Written evidence submitted by Aldersgate Group

ABOUT ALDERSGATE GROUP

The Aldersgate Group is an alliance of major businesses, academic institutions, professional institutes, and civil society organisations driving action for a sustainable and competitive economy. Our corporate members, who have a collective turnover in excess of £550bn, believe that ambitious and stable low carbon and environmental policies make clear economic sense for the UK.[1] They have operations across the UK economy and include companies such as Associated British Ports, Aviva Investors, BT, CEMEX, the John Lewis Partnership, Johnson Matthey, Michelin, Siemens, SUEZ, Tesco and Willmott Dixon.

We develop independent policy solutions based on research and the expertise and diversity of our members. Through our broad membership, we advocate change that delivers benefits to an ever-growing spectrum of the economy.

1. What contribution could battery electric vehicles make to achieving net zero by 2050?

Surface transport has only seen marginal falls in the level of emissions year on year[2] and is currently the largest emitting sector in the UK, accounting for 23% of total UK emissions. According to calculations by KPMG,[3] road transport is responsible for 91% of domestic transport emissions, with cars contributing 55% of the total and vans and HGVs contributing 16% each.

Curbing these emissions will require, in the short and medium term, setting out the right regulations and incentives to accelerate the transition to clean vehicles and fleets and make these the obvious choice for consumers, while at the same time investing in infrastructure to support this shift. According to the International Energy Agency's Pathway to Net Zero, EVs should represent 86% of the car stock by 2050 if we are to achieve net zero, with battery-powered buses representing 79% of the stock by the same date and heavy trucks 59%.[4] This makes it clear that battery electric vehicles play an important role in reaching the UK's climate target.

In the longer-term, decarbonisation of surface transport will require improving the overall efficiency of the transport system, minimising emissions, congestion and demand for transport, as set out in the Transport Decarbonisation Plan (TDP) policy paper. To achieve this, government policy will need to set out a vision for an integrated transport system, with better support for public transport at a local and national level, and a more efficient freight transport system based on reduced mileage.[5]

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[1] Individual recommendations cannot be attributed to any single member and the Aldersgate Group takes full responsibility for the views expressed.
[2] Committee on Climate Change (July 2019) *Reducing UK emissions: 2019 progress report to Parliament*
[3] These figures were calculated by KPMG as part of the work with the Green Finance Institute Coalition for the Decarbonisation of Road Transport
[4] IEA (May 2021) *Net zero by 2050: a roadmap for the global energy sector*
[5] Aldersgate Group (March 2018) *Shifting emissions into reverse gear: priorities for decarbonising transport*

Aldersgate Group welcomes the announcement in the Ten Point Plan bringing forward the phaseout date for the sale of new petrol and diesel cars to 2030. Establishing a phaseout date for hybrid vehicles and petrol and diesel HGVs will be essential to tackle residual road transport emissions and to ensure OEMs are given sufficient time to adjust manufacturing processes accordingly.

In addition to emissions savings, the switch to electric mobility can create opportunities in terms of job creation as well, with around 7,000 to 19,000 jobs that could be created by transitioning to EVs, depending on the levels of domestic production and imports. [6] Support for developing robust supply chains including battery production, maintenance and reconditioning will be key in further driving job creation.

2. How well is Government policy aligned with high-level commitment for growth of battery electric vehicles to support its net zero ambition?

The 2030 phaseout of petrol and diesel vehicles has sent an important market signal to producers, consumers and businesses in the supply chain. Such regulatory measures are a key driver for consumer behavioural change, innovating new technologies and enhancing UK businesses' competitiveness. Clarity of requirements, timelines and scale give business confidence to invest and develop the right solutions since it is a massive step change to move from petrol and diesel to hybridisation and then to full electrification.[7]

In addition to regulatory measures, government has committed a range of funds to reach its target of 70% of all new car sales comprising of EVs by 2030, including support for charging infrastructure (e.g. through the On-Street Residential Charge Point Scheme and funding for rapid charge points along the Strategic Road Network) and support for battery R&D and supply chain development through the Faraday Battery Challenge Fund and the Advanced Propulsion Centre.

However, some challenges remain for aligning policy to help overcome the main barriers to wider EV adoption: **upfront cost, availability of charge points and range anxiety**.

