increase the momentum of a used EV market.

Lifecycle CO₂-focused vehicle policy is then implemented, most likely achieved by incorporating well-practised cradle-to-gate, well-to-tank, tailpipe, and end-of-life emissions models. This, combined with increased use of mobility as a service, results in new light duty vehicles that are likely to be majority electrified with ICE vehicles operating on very low carbon or climate neutral fuels. Electric vehicles are powered by a mix of battery and hydrogen fuel cell systems leading to the co-existence of multiple powertrain technologies.

As we have argued, UKPIA strongly believes a robust, viable roadmap, supported by holistic policy measures across government departments will be needed to decarbonise UK transport.

Glossary

SZEC	Significant Zero Emission Capability
GHG	Green House Gas
BEV	Battery Electric Vehicle
FCEV	Fuel Cell Electric Vehicle
DNO	Distribution Network Operators
NEDC	New European Driving Cycle
WLTP	Worldwide Harmonised Light Vehicle Test Procedure
ZEV	Zero Emission Vehicle
ICE	Internal Combustion Engine
EV	Electric Vehicle
HVO	Hydrotreated Vegetable Oil
VED	Vehicle Exercise Duty
RDE	Real Driving Emissions
PEMS	Portable Emission Measurement System
OEM	Original Equipment Manufacturer