Written evidence from the Institution of Mechanical Engineers to the UK House of Lords Environment and Climate Change Committee inquiry on Electric Vehicles.

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About the Institution of Mechanical Engineers

The Institution of Mechanical Engineers (IMechE) represents 112,000 engineering professionals and students in the UK and across the world. The Engineering Policy unity (EPU) of the IMechE informs and responds to UK policy developments by drawing on the expertise of our members and partners.

This response has been prepared by the EPU with input from the IMechE's Automobile Division. It has been informed by the Institutions upcoming report on the UK Automotive Sector and the transition to net zero.

1. The Government has established ambitious targets for the transition away from diesel- and petrol-powered vehicles. These targets are widely support by the industry, and the IMechE endorses them in principle. However, without more substantial investment and government intervention to facilitate this transition, there is a risk that these targets may remain unattainable. While the £1 billion Automotive Transformation Fund is welcomed, is proving to be insufficient and eligibility for access to support is not wide enough.
2. The planned zero emissions vehicle (ZEV) mandate, a scheme whereby auto-makers fleet sold in the UK would have to be comprised of an increasing percentage of ZEVs each year from 2024, cannot drive this transition unless coupled with suite of other policies to make battery electric vehicles (BEVs) more attractive to consumers.
3. Recent statistics indicating a surge in battery electric vehicles (BEVs) obscure the fact that the vast majority of these are company cars. This is a result of a combination of tax benefits and other perks, making BEVs a much more attractive proposition than for private buyers, and proving that, providing the correct incentives and support is in place, the market could grow.
4. The deployment of electric charging infrastructure lags behind the requisite levels and there is an absence of an overarching strategy for achieving the established targets. Many motorists remain sceptical due to the economic barriers associated with transitioning to BEVs, particularly for the 44% of households without access to the low-cost option of charging their vehicle at home.[1]
5. Without the right incentives and higher public confidence in an electric future, the Government will be mandating the sale of vehicles before the market is ready. The Government is legislatively altering demand without taking comparable interventions to secure/boost domestic supply.

The Zero Emission Mandate

6. Many governments across the world have set dates beyond which the sale of vehicles powered by fossil fuels (primarily petrol and diesel) will be prohibited by law. The UK has chosen 2030 for light fleet, which puts it five years ahead of the European Union and the USA.[2] The Government have said that vehicles that can travel 'a significant distance when no carbon is coming out of the tailpipe' can still be sold up to 2035 but has not yet further elaborated on

what exactly this means. Government urgently needs to define what vehicles will be permitted to be sold in 2030 to 2035 so the industry can prepare.

7. Parallel to this, the UK Government are planning to introduce a zero emissions vehicle (ZEV) mandate on manufacturers. This policy would mean auto-makers fleet sold in the UK would have to be comprised of an increasing percentage of ZEVs each year. The UK Government's plan is to introduce such a mandate for light vehicles (cars and vans) from 2024. While the EU also has legislation that all cars and vans should be zero emission by 2035[3], there is currently no enforced ramp rate for manufacturers between now and then.
8. Manufacturers in the UK that miss the average target would have to buy allowances from others or have to pay a fine of £15,000 per vehicle.
9. The planned ZEV cannot drive this transition unless coupled with suite of other policies to make battery electric vehicles (BEVs) more attractive to consumers. Implementing the scheme in 2024 may also be too soon for the industry to gear up.
10. By 2030, approx. 33% (12m) of cars on the road need to be BEVs to be on target for 2050. Currently at 1.7% (0.6m) to achieve the 2030 milestone 75% of new sales for next 7 years would need to be BEVs.
11. Statistics showing BEV sales sharply increasing are masking the fact that the vast majority of these are company cars. This is because tax benefits and other perks often make them a much more attractive proposition than for private buyers.
12. At present, even if the industry were ready to deliver on the 2030 ZEV mandate, there are many signs suggesting that vehicles produced by the manufacturers may not find buyers, including:
    - **Sluggish private BEV sales.** There are still signs of low public enthusiasm for fully electric vehicles.[4] Headline figures for high and rising BEV sales are masking the fact that ~80% are company cars. These benefit from much more generous incentives than private sales.[5]
    - **Cost of material.** The cost of new electric vehicles has been driven up by competition for critical minerals.[6] Combined with the withdrawal of the Plug-In Car Grant, this means consumers could face a significant premium for purchasing electric vehicles for some time.
    - **Public charging infrastructure.** The UK is behind the targets set by Government for charge-point roll-out.[7] Households that do not have, or cannot install, their own off-road charge-point also face a significant premium in having to pay to use public infrastructure. Currently 44% of households will not have access to the low-cost option of charging their vehicles at home, disproportionately impacting those from low to middle income households and placing a burned on those who can least afford it.[8] Zapmap data shows that there was an increase of 46% in the cost of public charging from July 2022 to July 2023.[9]
    - **Skills shortage.** A recent Recharge UK report highlighted the need for more trained charge-point installers and for retraining across the sector, in particular for technicians in the aftersales market to be retrained in servicing BEVs.[10]
    - **Vehicle Excise Duty.** Electric vehicles are currently exempt from Vehicle Excise Duty. This exemption is due to end in 2025.[11]