Firstly, in spite of significant government investment in charging infrastructure, this remains uneven across the country, with urban areas having many more charge points available than some rural and peri-urban areas. Even in London, the number of charge points is unevenly distributed across boroughs: Havering only has 5 charge points for every 100,000 people whilst in Kensington & Chelsea, this figure is 197.9.[8]

Government should learn lessons from the rollout of the mobile phone network, which was driven by demand and predicted use and ended up delivering much better connectivity in affluent areas relative to poorer areas. Poorer areas picked up a large share of the network

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[6] Energy & Climate Intelligence Unit: www.eciu.net/briefings/net-zero/net-zero-why

[7] Aldersgate Group has commissioned a report from Buro Happold, looking at the benefits well-designed environmental regulations have had on industries including automotive, construction and waste. Buro Happold (March 2021) *Fostering prosperity: driving innovation and creating market opportunities through environmental regulations*

[8] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/907742/electric-vehicle-charging-device-statistics-july-2020.pdf

cost without receiving comparable benefits. Instead of devolving charge point installation to local authorities, **delivering charge points should be treated as a national infrastructure project**, led by central government, with increased levels of coordination between local authorities. This approached has worked really well in Norway, which now has one of the highest rated of EV adoption in the world.

Secondly, upfront cost remains a key barrier to wider adoption of EVs, with 52% of households citing this as the main reason for not switching according to SMMT. The availability of the Plug-in Grant, recently reduced to £2,500 for cars, is not sufficient to make a difference for low income consumers. **Support and fiscal interventions to create a robust and reliable second-hand EV market** should be prioritised to overcome this challenge, with guarantees or certificates for second-hand batteries to boost consumer confidence. The **introduction of scrappage schemes** is another potential solution to this, and it could also help boost sales and support the recovery of the automotive sector. Government previously introduced a scrappage scheme in 2010 to boost car sales in the aftermath of the 2008 financial crisis, which led to the sale of 400,000 new cars in 10 months. The 2010 scheme offered £2,000 off for buyers (£1,000 from the government and £1,000 from the manufacturer) scrapping a model aged 10 years or older. With the need to support the automotive industry following the pandemic outbreak, introducing a scrappage scheme for diesel and petrol vehicles will be an important mechanism to drive further uptake and help the UK meet its phaseout target.

Additionally, it is important that the introduction of scrappage schemes works for both new and second-hand markets. Otherwise, there is a risk that consumers would simply go for new cars as a way of qualifying for the scheme.

Thirdly, support for battery R&D and the establishment of gigafactories in the UK has been very welcome, but is not sufficient to compete with the more favourable investment conditions offered in countries like China, Korea or EU countries. Firstly, the battery industry has benefitted from larger levels of state subsidy in these countries. Secondly, the automotive industry and associated supply chains are more developed in countries like the ones mentioned above, where the manufacturing base has been historically much stronger.

Support for domestic battery production will be essential in making the levelling up opportunities afforded by the transition to electric mobility materialise and boosting the competitiveness of the sector in a net zero world. The transport cost of batteries from gigafactories to car assembly plants can create bottlenecks in supply chains and increase costs for OEMs. A steady supply and cost-competitive access to batteries can profoundly impact supply chains, so investment in gigafactories close to the UK automotive manufacturing base remains essential. **According to the Faraday Institution, 130 GWh of annual capacity will be required by 2040 if the UK is to retain a large automotive sector.**

Moreover, under the UK - EU Trade and Cooperation Agreement, **Rules of Origin for EVs** will apply from 2027, which means that UK-manufactured EVs will be eligible for preferential tariff rates. To qualify for these, the quantity of EV parts imported from outside of Europe must decrease from a maximum of 60% to 45%. **With 55% of EV parts having to be built in the UK or the EU, the case for investing in gigafactories at home is even more urgent for government.**

According to SMMT, manufacturing 2m EVs per year by 2040 would need a total annual battery production capacity of 120GWh – approximately 8 gigafactories. We are currently at just 2.5GWh. By contrast, total European battery production capacity is forecast to be 1.2TWh per annum by 2040.

To create favourable conditions for establishing a strong battery manufacturing sector in the UK, clarity on state aid rules, better investment in skills and clearer incentives for remanufacturing and recycling batteries will be essential.

According to the Trade and Cooperation Agreement, the UK can develop its own regime to perform the role of EU's state aid rules, with considerable freedom as to how the system is designed. Although reform of subsidy control has been the subject of a recent consultation and a part of the Queen's Speech, **businesses still lack clarity on how the new system will function, which could preclude them from making substantial investments in a new sector like battery production**. Under the EU system, there are ways of getting pre-approval for subsidies, which can provide certainty to investors, but this did not get rolled over into UK legislation. As such, there is a significant degree of uncertainty around the guidance for approvals and what rules public bodies need to follow when assessing whether certain investments qualify for state aid.

Compounding this issue, companies looking to establish or scale up battery production in the UK are facing long timelines for persuading investors to back up a fairly new sector, with long return times and risks associated with technology development. It is essential that government policy commits additional public funding to help overcome this, including through the UK Infrastructure Bank (UKIB) and creates the conditions for private finance to flow into battery production. Measures to enable this include the publication of a Net zero Strategy with clear pathways for the automotive sector or revenue guarantees for investors in battery technology.

In addition, **a major barrier to establishing a competitive battery manufacturing basis in the UK relates to the high industrial electricity prices businesses are facing** here when compared to other countries in Europe such as Germany, France or the Scandinavian countries.[9] Whilst government has made financial support available for energy intensive industries to offset the high costs of electricity, this funding is not accessible to new business.

This is compounded by the comparative lack of financial support for start-ups in the UK versus established companies. It is essential that through the UK Infrastructure Bank and funds like the Faraday Battery Challenge, start-ups are supported to scale up and achieve commercialisation in the battery sector.

3. **What action is needed to support investment and establishment of UK gigafactories?**

As mentioned under Q2 above, clarity on the future subsidy control regime will be key to increase business appetite for investment in battery production in the UK. Stronger financial support for this sector will be essential, especially in the initial stages, to enable it to compete with other countries. China, the US and certain EU countries have so far been seen as more attractive investment destinations, given the generous state aid support offered to this sector

[9] A UCL report commissioned by Aldersgate Group looks at industrial energy prices and the market barriers for mature forms of renewable energy and shows how government can play a role in keeping electricity prices competitive. UCL (February 2018) *UK industrial electricity prices: competitiveness in a low carbon world*

and the fact that the manufacturing base is better established thank in the UK. China, which currently hosts the largest battery production sector, initially offered a favourable fiscal and policy context for battery production, and is now moving to increasingly subsidising only large scale battery production facilities, enabling them to grow even more rapidly.

In addition, **policy measures that can mitigate the impact of high wholesale electricity prices will be essential.** Securing a route to market for mature renewables like onshore wind through the resumption of Pot 1 CfD auctions is an important step forward. In addition, **improving strategic coordination between investments in network and generation infrastructure to avoid congestion and inefficient network development** at all levels, and including review of transmission funding and charging approaches in the light of continental practice will be key, as will working with players like National Grid and Ofgem to achieve this.

Easy access to the raw materials going into batteries will be essential for domestic gigafactories and have substantial implications for OEMs. But with fears of shortages for materials like nickel, lithium or cobalt, greater cross-industry collaboration on raw material use will be key.

For example, the European Commission has created a list of Critical Raw Materials, which includes materials essential for a low carbon economy, where steady supply might be a problem. Building on the list, the Commission aims to encourage greater production through mining or recycling activities, foster more efficient use of these materials and raise awareness of the risks and opportunities among EU countries, investors and companies. Similar initiatives at the UK level, modelled on the National Industrial Symbiosis Programme (NISP) for example, could be useful in managing the risk associate with raw material supply.

Finally, incentivising UK-based battery production will require a favourable policy context to encourage recycling and remanufacturing as well as investment in the right types of skills needed in the sector. Measures to encourage this are covered under Q5 below.

4. **Government has announced £1 billion of funding to support the electrification of UK vehicles and their supply chains. Is this figure sufficient? How should it be split between supply chains and gigafactories?**

As explained above, whilst the £1bn of funding is a welcome starting point, it is not nearly enough to support the establishment of even one gigafactory. The costs of establishing a gigafactory are more than 3 times higher than the total pledged by government to date – for example, establishing the Tesla factory in Germany will require around €4bn of investment. The UKIB could play a role in bridging this funding gap. The European Investment Bank has done the same, with attractive loans for battery production offered to Polish and Swedish battery production projects in the past year.

In addition to government funding, the availability of low cost patient capital is essential for the establishment of gigafactories and associated supply chains. Businesses looking to invest in battery production often cite the long-time scales for raising capital in the UK compared to the US as a key barrier to establishing this industry. This is also due to a lack of understanding of the battery sector among investors, and the lack of capacity many businesses in this sector face, which precludes them from committing too much time to identifying and engaging with the right investors. Bringing businesses and investors together

to bridge this knowledge gap will be essential, scaling up the work of Innovate UK under the Knowledge Transfer Network.

Continued support for alternative battery technologies through the Faraday Battery Challenge will be important, especially given existing partnerships between universities, research centres and industry, which could accelerate commercialisation.