13. Despite these challenges, the ban on the sale of diesel and petrol cars and vans from 2030 is widely supported in the automotive sector and manufacturers are already making significant investments to gear up for it. However, the Government's current approach of giving

companies targets for sales through the ZEV mandate, without adequate policies to make BEVs an attractive proposition for consumers, needs to change.

14. A holistic approach to incentivisation of BEV private purchase is required that takes into account the fact that some people may have to rely on public charging.
15. There is an urgent need to boost electric charge-point deployment, with mandated targets from Central Government, with local authorities given increased funding ring-fenced for this purpose.
16. Alongside this, it is imperative that a nationwide skills and retraining plan for the auto industry. A whole sector approach is required, with increased focus, in particular, on official recognised training schemes for charge-point installers and for retraining in the aftersales market for to enable transition to servicing battery electric vehicles.

Critical Minerals, End of Life and Recyclability

17. It has been a challenging environment for the global automotive sector, in part because of supply chain issues in critical minerals and semiconductors. The supply chain for critical materials is international, but the UK needs to ensure security of supply. The importance of this is reflected in the recently published Critical Minerals Strategy. The global annual production of semiconductors in unlikely to recover to pre-pandemic levels in the foreseeable future with Europe showing a slow recovery of production volume.
18. UK capacity and capabilities already exist in lithium mining and processing, as well as graphite anode production. There is also significant potential for deep sea mining of critical minerals. This issue has attracted attention due to uncertainty of the environmental consequences and a moratorium has been proposed by some. It is right to be cautious in the beginning, but the UK has expertise in environmental mitigation and could lead in defining the regulation in this area to ensure these critical minerals (in the form of 'polymetallic nodules') are extracted responsibly and with minimal impact on environment and ecology.
19. In addition to sourcing newly mined materials, there needs to be a greater focus on recycling materials from vehicles at the end of their lives. The UK could innovate in developing new efficient ways of dismantling and reusing and recycling valuable materials from road vehicles. The engineering community, in academia and industry, should also work on designing vehicles to be more readily recyclable. In the longer term, a Net Zero transition plan for road transport needs to be about creating and expanding new markets.
20. It is important that the UK Government builds on the Critical Minerals Strategy and develop an auto-specific strategy to ensure the UK can source, mine, and process the materials required for a domestic electric vehicle supply chain. This can be done by exploiting domestic resources of lithium (and other key materials) and their processing to battery grade where economically viable.
21. It is vital that the UK considers recyclability and circular economy in the auto industry. As a nation, the UK should be developing and exploiting technologies that make recycling economically viable whilst creating a regulatory environment to make the UK a leader in this field. This will not only reduce the automotive sectors environmental footprint, but has wider implications to other sectors, such as aerospace and rail, and ensure the country is less reliant on an increasingly challenging international market for critical materials.
22. Currently, government oversight of end-of-life recycling sits in Defra, however joint-up responsibility across departments should be pursued, to exploit opportunities and promote innovation.