To complement this investment, the newly established UKIB should play a key role in providing the patient capital required to finance these technologies. The UKIB could provide guarantees to investors, as well as co-finance some of these projects and retain equity in companies investing in high-risk, higher-reward technologies, which could also help grow the Bank's capitalisation as these investments mature.

5. **What steps should be taken to ensure the UK workforce has the necessary skills to staff gigafactories and their supporting supply chains?**

The small supply of skilled employees in battery production is seen as a key barrier that needs to be addressed in order to enable the UK to establish a robust manufacturing base. The pool of skills available to companies is quite shallow, and the need to recruit from a global pool exacerbates the competition between companies and leads to an increased risk of shortages. The UK's withdrawal from the EU and the end of free movement can make it more difficult for the UK to access these skills, hence the need to establish a homegrown base of skills. In addition, battery production requires skills that cross over traditional industry sectors such as automotive, chemicals or remanufacturing, making it difficult to find people ticking all the right boxes.

To overcome this challenge, government should **develop a national low carbon skills strategy that embeds sustainability and net zero delivery across the whole education system, including apprenticeship programmes, higher education and lifelong learning**. This should be complemented by steps to make the adoption of skills action plans mandatory for all educational providers, including Further Education (FE) and Higher Education (HE). Improving the pipeline of skilled workers will also require improving diversity, especially in STEM subjects, which should form an integral part of the skills action plans.

In addition, reforming apprenticeships standards across the board will be essential, as well as creating apprenticeships specifically for battery engineering.

Recent government commitments to make the provision of skills more employer-driven is welcome, not just to help businesses plug the skills gaps they are grappling with, but also to establish a clearer route into employment for those in education or training. However, it is essential that employers are encouraged to think long-term and avoid investing in skills that may not be compatible with achieving a net zero emissions economy. Measures **like tax credits for companies for companies that are training staff in skills considered to be of high value for zero emission goods** and services including passenger vehicles could incentivise further investment in this area. Likewise, the UK Infrastructure Bank (UKIB) could support investment in skills and work in partnership with businesses, research centres like the UKBIC and local authorities to support investment in skills that is closely aligned with industry needs.

6. **What action can Government take to support growth of secondary markets to extend lifetime use of EV batteries?**

   What steps should be taken to ensure that EV batteries are recycled at the end of their lives and not simply sent to landfill?

While EVs significantly reduce use-phase emissions, the energy and emission intensive production processes of batteries will place new demands on the industry's efforts to decarbonise. **Electromobility will be responsible for roughly 90% of battery demand in 2030 and roughly 50% of automotive manufacturing emissions will be attributable to batteries.**[10,11] Addressing battery production related emissions will be particularly important before demand surges EVs reach sale cost parity with ICE vehicles by 2025.

There is a limited supply of raw materials for lithium-ion batteries and costs are on an upward trend over recent years, whilst global cobalt production in 2025 will likely need to be double that of 2016 production to satisfy global EV demand[12]. In addition to the ecological impacts of mineral extraction, and the limits to source reserves, social concerns in Africa and South America– e.g. human rights violations connected to cobalt mining – add yet another reason to reduce dependencies through resource efficiency.

Due to the complexity of supply chains and long vehicle production lead times, **integrating circularity into the automotive production process will require significant investment in clean materials supply chains, the stimulation of market demand for these materials, close collaboration between producers and aftermarket services, and a modular design process that ensures materials can be easily disassembled, sorted and reused at end of life**.

Whilst recycling of components and critical materials should continue to be a focus, the potential for reuse and repurposing of batteries prior to this stage offers greater resource efficiency and economic benefits as a greater proportion of the battery's intrinsic value is recouped. For example, the costs of remanufacturing/reuse have been reported to be as low as ~10% the cost of a new battery.[13]

Battery remanufacturing offers significant potential to provide a second life to EV batteries that can no longer meet EV performance standards, for example to perform stationary energy-storage services. **One barrier to the remanufacturing of batteries is the lack of standardisation and traceability and the fragmentation of volume of battery-pack designs on the market**, which will increase by 2025 with an expected 250 new EV models.[14] Additionally, the **cost gap between remanufacturing and new manufacturing must remain sufficiently large to warrant performance limitations of second-life batteries**.

While these challenges are not insignificant, they can be alleviated through targeted action along the supply chain from manufacturers to end users, enabling a sustainable second-life-battery industry to emerge. Nissan has a formal partnership with Sumitomo Corporation to reuse lithium-ion battery packs from the Nissan Leaf for stationary distributed and utility-scale

[10] World Economic Forum (2020) *The Road Ahead: A policy research agenda for automotive circularity*
[11] Statista (2021) *Global demand for cobalt in batteries from 2017 to 2025*
[12] McKinsey & Company (3 June 2019) *Recharging economies: the EV-battery manufacturing outlook for Europe*
[13] Ricardo Energy & Environment (2019) *Circular Economy Perspectives for the Management of Batteries used in Electric Vehicles*
[14] McKinsey & Company (30 April 2019) *Second-life EV batteries: the newest value pool in energy storage*

storage systems[15], and Renault is engaging in both recycling and reuse programs with industry partners and a structured process in each pathway, rooted in regional context. Renault's Re-Factory aims to extend the life of vehicles, decarbonise production and optimise resource management with 45,000 second hand vehicles to be reconditioned annually from September 2021.[16]

As a fairly new market, a strong regulatory regime on recycling and remanufacturing of EV batteries would significantly help address these challenges and provide certainty to manufacturers, second-life battery companies and customers. Stronger incentives and fiscal measures to stimulate the recycling and remanufacturing market for batteries will be essential. **VAT rebates and fee modulations for batteries with higher recycled content or EPR schemes could see wider interest from the private sector in recouping old batteries and repurposing them.**

Building on the Waste Prevention Programme for England, government should make product standards for batteries mandatory and set more ambitious timelines for the introduction of EPR schemes. Extending the life of EV batteries through technological advancement, providing incentives for modular design for ease of disassembly, setting a "right to repair" on batteries and strengthening the regulation of end-of-life processing requirements would all significantly improve re-use and recycling of batteries. In addition, **waste prevention and remanufacturing should be integrated in policy making beyond Defra and across all departments, including BEIS and HM Treasury**, which will be instrumental in implementing some of the aforementioned measures to encourage battery recycling and reuse.

It is worth noting that earlier this year the European Commission has proposed a suite of new battery regulations as part of its Circular Economy Action Plan to ensure batteries placed on the EU market are sustainable and high-performing and materials obtained in respect of human rights. These including mandatory carbon footprint disclosure for electric vehicle battery producers, performance and durability labelling, an obligation to reveal the recycled raw material content by 2027 and a minimum content requirement of recycled material from 2030.[17] The new Batteries Regulation will replace the Batteries Directive which, since 2006, has prohibited the disposal of batteries in landfill or incineration and required proper waste management of batteries including recycling and collection.[18]

Funding technologies and new business models for the remanufacture and recycling of batteries will also be essential. The Aldersgate Group warmly welcomes investment commitments from government under the Faraday Battery Challenge up to 2022 for research and innovation projects and facilities to make batteries produced in the UK. The projects announced through the Faraday Battery Challenge, aiming to reduce battery cost, weight, and volume, improve performance and reliability, and develop whole-life strategies, including recycling and reuse, mark a promising start.[19]

Alongside funding, stronger industry partnerships to repurpose used batteries will be needed. Government could support knowledge-sharing across economic sectors, based on the model

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[15] Sumitomo Corporation (2018) *Nissan, Sumitomo Corporation and 4R set up plant to recycle electric-car batteries*
[16] Groupe Renault (2020) *Re-factory: The Flins site enters the circle of the circular economy*
[17] European Commission (2021) *Batteries- modernising EU rules*
[18] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32006L0066
[19] BEIS (2021) *Press release: Over £30 million* product standards for the UK automotive sector on durability, reusability, repairability, and recyclability *government investment to boost batteries and hydrogen vehicles*

of the **National Industrial Symbiosis Programme (NISP)** that ran from 2005 to 2009. Knowledge-sharing between businesses operating within and across different sectors can generate cost-effective ways of reducing the amount of waste that ends up in landfill and enable particular businesses to provide their waste to others that have the technology and expertise to reintroduce it into their production cycle. The government could play an important facilitative role by establishing a supportive knowledge sharing forum, following the example of the previous NISP.

More widely, car sharing/fleet models can dramatically reduce emissions and material costs through optimising use phase and reducing the total number of vehicles in demand – subsequently reducing demand for the materials and energy associated with battery manufacturing. Privately owned cars are currently used at highly inefficient rates – the typical car is parked 9% of the time.[20] Government should encourage the scaling up of leasing and subscription models, and on-demand rental / car and ride-sharing models. Companies with cars could also increase capacity of use of their fleets by sharing the fleet across multiple services depending on demand cycles. Combining fleet-based mobility with improved maintenance and re-manufacture / recycling could significantly reduce emissions and resource extraction associated with batteries.

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[20] Brookings (2020) *The end of the car as we know it: What COVID-19 means to mobility in Europe*