UK Automotive

23. To take full advantage of the low carbon transition in road transport, the UK needs substantially greater battery manufacturing capacity and upstream materials supply, including multiple new gigafactories and manufacturing plants for key high value inputs such as anode, cathode and electrolyte materials.
24. Without UK battery manufacturing capacity, there is a significant risk that major investments in UK vehicle plants will fail to be attracted resulting in significant direct and indirect employment losses and the closure of several UK assembly plants and which are typically located in regions of relatively low GDP per capita, increasing the societal and economic impacts. The UK automotive sector has historically manufactured 1.0-1.6 million vehicles every year, would ultimately not be 'future-proofed' resulting in multiple plant closures and job losses across the regions.[12]
25. We need to see the right conditions for volume battery production in the UK, including matched funding, supply chain development, securing and processing of critical minerals. Incentivise local clusters around each factory to develop supply chains for other parts of electric vehicles, not just batteries. This should be supported by an increase in funding for partnerships between government, academia, and industry to incentivise the scale-up and commercialisation of new battery technologies in the UK.

An international and global sector

26. Every country in the G20 has some form of government support action for their domestic automotive industry, either to protect it, enhance it, or both. These include import, minimum domestic content requirements, direct subsidies for both R&D and plants.
27. With the notable exception of Tesla, every automotive operation in China has to be a 50-50 joint venture with a Chinese company. Countries such as Thailand and Vietnam are growing domestic car production through subsidies. Mexico benefits from being included in the NAFTA bloc along with US & Canada.
28. The EU is putting in place domestic content and especially battery sourcing requirements. In the face of this competition, UK risks making itself uniquely uncompetitive. This has created a risk of significant migration of capacity and investment to elsewhere in Europe.
29. Other countries have implemented protectionist policies and subsidies. Most notably, in the USA, the Inflation Reduction Act (IRA) extended tax credits of $7,500 for the purchase of BEVs with a requirement that the vehicle must undergo final assembly in the North America, and have at least 40% of battery material sourced from the US or a country the US has a free trade agreement with.[13]
30. Under the 'rules of origin' requirements in the UK-EU Trade and Cooperation Agreement (TCA), at least 40% of the finished EV (and 50-60% of the battery pack) must originate in the EU or UK by 31 December 2023, rising to 45% by 31 December 2026 and 55% from 1 January 2027. Vehicles that do not meet this requirement will face a tariff of 10%.
31. A technical fix is needed in the short term to allow frictionless trade with the EU beyond the Trade and Cooperation Agreement (TCA) Rules of Origin that are due to come into force on 1st January 2024. In the longer term, agree trade rules that align with strategic aims of the auto-industry.

[1] https://www.fleetnews.co.uk/news/latest-fleet-news/electric-fleet-news/2023/01/04/almost-half-of-uk-homes-unsuitable-for-electric-vehicles

[2] https://www.europarl.europa.eu/news/en/press-room/20230210IPR74715/fit-for-55-zero-co2-emissions-for-new-cars-and-vans-in-2035
[3] https://ec.europa.eu/commission/presscorner/detail/en/ip_22_6462
[4] Department for Transport (2023). National Travel Attitudes Study (NTAS): Wave 7. https://www.gov.uk/government/statistics/national-travel-attitudes-study-wave-7/national-travel-attitudes-study-ntas-wave-7
[5] https://www.autoexpress.co.uk/news/105893/uk-new-car-sales-2023-july-sees-one-new-ev-registration-every-60-seconds
[6] https://www.energymonitor.ai/finance/risk-management/data-shows-how-the-cost-of-energy-transition-minerals-has-soared-since-2020/
[7] https://www.thisismoney.co.uk/money/electriccars/article-12099511/Government-miss-electric-vehicle-charging-point-target.html
[8] https://www.fleetnews.co.uk/news/latest-fleet-news/electric-fleet-news/2023/01/04/almost-half-of-uk-homes-unsuitable-for-electric-vehicles
[9] https://www.zap-map.com/ev-stats/charging-price-index
[10] https://greenfleet.net/news/27072023/government-urged-address-electric-vehicle-skills-gap
[11] https://www.gov.uk/government/publications/introduction-of-vehicle-excise-duty-for-zero-emission-cars-vans-and-motorcycles-from-2025
[12] Nissan Motors UK (2023). Evidence submission to House of Commons BEIS Select Committee Inquiry on 'Batteries for electric vehicle manufacturing'.
[13] https://home.treasury.gov/news/press-releases/jy1379